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# List of Abbrevations

### General Abbrevations

| | |
|---|---|
| EU | European Union |
| FP7 | Seventh Framework Programme |
| ICT | Information and Communication Technologies |
| NGO | Non-governmental organisation |
| PACITA | Parliaments and Civil Society in Technology Assessment |
| PTA | Parliamentary Technology Assessment |
| R&D | Research and development |
| S&T | Science and technology |
| TA | Technology Assessment |

### Bulgaria

| | |
|---|---|
| ARC Fund | Applied Research and Communications Fund |
| BAS | Bulgarian Academy of Sciences |
| GDP | Gross domestic product |
| GMO | Genetically modified organisms |
| MEET | Ministry of Economy, Energy and Tourism |
| MEW | Ministry of Environment and Waters |
| MEYS | Ministry of Education, Youth and Science |
| MP | Member of Parliament |
| NIF | National Innovation Fund |
| NIS | National Innovation Strategy |
| NSF | National Science Fund |
| NSSR | National Strategy for Scientific Research |
| OP | Operating Programme |

**Czech Republic**

| | |
|---|---|
| ASCR | Academy of Sciences of the CR |
| BIOCEV | Biotechnology and Biomedicine Centre of the ASCR and Charles Univ. |
| CENIA | Czech Information Agency for Environment |
| CR | Czech Republic |
| CRDI | Council for Research, Development and Innovation |
| CZERA | Czech Republic in the European Research Area |
| EIA | Environment Impact Assessment |
| ENV | Environment |
| HTA | Health Technology Assessment |
| ILA | Innovation Leadership Agency |
| IMG | Institute of Molecular Genetics of the ASCR |
| MEYS | Ministry of Education, Youth and Sports of the CR |
| MIT | Ministry of Industry and Trade of the CR |
| RDI | Research, development and innovation |
| RIA | Regulatory Impact Assessment |
| SEA | Strategic Environmental Assessment |
| SF | Science Foundation |
| STRAST | Department of Strategic Studies TC ASCR |
| TA CR | Technology Agency of the CR |
| TC ASCR | Technology Centre of the Academy of Sciences of the CR |

**Hungary**

| | |
|---|---|
| BLI | Balaton Limnological Institute |
| CFRI | Central Food Research Institute |
| CAAG | Clean Air Action Group |
| ÉTT | Food Safety Advisory Board |
| HERC | Higher Education and Research Council |
| HAS | Hungarian Academy of Sciences |
| HAS ERC | Hungarian Academy of Sciences Centre for Energy Research |
| HAI | Hungarian Association for Innovation |
| HIPO | Hungarian Intellectual Property Office |
| KvVM | Hungarian Ministry for the Environment Protection and Water |
| HRC | Hungarian Rectors' Conference |
| OTKA | Hungarian Scientific Research Fund |
| METT | Hungarian Society for Sciences |
| KFKI AEKI | Atomic Energy Research Institute |
| GM | Ministry for National Economy |
| NGM | Ministry for National Economy |
| VM | Ministry for Rural Development |
| EMMI | Ministry of Human Resources |
| MND | Ministry of National Development |
| MPAJ | Ministry of Public Administration and Justice |
| LP | Momentum Programme |
| NDA | National Development Agency |
| NIH | National Innovation Office |
| NORT | National Office for Research and Technology |
| MNIR | National System of Innovation in Hungary |
| NHDP | New Hungary Development Plan |
| North-Balaton Region landfill | |
| PNPP | Paks Nuclear Power Plant |
| KTIA | Research and Technology Innovation Fund |
| | Sustainable Development Committee of the Hungarian Parliament |
| FTSS | The Federation of Technical and Scientific Societies |

**Ireland**

| | |
|---|---|
| ACSTI | Advisory Council for Science, Technology and Innovation |
| CSA | Office of the Chief Scientific Advisor |
| CSO | Civil society organisation |
| DSE | Discover Science and Engineering |
| E&O | Education and outreach |
| EI | Enterprise Ireland |
| EPA | Irish Environmental Protection Agency |
| ESOF | EuroScience Open Forum |
| FDI | Foreign-direct investment |
| GMO | Genetically modified organisms |
| HEA | Higher Education Authority |
| HEI | Higher education institution |
| ICB | Irish Council of Bioethics |
| ICSTI | Irish Council for Science, Technology and Innovation |
| IDA | Industrial Development Authority |
| IDC | Inter-Departmental Committee on Science, Technology and Innovation |
| IP | Intellectual property |
| IRCSET | Irish Council for Science, Engineering and Technology |
| IRCHSS | Irish Research Council for Humanities and Social Sciences |
| ISTJA | Irish Science and Technology Journalists Association |
| IVF | In vitro fertilization |
| MNC | Multinational corporation |
| NDP | National Development Programme |
| PRTLI | Programme for Research in Third Level Institutions |
| RDI | Research, development and innovation |
| RDS | Royal Dublin Society |
| RTD | Research and technology development |
| SFI | Science Foundation Ireland |
| SME | Small-medium enterprise |
| SSTI | Strategy for Science, Technology and Innovation |
| STEP | Science, Technology and Engineering Programme for Schools |
| STI | Science, technology, and innovation |

| | |
|---|---|
| STRIVE | Science, Technology, Research and Innovation for the Environment |
| STV | Single transferable votes |
| TD | Teachta Dala or Deputy in Irish Parliament (Dáil) |
| UCC | University College Cork |
| UK | United Kingdom |
| US | United States of America |

**Lithuania**

| | |
|---|---|
| CPMA | Central Project Management Agency |
| IAE | Ignalina´s atomic power plant |
| ICT | Information and Communication Technologies |
| KEF | Knowledge Economy Forum |
| LBSA | Lithuanian Business Support Agency |
| LIC | Lithuanian Innovation Center |
| LMA | Lithuanian Science Academy |
| LMT | Lithuanian Research Council |
| LSS | Lithuanian Scientific Society |
| LSYR | Lithuanian Society of Young Researchers |
| MITA | The Agency for Science, Innovation and Technology |
| MOSTA | Research and Higher Education Monitoring and Analysis Center |
| NCP | National Complex Programmes |
| NGO | Non Governmental Organisation |
| Seismas | Parliament of Lithuania |
| SF | Structural Funds |

**Portugal**

| | |
|---|---|
| AdI | Innovation Agency |
| CNECV | National Council of Ethics for Life Sciences |
| CNPMA | National Council for Medically Assisted Procreation |
| DGEEC | General Directorate of Statistics of Education and Science |
| EPTA | European Parliamentary Technology Assessment |
| ERA | European Research Area |
| FCT | Science and Technology Foundation |
| MCTES | Minister of Science, Technology and Higher Education |
| MEC | Ministry of Education and Science |
| MEE | Ministry of Economy and Employment |
| MecI | Minister of Economy and Innovation |
| OECD | Organisation for Economic Co-Operation and Development |
| PTA | Parliamentary Technology Assessment |
| PMA | Medically assisted procreation |
| R&D | Research and Development |
| S&T | Science and Technology |

**Wallonia, Belgium**

| | |
|---|---|
| ACCORD | Walloon Federation of Collective Research Centers |
| AGORIA | Union of technology industries |
| ARC | Concerted Research Action |
| ASE | Walloon Economic Stimulation Agency |
| AST | Walloon Technological Stimulation Agency |
| AWT | Walloon Telecommunication Agency |
| BELSPO | Belgian Federal Science Policy Office |
| BSTS | Belgian Network for the Science and Technology in Society studies |
| Cequal | Walloon Centre for Quality |
| CeRDT | Centre for Promotion of R&D and Valorisation of Technologies |
| CCSPA | Food and the Consultative scientific commission for food-industry products |
| CFPS | Federal Science Policy Council |
| CITA | Technology Assessment Research Unit, University of Namur |
| CIUF | Inter-university Council of the French Community |
| CReF | Council of Rectors of the French Speaking Community |
| CPS | Walloon Council of Science Policy |
| CESRW | Walloon Economic and Social Council |
| CRID | Research Center on IT (Information Technology) and Law |
| CRIW | Innovation Relay centre network |
| CSAAA | Walloon High council for agriculture, food-industry |
| CSO | Civil Society Organization |
| CWEDD | Environmental Walloon Council for sustainable Development |
| CRIOC | Research and Information Center for Customer Organizations |
| DBT | Danish Board of Technology |
| DGENORS | Directorate-General for non-obligatory education and scientific research of the French Community |
| DGO | Operational Directorate-General |
| DGO6 | Walloon Sixth Operational Directorate General for Economy, Employment and Research |
| EMF | Electromagnetic Fields |
| EMERIT | Experiences of Mediation and Evaluation of Research and Technological Innovation |
| EPTA | European Parliamentary Technology Assessment Network |
| ERA | European Research Area |

| | |
|---|---|
| FP | European Framework Programme |
| FPB | Federal Planning Bureau |
| FRIA | Research Fund for Industry and Agriculture |
| F.R.S. – | |
| FNRS | National Scientific Research Funds |
| FRFC | Fund for basic collective research at the initiative of researchers |
| FSR | Special Research Fund |
| FTU | Foundation Labour – University |
| FUCaM | Catholic University of Louvain - Mons |
| FUNDP | Catholic University of Namur |
| FUSL | Univeristy Saint-Louis Brussels |
| GERD | Gross expenditure on R&D |
| GDP | Gross Domestic Product |
| GMO | Genetically Modified Organism |
| ISSeP | Scientific Institute for Public Services |
| IBPT | Belgian Institute for Postal Services and Telecommunications |
| ICT | Information and Communication Technologies |
| IEW | Walloon Federation of Environmental Organizations (Inter-Environnement Wallonie) |
| IST | Institute Society and Technology (Flemish PTA institute) |
| IWEPS | Walloon Institute for Evaluation, Foresight and Statistics |
| LIEU | University-Enterprises Connection Network |
| CP-Wallonie | Walloon contact point for European Projects |
| NIMBY | Not in my Backyard |
| NGO | Non-Governmental Organization |
| MP | Member of Parliament |
| NTIC | New Technologies of Information and Communication |
| OECD | Organization for Economic Co-operation and Development |
| ONDRAF | Belgian Agency for Management of Radioactive Waste and Enriched Fissile Materials |
| OTA | Office of Technology Assessment (United States) |
| PACITA | FP7 Project Parliaments and civil Society in Technology Assessment |
| PAI | Inter-University Attraction Poles |
| PhD | Doctorate, postgraduate academic degree |
| $PI^2$ | Intellectual Property and Innovation Association |

| | |
|---|---|
| PIR | Project of Regional Interest |
| PIT | Technology Innovation Partnerships |
| PP | precautionary principle |
| PPP | Public/Private Partnerships |
| PTA | Parliamentary Technology Assessment |
| RETI | European Regions of Industry and Technology |
| R&D | Research and Development |
| RTDI | Research, Technology, Development and Innovation |
| SEED | Socio-Economy Environment Development research center, Université de Liège |
| SERV | Flemish economic and social council |
| SME | Small and Medium Enterprises |
| SPIRAL | Research Center at the University of Liège involved in Risk & governance; Science & Technology in Society Studies; Public policy and administration and Methodological innovations. |
| SPOW | Science parks of Wallonia |
| SPW | Walloon Public Service (Administration) |
| S&T | Science and technology |
| STI | Science, Technology and Innovation |
| STS | Science and Technology (in Society) Studies |
| STV | Flemish Foundation for Technology Assessment |
| TAB | Office of Technology Assessment at the German Bundestag |
| UCL | Catholic University of Louvain |
| ULB | Free University of Brussels |
| UMons | University of Mons |
| UWE | Walloon Union of Firms |
| WHO | World Health Organisation |

# Executive Summary

This report is the result of explorative studies on opportunity structures and barriers for introducing and establishing the concept of Technology Assessment in seven European countries which so far did not have any TA infrastructure for policy advice established at the level of national R&D policy making (government and parliament) - namely: the Czech Republic, Bulgaria, Hungary, Ireland, Lithuania, Portugal and Wallonia (Belgium) within the PACITA Work package "Expanding the TA-landscape".

The exploration of opportunity structures was organised in a way that the exploration itself at the same time would initialise reflecting, networking and possibly planning with regard to a national TA infrastructures in the countries explored. This was successfully done by a set of interviews with relevant actors as well as by two workshops with policy makers, stakeholders, representatives of science, public administration, media and civil society in each of the 7 countries. The findings with regard to existing R&D policy structures and their workings, with regard to the national S&T system and existing infrastructures for scientific policy advice as well as with regard to the level of public discourse on S&T were laid down in country studies which were discussed at a comparative workshop held at the Institute of Technology Assessment and Systems Analysis in Karlsruhe, Germany, in November 2012. The present report mainly draws on findings the country studies and the discussion at the workshop.

The comparative discussion of the country studies clearly revealed that the situational context for establishing TA in the countries explored differ significantly from the historical situation in the 1970s and 1980s when most of the existing national (parliamentary) TA units in Europe were established . Whereas back in the 70s and 80s S&T were subject to vivid public debates with relevant parts of the general public asking for being involved in decision making, public awareness of S&T policy making issues is rather low in the countries explored. Other than in the 70s and 80s there is also no expressed demand for unbiased scientific advice for policy making in the field of S&T policy based in problems to legitimise decisions taken in view of the vivid public discourse with often conflicting interests. Furthermore the countries explored are busy with building up or strongly reform existing R&D structures with an urgent need for keeping up with the pace of globalisation, whereas 30 years ago the establishment of TA took place in countries with strong R&D infrastructures forming the basis of quite well developed economies and public welfare. Thus: whereas questions of environmental and health risks and the socio-political steering of S&T dynamics in a socially sound way were in focus 30 years ago, it is nowadays very much about "economy first", i.e. initialising S&T dynamics and innovation for economic development in a climate of global competition and financial crisis.

Due to this situation TA as a concept is confronted with specific expectations and demands which have to be taken into account when searching for ways to install advisory TA structures:

- With regard to on-going often not well coordinated activities of governments to build up or restructure the R&D system, TA is often explicitly expected to contribute to strategic planning of the R&D landscape and evaluation of R&D capacities.
- Setting up innovation policies to improve competitiveness is the central R&D policy issue in the countries explored. TA could position itself with respect to these activities by providing support for identifying socially sound and robust country specific innovation pathways ("constructive TA") and contribute to lower costs of trial and error learning.
- Democratic and transparent decision making structures are often not well developed. Part of this is a low profile of parliaments in S&T policy making as well as a lack of communication among relevant actors. TA could find a role here as an independent and unbiased player to induce communication on "democratic" structures in S&T policy among relevant actors.

- "Involving the public" is seen as a challenge by many actors in the countries explored. Motives of democratizing S&T policy making, however, are often merged with "paternalistic" motives of "educating the public" (media, lay people). It has to be clarified to what extent TA's mission of "stimulating public debate" can adopt to that problem (without becoming "persuasive").
- A widespread awareness of problems such as in-transparent decision making, lack of trust in democratic structures, lack of competences of relevant actors, bounded rationalities of relevant actors and lack of strategic long-term thinking often results in an explicit demand for "knowledge based policy making". In this context the (not very well known) concept of TA is welcome as a means to underpin decisions with best available knowledge in an unbiased manner. Specific ideas about how to institutionally build it into the existing system are however missing and it might well be that in terms of institutional solutions none of the models so far realized in Europe might be appropriate.

Depending on the country specific situation existing models of institutionalisation of TA are taken up by certain actors: such as establishing a TA function at the parliament or building up TA capacities at scientific institutions (e.g. National Academies of Sciences) as support for policy making. The comparative analysis, however, has shown that the national initiatives taken in the countries explored imply new visions for the institutionalisation of Technology Assessment besides the (traditional, but still actual) support of the parliament. As a further step to introduce the concept the "network model" of TA might be most appropriate. This model seems to be of use especially in the exploration and starting phases of national TA initiatives serving as a platform to share knowledge and to connect relevant actors. Its practicality however has yet to be proven.

It will be a challenge for the TA community to react to this in a way that is supportive for policy making in the resp. countries but at the same time provides for keeping the conceptual core of TA as an unbiased and as much as possible comprehensive endeavour to reflect on the societal implications of new R&D developments.

As next steps to be taken in order to assure the results that have been achieved by the PACITA project – namely raising awareness of TA among relevant actors as well as instigating firs joint reflections on how to adopt the concept to the national context – we suggest:

- To further support on-going networking activities around the concept of TA by further raising awareness of the concept and identify possible "TA entrepreneurs" as well as by supporting reflections on the role of TA in national political setting by further input from existing TA institutions.
- To set up some kind of "prototype activities" like pilot TA-studies, policy briefings, participatory experiments etc. which at the same time can function as a starting point for collaboration of relevant actors and mutual methodological learning processes as well as a show case for the potential of balanced TA analysis.
- "Prototype activities" furthermore provide a very good basis for further cooperation with the international TA community. Joint work on TA-projects seems to be especially promising in this respect as it allows not only for the development of a shared problem orientiation and an exchange and reflection on methodological approaches, but also for a cross-national analysis of specific questions in the field of science and technology.
- A joint European TA network which would function as an umbrella for existing as well as newly emerging national TA initiatives would form an important platform for future activities. Such a network could, on the one hand, stabilize emerging TA activities by giving the national exploration processes an international framing. On the other hand, exisiting TA institutions would be challenged to react to new demands, new ideas, roles and function for TA, thus providing for continous

development of the concept alongside emerging new demands. A continuation of the processes which were iniated by the PACITA project thus seems to be promising for both, existing as well as newly emerging TA actors in Europe, but also beyond.

# Chapter 1 Cross-European comparative analysis of establishing PTA

Leonhard Hennen, Linda Nierling (ITAS, KIT)

## 1.1 Background and aim of the study

The goal of the PACITA[1] work task 4.1 "Expanding the TA landscape" is to explore opportunity structures as well as barriers for inducing the concept of TA in Bulgaria, Czech Republic, Hungary, Ireland, Lithuania, Portugal and Wallonia. In these countries Technology Assessment (TA) – be it at the parliament, the government or academia – is not institutionally established so far.[2] In this report, the comparative perspective will be used to point out similarities and differences found in the exploration processes. This comparison is based on seven national explorative country studies, which are documented in the report "Deliverable 4.1. Expanding the TA-landscape. Country Studies". These studies provide an overview about

- national institutional contexts and existing capacities (actors, organisations, networks, processes, institutions, political system)
- demands and interests in TA related activities
- barriers and opportunities in national contexts.

In order to initiate these discussion processes, partners who already have a Parliamentary TA institution in their countries ("PTA-partners") and partners who do not have parliamentary TA in their countries ("non-PTA-partners") collaborated. This report summarizes the joint participative research activities, of the experienced TA-partners of the PACITA consortium from Austria, Denmark, Flanders, Germany, Norway, The Netherlands, and Switzerland with PACITA-partners from Bulgaria, Czech Republic, Hungary, Ireland, Lithuania, Portugal and Wallonia which took place from February 2012 to March 2013. For the joint exploration the so-called "non or emerging PTA countries" were supported by experiences from PTA institutions in the following distribution:

[1] PACITA stands for Parliaments and Civil Society in Technology Assessment. It is a four-year research and action plan, funded by the European Commission Framework Program 7, under Theme SiS-2010-1.0.1 Mobilisation and Mutual Learning Actions. The overall PACITA objective is to empower European member states and associated countries with an interest in PTA to make informed decisions about institutionalising, organising and performing Parliamentary TA. At the same time, PACITA is meant to stimulate reflexivity in regions and countries with established Parliamentary TA organisations. In doing so, PACITA helps to improve the quality of knowledge-based decision making on science, technology and innovation in Europe.

[2] An exception is Wallonia, where TA research is performed at several academic institutions.

| Fieldwork in | By | Supported by |
|---|---|---|
| Belgium | SPIRAL (Wallonia) | TA-Swiss (Switzerland) |
| Bulgaria | ARC Fund | RI (The Netherlands)/ ITA (Austria) |
| Czech Republic | TC ASCR | IST (Flanders) |
| Hungary | HAS-SEC | DBT (Denmark) |
| Ireland | UCC | NBT (Norway) |
| Lithuania | KEF | ITAS (Germany) |
| Portugal | ITQB | ITAS (Germany) |

Table 1: Co-working scheme of the explorative country studies

The joint exploration of structures allowing for TA initiatives to draw on was performed via interviews as well as by providing a platform for debate on TA among relevant actors – mainly by organizing two national/regional workshops in each country/region.[3] The exploration thus was not done in a detached analytical, scientific modus but by means meant to directly intervene in the existing S&T policy making landscape, inducing networking activities with regard to a future establishment of a national TA community and TA capacities for policy advice. Therefore the approach can be compared to "action-research" by concurrently investigating the potentials for PTA and informing actors through questions and discussions. Research methods comprised document analysis (i.e., national research plans, TA related studies), interviews as well as discussion rounds with relevant stakeholders ("national workshops"). In total around 10 interviews with experts from governmental authorities (including parliament), industry, science, media, and civil society organisations lasting each 60-90 minutes were conducted per country study.

Plans and interim results were discussed with all PACITA partners at the consortium meetings in Brussels (7-9 September 2011), Oslo (8-9 February 2012) and Copenhagen (19-20 June 2012). A two-day international workshop "Expanding the TA-landscape" connected to the consortium meeting in Karlsruhe (15-16 November 2012) was held and included not only the participation of all PACITA partners but also was supported by three experts commenting on the developments in the countries mentioned above.[4] The workshop inputs and discussion provided first general insights on main barriers and opportunities for TA structures in respective national settings. Furthermore they were used to connect the findings of task 4.1 to task 2.1 (TA practices in Europe). The process was open, providing room for mutual learning between the partners: When starting from a close understanding of PTA as Parliamentary TA during the course of the study and discussions, the definition of TA providing policy advice in the field of S&T was opened to other societal actors.

The comparison of different national settings of TA stands in line with previous analyses of national TA practices especially with regard to its different forms of institutionalization (Delvenne 2011; Enzing, Deuten, Rijnders-Nagle, van Til 2012; Ganzevles, van Est 2012; Vig, Paschen 2000b).

[3] For reasons of language convenience it will be only referred to the "national" context and "countries". For the Walloon case, the correct wording "regional" and "region" will be implied by the above mentioned in the following.

[4] The three experts were: Prof. Arie Rip (The Netherlands) for the field of Technology Assessment, Prof. Thomas Saretzki (Germany) for the field of Political Science and Prof. Martin Potůček (Czech Republic) for the field of Public and Social Policy.

In contrast to these analyses the exploratory processes presented in this report had very much a practical intent, i.e. initiating Technology Assessment with a special focus on parliaments within Europe in countries of Southern and Western Europe, as well as in new (Central and Eastern) member states. In other terms, our study focused on the implementation potentials of Technology Assessment in new national contexts. This implementation would affect or even change a specific field of the STI policy making system.[5]

The main reference for such an endeavor is the establishment of European PTA agencies in the 1980s and 1990s, documented in Vig, Paschen 2000b.[6] Here, it is already pointed out that country differences are crucial to understand different national settings of Technology Assessment: "…the political motivations for adopting technology assessment varied considerably across nations" (2000a: 17). And further: "the concept as well as the organization of TA took remarkably different forms in different countries. What accounts for these differences? We have singled out institutional and cultural practices as likely determinants of theses variations" (Vig 2000: 367). Whereas Vig, Paschen and others could conclude ex-post from the experiences of already established TA institutions, the approach here is different: we aim at describing the national and political context relevant for a TA structure in order to assess which conditions are supportive or hindering factors with regard to an implementation of TA. Thus, this report is unspecific with regard to possible national TA institutions as it rather describes – in a comparative perspective – national "background factors" and political potentials with regard to a possible institutionalization at a later stage.

## 1.2 Cross-European findings of establishing (P)TA

In the following main aspects of national R&D structures with regard to expenditures, strategies as well as recent major changes will be reflected in a comparative perspective. In a second step, public debates on science and technology will be described, including the roles of societal actors, actual topics as well as characteristics of science-based policy advice. The chapter will conclude with relevant models as well as policy options for possible new TA institutions in Europe.

It should be noted that the countries involved in the sample by no means share the same level of integration of TA-like activities in their national S&T landscape. The preconditions for adopting TA are therefore different in many respects, e.g. political culture, institutional settings, organizational contexts, former experiences with TA-like activities, or actors active in TA. All of these factors can only partly be captured in the comparative perspective.[7] According to the qualitative research design the national exploration presented in the following is based on the opinions and evaluations stated in interviews with relevant national stakeholders, who were selected, analysed and interpreted by the national organizations being partners in the PACITA project. Thus, the findings from the country studies presented here are drawn from the (subjective) evaluation of the national situation by selected national actors. As regards the authorship of the country studies it is important to note, that the studies represent the perspective of different organizational contexts ranging from academies of sciences (Czech Republic, Hungary) through research centres at universities (Ireland, Portugal, Wallonia) to NGOs (Bulgaria, Lithuania). The evaluation of the different national settings with respect to barriers and opportunities for a TA landscape to develop is thus given from a specific organizational perspective in the different countries. The following analysis is based on the national reports (cf. Hennen, Nierling 2012) as well as on comparative studies from the field of political sciences. Thus, the report does not claim to fully reflect the respective national debates as well as newly evolving initiatives.

[5] Hereby STI is understood as science, technology and innovation policy, which are more or less inter-connected policy fields.

[6] In France, OPECST was founded in 1983, the Technologieradet in Denmark and the Rathenau Institut in 1986, POST in the UK 1989, the TAB in Germany 1989. In 1987, STOA was founded in the context of the European Union. In 1992, TA-SWISS was founded while IST in Flanders was created in 2000.

[7] Please refer to the country studies for more details (summarized in Hennen, Nierling 2012; deliverable 4.1).

### *1.2.1 R&D Structures*

Historically, TA has been developed in Western democracies when R&D gained central relevance for the economic and social development of the nation state. Today in a globalised world it goes without saying that the R&D performance of a country is decisive for its standing in a global economy for social welfare and wealth creation. “Modernisation”, “Building up a knowledge economy”, “Increasing the innovative capacities of R&D systems” etc. is in all countries nowadays on the agenda as a reaction to the salient importance of R&D for economic development and the growing global competition. For most of the countries involved in our explorative study the development and modernisation of national R&D capacities is in the focus of R&D policy making. Many of them, however, are pursuing STI policies in a particularly difficult situation of transformation of R&D structures as well as R&D governance.

#### *R&D expenditures*

As a view on some basic economic data (see table 2) reveals, most of the countries involved in our study (except for Ireland and Belgium – the latter standing for Wallonia here) in terms of their GDP (Gross domestic product) are lagging behind the EU27 average development. And - partly due to the relatively weak economic performance - their expenditure and investment in R&D is (in some cases significantly) below EU27 average expenditures in terms of GERD (Gross Expenditure on Research and Development), GDP and GBAORD (Government Budget Appropriations or Outlays for Research and Development). For the Central and Eastern European countries this is with no doubt due to the fact that their economic modernization is a disappointingly slow and conflicting process, involving political and social tensions.

For Portugal and Ireland it applies that they are in a process of restructuring their economy from domination by agricultural structures to a modern knowledge-based economy (with Ireland having been extremely successful in this respect during the last two decades). Wallonia (Belgium) is the only region/country that can be regarded as being in a position of the average Central and Western capitalist economies, especially the region of Wallonia however is undergoing a shift from traditional industrial structures (mining and steal) to S&T based economy.

| | Population 2011 Mio. | Year of EU entry | Democrat. system since | GDP p.C. 2011 Euro | GERD/ GDP % 2010 | Private R&D % 2011 | Public R&D % 2010 | GBAORD 2010 Euro |
|---|---|---|---|---|---|---|---|---|
| **EU 27** | 18,61 (tot. 503,7) | - | - | 25.100 | 2,0 | 61,53 | 37,51 | 3.275 |
| **BE** | 11,0 | 1952 | 1830/1980 (regions) | 33.600 | 1,99 | 66,3 | 32,7 | 2.153 |
| **BG** | 7,5 | 2007 | 1989 | 4.8000 | 0,6 | 50,0 | 48,9 | 96 |
| **CZ** | 10,5 | 2004 | 1989 | 14.7000 | 1,56 | 62,0 | 37,4 | 873 |
| **HU** | 10,0 | 2004 | 1989 | 10.100 | 1,16 | 59,9 | 38,4 | 467 |
| **IE** | 4,5 | 1973 | 1937 | 34.900 | 1,79 | 68,13 | 31,9 | 934* |
| **LT** | 3,24 | 2004 | 1990 | 9.5000 | 0,79 | 29,22 | 70,93 | 47 |
| **PT** | 10,64 | 1986 | 1974 | 16.100 | 1,59 | 45,5 | 44,13 | 1.763 |

Table 2: Core economic and R&D data
Source: ERA Watch (http://europa.eu/about-eu/countries/index_en.htm) and Eurostat 2010
* 2007

The weakness of R&D infrastructures for some of the countries is revealed by the dominant share of public R&D expenditures (on a relatively low level) compared to private R&D investments. This applies for the former socialist countries. On top of that, R&D structures in post-communist countries were subject to serious cuts that led to a reduction of research capacities in the academy of science and a reduction of research units in general (Pokorny, Hebakova, Michalek 2012: 64). At the same time the transformation of public research capacities into private companies or the introduction of economic management principles in some cases led to a cut of research capacities in order to reduce costs. It is also clear from the data given in table 2 however, that some of the countries already achieved a lot in increasing the share of private R&D expenditures (such as the Czech Republic and Hungary). In most cases this increase has been achieved by investments of foreign companies. In the Czech Republic, 57%, in Hungary about 60% of private R&D investments come from foreign companies. The countries involved share a relatively low R&D profile (exception Wallonia/Belgium). They all do a lot toincrease activities in R&D and some succeeded in improving their R&D basis – this applies for Ireland as the booming country in the EU during the 1990s but also for Hungary and the Czech Republic, where R&D expenditures quadrupled from 1995 to today (Pokorny, et al. 2012: 66).

The Western European countries involved in our exploratory study in many respects share the economic situation of the Eastern and Central European countries, albeit for historically different reasons, and are

investing significantly in fostering their competitiveness by building up a knowledge based economy by developing their R&D capacities.

- In the last decade, Portugal had one of the highest growth rate of investment in R&D of the EU member states (Almeida 2012: 227). Not only the public sector contributed to this development also private investments. In Portugal the share of private investment grew from 27% in 2000 to 47% in 2007, however it dropped down due to the financial crisis in the last years (Almeida 2012: 227).
- Investments in R&D supporting research clusters in advanced R&D areas are an integrated part of Wallonia's efforts to recover from the serious decline of old industrial structures (mining, steal). The Belgium federal planning bureau in a study carried out in 2009 attested Wallonia perceptible success in recovering from this burden. Compared to other regions with similar structural problems, Wallonia scored high in knowledge production, i.e. its capacity to mobilize resources for research and innovation and with regard to trained R&D personnel. There were however still problems in transforming R&D efforts into economic development (Delvenne, Rosskamp, Fallon 2012: 261f.).
- Also Ireland – despite completely different historical conditions – shares the experience of lagging behind in terms of R&D performance and took initiative to catch up with globalisation by investing in R&D. The first governmental R&D strategy in Ireland has been published as recently as 1996. But since then R&D rapidly gained importance. The rapid economic growth was initially based on the successful implementation of a so called "industrialisation by invitation" policy (attracting investments from multinational firms mostly in the manufacturing sector). Now it is consensus that Ireland has to invest to rebuild itself as a knowledge economy. Ireland successfully managed to become an attractive location for S&T based investment. The country is running a National Development programme (2007-2013) as well as a Strategy for Science, Technology and Innovation (2006-2013) which underline the perceived importance of R&D. The Irish case illustrates that R&D - as can also be observed in other countries - is regarded as being an important, if not the most important instrument for economic growth.

Notwithstanding achievements since the 1990ies, countries like Ireland and Portugal still have relatively weak own research capacities and have to improve the science and education system at all levels (O'Reilly, Adam 2012: 145f.). Being in a complex and expensive process of restructuring, the financial crisis hit these countries hard resulting in a shrinking economy and high unemployment rates. The high burden on public budgets led to a decrease of R&D expenditures. As the investments of recent years were promoted as being the big step to create economic growth and jobs, the recent backlash can be regarded as having caused sobering with regard to science and technology, and thus caused a decrease of public and political support for R&D policies (particularly reported for Ireland).

In their efforts to build up a knowledge based economy the countries explored can (and have to) rely a lot on EU money. EU structural funds money is reported to be the main source of funding of R&D in Lithuania, 10% of structural funds have been spent on R&D (2007-2013) (Leichteris, Stumbryte 2012: 185). Wallonia decided to allocate large parts of EU structural funds to building up R&D infrastructures in advanced technology fields (mainly bioscience and biotechnology) (Delvenne, et al. 2012: 259). Also in Portugal EU funds with 400 – 600 Mio € for R&D contribute significantly to the overall spending for R&D of 1.7 billion € (2010) (Erawatch, Almeida 2012: 221). EU structural funds helped to build up new R&D infrastructures as well as PhD programmes in strategic research areas, such as Biotechnology or Nanotechnology.

### *Modernising the R&D system - Economy first*

All countries explored have set up national innovation strategies or action plans to modernise the R&D system, attract private investments and improve competitiveness. The key targets listed in governmental R&D programmes and strategies in all countries explored can at the same time be read as a list of typical deficiencies of R&D government, infrastructures and strategies in the respective countries, such as the key targets mentioned in the Bulgarian president's strategic document "Bulgaria 2020: National Priorities in Education and science" (2012). The targets addressed comprise: prioritisation of young scientists, internationalisation of Bulgarian research, improvement of R&D competitiveness, stimulation of cross-sectoral partnerships and development of R&D infrastructures (Kozarev 2012: 32). Areas that are targeted by governmental innovation and R&D funds usually comprise advanced fields of research such as Nanotechnology, Biotechnology, ICT, Renewable Energy and others.

Planning and investment in R&D clearly are governed by the main goal of building up the economy. The running Science and Innovation Programme in Hungary (2007-2013) has as its goals: to create jobs of higher quality, to enhance competiveness, to achieve sustainable socio-economic development, and to improve quality of live (Mosoni Fried, Zsigmond, Palinko 2012: 106f.). Thus building up the economy sets the main frame for R&D policy making.

Despite actual budgetary problems in Ireland it remains a priority of the government to position Ireland as an international innovation hub in Europe. But the financial problems led to the reorganisation of the R&D government system with the goal to "bring together a streamlined and focused programme of funding of research and development that is aligned with the objectives of enterprise policy" (O'Reilly, Adam 2012: 149). In the focus of R&D policy is the need for "commercialising research and supporting start-ups" (149). The Priorisation Action Plan (2012) intends to focus the government's 500 Mio € expenditures for R&D on scientific areas with the greatest potential for economic return (O'Reilly, Adam 2012: 149). Efficiency of funding schemes and the improvement of the international competiveness of the country in terms of innovation are also in the focus of the Czech Reform of the Research, Development and Innovation System (2008). The goals of the reform are (Pokorny, et al. 2012: 65): internationalisation of R&D, collaboration of private and public research institutions, evaluation of R&D performance, technology and research transfer to users, simplification of bureaucratic procedures, and deduction of funding sources.

### *Reform of R&D policy making and structures*

In line with the strategic goals are new modes and objectives of R&D funding and government. Funding schemes are shifted to more project based funding on the costs of institutional funding. Public-private-partnerships are favoured; technology transfer from academia to industry is fostered. Generally the focus is on applied research on the costs of basic research. The R&D funding is meant to be part of the economic strategies such as support for SMEs and preventing brain drain by creating jobs for qualified scientists.

Countries are busy with reforming the public R&D system by introducing evaluation schemes to improve the R&D performance. The administration of funding schemes, evaluation and strategic planning functions are often strengthened by setting up S&T agencies supporting governmental administration (Lithuania, Hungary, Portugal). This is meant to induce more expertise in R&D policy making, which in interviews is on the one hand often welcomed by researchers and representatives of academia. On the other hand, it is also criticised because it implies a loss of influence of existing bodies and institutions, especially in Central and Eastern Europe namely the national academies of sciences.

The reform process often comprises a complete restructuring of the existing R&D infrastructures and competences of actors. The reform of the R&D system in Lithuania starting in 2008 led to more

independence for universities, and the majority of governmental research institutes was integrated in universities. Competitive funding schemes were introduced and administered by the newly established Lithuanian Research Council, which is supported by two new agencies for evaluation and strategic planning (Leichteris, Stumbryte 2012: 184). The setting up of a Technology Agency in 2009 in the Czech Republic accompanied by the introduction of targeted research as a new funding model in the Czech National Research Policy 2009-2015 (Pokorny, et al. 2012: 65) is meant to strengthen an orientation towards applied research – and showed some effect on public institutions in splitting their activities between applied and basic research (Pokorny, et al. 2012: 64).

The result of reform initiatives is often a complex system of research units, as well as funding and evaluation schemes and administrative authorities and bodies. Ireland's increasing efforts in developing the national R&D structures (since the 1990ies) have been accompanied by building up a system of public agencies and institutes not only administering new competitive funding schemes but also supporting politics with expertise in strategic planning, evaluation and innovation policies. This includes a cabinet Sub Committee on Science and technology, a Chief Scientific Advisor, an Advisory Council for Science Technology and Innovation, and an Office of Science and Technology and Innovation within the department of Jobs, Enterprises and Innovation. Since 2007 the implementation of Ireland's innovation strategy is overseen by three new research and advisory bodies for technology, higher education, and health research which report to the Interdepartmental committee.

Lithuania may serve here as a special example for a comprehensive reform of the science system in Eastern and Central European countries. The backbone of the Lithuanian R&D system is formed by 14 universities and 5 big technological centres: the so called science valleys that are dedicated to research areas such as biotechnology and ICT. Two ministries supervise and administer 12 national research programmes and funds (such as for biotechnology, new materials, nanotechnology …). The activities are supported by an agency active in monitoring the system and the research performance which gives scientific advice to government. Three further agencies are responsible for implementing funding schemes. The national academy of sciences is the advisory body to the government with the mission to improve the general public's understanding of science. Publicly funded CSOs such as the Knowledge Economy Forum have the mission to improve interchange and cooperation of stakeholders towards fostering a knowledge economy (Leichteris, Stumbryte 2012: 185ff.). The system thus includes elements of strategic thinking, quality control, evaluation and monitoring as well as institutions taking account of science and society issues.

These modernised structures however appear to be functional only to a certain degree. Interviews and workshops revealed scepticism with regard to the effectiveness of newly established systems and strategies by actors from academia, policy making as well as industry and civil society. In the following the most important dimensions of deficiencies are discussed.

#### *Lack of cooperation and split of competences*

As in the case of Hungary (Mosoni Fried, et al. 2012: 108) we often find in interviews complaints about a "fragmented structure of RDI policy making". In all countries involved in our study we find a traditional split of competences between science policy on the one hand and technology and innovation policy on the other hand. Science policy – mainly taking care of higher education and university research – is administered by the science and/or education ministry, whereas (often newly established) innovation and technology development policies are administered by ministries for economy and development. As put forward in interviews and workshops, complaints about the lack of cooperation between both tracks of R&D policy making are widespread. This is the case for Eastern and Central European countries as well as for Western European countries. As in Bulgaria the split of competences is accompanied by the fact that great shares of

public R&D money are spent for salaries and administration and are not targeted to research projects and infrastructures (Kozarev 2012: 31). For many Eastern European countries it is still the case that the biggest share of R&D funding (reported in official statistics) mainly goes into higher education and less into research. Thus typically a country like e.g. Lithuania is internationally ranking high in percentage of young people in third degree education but at the same time does not have appropriate jobs to offer in public and private research activities.

Generally the split of competences leads to a lack of coordination between strategies of improving third degree education and the development of universities on the one hand and applied research and cooperation between private and public research units on the other. This is amplified by difficulties to generally shift from a centralised R&D system with public research institutes to a more diverse system with a higher level of private research investments. Even if countries are successfully increasing the share of private investment in R&D – as is reported for Portugal – an interface between private and public research may be missing and the development of the public science system fails to significantly support innovation strategies (Almeida 2012: 229). The split of competences thus implies in the most cases that an R&D based innovation strategy or an R&D based strategy of economic development is just added as a new strand of policy making to the existing system of public R&D. Symptomatically this then often leads to criticism by experts and policy makers towards reform strategies as being driven by a short term perspective of economic growth on the costs of long term development of excellent R&D structures (e.g. Hungary, cf. Mosoni Fried, et al. 2012: 111).

#### *New role of the academies of sciences*

Initiatives to instigate knowledge transfer and debate on innovation strategies (often funded by EU money) have difficulties to bring their message over or are probably not fitting in the existing hierarchical structures of policy making. The Czech reform on research, development and innovation mentioned above was partly successful but received serious criticism from universities and the academy of sciences, who regarded the new system as being directed against the established academic system not allowing its further development but instead mainly supporting private research activities. Further it was criticised that the reform was aiming at direct economic benefit but not as promoting science as such (Pokorny, et al. 2012: 66).

In Central and Eastern European countries the academies of sciences, which were the leading and often only research institution in communist regimes, obviously still play a crucial role in the R&D reform process. On the one hand, the academies in Bulgaria or Hungary still form the main infrastructure for public research in certain disciplines. They are however on the other hand struggling with hierarchical traditions and are undergoing a process of change by including more competitive elements of research funding. At the same time they are at least partly losing their central role as research performers in the country as well as being the main and often only provider of scientific advice to R&D policy making bodies. This implies that reforms of the R&D system have to take account of interests of the academies. The academy of sciences in Hungary, e.g., has still a strong position with regard to resources (13.4% of total R&D personnel, 11.8 % of GERD) but also as advisory body to government and strategic planning body and host of important research activities. Programmes set up by the academy include long term issues like “future of education”, the energy strategy, “future environment”, or the demography and pension system (Mosoni Fried, et al. 2012: 109). The academy however had to undergo serious reforms in 2012 in order to have the capacities concentrated. It for example established nine new research centres which incorporated the academy’s former 32 institutes. In the Czech Republic the academy of sciences has been drastically reduced to the advantage of the Higher Education Sector, namely universities (Pokorny, et al. 2012: 67). Some of the criticism against reforms in the Central and Eastern European countries is most probably rooted in conflicts between the new governmentally implemented structures and the old academic system.

### *Discontinuity and deficient management of reform strategies*

Reform strategies are often criticised for lacking focus and for not being supported by a general increase of the budgets for R&D. Criticism as mentioned above might sometimes be motivated by the loss of privileged positions of established academies or universities. But generally the effectiveness of strategies seems to be compromised by discontinuity and lack of focus mainly due to quickly changing political agendas driven by political tactics and by quickly shifting political powers. The Hungarian National Council for Research and Innovation, the main coordinating body in R&D governance with representatives of all R&D agencies and authorities, was dissolved in 2012 and substituted by a "Development Cabinet" with the Prime Minister and three Ministers as its only members (Mosoni Fried, et al. 2012: 102). The multi-stakeholder council is about to be reestablished in 2013. The Hungarian innovation office established in 2010 aiming at supporting SMEs with knowledge and technology transfer in order to foster innovation in HU, suffered from a cut of 50% of its budget in 2012 as well as the loss of its role as a funding body. It now focuses on monitoring and policy analysis (Mosoni Fried, et al. 2012: 109). Discontinuity in setting up reforms is also reported as being a main weakness of R&D policies in Lithuania due to shifting parliamentary majorities. Innovation strategies thus often are perceived as "activism" since they apparently result in constant reorganisation of strategic planning and advice structures. Each government in Hungary initiated a reorganisation of the policy making and advice structure in R&D at least once in their 4 years term (Mosoni Fried, et al. 2012: 113). The National Innovation Fund in Bulgaria (part of the country's innovation strategy) was functional between 2005 and 2008. After that the funding activities stopped and new calls have not been announced until late 2012 (Kozarev 2012: 31).

### *Lack of capacities and transparency*

In most of the countries national councils for R&D have been established. These councils mainly represent academies of sciences, industry, universities, public administration as well as the non-profit sector. They have been established to coordinate reform strategies and to advise the government. In the case of the Czech Republic the Council for Research, Development and Innovation takes over the role of almost a ministry and is more or less designed to centralise the system of R&D and even to take over micromanagement tasks (Pokorny, et al. 2012: 69). As far as Research Councils mainly represent academia, industry and public administration, they can be regarded as an element of academic self-administration and expert policy advice. As far as industry is involved, this measure also intends to establish closer relations between public and private research bodies in order to improve innovation performance. In the interviews we often find criticism with regard to a lack of transparency of the councils' work and a lack of resources to fulfil its coordinating tasks. Interviews showed that institutional structures of R&D policy making are often regarded not to be in a position to really coordinate R&D policies effectively. Furthermore it is often reported that governance structures are lacking openness not only with regard to civil society but also with regard to experts who show dissatisfaction with the performance, accountability and accessibility of advisory structures (e.g. Pokorny, et al. 2012: 70).

Even if processes are formally transparent, e.g. relevant documents for decisions are publicly available and consultation of experts is organised, a lack of accountability is stated by many interview partners. It appears that administrations act without taking arguments and conclusions found in consultations (be it expert or public) into account. Interviewees in Bulgaria report that transparency and accountability of expert's participation in governmental or parliamentary consultations or hearings is rather low (Kozarev 2012: 36). A certain level of distrust from the side of academic or other experts in governmental performance appears to be significant in many of the countries explored. In Central and Eastern European countries this might to a

great part be related to the conflicting character of the on-going and long-lasting political transition period from a non-democratic system to a democratic one.

In Ireland, the reported lack of transparency and public involvement in R&D policy making might be explained as being rooted in a lack of cooperative traditions and remaining authoritarian political culture clashing with the country's rather new and fast emergence as an R&D economy. The highly developed Irish system of advisory bodies and agencies thus apparently did not open up to the wider public or stakeholders and remained a closed deliberative circle of the executive branches of government and related expert communities.

#### *Role of Parliaments*

The deficit in terms of societal involvement in R&D policy making is aptly reflected in the fact that the role of parliaments in R&D policy making is reported to be quite low in all countries explored. There is no doubt that there are formal structures for parliamentary debate and decision making in R&D matters (standing committees). Formally parliaments are of course involved in R&D policy making by adopting laws or also by supervising public authorities. However, in most of the countries, the focus of parliamentary committees in charge of R&D policy making often is mainly on higher education and not R&D and its related economic and social relevance and impact. Parliaments are also reported not to have the resources to feed their debates with necessary knowledge on R&D issues. Parliamentary committees in most cases only occasionally organise hearings to improve the knowledge base of debates. Connected with the weak role of the parliaments is apparently also a lack of permanent structures at the interface between science, society and policy making, as reported for Portugal (Almeida 2012: 230). Thus R&D policies are mainly discussed and decided on without general publicity and sufficient transparency to motivate intervention beyond closed circles of experts from academia and governmental administration.

It is difficult to draw conclusions from the country studies regarding the reasons for the low involvement of parliaments. Explanations given in interviews such as MPs lacking a personal background appear to be somewhat shorthanded. We might rather take into account that the low level of public engagement in R&D issues (as reported in the country studies) and a widespread political consensus of R&D being a guarantee for the countries' economic development excludes interest in thorough deliberation on risks and benefits that might trigger parliamentary debates. Other causes related to political culture and particularities of the political system might apply as well. This might be illustrated by Ireland: The Irish voting system leads to MPs focussing on problems of their constituencies which – as far as no local interests are affected – apparently leads to leaving R&D policy to executive and academic expert communities (O'Reilly, Adam 2012: 150).

### *1.2.2 Debates on science and technology in national socio-political contexts*

The set of countries, building the basis for the comparative study done here, is quite heterogeneous as regards the political system, its function and history. Which kind of criteria count if one wants to assess barriers and opportunities for a TA institution influencing the political process? In the following we assume that an informed debate on S&T topics in the political sphere as well as in society needs solid democratic structures in function with active citizens demanding transparency and responsivity from the political sphere on S&T issues.

However, to overcome some firmly established judgments on European democracies, it is important to point out that according to indicators measuring the quality of democracy some of the "new" democracies have already overtaken some of the European founder members like Italy or France because of weaknesses in

their separation of powers (cf. Gabriel, Kropp 2008: 19). Especially with regard to democratic consolidation according to recent political studies in the meantime Central and Eastern European democracies including Lithuania, Hungary and the Czech Republic "no longer differ much" from Western Europe. Also Bulgaria is "well on the way to consolidation, though it is certain that their problems with corruption, organised crime, and the weakness of the judiciary cannot be overcome quickly" (Merkel 2010: 20f., also Merkel 2007).[8]

Comparative quantitative political analyses imply that there are very different national political contexts and political cultures which are reflected here in the sample. This also holds true when using recent data from the Eurobarometer more specifically focused on science and technology, which is used to illustrate some findings in the following (TNS Opinion & Social 2005, 2010).

## *Public Debates on S&T – Actors and Topics*

### *Strong experts – weak citizens*

The country case studies from the new member states and Portugal (namely Bulgaria, the Czech Republic, Hungary, and Lithuania) skeptically report with regard to the public interests in debating S&T issues: S&T topics are only hesitantly taken up by politicians as well as the public for debate. Generally, a "systematic integration" of S&T issues in a societal discourse including all relevant groups – politics, science and the public – seems to be often missing.

For the Bulgarian context one reason for the observed lack of debate especially from the political side is seen in the different time horizons of politicians and scientific and technological developments: Whereas elected politicians have to deal with the "short time horizon" of their election phase, the "long-term" complexity of S&T topics gives "no political return" for them. Furthermore, "political benefits" from investments in S&T developments do not occur as they also have a too long time horizon of return (Kozarev 2012: 37). S&T issues are thus often taken up in public discussions as a "secondary" topic to others, preferably economical ones.

***TA-Case example from Portugal: Parliamentary debate on Medically Assisted Procreation***

The topic of medically-assisted procreation (PMA) for the first time led to debates on regulatory issues in Portugal in 1986. After a first attempt to approve legal regulation was stopped by a veto of the president in 1999 a law on PMA finally passed the parliament in 2006, 26 years after the first IVF baby was born. In 2012 the parliament decided to seriously assess the 2006 regulation in the light of practical experience and to adpat the regulation according to the current scientific knowledge.

This kind of implicit assessment activity comprised a written opinion produced by two parliamentary rapporteurs and hearings organised by the parliamentary committee for health. The hearings included 6 experts and seven organisations (such as the Portugese Association for Fertility and the National Council of Ethics). The parliamentary rapporteurs supported their opinion on the draft bills by a technical note based on expert knowledge. This note however was lacking a clear indication of the background of experts heared as well as a transparent presentation of the opinions held by the experts.

The parliamentary Committee for Health requested a report on assisted procreation from the National Council of Ethics for Life. The council amonished deficiencies of the existing regulation e.g. that so far criteria and requirements under which the donation of embryos can be carried out in practice are missing. The councils reports states a serious lack of knowledge and data and states in the report that it would have been better the council would have given the time to consider the technical and social aspects of implications of the existing law before expressing a position on the proposed ammendments, thus requesting a proper assessment of the situation given in Portugal.

[8] The ongoing changes of the political landscapes have to be of course continuously updated – as the current Hungarian government which limits democratic participation and freedom of press currently shows.

Further reasons for a lack of "public debates" in S&T issues are identified such as a "lack of a debate culture and debate traditions" in Bulgaria (Kozarev 2012: 37), or a general scepticisim with regard to public debate rooted in national political culture in Lithuania. Very often, S&T topics are mostly discussed in expert circles advising the government and its respective ministries. Exclusively relying on expertise in political decision making seems to be also an acceptable approach in Lithuania (Leichteris, Stumbryte 2012: 194), as well as in Hungary where scientific advice is widely used in expert-based advisory boards. In the Czech Republic, it is described that the political sector has a "weak role in the creation of conditions for accepting new technologies and R&D results in the society" (Pokorny, et al. 2012: 72). This is also related to the fact that the public is not well informed about political steps and debates leading to decisions about S&T innovation and development. The other country studies also describe and admonish a general lack of transparency in S&T decision making from the governmental as well as the parliamentary side.

Although the public often is perceived and reported to "passively" (Pokorny, et al. 2012: 72) rely on political decisions in the field of S&T, S&T issues can still bear the potential to lead to public mobilisation in controversial cases, as reported from the Czech Republic, but also from Bulgaria, Hungary and Portugal and Ireland. In Hungary, for example, national debates on GMOs included street protests which in some cases finally led to an open dispute implying quite widespread and rational public and professional debate which for all participants surprisingly ended in a national refusal of GMOs.

With regard to citizen participation in the field of S&T it is reported that very often supportive framework conditions are missing. Be it the lack of debate culture on a general level as reported from Bulgaria and Lithuania or missing formally established structures for the exchange with the public in the Czech Republic. From Hungary it is reported that citizen participation has a weak standing especially among policy makers. Nevertheless, it is reported that there are initiatives of social scientists to experiment with participatory formats.

The conditions for public debate on S&T seem to be more favorable in Ireland and Wallonia. For Ireland a growing interest in citizen participation in the last years is reported, explicitly expressed by politicians (O'Reilly, Adam 2012: 159) based on actual technological conflicts on the local and regional level. In the ongoing political discussion on setting up a TA institution in Wallonia public involvement is a central topic for involved policy makers. Wallonia has already had experiences with broad participation exercises recently: on brain research and political reforms (Meeting of minds in 2007, G1000 in 2011/2012) as well as with a federal citizen conference on nuclear waste management in 2009/2010. These initiatives have been considered as successful and follow-ups are planned for the future (Delvenne, et al. 2012: 266). Despite this favourable climate for public participation on S&T issues in Ireland and Wallonia, both country reports describe that there is still no widely estabiahed practice. In both countries S&T debates are dominated by expert discussions, whereas public participation plays a minor role and is described as being "unidirectional": an exchange from "scientific experts to policy makers and/or society" without a response from society (Delvenne, et al. 2012: 266).

The findings from the country studies are in line with the quantitative findings of the TNS Opinion & Social (2010: 87). For a broad majority of the respondents from all of the countries analysed here, the involvement of experts (scientists, engineers, politicians) is regarded as the most appropriate way to take political decisions in science and technology. Following this strong expert orientation, the consultation on science and technology issues with the public is clearly regarded as beoing less important in Bulgaria, the Czech Republic, Lithuania, Hungary and Portugal. Only in Belgium and Ireland public opinion on science and technology appear to be of significant relevance for sound policy making as at least one third of the respondents are in favor of public consultation on matters related to science and technology.

### *Strong actors on the local level*

When considering *who* (which groups of persons or organizations) is actually active in national science and technology debates, two different kinds of actors are mentioned in all country studies: Scientific or technological experts on the one hand discussing S&T on a national level as well as civil society initiatives on the local level pushing public discussion on environmental or technological issues driven by NGOs on the other hand. An exception is Wallonia where – apparently partly due to a corporatist tradition of policy making – industries and labor unions (the collective bargaining) play an important role in the discussion about S&T and take clear positions with regard to the impact of technologies.[9]

However, skepticism prevails about the societal role and the political impact of local initiatives. An example is given in the Czech report where it remains unclear whether local initiatives acting on the municipality level have effectively contributed to final decisions of the municipality. Also the Irish case highlights the strong and important role of local initiatives with regard to environmental issues on the local level, but also underlines that there is a problem of making these bottom-up processes being heard and acknowledged by the government (O'Reilly, Adam 2012: 158). In the Portuguese and Hungarian country reports, political strategies are described which even strengthen the role of experts in S&T debates and lower the impact of public lay people. In Portugal, two papers reflect the issue of science, technology and governance specifically for the Portuguese context[10]. According to these studies a "tendency to exclude lay citizens from the debate" (Almeida 2012: 234), instead of integrating them leading to a lower motivation of stakeholders to engage especially with opinions "dissenting from official views" (Almeida 2012: 234) could be observed. Generally it is reported in the country studies that problems with the integration of stakeholders are rooted in prejudices regarding lay people, which are – as is explicitly stated in the Hungarian report – regarded by policy makers as being "emotional and incompetent" (Mosoni Fried, et al. 2012: 126).

With regard to the development of citizen participation it has to be pointed out that there are different historical contexts in Western Europe as opposed to the post-communist countries, as can be read from Irish and the Hungarian report respectively: Ireland has a "Western tradition" of social movements especially with respect to a "popular eco-movement" (O'Reilly, Adam 2012: 155) against nuclear power plants becoming active in the late 1970s. In recent years it occurred that the environmental activism of the local population was still alive and became visible in initiatives against plans for shale gas exploitation (fracking) in Ireland. These iniatives are very strong on the local level and even tend to radicalize their activities when they "remain unheard in the wider national debate" (O'Reilly, Adam 2012: 158). In contrast to this Western European history of the environmental movement, in Hungary, exemplifying the situation in post-communist countries, the development of civil initiatives especially with respect for environmental protection started in the mid-1980s with the decline of the soviet regime. Although the peak of these social movements was in the end of the 1990s, the groups are still to some extent active today, especially in fields of waste management (nuclear, hazardous waste, municipal waste). However, both developments described in Ireland and Hungary show that the influence of citizens initiatives is restricted and can easily result in disappointment and demotivation: "key decisions were made above their heads" (Mosoni Fried, et al. 2012: 118) as the Hungarian report states.

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[9] Whereas in the past Christian democrats have rather been techno-pessimistic and engaged in TA-like activities the socialists were used to consider technology as "unquestioned keystone for social and economic progress", a position that is currently evolving in both political parties and movements (Delvenne, et al. 2012: 266).

[10] Arriscado Nunes, J.; Matias, M. (2004): Agnostic spaces, contentious politics and the trials of governance: Environmental policies and conflict in Portugal. STAGE discussion paper 21 and Arriscado Nunes, J.; Matias, M. (2004): Science, Technology and Governance in Portugal. STAGE discussion paper 22.

Comparative studies on political and social participation and political transparency and reponsivity reveals that there is still a lack of public engagement in post-communist countries compared to western European countries: Citizens from central and Eastern Europe use their rights of political participation up to now only hesitantly. With the exception of the Czech Republic, also attendance in protest activities occurs less frequently. Political exertion of influence is mostly done via voter participation. According to recent European data (ref. Gabriel, Völkl 2008: 283ff.), the level of participation is highest in Belgium followed by Ireland, whereas Portugal, Hungary and the Czech Republic have the lowest levels of social and political participation.[11]

***TA-Case example from Wallonia: Mobile phone antennas controversies***

The case of public controversies on electromagnetic fields illustrates the different levels of regulations in Belgium (federal and regional), its complex interferences and clarification of competences in the field of "environmental health". On the federal level, after expert consultation according to a precautionary approach, norms which are three times higher than those recommended by the WHO and the EU were set. In 2009, the regulation of environmental health issues was committed to the regional level.

The case rather illustrates an unsuccessful example of citizen participation as at both levels (federal and regional) participation demands of local actors were not fulfilled by the government. Rather the strong orientation of the regional authorities on the federal precautionary norm "contributed to blackbox the decision-making process and additionally raised resistance" (Delvenne et al. 2012: 278). Generally, public authorities avoided controversies "by closing the spaces" (278) for debates on both level and thus, the participation of stakeholders was rather limited during the whole process: There was no institutional forum for the interrogation and an exchange of expertise of social actors to address and uncertainties of the citizens with respect to health issues. The only spaces for participation were "narrowed down […] pretty much downstream the decision-making process" (278). Finally, local actors were frustrated since their demands for negotiation were rejected also by the federal level and they now continue now "battle" (278) on the local level.

The authors state that a TA institute with an independent character could play an important role to accompany such controversies, possibly preventing a direct political interference in the controversies, which might lead – as the case has illustrated – to a "too early or unproductive closure" (278) of social participation demands.

### *The Role of Science*

It is obvious that the scientific landscape in all post-communist countries of the sample (Bulgaria, Czech Republic, Hungary, and Lithuania) is still very much influenced by the prominent role of the national academies of sciences. This strong role is for example described for the Hungarian academy which before the new law on the academy (1994) acted as it were "as ministry of science" (Mosoni Fried, et al. 2012: 124) in Hungary. Although none of the academies is currently active in the field of TA, at least in the Czech Republic and in Hungary there are traditions of problem-oriented and interdisciplinary research, as well as of applying methodologies also relevant for TA (e.g. foresight, future scenarios, indicators for sustainable development) at the national academies but also at universities. Hungary has since 1998 a strong foresight tradition (Mosoni Fried, et al. 2012: 116) and the work of the academy seems to be also focused on actual topics of interest for the Hungarian national context like waste management, food safety, climate change or the red sludge catastrophe in 2010. In the Czech Republic, there were already more concrete experiences with TA and TA like activities as for example the participation of the Czech Academy of Sciences in EU funded projects on TA concepts and methodologies or the establishment of the Czech Council on Health Technology Assessment (HTA) at the ministry of health as well the Czech participation into various European foresight activities.

[11] No information available for Bulgaria and Lithuania from this source.

***TA-Case example from Hungary: Preparation of the National Food Safety Strategy***

The Hungarian case study focuses on the development of the National Food Safety Strategy under the coordination of the Ministry for Rural Development. Already in 1993, the ministry integrated experts' expertise in the development of the strategy drawing on the expertise of the Hungarian Academy of Sciences. The Hungarian Food Safety Office, founded in 2003, which cooperated not only on the national but also on the international level, launched in 2004 the First National Food Safety Program using the expertise of "several hundred experts" (Mosoni-Fried 2012: 132f.). Hungary's entry into the EU caused significant changes in the legislation of food safety. In this process, the role of the national Food Safety Office was more and more strengthened implying a broader legal competence and the concentration of all relevant authorities under one the head of one ministry. Again, prominent researchers of the Hungarian academy of sciences contributed to the development of the new national food safety strategy coming in 2013. Hereby, the work of a strategic research program of the Academy, which started in 2008 was used intensively by the ministry, taking "into consideration the same general principles that are outlined in the strategic materials of the Academy" (133). In this latest attempt for a national Food safety strategies further stakeholder were integrated who had access to all relevant documents on the website of the ministry which was supported by a survey on the basis of the material. The input were compiled and discussed by all actors in the process: the Ministry, the Academy of Sciences as well as the National Food Safety Office.

This case study illustrates a successful contribution of scientific experts to governmental regulations in a specific political field which was coordinated by a ministry. It further illustrates the role of the Academy of Sciences in such a legislative process which is still the strongest actor in policy advice in Hungary.

In Lithuania and Bulgaria the science academies seem to have currently a less influential role and also fewer experiences with interdisciplinary and problem-oriented research. In Lithuania, the roles of the academy of sciences and of the research council seem to be more formal. By this, policy advice is provided to the parliament as well as to ministries. However, for the academy it is more important to take up the mission to promote science and science literacy in the wider public (Leichteris, Stumbryte 2012: 195). Although experts from the academy critically commented on the ongoing *foresight* strategy in Lithuania, supporting the need for science-based policy advice in general, the Lithuanian academic institutions seem to be "passive" (Leichteris, Stumbryte 2012: 195) with regard to S&T topics of national relevance. In Bulgaria, the Academy of Science faces major internal restructuring at the moment combined with severe problems in scientific knowledge production which led to a low public reputation of scientists and also an erosion of trust in scientific institutions in recent years. This low reputation of the science system makes it even more difficult to transform science in a communicable topic in the Bulgarian context, as S&T topics "transpire only marginally within the public discourse" (Kozarev 2012: 43).

In contrast, in Ireland and Wallonia there are quite a few scientists active in TA-like research fields like problem-oriented applied research in the fields of Science in Society, STS or environmental studies, including a set of PhD-programmes as well as a range of research institutes working in this field. Similar to this, and of particular interest here, is the Portuguese case, as the most active institutions in fields related to Technology Assessment in this national context are academic ones: there is one international PhD program running in the field of social sciences and technologies focusing specifically on TA, and there are two TA related stakeholder networks (GREAT[12], Bioscience) which seem to imply a strong academic focus on TA in Portugal (Almeida 2012: 235f.; Moniz, Grunwald 2009).

### *S&T as subject of social debates*

When it comes to specific (contested) topics in the field of S&T which were debated and were received politically as well as publicly in the respective national contexts, the compilation (see below) shows a broad

[12] GREAT is a national network on TA with members from the fields of academia, economy, public institutions, as well as hospitals (more information available here: http://avaliacaotecnologia.wordpress.com/).

range of issues. The topics which were debated most intensively were environmentally and health-driven topics like GMOs, energy policies, waste management as well as food safety. GMOs raised the most controversial and vivid debates which also implied public resistance in some countries. But also specific implications of technologies like ICTs or ethical concerns in controversial fields like assisted reproduction were debated within national contexts. Furthermore, locally or regionally embedded large-scale technological projects like a dam or an oil pipeline were subject of national interest.

Topics mentioned (the following list is illustrative and not exhaustive):

- **GMOs** (Bulgaria, Czech Republic, Hungary, Ireland, Lithuania, Portugal, Wallonia)
- **Waste management** (Czech Republic, Hungary, Ireland, Portugal, Wallonia)
- **Nuclear Energy** (Bulgaria, Czech Republic, Lithuania, Wallonia)
- **Food safety** (Bulgaria, Hungary, Lithuania, Portugal)
- **ICTs** (Bulgaria, Lithuania; Wallonia) *(Privacy of electronic communication in Bulgaria; e-voting, ACTA-initiative in Lithuania)*
- **Electromagnetic fields/ mobile phone antennas** (Ireland, Lithuania, Wallonia)
- **(Renewable) Energies** (Czech republic, Ireland)
- **Shale gas/fracking** (Bulgaria, Ireland)
- **Assisted reproduction** (Bulgaria, Ireland, Portugal) *(in-vitro fertilization; surrogate motherhood esp. Bulgaria)*
- **Assisted suicide** (Bulgaria, Ireland)
- **Stem cells** (Bulgaria, Ireland)
- **NATURA 2000** (Bulgaria)
- **Oil pipeline** (Bulgaria)
- **Water management** (Czech Republic)
- **Ageing** (Czech Republic)
- **Dam project (**Portugal, red sludge catastrophe in Hungary)
- **Nanotechnology** (Ireland)
- **Animal experimentation** (Wallonia)

***TA-Case example from the Czech Republic: Public debates on Nuclear Waste management***

The case study of the search for a nulear waste disposal site in the Czech Republic exemplifies that despite an often attested lack of the general publics awareness of S&T issues public reactions can be vivid if it comes to direct local effects of S&T policy making. It also shows that participatory formats can gain relevance for governance in case of public resistance questioning the legitimacy for decision making processes.

Having set up a first nuclear power plant in 1972 and having 2 nuclear power plants delivering 30% of the Czech republics electric power, the country is in need for a final depository of nuclear waste. The search for a deep geological depository started in 1980. According to the governments plan after a research phase for finding a location for the wadste disposal site two sides have to be selected which then will be explored technically for disposal. The responsible authority had committed itself to not start investigation without consent from the municipalities responsible for the areas chosen. Two environmental action groups together with municipalities have organized public meetings with citizens in affected municipalities as well as local referenda and protest events, leading to some municipalities on the basisi of their citizens' opinion rejecting their willingness to accept, if being selected.

The responsible authority in 2010 has set up a "Working group for dialogue about the deep geological repository" with participation of representatives of the authority, representatives of municipalities considered as locatoions for the depository, environmental NGOs, members of parliament and scientific experts. The working group officially is an advisory body of the Ministry of Industry and Trade. There is however some criticism that the ministry ignores the recommendations of the working group. The working group as a participatory body already managed to enforce changes of the atomic law and currently is pushing for a legal right to veto for municipalities against a decision on the disposal site and for a reassessment of its legal status as advisory body.

Next to the "classical" S&T topics also issues with regard to development of the science and innovation system were prominently mentioned to be subject of political debate in Bulgaria, the Czech Republic, Hungary, Lithuania and Ireland like e.g.: national innovation strategies, restructuring and strategic development of the science and education system, or priorities for funding the R&D and innovation system. These issues obviously are of high national interest and are in their national contexts regarded as a potential topic for TA-like activities. Especially in the new member states there seem to be a high interest and a perceived national need to inform and develop such strategies in order to stay or to further develop economic competitiveness. Up to now corresponding decisions and debates are accomplished by governmental agencies with the support of scientific experts. The public is not included in these debates.

#### *Media coverage and public attention and "public understanding of science" initiatives*

As is well known, media coverage of S&T topics is high as far as topics raise political interest and controversy (beyond pure scientific discourse). In Lithuania for example media attention was relatively high for those topics that made it to the political agenda, namely GMOs and food safety and nuclear energy). The same is reported from Wallonia where nuclear power, waste management, sitting conflicts, GMOs, ICTs, and animal experimentation was covered by the media. Also in Portugal, media coverage was highest on environmental topics which implied public controversies on local or national levels, like waste management. In the Irish report, fracking is used as an illustrative example to show the crucial role of the media initiating and forming discussions on local and national levels, including lively debates in the Irish Times on the topic.

As regards "science journalism" (in terms of a specialized branch of informing the general public about newest developments in S&T), the Irish case hints at structural poblems, namely limited capacities, as in Ireland only a small number of journalists focuses on S&T. For the Czech Republic a lck of governmental initiatives is amonished which would "give publicity" (Pokorny, et al. 2012: 73) to the field of S&T. In Bulgaria, an obligatory air time for science at national media channels is regulated in the Radio and Television act. However, this did not lead to major effects, as the format of a popular science show which was developed in this context was televised only for three months. The Bulgarian media coverage on S&T issued is aggravated by the fact that the media seems to be strongly biased by political and corporate

interests, only in rare occasions giving analytical background information on scientific and technological issues.

According to data from the TNS Opinion & Social (2010: 10) an average rate of 20% of European citizens are not at all interested in recent scientific and technological developments. From the countries under review here, most of the countries – Belgium 20%, Czech Republic (22%), Ireland (26%), Portugal (35%), Bulgaria (36%) and Lithuania (37%) – are close to or even exceed this rate of disinterest. Only in Hungary (8%) a lower share of citizens is not at all interested in science and technology issues. According to the findings from the Eurobarometer citizens of the countries under review are also less interested in science and technology issues than the average European. According to the statistics, they read less often articles on science in newspaper, magazines or the internet than the European average of 19% on a regular basis: Lithuania 17%, Ireland and Hungary 16%, Czech Republic 14%, Portugal 13%, Bulgaria 13%, with only Belgium with 30% being far above the European average (TNS Opinion & Social 2005: 23). The Irish, Portuguese and Hungarian case studies report on politically driven attempts to raise the interest in science by specific "public understanding of science" approaches. In Ireland, the number of public programs aiming at a popularization of science has increased in recent years. The Irish public science programs aim especially at school education (O'Reilly, Adam 2012: 155). Experiences from these initiatives show, that an increased interest in science issues can be reached by young, well-educated citizens living in cities (O'Reilly, Adam 2012: 155). For the "larger population, outputs from science are having 'little resonance, except where they bear on pressing topical issues, like health, energy or environment'" (O'Reilly, Adam 2012: 155). Also in Portugal, there have been increased political attempts to communicate science into the society in the last years. The parliament has supported a campaign for the popularization of science launched by the national science foundation, which included public funded media coverage of recent scientific discoveries aiming to strengthen the communication of science into society (Almeida 2012: 233). The national agency "Ciencia Viva" ("Live Science") organizes together with the committee for Education, Science and Culture the "Café Ciencia" in the parliament, where politicians discuss with scientists and stakeholder on various topics. Furthermore formats for the communication of science and technology in the media (radio and TV) were publicly supported to strengthen general awareness about science. Also the Hungarian country study reports about special science popularization formats broadcasted in the national media. In Hungarian TV, a popular science education program initiated by the Hungarian Academy of Sciences and a special national TV channel cover scientific issues.

It appears that as far as government initiatives on science and the public are convcerned approaches guided by the so called "deficit model" of public understanding of science are dominant. The public is regarded to be not sufficiently knowledgeable on scientific issues and science is regarded to need supported by being "popularized". In this respect the central problem is apparently less a perceived need to educate the public in order to deal with public criticism on S&T issues but to deal with public disinterest in S&T that might interfere with or lack to support governmental modernisation and innovation strategies.

### *Role of policy advice*

#### *Lack of trust and legitimacy*

A strong need to improve the current situation of national policy advice is expressed in the Bulgarian and Portuguese reports with regard to the legitimacy and transparency of political decisions as well as setting up of missing communication channels between science, politics and the public. Bulgarian interviewees were "very critical of the available expertise and knowledge base" (Kozarev 2012: 42) of current parliamentary debates which are not sufficiently equipped for a properly informed decision making process on S&T. In

Bulgaria, S&T expertise is typically provided internally by governmental staff at the respective ministries. In rare occasions external expertise is asked for on an "ad-hoc basis" (Kozarev 2012: 42). However there is almost no public accessible information on this expertise. Corresponding to this, a lack of communication channels between the parliament, the public (NGOs) as well as science and industry on the science and technology issues is stated.

***TA-Case example from Bulgaria: Parliamentary committee for the study of best practices in shale gas exploration and extraction***

The Bulgarian case study exemplifies the problematic consequences of premature, badly informed and publicly intransparent decision making as well as the problems to find ways to introduce TA as scource for independent knowledge based policy advice in an adverse political culture.

A decision of the Bulgarian government to give a license to a company for exploring shale gas exploitation in Bulgaria led to controversies and public protest. The decision taken by the government was obviously not based on broad information on fracking technologies and its probable risks and did not involve the parliament as the body presenting the wider public. The decision was motivated by reducing Bulgaria's dependency on Russian gas deliveries. When the issue was taken up and made public by parliament the environmental risks of fracking became the focus of public debate. The (again) badly prepared decision by parliament on a moratorium for fracking technologies led to criticism that the way the moratorium was phrased would imply a moratorium not only for shale gas fracking but for the use of certain technologies for conventional gas exploitation as well. As a reaction to this situation the parliament decided to set up an ad-hoc inquiry committee of parliamentarians and experts with a mission that can be regarded to be that of Parliamentary Technology Assessement. The committee aimed at assessing uses of technologies for shale gas exploitation in other countries in order to come to conclusions on economically and environmentally useful and feasible shale gas exploitation technologies. The practice of the commission however revealed a lack of joint fact finding activities between experts and MPs, many of the MPs were non-active in the committee and the committees negotiations did not lead to a proper report laying out data and arguments for and against the use of exploitation technologies. The comittees recommendation of rephrasing the moratorium in a way that conventional gas exploitation would not be affected was accepted by the parliament. The committee however failed to have any effect on the ongoing public debates on risks and benefit of shale gas exploitation.

Also the Portuguese case describes a lack of communication between politics and different stakeholders (Almeida 2012: 234) and points to widespread public distrust in political decision making being rooted in a sound "objective" knowledge. There seems to be a low level of trust in politicians, which very likely results from a lack of transparency in decision-making processes and their underpinning information (Almeida 2012: 234). Although there is a number of institutions which can provide policy advice in Portugal (e.g. a formal advisory body of the government, other national councils) and although there is an occasional demand for scientific advice from the political sphere (e.g. the government or parliamentary commissions), there seem to be no institutionalized or "routinized" ways for constant policy advice. Communication channels between scientists and policy makers and other potential knowledge providers are not clearly defined. They rather depend on decisions of policy makers to ask for advice and thus are characterized as "fragile and dependent on the continuous will of interacting between specific stakeholders" (Almeida 2012: 235).

#### *Strategic planning of science, technology and innovation*

The Czech Republic, Hungary and to some extent Lithuania seem to have a similar approach to use expert-based policy advice especially for strategic planning and evaluation of science and innovation strategies at governmental level. In the field of science and technology, the government is regarded as the most important actor, while the parliament is assessed as far less important and knowledgeable (see chapter 2.1). In all three countries, a set of institutions exists, which give advice to the political sphere (policy makers and government) on a regular basis. In the Czech Republic a number of expert committees have been established. In Hungary the institutional setting is fragmented with four ministries sharing the powers and

responsibilities. The multi-stakeholder National Research, Innovation and Science Policy Council served as the advisory body to the government between 2010 and 2012 in the coordination of science, research and innovation policy. It is about to be set up again in 2013. With regard to Lithuania's science, technology and innovation policies two analytical centers of different ministries were recently founded to base the ministries' decisions.

It becomes apparent that all these institutions give strategic advice with regard to the future development of research and innovation strategies, whereas policy advice with regard to future (controversial) technological or scientific development is of minor relevance. An exception here seems to be the Czech Republic which has set up a bioethical commission as well as three expert committees dedicated to different scientific topics (life sciences, technical sciences and engineering, humanities and social sciences). Furthermore, the example of a civic initiative which fundamentally shaped legislative decisions on the electronic signature by its expertise but also by starting a public discussion shows broader experiences in the Czech science based policy advice than in the other countries mentioned above. In Hungary the National Research and Technology Office in 2007 launched an initiative with the title "Support of National Research and Technological Platforms (NRTPs)" and established 20 NRTPs in areas of importance and perspective for the national economy. Meanwhile the Hungarian Academy of Sciences has set up 9 strategic committees in the most emerging fields (e.g. safety of food, water supply, information society, energy, etc.) in order to help strategy-making and enhance dialogue between the interested actors.

The focus on strategic innovation is - as had been mentioned before (2.1) – motivated by national efforts to improve the competitiveness of the national economy. This is highlighted not only in the Czech Republic, Hungary, and Lithuania, but also in Ireland and Wallonia. In this context, very often, foresight methods are used by governmental agencies to assess the economic strategic planning (see e.g. the recently published National Research Infrastructure Survey and Roadmap "NEKIFUT" report in Hungary).[13]

***TA-Case example from Lithuania: Public debates on the construction of a Nuclear Power Plant***

Ongoing discussions on the use of nuclear energy and the construction of a nuclear power plant in Lithuania exemplify how deeply entrenched political positions hinder a constructive debate on a viable and socially robust path to future energy supply. Unbiased analysis and mediation by an independent institution that could help to open up debate and unlock blockades is missing.

Lithuania' "Ignalina´s Nuclear Power Plant (IAE)" was built from 1972 until 1986 and is now subject of debates about a new power block to be added to the plant. The history of the plant rooted in the energy strategy of former Soviet Union. Since the accident in Chernobyls atomic power plant in 1986 there is a public debate about IAE, because it had been using the same "unsafe" reactor type as in Chernobyl. "Green" protest against the nuclear power plant was very much linked to the Lithuanian movement for independence of the Soviet Union. The green movement ("green clubs") collected 700.000 signatures against the power plant in 1986. After Lithuania's independence in 1990, the Soviet Union initiated an economic blockade which led to a shift in the debate and calming down of green anti-nuclear protest: The debate about IAE now focused on whether the plant can support Lithuanias independence from Russian energy supply or not. The debate continued during the process of joining the EU. Since 2005 it appears that changing governmental coalitions supported the development of atomic energy and the construction of a new plant in Ignalina. A Japanese company is foreseen to build the new power block. Then, in 2011, after the nuclear accident in Fukushima, new protest initiatives against nuclear power have been launched. A referendum against the power plant was less successful than in the year 1986, but revealed that a majority of the population is sceptical with regard to the construction plans. Proponents of nuclear power questioned the validity of the results of the referendum. The government apparently is stuck now in a debate characterised by an exchange of all kinds of arguments, claims and allegations (pro and con) with regard to issues such as "energetic independence", "security and safety", "economical risks and benefits" as well as the publics perception and preferences. The debate is characterized by mutual allegations of personal (financial) interests, hidden agendas and corruption. It is symptomatic that colleagues when doing interviews for the case study have been asked by stakeholders which side they represent and from whom they get money (Russians or Japanese).

[13] The Hungarian National Research Infrastructure Survey and Roadmap is available under http://www.nih.gov.hu/strategy/news/nekifut-project-new.

***Policy advice and public controversies***

In contrast to Bulgaria and Portugal, where improved institutionalized/ organisational procedures are requested or to the Czech Republic, Hungary, and Lithuania where policy advice mainly aims at strategic planning of science, technology and innovation, in Ireland and Wallonia policy advice dedicated to the assessment of certain (controversial) technologies is in place. In the Walloon region, a wide range of governmental advising bodies is active with regard to S&T in different fields for "technology guidance" or in the field of environmental assessment. However, the level of cooperation between the different entities appears to be quite low and their focus quite specialised.

In Ireland, during the years of strong economic growth, there has been a time where there was an *"almost complete absence of parliamentary debate*" on S&T as there was an unquestioned acceptance of Ireland's commitment to science, research and innovation (O'Reilly, Adam 2012: 158) by both political and social partners. Since the mid-2000s, however, an increase in questioning S&T policies has taken place, also implying an increased interest in "strategic intelligence tools" including TA and foresight with a focus on Ireland's competitiveness on global markets (esp. ministerial statement on nanotechnology in 2005, another parliamentary initiative documented in 2006). Driven from another angle was the ambition to take up the topic of biotechnology in 2000 in Ireland, where an increased demand for public participation methods was expressed by policy makers in order to provide political options on the basis of "key stakeholder" discussions. More recently the wish for public involvement was renewed during public upheavals due to the protests against shell gas exploitation in 2012. In this context, policy makers explicitly expressed their demands and started initiatives to enforce public involvement in policy making in order to be "better informed when making decisions on issues related to science and technology" (O'Reilly, Adam 2012: 160) by learning about the motivation of local protests and citizens demands.

***TA-Case example from Ireland: Closure of the Irish Council for Bioethics***

The short life (2002 – 2010) of Ireland's so far unique independent advisory body on S&T governance, the "Irish Council for Bioethics", exemplifies the precarious situation of independent scientific advisory bodies and how sensitive the issues of unbiased and transparent procedures can be.

The Irish Council on Bioethics was established at the Royal Irish Academy on request of the Irish government in 2002. The council was made up by experts with different backgrounds appointed by the Royal Academy. The members were not asked to represent particular bodies but joined the Council "by virtue of their personal expertise, distinction and authority". In 2008 the Council had been reorganized as a company limited by guarantee with three directors who appointed the council members. The council's mission then was apart from identifying and discussing ethical question related to advanced medical research to promote public understanding and to stimulate discussion. The council published many valuable reports on issues such as research ethics, GMOs, biometrics and human biological material. A report on stem cell research published in 2008 was controversially received by the public and policy makers and (at least) contributed to the Council's closure in 2010.

In their report on stem cell research the council members unanimously supported legal regulation of stem cell research based on a definition of the moral status of the embryo, which attributed *significant* rather than *full* moral value to the embryo. This was obviously not in line with positions held by the catholic majority of the population holding that he human embryo has to be protected as a full human being right from its conception. The Council in preparing its statement and recommendations invited the general public as well as stakeholder organisations to give input to the council's work by by filling in an online or postal questionnaire. The results from this public consultation made apparent that the majority of those taking part did not support the council's definition of the human status of the embryo. The council in the aftermath of the publication of the report was confronted with criticism of having ignored the perspective of the majority of the Irish population. The argument of the Council that the consultaion was not meant as an opinion poll but just as a means to learn about arguments pro and con stem cell research that could help the independent reasoning of the Council did not help. Obviously the council – apart from being in dissent with a great part of society – did not give enough credit to the input given by citizens and failed to make his mission as a body based on independent reasoning of its members sufficiently clear. It was still with received with surprise when the government in the context of an announcement to save 7.5 billion € from the public budget until 2014 stopped funding for the Council. The Council's protest against closure, however, was neither supported by a significant part of the general public nor by expert- or stakeholder communities. The closure of the Cpouncil did not contribute significantly to the savings in the public budget, but the council, lacking the backing of strong advocates, was an "easy target". The council "…fell to political expediency and the desire for the government to portray an image of 'waging war' on wastage in public expenditure and in reducing the number of Quangos" (O'Reilly, Adam 2012: 169). Ireland is up to now is still left with the situation of stem cell research beeing legally not regulated.

## 1.3 Policy options and national recommendations for a TA infrastructure

The countries involved have very different preconditions with regard to the political setting described above, but also with regard to experiences with TA. For the Central and Eastern European countries involved in the study it can be stated that the concept of TA is (was?) widely unknown so far – with a few exceptions such as in the Czech Republic, where TA-like activities have been going on at the Academy of Sciences and the Technology Centre ASCR. Generally it is quite clear that PACITA had to make relevant actors aware of the idea behind the concept and its practical workings as a tool of policy advice. It thus can be regarded as a first achievement of the PACITA project to motivate relevant actors to jointly discuss the possible role of TA in the context of the challenges they are actually facing in the field of S&T policy making. There is some indication that this might lead to further activities in terms of exchange about TA among actors and networking activities beyond the PACITA project.

Ireland sharing some of the problems of developing a strong R&D system with Central and Eastern European countries nevertheless has a relatively developed system of S&T policy making and innovation policies. Here TA was perceived as something that in terms of strategic planning and evaluation of policy measure exists already. There is however a felt need to open up existing structures of knowledge based

policy making to stakeholder groups and an attentive general public. Existing TA like activities and structures are so far also not connected to the European TA community.

Portugal again shares structural problems of the R&D system with the other countries as well as weak or inconsistent structures of democratic S&T policy making. There is however a small but vivid network of academic TA researchers and despite (or probably exactly due) to the rather weak role of the parliament in S&T policy making there already have been initiatives out of the parliament to explore the need and options for adapting TA as a parliamentary institution. PACITA could connect to these activities and help to re-introduce the TA issue to the agenda of the parliamentary committees.

Wallonia is an exception as there is already a history of TA debate in the political system. There have been several initiatives to set up TA capacities related to the government and the parliament and just at the very moment when PACITA started its activities a decision for setting up a TA institute has officially been taken. PACITA here could provide additional space for further development of the idea and specification of institutional options, as there apparently is inconclusiveness about the institutional body the TA capacity should be linked with and who the addressee actually should be: Parliament and government are mentioned as main addressees, but there is a vivid political debate on the polity a TA institute should address: Walloon region or Federation Wallonia-Brussels (Delvenne et al. 2012 for more details).

When it comes to policy options especially with regard to the further development of a TA infrastructure, the country studies propose different paths. These can be summarized in the following classification of countries:

**1. Supporters of the parliament (Ireland, Portugal, Wallonia)**

In Wallonia, Ireland and to some extent Portugal, members of parliament or parliamentary committees expressed their interest in TA, thus the parliament was selected as main addressee for TA activities in these countries. The process is further advanced in Wallonia with a parliamentary decree for TA since 2008. Ireland and Portugal are at the beginning of such a process, as both parliaments expressed an interest in TA. In both countries, the parliaments have a rather weak political role. Whereas, in Ireland, TA is regarded as a possibility to strengthen the role of parliament (O'Reilly, Adam 2012: 162), in Portugal, the advantages of a TA unit at the parliament is seen as a possibility to support the "political, social and economic" development of the country (Almeida 2012: 237).

In all three countries the country studies advise to use existing institutions for future TA activities in order to draw on national academic expertise in S&T. Furthermore, a special interest is expressed to include participatory aspects in a future TA unit either to make first or respectively improve national experiences with methods of participation or to include relevant stakeholders and the public in political decision making in science and technology in the future.

**2. The innovative explorers (Bulgaria, Lithuania)**

The national recommendations developed for Bulgaria and Lithuania present a new model for a national TA landscape: the network model. In both countries, there were only very few former experiences with TA or TA-like activities. However, during the PACITA activities TA was identified as "an unrecognized need" (Leichteris, Stumbryte 2012: 200) by some of the relevant decision makers. It is seen as the main function of such a network model to raise awareness for S&T topics in society and by decision makers in relevant political fields. Both countries consider it to be helpful to start with some kind of pilot project first (as was the case also in the starting phase of POST, TA Swiss or IST, ref. Ganzevlees, van Est 2012) in order to "prove" the national relevance and to increase the understanding about the concept of TA but also about possible "products" of TA.

The two NGOs from Bulgaria and Lithuania participating in the PACITA project are both well connected to the national S&T landscape and draw from their networks to propose relevant expertise and also to address decision makers on S&T issues. During the process of exploration both country studies identified possible windows of opportunity for TA in the current system, with regard to a new national innovation strategy (Bulgaria) or with regard to funding options from the European structural fund (Lithuania). Problematic, however, is the lack of academic traditions in the field of interdisciplinary, problem oriented research, connected with a current lack of trained personnel in both countries.

**3. The institutional traditionalists (Czech Republic, Hungary)**

The Czech Republic and Hungary make up a third group. Both countries have in common that the academy of sciences are decisive players in the field of S&T policy; furthermore the national academies in both countries have been in contact in the with TA, respectively TA like activities (especially foresight and STS). Both evaluate the "system barriers" (Pokorny et al. 2012: 80) in the current political context as being quite strong and are thus pessimistic about the establishment of a TA unit in the future. Barriers to be dealt with are lacking options for national funding of TA in the current situation, a lack of trained personnel, but also a general lack of interest from the decision making sector in S&T as well as the public.

The best chances if any to build up a TA institution are for TA being integrated into already existing institutions which act at the governmental level with responsibilities in monitoring and evaluation of S&T. Thus, here the specific function of TA would be to support the development of national agendas and strategies for research and technology development. In Hungary, the Academy of Sciences (with its extensive membership) appears to be the only public institution that has the infrastructure and human potential to investigate policy alternatives related to scientific issues in various strategic areas.

But nevertheless, also in the Czech republic and Hungary PACITA could to some extend contribute to raise awareness of a broad scope of options of use TA as a tool for improving the knowledge base of policy making TA and for modernising structures of democratic decision making (Mosoni Fried et al. 2012: 119).

## 1.4 Conclusions – A second wave of Technology Assessment in Europe?

### *1.4.1 Institutionalizing TA in Europe – old and new developments*

If we look back at the history of TA, the socio-political context of the 1970ies and 1980ies (when most of the existing Parliamentary TA bodies were set up) it is obvious that in the seven countries explored in the PACITA project the situation nowadays is completely different. Notwithstanding existing peculiarities in the different PTA countries at the time of the first (or second) wave (see also Rip 2012) of TA institutionalization we regard the following features to have been pertinent in one way or the other for the establishment of PTA in the 1970ies and 1980ies in today's PTA countries:

- There was a highly developed and differentiated R&D system with a strong and visible commitment from the governments to develop and fund national R&D performance in order to improve or foster international competitiveness of the national economy. S&T was clearly regarded to be a decisive factor of social development, which in the best interest of society has to be taken care of by government. This – among other developments – was reflected in the setting up of specific structures in governmental administration (Research Ministries) growing public funding for R&D, as well as by increasing salience of R&D issues in many standing committees of parliaments.
- There was a strong (compared to the implicit consensus on S&T in the 1950ies and 1960ies) and articulated public critical interest in S&T issues. Apart from a more generalized criticism against

"industrialization" or "consumerism" there were citizen initiatives on every political level (from the local to the national) demanding to have a say in planning decisions and R&D politics as these were regarded to interfere with citizen rights. This was not the least a reason for the salience of the issue of public participation in TA right from the inception of TA in the US and even more later on in Europe (Hennen 2013).

- In the academic sector problem oriented research and self-reflexive science gained importance, first in the field of environmental politics, later on in Risk Assessment, Systems Analysis, in the social sciences (STS, risk perception) and in ethics of S&T (environmental ethics and bioethics). The term "sustainable development" served as a focus for interdisciplinary problem oriented research. With these activities there has been a visible and growing fraction of the academic sector advocating TA-like "hybrid-science" and policy oriented research.
- An effect of these factors was a strong and explicit demand by the policy making sector for support by best available scientific knowledge as well as by in means to take up or deal with public concerns. In some countries this manifested mainly in demands for a particular support of the national parliament with best available and non-partisan scientific advice. In other countries demands for stimulating a vivid (and well informed) public debate and a better connection of parliament and government to on going public debates was prevailing. This resulted in different forms of institutionalization of TA bodies in, at or in relation to parliaments and governments as has been shown in a previous PACITA report on existing policy related TA practices (see Ganzevles, van Est 2012).

When we look at what the country studies tell us about national R&D systems, democratic S&T governance structures, and interest of the general public in S&T it is clear that the societal context today in these countries is to a high degree different from what was prevailing in the 1970ies and 1980ies.

- In most of the countries explored it is not about further development of a strong R&D system but it is on building up new structures or fundamental restructuring of existing structures in R&D. Especially in Eastern and Central European countries it still is seen as a challenge to abandon the heritage of a hierarchical and centralized, bureaucratic system of R&D and develop towards a more diverse, market like and self-governing system of R&D structures. It is much about setting up new funding structures (competitive funding instead of institutional funding) and new agencies for funding, promoting and evaluating S&T. The R&D landscape is in transition (for other reasons also in Ireland and Portugal) and it is less about reflection about "protecting" societal needs and values against the dynamics of S&T but about instigating dynamics and exploring innovation paths to generate economic growth, to stimulating social welfare and a better quality of life and to keep up with globalisation pressures. Social impact of S&T comes into perspective less in terms of environmental or health risks and ethical issues but in terms of supporting societal welfare. Technology Assessment thus is expected to provide support with strategic thinking on robust R&D structures, options for innovation policies and evaluation of existing structures and practices. It is not by accident that whereas TA often is not very well known in the countries explored, "foresight activities" had been promoted widely in some of the countries.
- Governments play a central role (ministries for education, economy, and science) in restructuring processes with setting up evaluation and funding programmes and related agencies as drivers of the process. There is however apparently no open public discourse on the role of R&D structures for societal development. The process is restricted mainly to administration and experts. Accordingly parliaments have a rather weak role in this context. S&T in related parliamentary committees is often mainly dealt with in terms of scientific education and development of universities – innovation policy

as well as shaping and regulating the context of implementation is of marginal parliamentary relevance. With the exception of Wallonia and Portugal parliaments are not active in taking up TA as a means to strengthen their own role and are often also not regarded by TA-interested actors as appropriate places for TA activities. Often a lack of democratic structures in S&T policies is perceived, as well as a lack of communication and cooperation among relevant actors (academia, government, parliament, CSOs) – TA then comes into perspective as a means of unbiased information of discourses (like knowledge based policy making or responsible innovation) or a platform to establish a democratic (public) S&T discourse (independent of reflections on its institutional setting).

- At least for the Eastern and Central European countries involved in the exploration it applies that a vivid and well-connected scientific community active in problem oriented research or reflexive S&T research is not visible. There often are single chairs at universities active e.g. in science and technology studies, and at the Academies of Sciences there is a tradition of philosophical thinking on S&T. We also find "ethics committees" attached to professional associations. Also some activity in environmental research usually can be identified. These activities however often appear to be isolated even in the academic sector and a connection with politics e.g. via advisory bodies or public uptake of results is not visible. Thus important TA entrepreneurs are missing in those countries. On the other hand we see that the academic sector complains about not being sufficiently involved in S&T policy making (especially in on-going restructuring of the R&D sector) and reactions at workshops showed that "knowledge based policy making" is regarded to be a promising concept to support more "rational" policy making. These notions often are accompanied by "technocratic" connotations. Nevertheless they are also often coupled with a demand for more transparent, public and accountable processes of decision making and might thus serve as door openers for TA.
- Other than in the 1970ies and 1980ies in western European countries, S&T is far less an issue of a vivid public discourse and activism of CSOs. Whereas in western Europe the nowadays relatively low public engagement in S&T debates comes with an established system of professional and public authority bodies dealing with risk and ethical issues, such structures are missing in the countries explored in PACITA (with the exception of Wallonia). For those examples of public controversies reported in the country studies (such as e.g. the debate about nuclear power in Lithuania) it is often noted that they are characterized by a lack of platforms for constructive interchange of actors including CSOs and lay people: TA is expected to play a role in this respect. On the other hand "the public" often comes into perspective with complaints about the lack of interest in and knowledge about S&T issues. As much as this might be in line with a well-known attitude of scientific elites and the prevalence of the so-called deficit model of Public Understanding of Science, this might also indicate a specific problem connected with a lack of trust in democratic structures and with distance to the political process that goes beyond the usual disenchantment with politics. In all countries explored there is, to various degrees, a lack of tradition in public debates on S&T as well as a relative lack of structural channels or platforms for public debate (including media and CSOs). Thus "stimulating public debate" as a mission of TA may gain particular importance here. This would probably also include aspects of Public Understanding of Science activities, while it may also be more interactive and open-ended. It also is important to relate this TA mission to the actual activities of expert communities and public authorities in building up R&D structures and instigate innovation policies. Debates thus might be needed about what "socially sound" innovation actually would mean in the national context and what the actual role or salience of S&T for the development of economy and society can be.

All in all, TA in the countries explored has to define its role in relation to the following context features:

- On-going often not well coordinated activities of governments to build up or restructure the R&D system. In this respect TA is often explicitly expected to contribute to strategic planning of the R&D landscape and evaluation of R&D capacities.
- In the context of globalization and crisis, innovation policies to improve competitiveness are central in the countries involved – "the economy first". TA would have to position itself with respect to these activities by providing support for identifying socially sound and robust country specific innovation pathways ("constructive TA") and contribute to lower costs of trial and error learning.
- Democratic and transparent decision making structures are often not well developed. Part of this is a low profile of parliaments in S&T policy making as well as a lack of communication among relevant actors. TA could find a role here as an independent and unbiased player to induce communication on "democratic" structures in S&T policy among relevant actors.
- "Involving the public" is apparently regarded to be a challenge by many actors in the countries explored. In this respect motives of democratizing policy making are often merged with "paternalistic" motives of "educating the public" (media, lay people). The latter nevertheless may indicate a real problem of broad public unawareness regarding the democratic relevance of S&T politics and it has to be clarified to what extent TA's mission of "stimulating public debate" can adopt to that problem (without becoming "persuasive").
- In all countries explored actors from different perspectives highlight problems such as in-transparent decision making, lack of trust in democratic structures, lack of competences of relevant actors, bounded rationalities of relevant actors, lack of strategic long-term thinking. All this results in an explicit demand for "knowledge based policy making" in the context of which the (not very well known) concept of TA is welcome as a means to underpin decisions with best available knowledge in an unbiased manner. Specific ideas about how to institutionally build it into the existing system are however missing. It might well be that in terms of institutional solutions none of the models so far realized in Europe might be appropriate. Providing for "independence of" and at the same time "connectedness" to the existing S&T policy making landscape is asked for. In this respect ideas like a TA network including different (governmental, scientific, societal) actors and bodies with more or less close relations to policy making, as well as a "NGO model" for TA are discussed.

In general TA has to be responsive to the given policy context and the expectations and demands expressed in the countries explored. In this respect it might also be imporatant for future activities to take account of the fact that TA can be ssupportive (and organised) on different levels of R&D policy making activities. The explorative endeavour of the PACITA project focussed on the "macro level" of national bodies and authorities of policy making. Supporting activities could further on – possibly in the frame of the EU "responsible research and innovation" inititive - also aim at the "meso level" of regional or local bodies or on the "micro level" of R&D strategies developed on the micro level: be it in industrial companies or individual research institutions. By initiating TA activities on different levels a "distributed structure" of TA could be supported that might be more appropriate for some of the countries explored than directly heading for the setting up of a powerfull TA organisation on the national level of policy making.

On the other hand "being responsive" to national expectations should not imply to give up a certain (normative) core of TA as a concept. TA - as was argued by Arie Rip at the comparative project workshop held in Karlsruhe in November 2012 - might be in danger to become an "empty signifier" when responding to any demand for "rational" decision making and planning expressed by policy making bodies and authorities. TA as a concept implies the role of a critical observer of R&D policy making activities, which necessarily asks for some institutional independence in order to provide space for reflection beyond

shortsighted political agendas and openness for a broad spectrum of persepectives being applied in assessment processes.

### *1.4.2 Open research questions*

The activities within the context of PACITA which are presented here represent a specific set of case studies. The knowledge which can be gained from these cases is rich at the one hand – as it inspires to discuss new trends in the overall development of TA and shows vividly different national, organizational as well as personally shaped paths of TA development. On the other hand, the results give way for further questions in the field of TA development.

#### *The influence of national political settings and cultural contexts*

The national case studies have explored national settings and opportunity structures for TA, in countries which have their own history and cultural identity which both very much shape the political system, the political debate, as well as political institutions. These issues have been already subject to intensive research in the field of comparative political sciences (e.g. Gabriel 2008; Welzel, Inglehart 2011). Also within the field of Science and Technology Studies and more specifically TA, the importance of national contexts and cultural settings has been reflected on and highlighted (e.g. Jasanoff 2005; Sanz-Menéndez, Cruz-Castro 2005; Vig, Paschen 2000a).

Thus, when reflecting on the further development of Technology Assessment within different national contexts, on the one hand, aspects of political culture (legitimacy, effectiveness, responsivity) should be taken into account: trust in political institutions, satisfaction with democracy, and participation in political processes. On the other hand, the political system itself should come into view: knowledge about the parliamentary systems and their rules and procedures, functioning of further democratic institutions, democratic development and stability seems to be crucial.

Using this information questions focusing on the role and position of science-based policy advice within political systems should be addressed:

- At which stage of democratic development needs for science-based policy advice are expressed and implemented ("TA on top of fulfilled basic democratic needs")?
- What are main drivers for the wish for independent policy advice? Or more specifically: To which extent can e.g. dissatisfaction with fragmented decision structures be considered as an important driver or barrier for the implementation of science-based policy advice? And further: to which extent hinders or favors e.g. public distrust in democratic institutions the implementation of science-based policy advice?

With regard to the role of public debate on technologies and technological controversies, the concept of "Civic Epistemologies" as developed by Sheila Jasanoff (2005) could be instructive. Jasanoff defines the term briefly as follows: "Civic epistemology refers to the institutionalized practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices." (255). Based on empirical research in the field of biotechnology, she compares different knowledge regimes in the US, UK and Germany and analyses "culturally specific, historically and politically grounded, public knowledge-ways" (249). Her analytical proposal represents a sophisticated tool to picture different national approaches of the diffusion of public knowledge in the political sphere. Even if Jasanoff's depth of national comparison in a specific technological field cannot not easily be reached in other contexts, her analysis points at

important questions which should be addressed when thinking about the development of TA in different national contexts:

- How are technological conflicts constructed on a national level?
- How are technologies debated, embedded and accepted in specific national contexts?
- What are national characteristics of the contribution of scientific knowledge to political decisions?
- What are nation-specific drivers for technological development, what are barriers?
- What is the specific national interplay between the state, the scientific system and the public with regard to technology?

It might also be asked then to what extent "civic epistemologies" are at all developed in some of the countries explored. For Jasanoff

> "…the concept [of civic epistemology] has meaning only if we conceive of public life, in part, as a proving ground for competing knowledge claims and as a theatre of establishing the credibility of state action. In technology-intensive societies, the construction of governmental credibility necessarily encompasses the public production of scientific-knowledge" (258).

Features of civic epistemologies mentioned by Jasanoff (259) are among others: "Styles of public knowledge making" (How are knowledge claims made public? Who is involved in assessing claims?) or "Public Accountability" (How do policymakers find ways to persuade publics that policies and their knowledge claims are right? How policymakers are held publicly accountable? How is trust and credibility established?). It might well be concluded that such features of public knowledge production are absent to a certain extent in the countries explored. As much as S&T policy making issues are not on the public agenda as a "collective choice" we might speak of rudimentary forms of civic epistemologies only. And as far as Technology Assessment structures, institutions and processes must be understood as being elements of civic epistemologies we could ask whether central aspects of the "TA habitat" are just missing?

The science system forms the basis for the production of scientific knowledge to be fed in the political decision making processes. When looking back in the history of the existing TA institutions the science system has played a crucial role. Thus, we would propose to emphasize aspects to understand further TA-development:

- What is the role of national scientific systems and its national characteristics for the development of (new) TA institutions?
- To which extent and how does the lack of problem-oriented and interdisciplinary research impair the further development of (new) TA institutions?

Last but not least, we like to address the civil society as an actor of technology assessment and address the question:

- Which influence has civil society with regard to representation of civil society groups (NGOs) or within processes of political participation in different national settings?

#### *"Side-effect drivers" for the institutionalization of TA*

Processes of institutionalization and the scientific understanding of these processes have been subject to intensive debates, reflecting e.g. its normative foundations (Jaeggi 2009) or organizational and governmental

aspects within organization and state theory (e.g. Scott 2001). Whereas the topic of institutionalization processes has been already addressed specifically with regard to TA institutions (Vig, Paschen 2000b), what has been neglected so far is the "personal history" in the development of TA institutions. Thus, when reflecting on these institutionalization processes, especially the persons acting as "entrepreneurs" should be considered, e.g. who builds up an institution based on own personal networks drawing on one's own personality, charisma, high enthusiasm, and personal preferences which (implicitly) shape the way TA is performed and which organizational structures are built up within political settings. Thus, the specific role and importance of these "personal entrepreneurs" and their specific strategies should be considered much more systematically: What can we learn from the history of TA and can we see a similar development again, e.g. in the case of Wallonia? Generally, in future studies it would be helpful to go beyond institutional frames and use an extended analytical framework to further develop appropriate national strategies for the implementation of science-based policy advice. Especially actor centered approaches would be important in this respect.

Another aspect is the strategic role of funding by the European Union, which should be addressed, in particular when thinking about the "second (or third?) wave" of Technology Assessment. The research and development funding strategies of the EU thus initiate and further shape the development of initiatives like foresight in the past and is actually shaping the development of TA in different national contexts within the project frame of PACITA. Thus it can be asked, whether this approach gives way for an "imposed" procedure, where "existing models" take on a formative ("colonializing"?) role and where original interests of countries are not fully evaluated beforehand. It should be explored in which way this procedure can "sustainably" shape the setup of TA(-like) initiatives, -activities or even -institutions in the long run and how "bottom-up"-initiatives in specific contexts are related to that approach.

### *1.4.3 Next steps*

The analysis has shown that current political and economic circumstances like the financial crisis, which was mentioned prominently in the country studies, shape very much actual demands for and expectations with regard to Technology Assessment. This counts both for existing as well as emerging TA institutions, underlining the need to constantly reflect on the TA concept and also on the "added value" of TA in today's society.

The analysis has further shown that the national initiatives taken in the countries explored imply new visions for the institutionalisation of Technology Assessment besides the (traditional, but still actual) support of the parliament. Especially in Central and Eastern Europe there is a demand for TA to improve functions of research and technology development with a focus on S&T evaluation. The national initiatives in Eastern Europe furthermore proposed – besides the three (traditional) models of TA institutions: Parliamentary Committee, Parliamentary Office and Independent Institute (Hennen/Ladikas 2009, Enzing et al. 2012) – a new national organisation model for TA: the network model. This model seems to be of use especially in the exploration and starting phases of national TA initiatives serving as a platform to share knowledge and to connect relevant actors. Its practicality however has yet to be proven. It will be an important task for the TA community to react to these new challenges in a way that is supportive for policy making in the resp. countries but at the same time provides for keeping the conceptual core of TA as an unbiased and as much as possible comprehensive endeavour to reflect on the societal implications of new R&D developments.

The exploration phase of TA in the respective countries is in its first phase finished by now. In order to assure the results of the preceding process, a set of measures is proposed in the following, which are relevant in national contexts, but also reflect future international activities.

***National level***

The process described above showed that after the first exploration process a further clarification of goals and needs tailored to national characteristics should take place. In a first step, especially a critical reflection on the activities which took place within the frame of PACITA would be important:

- What is the *specific and very concrete need* for TA?
- What are the reasons and consequences if there are *no current needs* for TA identified?

In a second step, an actor centred evaluation should take place. Network activities should be strategically reflected and further expanded to relevant and interested national actors:

- In which directions can *networks be initialized and further expanded*?
- What can be done to further support awareness of TA as a useful concept ("ideas do not flow freely")?
- Which persons can be identified as *"TA entrepreneurs"*?
- Which organisations can be identified as *"TA capacities"*?
- In which way can the PACITA consortium further support national activities (beyond the framework of the project)?

In a third step, concrete national measures could be proposed and given a try. The measures envisaged should as much as possible head for supporting ongoing policy making processes in a practical way. Thus further activities to raise awareness and expand networks of TA supporters should include the setting up of any kind of "prototype activities" like pilot TA-studies, policy briefings, participatory experiments etc. Hereby it should be cautiously reflected with regard to the national contexts whether it is wise to address national technological controversies (e.g. nuclear power) which might raise a great political and public attention on the one hand, but are controversially discussed on the other. An alternative option would be to start with "softer technological topics" (e.g. IT) which might be of interest for a restricted expert or stakeholder groups only but could somewhat detached from political conflicts and public debates experiment with TA methods and show case the potential of a balanced TA analysis.

***International level***

Especially the last aspect mentioned above, the setting up of concrete "prototype activities", provides a very good basis for further cooperation with the international TA community. Joint work on TA-projects seems to be especially promising in this respect as it allows not only for the development of a shared problem orientiation and an exchange and reflection on methodological approaches, but also for a cross-national analysis of specific questions in the field of science and technology.

A joint European TA network which would function as an umbrella for existing as well as newly emerging national TA initiatives would form an important platform for future activities. Such a network could, on the one hand, stabilize emerging TA activities by giving the national exploration processes an international framing. On the other hand, exisiting TA institutions would be challenged to react to new demands, new ideas, roles and function for TA, thus providing for continous development of the concept alongside emerging new demands. A continuation of the processes which were iniated by the PACITA project thus seems to be promising for both, existing as well as newly emerging TA actors in Europe, but also beyond.

## 1.5 References


Almeida, M., 2012. Explorative Country Study: Portugal. In: Hennen, L., Nierling, L. (Eds.), Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 221-254.

Delvenne P., 2011. Science, technologie et innovation sur le chemin de la réflexivité. Enjeux et dynamiques du Technology Assessment parlementaire. Louvain-La-Neuve: Academia L'Harmattan.

Delvenne, P., Rosskamp, B., Fallon, C., 2012. Explorative Region Study: Wallonia, Belgium. In: Hennen, L., Nierling, L. (Eds.), Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 255-286.

Eurostat, 2010. Science, technology and innovation in Europe. Statistical Books. Publications Office of the European Union

Enzing, C., Deuten, J., Rijnders-Nagle, M., van Til, J., 2012. Technology Across Borders. Exploring perspectives for pan-European Parliamentary Technology Assessment. European Parliament, Brussels.

Gabriel, O.W., 2008. Politische Einstellungen und politische Kultur, in: Gabriel, O.W., Kropp, S. (Eds.), Die EU-Staaten im Vergleich. Strukturen, Prozesse, Politikinhalte. VS Verlag, Wiesbaden, pp. 181-214.

Gabriel, O.W., Kropp, S., 2008. Einleitung: Die EU-Staaten im Vergleich: Strukturen, Prozesse, Politikfelder, in: Gabriel, O.W., Kropp, S. (Eds.), Die EU-Staaten im Vergleich: Strukturen, Prozesse, Politikfelder. VS Verlag, Wiesbaden, pp. 11-30.

Gabriel, O.W., Völkl, K., 2008. Politische und soziale Partizipation. In: Gabriel, O.W., Kropp, S. (Eds.), Die EU-Staaten im Vergleich. Strukturen, Prozesse, Politikinhalte. VS Verlag, Wiesbaden, pp. 269-298.

Ganzevles, J., van Est, R. (Eds.), 2012. TA practices in Europe. Deliverable 2.2. European Union, Brussels.

Hennen, L., 2013. Parliamentary Technology Assessment in Europe and the role of public participation, in: O'Doherty, K., Einsiedel, E. (Eds.), Public Engagement and Emerging Technologies, UBC Press, Vancouver, pp. 27-44.

Hennen, L., Ladikas, M., 2009. Embedding society in European science and technology policy advice, in: Ladikas, M. (Ed.), Embedding society in science and technology policy. European and Chinese perspectives. European Commission 2009, pp.39-64

Hennen, L., Nierling, L. (Eds.), 2012. Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission

Jaeggi, R., 2009. Was ist eine (gute) Institution?, in: Forst, R., Hartmann, M., Jaeggi, R., Saar, M. (Eds.), Sozialphilosophie und Kritik. Suhrkamp, Frankfurt am Main, pp. 528-544.

Jasanoff, S., 2005. Designs on Nature. Science and Democracy in Europe and the United States. Princeton Universtity Press, Princeton and Oxford.

Kozarev, V., 2012. Explorative Country Study: Bulgaria, in: Hennen, L., Nierling, L. (Eds.): Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 30-62.

Lehmkuhl, M., Karamanidou, C., Mörä, T., Petkova, K., Trench, B., AVSA-Team, 2012. Scheduling science on television: A comparative analysis of the representations of science in 11 European countries, in: Public Understanding of Science, Vol. 21, No. 8. pp. 1002-1018.

Leichteris, E., Stumbryte, G., 2012. Explorative Country Study: Lithuania, in: Hennen, L., Nierling, L. (Eds.): Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 184-220.

Merkel, W., 2007. Gegen alle Theorie? Die Konsolidierung der Demokratie in Ostmitteleuropa. In: Politische Vierteljahresschrift, Vol. 48, No. 3. pp. 413-433.

Merkel, W., 2010. Plausible Theory, Unexpected Results: The Rapid Democratic Consolidation in Central and Eastern Europe. In: Best, H., Wenninger, A. (Eds.): LANDMARK 1989. Central and Eastern European Societies. Twenty Years After the System Change. LIT Verlag, Berlin, pp. 7-26.

Moniz, A.B., Grunwald, A. 2009. Recent experiences and emerging cooperation schemes on TA and education. An insight into cases in Portugal and Germany. Technikfolgenabschätzung - Theorie und Praxis 18, 3, pp. 17-24.

Mosoni Fried, J., Zsigmond, A., Palinko, E., 2012. Explorative Country Study: Hungary, in: Hennen, L., Nierling, L. (Eds.): Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 104-143.

O'Reilly, P., Adam, F., 2012. Explorative Country Study: Ireland, in: Hennen, L., Nierling, L. (Eds.): Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 144-183.

Pokorny, O., Hebakova, L., Michalek, T., 2012. Explorative Country Study: Czech Republic, in: Hennen, L., Nierling, L. (Eds.): Deliverable 4.1. Expanding the TA landscape. Country Studies, European Commission, pp. 63-103.

Rip, A., 2012. Futures of Technology Assessment, in: Decker, M., Grunwald, A., Knapp, M. (Eds.): Der Systemblick auf Innovation. Technikfolgenabschätzung in der Technikgestaltung. edition sigma, Berlin, pp. 29-39.

Sanz-Menéndez, L., Cruz-Castro, L., 2005. Explaining the Science and Technology Policies of Regional Governments. Regional Studies 39, 939-954.

Schäfer, M.S., 2008. Medialisierung der Wissenschaft? Empirische Untersuchung eines wissenschaftssoziologischen Konzepts. In: Zeitschrift für Soziologie, Vol. 37, No. 3. pp. 206-225.

Scott, W. R., 2001. Institutions and Organizations. Sage, Thousand Oaks, CA

TNS Opinion & Social, 2005. Special Eurobarometer 224/ Wave 63.1. Europeans, Science and Technology. Survey requested by the Directorate General Research and coordinated by the Directorate General Press and Communication. European Commission, Brussels.

TNS Opinion & Social, 2010. Special Eurobarometer 340/ Wave 73.1. Science and Technology. Survey requested by the Research Directorate-General and coordinated by the Directorate-General for Communication. European Commission, Brussels.

Vig N.J., 2000. Conclusions. The European Parliamentary Technology Assessment Experience, in: Vig, N.J., Paschen, H. (Eds.), Parliaments and Technology. The Development of Technology Assessment in Europe. State University of New York Press, New York, pp. 365-384.

Vig, N.J., Paschen, H., 2000a. Introduction: Technology Assessment in Comparative Perspective, in: Vig, N.J., Paschen, H. (Eds.), Parliaments and Technology. The Development of Technology Assessment in Europe. State University of New York Press, New York, pp. 3-35.

Vig, N.J., Paschen, H., 2000b. Parliaments and Technology. The Development of Technology Assessment in Europe. State University of New York, New York.

Welzel, C., Inglehart, R., 2011. Political Culture, in: Caramani, D. (Ed.), Comparative politics. Oxford University Press, Oxford, New York, pp. 311-330

# Chapter 2 Explorative Country Study: Bulgaria

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## 2.1 General Objective

This study seeks to explore the range of barriers and opportunities with respect to the establishment of a formal body or structure tasked with technology assessment (TA) in public policy making. It is based on desk research, on structured interviews with relevant stakeholders, on public discussions on TA options hosted by ARC Fund, and further includes some of ARC Fund's own strategic analyses of TA capacity development.

The study provides an overview of:

- national institutional contexts and existing capacities (actors, organisations, networks, processes, institutions, political system)
- demands and interests in TA (related) activities and TA outcomes
- barriers and opportunities for formalisation.

In preparing this study, ARC Fund is grateful to all its partners within the PACITA project, and in particular to the Rathenau Institute in the Netherlands and the Institute for Technology Assessment in Austria.

The study is structured in four parts. The first part describes the governance system with respect to R&D and provides some relevant figures and comparisons. The second part discusses some of the barriers and opportunities for the establishment of a viable TA infrastructure in the country. The third part presents an overview of the next steps to be taken in order to start the development of a national TA infrastructure. In the fourth part a case study on the first national TA experience is presented. It analyses the formation of an ad-hoc parliamentary committee, whose mandate is very much PTA-relevant, and discusses some of the shortcomings such an approach had.

## 2.2 Description of governmental system and general R&D structure

### *2.2.1 General information about the R&D system*

Bulgaria continues to be among the countries with the lowest R&D intensity. Regrettably, despite some positive efforts over the past couple of years, Bulgaria still exhibits deficient public policies on research, innovation, science and technology, and also insists on ignoring the critical link between science and business.[14]

Several key documents outline the strategic framework guiding the development of research and technological policy-making. Two such documents are the "National Strategy for Scientific Research to 2020"[15] (NSSR), adopted in June 2011, and the "National Innovation Strategy", adopted in 2004 and last

[14] Applied Research and Communications Fund (2012). Innovation.bg Report. Unpublished manuscript, due for print in September 2012.
[15] Available in the English language at http://www.strategy.bg/FileHandler.ashx?fileId=1437, downloaded on July 23rd 2012.

amended in 2006[16]. Although the availability of these documents is, in itself, a positive indication, they clearly illustrate the incoherence and division in the public policy approach to science and research, on the one hand, and innovation encouragement and development, on the other. This division is further echoed into an institutional dualism, having innovation positioned within the Ministry of Economy, Energy and Tourism, while science and research within the Ministry of Education, Youth and Science. That stifles policy coordination, makes succession in policy design more difficult when governments change, and inhibits long-term cohesion and adoption of shared priorities. It further prevents the state and other stakeholders (such as business and higher education institutions) from formally implementing the science-education-innovation interaction[17], thus also hindering knowledge creation and transfer – within and between the different societal sectors. That ultimately leads to the loss of public value in the long term.

The NSSR is the primary document to define Bulgarian governmental policy with regard to the need to improve science education, mobilise resources for carrying out scientific research and improve Bulgaria's integration into the European Research Area. The strategy has set the ambitious goal to bring Bulgaria's research and innovation system in line with the Europe 2020 goals, including raising expenditure of R&D to 1.5% of the GDP by 2020, which is still only half of what the EU target combined, is (3%).

The NSSR further encourages the concentration of resources on priority research areas, seeks to improve cooperation between the public and private sectors, and to improve the synergy between education, research and innovation policies. However, the strategy neither outlines measures for coordinating science and innovation policies, nor proposes ways of measuring the impacts of science and innovation policies[18]. Particularly acute problems include the need to improve the market orientation of public research as well as the structure and tools used for the public funding of research. This is highlighted by the fact that a large share of public funding is still spent on salaries and administrative costs, rather than research and research infrastructures. Research is mostly performed with external assistance as only negligible national financial support has been directed towards research, typically through the National Science Fund, whose calls for competitions are rather limited, and which has been the subject of recent public scandals and corruption accusations. Partially due to anti-crisis measures in general, the state subsidy received by the BAS dropped by around 30% between 2009 and 2010. This occurred on the back of a 5.5% contraction of GDP in 2009 and weak growth in 2010 of 0.2%.

Another key strategic document is the National Innovation Strategy, adopted by the Government in 2004 and aimed to support the development of innovative and competitive market-oriented products and services by increasing cooperation between science and industry. Its main instrument for achieving this goal was through the co-financing of the R&D activities of Bulgarian firms through the National Innovation Fund (NIF) at the Ministry of Economy, Energy and Tourism. Its administrative governance is delegated to the Small and Medium Enterprises Promotion Agency. While initially functional between 2005 and 2008 the fund's operations have come to a halt and no new calls have been announced since 2009. During its last two years of operation in 2007 and 2008, the NIF targeted specific sectors including: nanotechnologies, biotechnologies, nuclear energy, energy saving technologies, eco innovation, newly founded technology enterprises, pharmacy, chemistry and waste treatment.

The newly elected Bulgarian President (2011) has demonstrated commitment to the support of R&D and innovation. The Presidency published a strategic document entitled "Bulgaria 2020: National Priorities in

[16] According to the Ministry of the Economy, Energy and Tourism, http://www.mi.government.bg/bg/themes/inovacionna-strategiya-na-republika-balgariya-14-287.html. Retrieved on July 24th 2012.
[17] Applied Research and Communications Fund (2012). Innovation.bg Report. Unpublished manuscript, due for print in September 2012.
[18] Applied Research and Communications Fund, Innovation.bg: Innovation Policy and Sectoral Competitiveness, 2011. http://www.csd.bg/artShow.php?id=15609. Retrieved on July 24th, 2012.

Education and Science"[19], published on May 29th 2012. It reiterates the same thematic priorities defined in the NSSR, and further lists key targets for R&D for the 2014-2020 period, which include: prioritisation of young scientists; internalisation of Bulgarian scientific research; improvement of Bulgarian R&D competitiveness; stimulation of cross-sectoral partnerships; development of R&D infrastructures.

Research and development (R&D) governance and policy in Bulgaria still occur exclusively at the national level. Even though Regional Innovation Strategies for each of the six Bulgarian regions (NUTS2) have been adopted since 2004 (the first one being the South Central Region), followed by the other 5 NUTS2 regions in 2008, there is no regional dimension to research and innovation policy development or regional budgetary discretion. These strategies lay out measures for increasing the R&D activities of companies as well as mechanisms for improving linkages between business and academia on the regional level. However there is no (national) mechanism in place to support their implementation, despite isolated attempts, mostly through the operating programmes Competitiveness and Regional Development, which did not lead to any sustainable results due to lack of political will and policy visioning.

The second main instrument in support of science is the **National Science Fund (NSF)** at the Ministry of Education, Youth and Science. The NSF is designed to support both public and private scientific and applied research initiatives by providing both domestic and international cooperation schemes. The NSF organises competitive calls and activities, which promote international scientific cooperation. The modes of funding include open competitive calls for proposals published on the website of NSF[20]. However, no new competitive calls were announced in 2010 and the allocated funding of 50 million BGN for 2010 (reduced from 100 million BGN to 80 million in 2009) was allocated for co-funding of ongoing EU-supported projects and national activities rather than the initiation of new projects. Despite significant reductions in its budget, in 2011 the NSF is the only working state financial instrument despite delays in payments and an inconsistent budget[21]. As a new strategic step in the development of the NSF is the signing of a 5-year Cooperation Memorandum between the Fund and the Bulgarian Academy of Sciences on July 11th 2012[22]. Three shared priorities are outlined in the memorandum: (1) cooperation in carrying out scientific research in accordance with the National Strategy for Scientific Research 2020; (2) development of scientific infrastructure; and (3) fostering career development of young scientists and promotion of Bulgarian scientists' research accomplishments and results.

For the very first time after 2000, in 2010 (the latest year, for which data are available) R&D expenditure in the country is not dominated by the government sector. Its share of all funding is 37%, compared to 55% in 2009, while that of the business enterprise sector is 50%, compared to only 30% in 2009[23]. In terms of distribution of funding across fields of science, the shares of total expenditures for the natural sciences and engineering and technologies is shrinking from more than 65% in 2008, to 60% in 2009, down to 46% in 2010, while the share of medical sciences alone grows almost nine fold from 4.5% in 2008 to more than 38% in 2010. However, the structure of government-only expenditure for each of the science sectors hardly changes over the same period, with the majority of spending going to natural sciences and engineering technologies remaining around 65% of total government expenditure. Unfortunately, it is not possible to provide a similar comparison of business enterprise expenditures due to lack of complete data for 2009 and 2010. Overall, expenditure in R&D is, as a percentage of GDP, remains very low in Bulgaria, at only 0.6% in

[19] Available in the Bulgarian language at http://www.president.bg/pdf/3.SummarySavetON.pdf, retrieved on July 25th 2012.
[20] National Scientific Fund, http://www.bulfund.com.
[21] Applied Research and Communications Fund, Innovation.bg: Innovation Policy and Sectoral Competitiveness, 2011. http://www.csd.bg/artShow.php?id=15609. Retrieved on July 24th, 2012.
[22] Source: http://www.bas.bg/cgi-bin/e-cms/vis/vis.pl?s=001&p=0079&n=001198&g=, retrieved on August 10th 2012.
[23] Own calculations, based on National Statistical Institute data, retrieved from http://www.nsi.bg/otrasalen.php?otr=54&a1=2257&a2=1850&a3=1851#cont on August 10, 2012.

2010, compared with an EU-27 average of more than 2%[24]. However, a positive trend could be seen resulting from the increase in intramural R&D as a percentage of GDP between 2008 and 2010 at the same time as GDP increased in nominal terms. Given the reduced funding and closing of calls from the national financial instruments in support of research and innovation, it may be that increasing GERD is not a high priority, especially with regard to incentivising the private sector to increase their R&D budgets.

### 2.2.2 General information about the performance of and the foci of national research systems

Domestic funding of science and research in Bulgaria is generally done through the National Science Fund and the National Innovation Fund. While the former still operates, albeit rather marginally, the latter has not been functional for the past three years. Available funding through OP Competitiveness remains largely unattractive, riddled by low administrative capacity, lack of transparency in decision-making, delays at all stages of project approvals, and the overall image of uncertainty and unreliability of the management and awarding procedures.

Significantly more important and with a much higher impact for research funding is the role of EU programmes, particularly the Framework Programmes, COST. Bulgaria has fully participated since Framework Programme 5 as a full member.

Following is an overview of relevant bodies and organisations, whose competencies and responsibilities include S&T, R&D, and innovation.

#### *Public Authorities (Government, Parliament)*

*The Standing Committee on Education, Science, Children, Youths and Sports at the National Assembly* – The committee is the most prominent research policy making body in the country and consists of 20 members of parliament. It deliberates and elaborates on policies and legislation regarding the educational and scientific systems of the country, as well as youth and sports policy.

*The Ministry of Education, Youth and Science* – The ministry coordinates national policy related to science and education and aims to create a favourable environment for the monitoring of the science and educational systems.

- National Council for Scientific Research – Is an advisory body to the Minister of Education, Youth and Science, which helps set scientific priorities and improve the impact that these activities have scientifically and economically both domestically and internationally.

*The Ministry of Economy, Energy and Tourism* – The ministry works on the development of economic and energy policy. It aims to do this by stimulating investment, innovation and entrepreneurship as well as the migration to a more sustainable and secure energy supply in Bulgaria.

- National Council on Innovation - was designed as a consultative and advisory body to the Minister of Economy, Energy and Tourism to help implement the National Innovation Strategy. In this capacity, it was supposed to assist in the elaboration of legislation, to draft annual reports on innovation in the country, and to approve policy measures. It does not currently function, and has not delivered to its declared mandates.

[24] Own calculations, based on National Statistical Institute's data. Retrieved August 10, 2012.

*The Ministry of Labour and Social Policy* – The ministry elaborates and implements, along with other national ministries, national policy in the areas of education and qualifications for the work force along with other national ministries.

*The Ministry of Transport, Information Technology and Communications* - The ministry elaborates and implements, along with other national ministries, national policy in the areas of transport and ICT along with other national ministries.

- Executive Agency Electronic Communication Networks and Information Systems – The agency implements telecommunications and information technology policy.

*The Ministry of Agriculture and Food* – The ministry elaborates and implements, along with other national ministries, national policy in the areas of agriculture and food along with other national ministries.

*The Ministry of Health* - The ministry elaborates and implements, along with other national ministries, national policy in the areas of health along with other national ministries.

- National Centre of Public Health Protection – The centre advises the Ministry of Health and other governmental bodies and city officials on how to improve the health care system in the country.

*The Council of Ministers* – prepares and approves important strategic research documents and consists of the Prime Minister as well as the heads of all government ministries. It also approves of the legislative drafts prepared by the ministries before submitting them to the Parliament.

***Industry***

*Bulgarian Industrial Association* – The association initiates and coordinates the branch and regional business associations in Bulgaria. It has large business and scientific organizations and universities as members and aims to stimulate technological innovations by creating stronger linkages between science and industry.

*Bulgarian Industrial Capital Association* – The association represents more than 50 holding and investment companies and over 1200 industrial enterprises. It engages in discussion and debate regarding various policy matters including the national budget, tax and insurance policy, export strategy and reducing barriers to business growth.

*Bulgarian Chamber of Commerce and Industry* – The chamber protects the interests of businesses in the country and stimulates the economy, for example through the organization of business clusters. The chamber also elaborates and communications common positions on business and economic issues before competent state and local authorities and institutions.

*Confederation of Employers and Industrialists in Bulgaria* – The confederation represents the vast majority of business in the country and formulates opinions on draft laws in the Bulgarian parliament and has representatives on national, sectoral, regional and European level.

All of the above organisations employ a Parliamentary Secretary, who is responsible for liaising with Members of Parliament, monitors Standing Committee work, and has access to all MPs. That puts them in a position to also influence relevant policy development trends.

***Science:***

*The Council of Rectors of the Higher Education Schools of Bulgaria* – The council's mission is to take part in the development of educational policy and scientific research along with the Ministry of Education, Youth

and Science and the National Assembly and represent the interests of higher educational establishment at the national level.

*Agricultural Academy* – The academy undertakes scientific and applied research across all areas of agricultural activity. It also helps to develop national and regional strategies in the sector and promotes collaboration between science and research.

*Bulgarian Academy of Sciences* – The academy operates across all academic fields in the support of the needs of the national economy and social progress and serves as a policy advisory body in various capacities (natural, engineering, technological, medical and agricultural sciences and the humanities and social sciences) to the Bulgarian government.

*Federation of the Scientific Engineering Unions* – The federation's mission is to promote the professional development of engineers in the country and promote the interests of the engineering profession in the country. The federation also helps in the elaboration of laws, regulations, strategies, programs and other documents.

*Union of Scientists in Bulgaria* – The union aims to assist the advancement of science and higher education in the country and provides guidance to policy-makers. It also assists in the professional development of its members.

***Civil Society Organisations:***

*Applied Research and Communications Fund* - The organisation's activities encourage the competitiveness and growth of the economies in the region through the promotion of innovation and transfer of advanced technologies and know-how. ARC Fund is engaged in applied research and analyses, public policy support and advocacy, capacity building, training, and knowledge and innovation brokerage.

*The Centre for Economic Development* – The centre aims to promote sustainable economic growth throughout Bulgaria and to promote public debate on economic issues. It also promotes cooperation between the government and businesses, academia and NGO's in the development of economic policy options to overcome economic challenges.

*The Center for the Study of Democracy* – The organisation is a public policy institute dedicated to the values of democracy and market economy aiming to support reform process in Bulgaria through impact on policy and civil society. In doing this, the organization supports policy-making and institutional reforms in the country in the support of successful European integration and increased economic opportunities.

*Institute for Market Economy* - The aim of the organization is to assess national economic policies with relevance to Bulgaria's market economy and promotes market based solutions to the societal challenges of Bulgaria.

Despite the large number of organisations and institutions across all societal sectors, none are specifically targeting issues that bridge S&T (policy) with societal impact and relevance. Moreover, due to the specific institutional setup, different higher-level policy bodies are responsible for innovations, on the one hand, and for R&D on the other, the effect of which has been the stifling of innovation policy planning and implementation due to difficulties in inter-institutional coordination and frequently unaligned priorities.

## 2.3 Barriers and opportunities for building up a national TA landscape

### *2.3.1 Democratic structures in S&T*

The S&T decision-making system is stretched between the Ministry of the Economy, Energy and Tourism and the Ministry of Education, Youth and Science. This duality was pointed out by most of the interviewees as being a critical hurdle not only in the focused development of TA capacity and infrastructure, but also in general terms, namely in view of better innovation policy planning.

It is mandated by law that legislative drafts are put forward for public debate, and that includes drafts dealing with R&D and/or S&T. To many of the interviewees however, this requirement makes little difference in terms of public involvement or increased quality of the final act. Among the key cited reasons is that even though there is transparency in the process – drafts are accessible online to the public, submitted opinions are public and traceable – it is the accountability that is questioned, because there is no way to trace how the administration has used (and reconciled) the range of opinions received through the consultation process. In no way does it become evident how opinions of the public were reflected into the draft proposal.

The latter also holds true for expert-based consultations, which are oftentimes used where legislation is prepared on a more specialised subject matter. Even though expert opinions are typically welcomed and encouraged, the administration is free to neglect any recommendations in the process without further explanation, or alternatively to use experts' suggestions without any form of recognition. In the opinion of some of the interviewees, this "trend" has largely led to the withdrawal of external (non-government) experts from legislative consultations, and to a general erosion of the trust in the administration.

The major science-producing institution in the country is the Bulgarian Academy of Sciences, which has been undergoing difficult reforms for at least a decade. At the moment, the Academy is not positively perceived in society, and news about it are typically concerned with underfinancing of research activities, rather than with research itself, or the results thereof. For this reason, the Academy fails to serve as a space for public debate that advances the importance of science within society at large. Instead, it has often been more vocal on political and administrative issues.

The above in particular makes the Bulgarian Academy of Sciences an unlikely candidate for hosting TA infrastructure, although many of its scientists are well-qualified and could provide expert-based input for various TA-related projects. As a whole, the institutional framework at the moment favours the establishment of a TA structure outside of formal public (administrative) bodies – a view reiterated by all interviewees, albeit less openly by members of the state administration. This is at least partly true due to the greater degree of freedom in shaping the functions and responsibilities of a TA body that non-profit organisations have, but comes at the price of insecure budgets and revenue streams.

A very recent development, which bears strong resemblance to a TA-focused infrastructure, was the formation of an Expert Council on Science, Technologies and Innovation at the Municipality of Sofia (July 17th 2012)[25]. Its exact structure, tasks and mandates remain highly elusive, though possible areas of expert consultation in policy development are quoted to include public transportation optimisation, buildings' insulation, earthquake impact assessment, disaster preparedness, environmental management, but also topics such as cultural heritage, education, and science-business relations management.

[25] A press-release (in Bulgarian), which is the only published piece of information, is available at http://www.sofia.bg/pressecentre/press.asp?open=10&sub_open=64020&nxt=0, retrieved on July 19th 2012.

### 2.3.2 Public debate about S&T/ Public engagement in S&T issues

In Bulgaria, science has been commonly perceived as distant to society, as aptly pointed out by an interviewee from the academic community, and decisions concerning innovation are mostly influenced by political, rather than creative, interests. One of the interviewed MPs explained that there are purely political reasons for the lack of debate on science, namely – the short "time horizon" of that elected politicians deal with. On the one hand, it is difficult to talk about S&T to voters and constituents, with little to no "political return". On the other, the required time to demonstrate the benefits of an investment (through policy decisions) in an S&T topic is too long to include the results in the political discourse, or to reuse these results in any political pursuits. PTA as a function would have a critical role in this regard, as it could help build consensus around the little steps to be taken.

A far more critical and systemic problem that hinders public debate on S&T topics, as pointed out by a higher-level official at the Ministry of the Economy, Energy and Tourism, is that scientists have a relatively low standing in Bulgarian society, especially in the last decade, when the governance and productivity of scientific institutions have suffered a lot of setbacks, leading to the quick erosion of trust in the key scientific institutions (the Bulgarian Academy of Sciences being the iconic case), but also to an accelerating disintegration of the scientific community. Hence any debate where scientists are one of the participating parties are frequently underestimated and quickly dismissed.

It comes as no surprise that the inclusion of S&T-relevant topics in the public discourse therefore typically happens on an ad-hoc basis; it is responsive rather than enabling, or is only secondary to another overarching topic. For example, quite recently renewable energy technologies were a frequent topic of the mainstream public discourse but only because they were "blamed" as the key reason behind the 13 per cent increase in electricity prices as of July 1st 2012. Debates on GMO a couple of years back were only initiated when a questionable legislative amendment was presented to the Parliament, but not before. Thus, S&T issues, and in particular all the expert-based opinions around them, almost never reach beyond the limited and fairly closed confines of experts' circles.

Furthermore, the most contested S&T issues are marginally, if at all, relevant to the announced priorities by the state, which presents an intriguing systemic challenge. Though many interpretations of such a discrepancy are certainly possible, the disconnect between what matters to citizens, and what the state thinks should matter, becomes apparent. That is perhaps the result of the lack of culture of debate, and also a sign of non-transparent decision-making and policy planning processes. Last, but not least, S&T debates rarely have the potential to spread beyond those stakeholders most immediately involved, thus exerting almost insignificant impact on the general public discourse.

In the opinion of a long-time journalist covering S&T-related topics, real and informative public debate on S&T in Bulgaria is largely missing. Even at times when such debate is present, it remains isolated, and fades (from public attention) quickly. When discussions do occur, they happen mainly through the media, which however are often biased, with questionable impartiality. Media are not just in the position to inform, they are also in the position to impose, steer and shape any issue into the public discourse, without however presenting a multitude of viewpoints and opinions, thus making communications almost exclusively unilateral. Therefore, debates remain largely superficial and uninformed, and do not contribute to any educational purpose. This is due to the high dependence of (mainstream) media on political and corporate interests, and the lack of debate traditions within the society.

There is also no uniformity of opinions among interviewees on who (which societal actor or institution) should initiate debates on S&T, so that role has more or less been "granted" to the media. A higher-level official at the Bulgarian Industrial Capital Association however pointed out that such a situation is not least the result of the lack of established channels for communication and expert opinion exchange between

Parliament (or any other policy- and decision-making public body) and the public, particularly NGOs and the industry. Almost unnaturally the media fill in this vacuum, thus also becoming the sole venue for debate. Thus the content of communication between public policy bodies (e.g. the Parliament) and the general public gets easily distorted due to the number of external pressures onto media, which have nothing to do with the thematic topics in question (like S&T).

There is very little on any field of science in the current Bulgarian media. According to the Radio and Television Act, public electronic media (i.e. National Television and National Radio) should provide air time to topics of science, with no restrictions on minimum air time. Such a provision however is not imposed on commercial media, which are strong competitors to their national counterparts.

Recently, the Bulgarian National Television (which has the largest share of science-related broadcasts among Bulgarian electronic media) has featured a popular "show" on topics of science, called "Beautiful Science", in close cooperation with the British Council in Sofia and several other community groups. It is primarily targeted at young scientists, and presents issues of current scientific interest. The show aired once a week, but only between April and June, with no new shows following June 2011.

Bulgarian media however face strong competition from popular foreign science-focused channels, which are easily accessible and localised (subtitles in Bulgarian language). Nonetheless, science is still among the least appealing topics on TV (in terms of audience capture). Authors Slavova and Galev (2008) acknowledge in a special report[26] that hardly 1.3% of people regularly watch science broadcasts, while 25% never watch anything science-related.

Reporting on science topics in printed media is not in a more favourable position than in electronic media. Apart from certain specialised publications (i.e. in the field of ICT), science is a rare topic in any mainstream publication. Two specialised, albeit not as popular, publications are the Journal of the Bulgarian Academy of Sciences, and a journal published by the Bulgarian Union of Scientists called *Nauka (Science)*. In spite of their target audience being the public at large, both journals are mostly popular within and disseminated among the scientific community[27].

There are growing concerns with mainstream media's impartiality with regard to reporting on contentious issues, including those, which may be subject to policy regulation. Moreover, the more specialised a topic is, the more conflicting views are presented to the public, thus typically impeding the formation of an informed opinion. Media tend to report on facts, and only in rare circumstances provide analytical and educational perspectives, especially on issues related to science.

Outside of media, public debates on any issue, much more so on S&T, are rare and exhibit their own range of deficiencies.

The following issues related to S&T (in no particular order) have provoked, to a varying degree, considerable public debate over the past few years.

- **Nuclear energy and building of a new nuclear power plant on the Belene site** – even though the project has now officially been declared closed, the construction of a second nuclear power plant, along with the topic of nuclear energy significance to the Bulgarian electricity grid, continues to represent one of the most contentious debates – both in the public sphere, and within the political domain. Traditionally, operating a nuclear power plant has been considered by many as a source of national pride, despite the lack of matching relevance to economic output or development. While

[26] Slavova, Petia; Galev, T. (2008). Audiences of Scientific Broadcasts and Their Social Geography: Who, When, Where and Why Watches Scientific Broadcasts (draft).

[27] According to a special report Science Communication in the Press (2007), produced within European Science Communication Workshop, a project funded under FP6.

many EU governments made active motions against nuclear energy altogether, especially following the Fukushima disaster, Bulgaria seemed undeterred in its intention to invest further into the construction of a new nuclear power plant, backed by strong lobbies and justified by dubious arguments of cost-effectiveness and increased energy demand. Both arguments have been challenged by a number of nonprofits, with further criticisms extending into compromising national security, secrecy of negotiations, obfuscating electricity price projections to the end-consumer, etc. The debate is partly a continuation of a previous one linked to the closing down of 4 reactors of Bulgaria's nuclear power plant in Kozloduy upon accession to the EU.

- **Shale Gas Explorations** – In 2011 Permission was granted to a major international corporation to carry out preliminary exploration of shale gas deposits near populated areas, which spurred debate about possible environmental damages and health risks, especially due to the "fracturing" technology used for such explorations and extractions. That prompted the Parliament to adopt a moratorium on gas exploration in early 2012. In the following few months, various stakeholders, including the Ministry of the Economy, Energy and Tourism, expressed concerns that specific wordings of the moratorium apply not only on shale, but also on conventional gas extraction. An ad-hoc Parliamentary Committee was formed to research into good practices of shale gas exploration around the world in order to obtain an informed opinion about the range of technologies in use, their safety and applicability, as well as to decide on more specific amendments to the moratorium texts so that conventional gas extraction/exploration would not be impacted. The Committee concluded its work by late May 2012. This example comes closest to what TA could contribute to the parliamentary work, and is described as a case study in Part 4 of this document.

- **Proposed amendments to the Genetically Modified Organisms Act** – in early 2010 the ruling party dropped some of its original proposals to amend the GMO Act following wide-spread public reaction and occasional street protests.

- **Enforcing (new) food safety standards** – the Ministry of Agriculture and Food has been responsive to consumers' concerns about the safety and quality of popular food products, including cereals, dairy, and meat. New standards have been introduced imposing additional monitoring on producers wishing to comply with them. Tasked with this responsibility was the newly created (2011) Food Safety Agency. Concerns about food safety and quality have been fuelled by a number of occasions whereby producers have used substances unfit for human consumption, which consequently prompted public outcry.

- **Bourgas-Alexandroupolis Oil Pipeline Project** – this has spurred a number of discussions on different levels, with a couple of local referenda too. Major concerns are the possible long-term environmental damage to the Black Sea and associated losses for the local tourism sector. As of December 2011, the Bulgarian Government has withdrawn from the project, although periodically appeals for reconsideration resurface.

- **Restructuring of the Bulgarian Academy of Sciences** – BAS is the major science and research institution in Bulgaria, with a rich tradition and long history. Debate on the scope and extent of necessary reform has been ongoing for years, but has recently intensified due to conflicting visions of the future of the Academy as an institution and of the future of science in Bulgaria in general. Several motions have been made towards reform, including transferring research responsibilities away from the Academy into the universities, permitting the Academy to enrol bachelor and master-level students (it currently only enrols PhDs), cutting public funds and encouraging the Academy to attract private and international funding, etc. Lines of tension exist, too, between the Ministry of Finance, which is in charge of planning the budget, and the Ministry of Education, Youth and Science, which oversees science and research, and devises major policies in that field.

- **Multiple amendments to the Electronic Communications Act** - These concern several issues over the past few years, such as digital multiplexes, protecting online privacy from government monitoring, and regulations pertaining to cellular telephony, which affect consumers. With regards to multiplexes a draft bill has been in the making, particularly for public multiplexes, but it remains unclear at what stage of development it is. The process has been particularly slow, allegedly due to private pressures, spurring additional public debate. Further outcry has been caused by mounting consumer complaints related to the positioning of cellular providers' antennae and the associated health risks. Last but not least, both the current and the previous government had made several attempts at amending the EC Act in order to allow closer monitoring of individual online communications as an alleged preventative measure against fraud and conspiracies against national security. Although certain amendments were eventually passed and went into force, the original intention was met with serious wrath by a plethora of nonprofits and interest groups over concerns of privacy and confidentiality of personal communications. Doubts about the actual technological implementation of this form of online "surveillance" still remain too.

- **New legislative framework for scientific degrees earning (PhD and post-doc level)** – this debate has been fairly contained within the scientific and academic communities. With the academic system as a whole being among the slowest to reform, any proposed change is bound to stir debate. The most significant step made has been the cancellation of a couple of old acts, and their replacement with a unified one – the Development of Academic Personnel Act. However, parts of it have been denounced by the Constitutional Court in 2010, so the regulatory framework is still subject of debate and uncertainty. No amendments have been proposed since December 2010.

- **NATURA 2000** – there have been a range of issues related to the inclusion of Bulgarian territories in the NATURA network, mostly highlighted by environmental organizations. On a number of occasions there have been motions to allow for the construction or continuing functioning of renewable energy installations (such as wind farms or hydropower plants) within NATURA territories. NGO responses have been more vocal and pronounced than state-led ones.

- **Assisted reproduction (in-vitro fertilisation)** – Assisted reproduction is regulated mostly through Government decree No25/February 9th 2009. There has been considerable public pressure on the government to provide financial support to families affected by infertility who wish to try in-vitro fertilisation. Debates were fuelled by a case of a 65-year-old woman (2010) who gave premature birth to twins, one of which subsequently passed away while in hospital care, and the other sustaining damage to vital organs and functions. Concerns were raised on the maximum age that women should be allowed to use in-vitro fertilisation without endangering their health and that of their prospective new-borns. Though such a debate is multidisciplinary it has been led mostly within the domain of ethics, without proper research and analysis, including cost-benefit. A resultant debate is also that of **surrogate motherhood**, which surfaced as a serious health and ethics issue as many women have been reported to offer themselves as surrogate mothers to infertile foreign families. In 2011, a legislative amendment was proposed for the Family Code to introduce surrogate motherhood. Though this bill focused exclusively on legal and ethical, rather than medical technology issues, it was passed at first reading by the Parliament in October 2011. It seems to be currently put on hold.

- **Introducing a new Innovations Act** – it has been acknowledged by multiple sources that Bulgaria lags behind in terms of innovation with regards to both development and supporting policy. The ARC Fund is currently involved in a wide consultation process in collaboration with the Ministry of the Economy, Energy and Tourism towards the development of a draft bill on innovations. It is envisioned that provisions in this bill would provide the necessary regulatory framework that would enable technology assessment on the policy level. In early May 2012, the draft bill was finally ready, although a year and half later than initially promised. It was then put forward for public discussion, but it remains largely uncertain whether it will be submitted to Parliament till the end of its current

term. All the proposed texts concerning the performance of technology assessments were removed from the final and public draft, despite initially demonstrated support.

- **Stem cells** – this is a fairly new topic for Bulgarian society and is still not highly contested. Knowledge on stem cells application in health care is still fairly limited, though gaining rising popularity due to mostly private stakeholders. Stem cells application is regulated in the Transplantation of Organs, Tissues and Cells Act.

- **Euthanasia** – debate on euthanasia resurfaces periodically, but public opinion with respect to its use still appears to be negative. Euthanasia is still being considered as primarily an ethical issue, to a great extent as a religious issue, and to much lesser extent – as a healthcare or economics issue. A proposed Bill on Euthanasia was rejected in September 2011 by both the responsible standing committee at the Parliament and the Plenary.

- **National Strategy for the Development of Scientific Research 2020** – following prolonged deliberation about the future of Bulgarian scientific research, this strategy was put together to provide a lasting vision, detailing priorities and challenges, and to supplement the related Promotion of Scientific Research Act, also recently adopted and enforced. The Strategy was approved by the Parliament in July 2011.

Almost without exception, the most active driving force behind any of these debates have been non-profit organisations and semi-organized civic groups, and to a much lesser extent – the Bulgarian Academy of Sciences, particularly with respect to policy developments that affect the Academy. Especially vocal have been environmental NGOs, which monitor relevant legislation on a regular basis. In the case of shale gas exploration, the local administration in one of the affected municipalities, also voiced its concerns and took an opposite position to that of the government. Many environmental NGOs were also active during the term of the ad-hoc parliamentary committee tasked with shale gas good practices identification. In the case of food safety and adoption of new standards, the Ministry of Agriculture and Food has appeared to be the leading actor in the debate, with rich media coverage of political officials.

Consumer organizations[28] have been the driving force in the debate on certain issues, which are of concern to consumers, such as food safety or cellular telephony. Some of them operate only locally or regionally, and some on a national scale. There is no one single organization among them to be considered representative or as an "authority" in the field of consumer protection, and the majority are specialized either in a particular field (such as telecommunications) or in a particular sector (such as services).

ARC Fund has been the leading organisation to promote the inclusion of S&T issues into the public discourse and also in the shaping of this discourse by providing unbiased, well-informed and analytically substantiated reporting on S&T and innovation policy developments, technology foresight and transfer trough the annually published *Innovation.bg* reports[29] and the hosting of annual Innovation Forum[30]. It is officially recognised as an R&D organisation by the government, which gives it a unique strategic advantage and a leading edge in the non-profit sector among other research institutes and think tanks. In this capacity, ARC Fund has had strong partnerships with the Ministry of the Economy, Energy and Tourism, the Ministry of Education, Youth and Science, and with the Agency for Small and Medium Enterprises. ARC Fund has also pioneered the technology foresight methods in Bulgaria, and has had a number of years of experience in successfully applying them to a wide range of issues. In addition to that, through the CIVISTI project[31], ARC

[28] An indicative list of consumer-related organizations and resources is available at http://www.mi.government.bg/bg/pages/zashtita-na-potrebitelite-polezni-vruzki-37.html. Retrieved on July 25th 2012.
[29] More detailed information available at http://www.arcfund.net/arcartShowbg.php?id=4737, retrieved on July 25th 2012.
[30] More information available at http://www.arcfund.net/index.php?id=2052, retrieved on July 25th 2012.
[31] See http://www.arcfund.net/index.php?id=1027, retrieved on August 10, 2012.

Fund has gained valuable knowledge in organising citizens panels – a useful tool in technology assessment designs.

Others include the British Council, with whose financial support the Beautiful Science TV show was made possible, as well as smaller, mostly informal, civic groups focusing on science, but they lack access to mainstream communication channels to be heard outside of the scientific community.

### *2.3.3 Policy advice*

The fact that there is significant public outcry (not always accompanied by a meaningful debate) on certain issues, followed by decisions made by policy institutions to alter earlier ones, is in itself a proof that legitimacy of policy decisions, as well as transparency, could be improved.

Most of the interview respondents were very critical of the available expertise and knowledge base among Members of the current Parliament in Bulgaria, which suggests of a number of deficiencies in terms of making informed decisions when voting on particular legislative texts. These deficiencies are not adequately addressed, and certain Members of Parliament have been quoted to express their reservations when external expertise is offered.

As of the time of writing of this report no formal communication channels exist specifically for TA-related topics, mostly because TA is neither a popular concept, nor an established practice. At best, TA tends to be viewed as a slightly modified form of (ex-ante) impact assessment, but even that latter concept, which is more well-known, is subject to different connotations among stakeholders. Furthermore, sources of expertise on S&T are either internal staffers at the institution in charge of preparing an actual policy document (such as a draft legislative act, initially authored in a Ministry), or are, less frequently, formally commissioned on an ad-hoc basis, with little, if any, public evidence of the actual expert contributions.

The typical legislative preparatory procedure includes a period of no less than 14 days for public consultation, mandated by law (Law on Statutory Acts, art. 26(2)), during which the proposed act is made publicly accessible through the website of the preparing authority. Current practices in this regard bare numerous shortcomings, and the effectiveness of such a public consultation process is difficult to evaluate. For one, no report is published to summarise or detail the gathered feedback during the public consultation process (there is no such legal requirement). Neither is it evident from a bill's text as submitted to the Parliament which paragraphs and articles were influenced by public solicitation. With certain drafts of important laws the public consultation has been extended to include public hearings (i.e. Law for the Protection of the Child, Law for the Volunteerism), none of which however have to do with S&T. The draft of the Law on Innovation, on the other hand, which was also subject to a lengthy public consulting process, generated much narrower debate, even within the business community, and even less in the general public.

Parliamentary procedures also allow, and typically provide for, semi-formal hearings with experts, when the matter of the law in question requires special expertise. This typically happens during sessions of the relevant Standing Committees, but it is solely within the discretion of the Committee's Chairman to invite selected experts who provide their opinion, often only orally during the Committee session. As pointed out by one of the interview respondents, there is no way for the general public, or even for the Members of Parliament, who do not sit on that Committee, to know whether any expert opinion was taken into account, and how it affected the final report of the Committee unless the report itself notes a specific contribution. Continuing communication between Parliament and experts is also not mandated, and is done at the discretion of the Committee's Chairperson.

Science-related communication is generally a recognised problem for Bulgaria's science system, without an obvious immediate solution. According to member of the Bulgarian Academy of Sciences, there is a general lack of primary information about scientific development activities, not least because the latter are not reported (due in part to the lack of requirement or guidelines), hence transforming science into a communicable topic becomes rather challenging. S&T topics transpire only marginally within the public

discourse as part of the much larger discussion on the S&T development capacity of universities, of research institutes (i.e. at the BAS), and less so – in the private sector.

A seminal event, which has provided venue for public debate of innovation, especially in terms of policy and business entreprise relevance is the annual National Innovation Forum, organised successfully for 7 consecutive years (with 2012 being the 8th) by ARC Fund. Each Forum has received generous media attention, having been featured very favourably in more than 40 publications. In subsequent Innovation.bg forums ARC Fund intends to pay particular attention to PTA opportunities.

Despite some obvious challenges and some negative trends, none make the TA capacity and infrastructure building in the country obsolete or pointless. Instead they should be considered opportunity windows for the range of strategic tasks TA in Bulgaria could address, however ambitious it may seem to address all at once.

### *2.3.4 Science/Academia*

Debates within academia are contained, and only rarely do details become known to the outside public. Most notable exception is the continuing (though not as vocal any more) debate on the mission and functions of the Bulgarian Academy of Sciences, its place and significance to the Bulgarian society. This debate is clearly illustrative on how disconnected researchers are from policy-making, on the one hand, and on the other – how policy-makers, as well as policy-minded scientists at the Academy, are disconnected from the tasks of research and from having an idea about the full range of societal implications of their work. To date, this debate has not proved particularly helpful to the Academy, though it has undergone some internal restructuring. However, it is riddled by ever more acute problems, such as aging of leading scientists (which leads to growing rates of attrition), growing unattractiveness of the Academy for younger scientist, failure to enable younger scientists to get involved in original research, and not least – almost universal failure to make notable international contributions. The unenviable result of that is that new knowledge is hardly produced or sustained.

An interviewee, member of the BAS, confirmed this continuing polasiration within the science community. One part of it tends to be very loud in political debates, but this is the part that is not directly involved in the science creation process. The other part, which is heavily involved in real science and technological development, shuns away from participating in political debates. Such polarisation clearly illustrates the disconnect between science and policy, and more so the inability of the science community to generate policy attention on the essential products of its work.

Very few organisations in Bulgaria have the capacity to perform TA-like research, less so on a regular and/or sustainable basis. ARC Fund could be considered an exception not least because of its thematic focus and rich relevant expertise, especially on participatory methods and technology foresight, technology transfer, and science systems assessment. It has been involved in interdepartmental expert groups on a number of legislation development processes, most recently for the Act on Innovations, which is yet to be approved as a draft by the Council of Ministers before it is submitted to the Parliament, and is well known and widely recognised within both the Parliament and the government administration. Furthermore, its track record of EU project participation makes it especially well-prepared to take on future challenges in terms of both managerial capacity and subject expertise. Participants at the Second National Workshop confirmed ARC Fund's suitability for such a task, and expressed their readiness to cooperate.

In terms of strategic positioning, ARC Fund's central role in establishing TA infrastructure is well-grounded. Throughout the course of the PACITA project, ARC Fund has the opportunity not only to promote (parliamentary) technology assessment and its novelty within the public policy process, but also to develop its own capacity, and to share experience with both established TA institutes in Europe and with other similar bodies undergoing the same TA infrastructure formation process. Its further involvement in cross-European TA activities provided within the PACITA project will serve as a true test bed for the application and "localisation" of TA methodology to the Bulgarian environment. No other organisation in the country could provide a more "competitive edge" than that.

Regrettably, the academic community still needs to become much more open if it is to be at the forefront of any science or research-related public debate. The academic community has not been capable of and has not demonstrated leadership potential in terms of identifying critical issues or initiating wider debate on what it views as a problem. It has however been quite unanimous in putting forward financial and managerial issues of specific universities (a strictly political discourse) or of the BAS, which has additionally steered public opinion in a non-science-related direction. On the other hand, there is little if any public "demand" for S&T reporting by state-funded research institutes.

## 2.4 Policy options and national recommendations

### *2.4.1 Conclusions from the above given description with regard to the opportunity structures for TA in the country.*

All interviewed individuals within the task 4.1 study process have demonstrated their support, at least in principle, for the introduction of (P)TA infrastructure in the country, although opinions vary significantly on the exact roles, mandates, form, position and composition a TA infrastructure would have. The same kind of support was also demonstrated during the first national workshop.

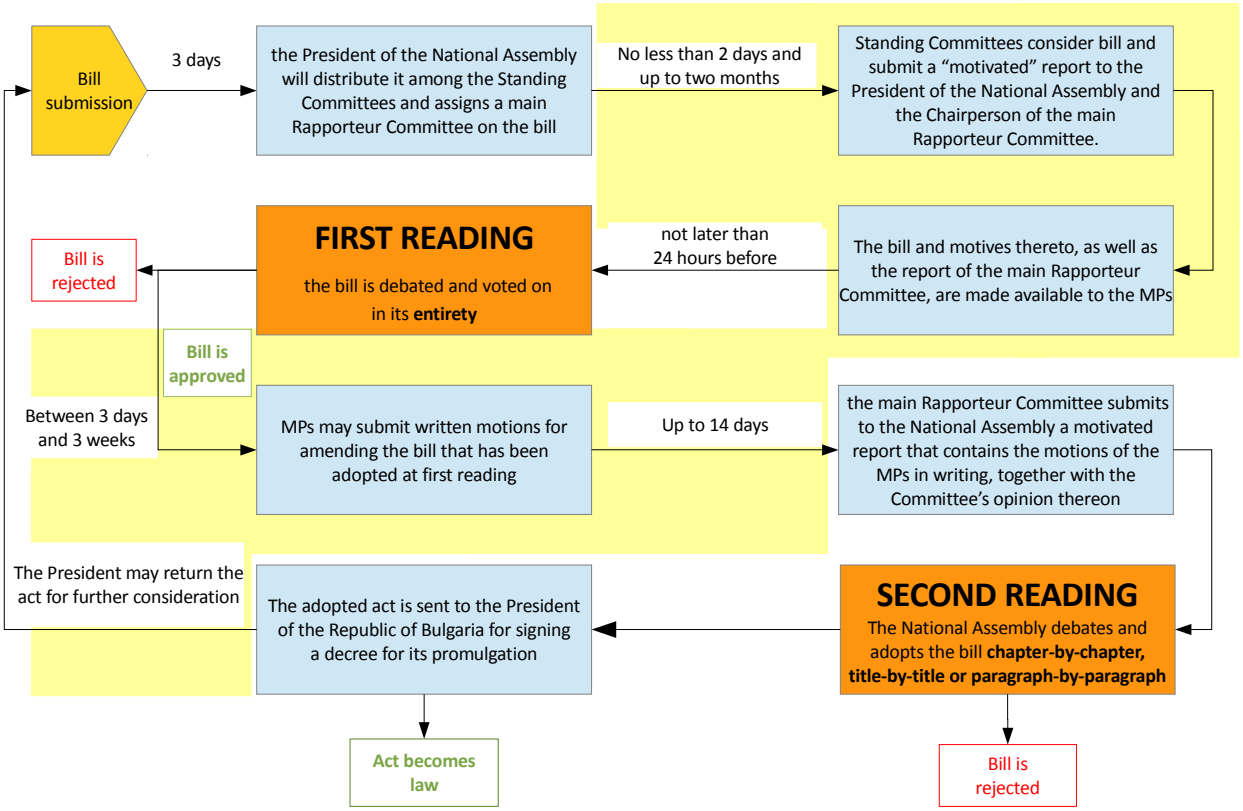


*Figure 1 Legislative process diagram[32], yellow blocks indicate TA opportunity windows*

The way interviewees imagine the positioning of a TA "unit" range from a structural unit at a specific ministry, to a consultative body at the Council of Ministers, to a consultative body at the Parliament, to an independent non-partisan organisation, to a specialised unit at the Bulgarian Academy of Sciences, to a semi-formal body at the Presidency. Regardless of the exact positioning, however, a TA body is believed to be the most useful if it could provide expert advice to all relevant stakeholders (despite the obvious organisational

[32] Source: http://www.parliament.bg/en/billbecomeact/, retrieved on July 27th 2012.

and managerial challenges such a set up involves). As discussed during the first National Workshop, the institutionalisation process of a TA body remains a significant challenge, and should be carried out in a fashion that would ensure the sustainability and effectiveness of the policy-making processes in the long run. Participants also agreed that it need take into account the specific features of the Bulgarian institutional arrangements and political culture.

The nature of the legislative process in Bulgaria (as depicted on Figure 1) makes it especially challenging to introduce an efficient TA structure *at* the Parliament, if the former is to be strictly attached to a legislative process. Instead, the executive branch appears more favourable to "host" TA infrastructure. Following are three of the most apparent reasons. First and foremost, about 80 per cent of all adopted legislation is traditionally authored at a Ministry, typically by a team of in-house experts. Thus the Parliament, which is by Constitution the superior policy-making body, frequently has only a secondary, technical role. The latter is especially true of (new) major laws, as well as of cases where significant amendments are introduced into the legislation. To some, this is a sign of a serious deficiency in the democratic process, not least because of the (added) lack of transparency and accountability (anonymous "authors" of legislative proposals). Hence, a strictly Parliament-based TA unit could be functional, but hardly useful if not used in the preparatory process by the respective Ministry. Once draft legislation is submitted to the Parliament, the TA unit would not have a much different task than a typical standing committee, although it would most likely serve as a horizontal consultative body across all other relevant standing committees. Due to the rules of procedure however, which provide for a very narrow time frame between two plenary readings, in the cases when TA analyses are linked to a specific piece of legislation, TA would be hard to impossible to carry out once the proposal is under parliamentary consideration. Therefore, a TA process will necessarily have to focus on a broader issue (i.e. independent of a specific proposal at the time of the analysis) – either (1) as soon as possible public reaction has been detected and a critical legislative/policy gap has been identified, or (2) once current policy regulations have been determined as inadequate and a change is deemed necessary. This also implies that, at least ideally, a structured TA process should run parallel to, yet independently of, the general political process, sharing results but not authority over process or content.

A second important reason is that current parliamentary rules of procedure do not provide for sufficient flexibility in setting up a structure that would permit subjecting S&T-related legislative proposals – or even preliminary ideas – to closer (parliamentary) scrutiny. Though MPs (or rather – the Parliamentary groups) may, at their own discretion, organise and host public discussions on a particular set of issues, such a process does not add validity to the legislative development process, albeit it carries a higher chance of reaching to a wider audience and publicity. In any case, such an approach will likely be political party-dominated thus leaving doubts about its legitimacy and agreeability.

Third, but not least, is the fact pointed out by all attendees at the first national workshop, namely the lack of expertise among parliamentarians, resulting in the inability to properly judge and form opinions on S&T-related matters being voted. That is further amplified by the lack of transparency and accountability in integrating external expert recommendations – a fact pointed out by two of the interviewees, especially expertise provided to and shared at standing committee meetings. This is not only a matter of policy communication, but reveals a critical deficiency of the policy consultation process as it happens within the Parliament. Though experts (and generally speaking – stakeholders, such as nonprofit organisations, business associations, etc.) are often welcomed to the standing committee meetings, their contributions do not readily become available to the rest of the MPs or the general public and no formal requirement is in place to demand that such opinions are included in full in the standing committee reports on a particular legislative proposal. The latter could be done at the discretion of the Committee's chairperson, which means that different committees may follow different procedures in this regard. In terms of accountability, even though expert opinions would be heard during a committee's session, there is no mechanism in place for those

opinions to be formally taken into account, or to provide publicly available argumentation why they are discarded. This is not to suggest that the establishment of a TA unit would help change that, but rather than if it is subjected to the Parliament, it will very likely also inherit all the current weaknesses, as identified by the interviewees.

The major barrier however is seen as the absence of an unequivocal source of funding for any kind of a formal TA structure, which in turn prevents stakeholders from reaching an agreement about the exact positioning of a TA unit within the current institutional system. Thus although the immediate user of TA products would be a national policy body, funding for all of the TA activities will have to be sought from external (likely international) sources before the added value is proven and national (public) funding could become an option. To a large extent, financing of science and innovations in Bulgaria is fragmentary and does not provide for sustainability. At the first National Workshop One of the BAS representatives put forward the idea that financing TA-like activities could be regulated through the Law on Innovations, whose draft is currently under discussion. There was further an appeal by one of the participants for the continuous advocacy for the cause of TA in the Parliament in order to ensure its financial sustainability in the long-run.

Some content that a major obstacle is the lack of a formalized procedure to require that policy makers and legislators commission studies and use expertise from either business or the scientific community, where a lot of expertise is already available. In fact, respondents see it as favourable to TA capacity building, if TA analyses were mandated in the form of law. There has been very little done in such a direction – minimal changes were introduced in the Statutory Documents Act in 2009 that introduced impact assessments with respect to financial impact of newly introduced amendments. The phrase “impact assessment” however is not even cited in the text of that law.

Another frequently cited barrier was the lack of TA-trained human resources, which also bears close relevance to the quality of research-focused education in the country. Most respondents and workshop participants pointed to the presence of interdisciplinary expertise, which is scattered across numerous organisations, with varying sources of funding, diverse missions and modes of operation. At the same time, however, graduate and especially post-graduate education in the country puts very little if any emphasis on developing research (quantitative and qualitative) skills, which has its serious implications for building human capacity in the real sector. To that end, a participant at the first National Workshop, representing academia, suggested that a Master’s programme on technology assessment be developed and introduced at one Bulgarian university

A key challenge has to do with the proper naming of PTA in the Bulgarian language. If translated literally, the phrase “technology assessment” bears little to no meaning to most of the immediate stakeholders. That is partly due to the lack of culture of assessment (a deficiency of the policy planning process), and partly to the ambiguity of the term “technology”, which is often understood in terms of actual artifacts, and not in terms of its social relevance. The term “impact assessment” is relatively better-known, especially within the domain of environmental policy and management, but no concept covers the range of societal implications of S&T, or the specific policy ramifications associated with the use of any scientific or technological advancement.

Despite the numerous identified challenges, and though far from being openly admitted, Bulgaria has already had its first (P)TA experience, initiated by the Parliament in the form of an ad-hoc parliamentary committee, tasked to study the best practices of shale gas exploration and extraction, reviewing in the course of its mandate all available sources on the subject, and trying to conduct a presumably impartial assessment as to what technologies and how could be enabled via the relevant legislation. The case study featured in part 4 of this document covers the details of that Committee, particularly with a view on its TA-like mandate and working procedure.

### *2.4.2 Next Steps*

It has become clear during the TA study process, and especially during the first National Workshop, that the proper formal establishment of a TA body will be a longer process, lasting perhaps at least a couple of years, and involving multiple stakeholders. The situation is especially challenging due to the upcoming elections for national Parliament in July of 2013, after which all progress made might prove wasted due to the traditionally high rate of MP turnover and subsequent changes in decision-making structures, authorities and individual figures.

During the initial stages of TA infrastructure development, one of the core tasks and underlying functions of a TA body will be to raise the awareness of TA among key stakeholders while at the same time to increase the level of debate on S&T in society at large. As a by-product of such a process, ARC Fund hopes to encourage greater public interest in public policy making in general. Furthermore, another desired accomplishment we will seek is giving more voice and visibility of research and development institutes in civil society, the industry and possibly in the Bulgarian Academy of Sciences in deciding about public policy options. As a result, this should improve the currently faded status of Bulgarian scientists, in addition to enabling a wider S&T-focused public (and policy) discourse.

The TA body will need to be proactive in its efforts, it should contribute to the elaboration of a more focused policy agenda by "horizon scanning" and early identification of possible issues of societal concern, rather than merely expecting to follow static agendas put quickly in the Parliament or in another public policy body. In the mid-term, however, this process should be more balanced, with increased interchange of ideas and shared priorities between TA "scanners" and policy-makers.

The PACITA explorative country study, and its underlying process, initiated and set the stage for the continuing debate on the structured application of technology assessment in public policy making. It helped increase the awareness of (P)TA practices across Europe, and also fostered a wider discussion on the science system in the country, especially highlighting the science system's disconnect from the overall public policy system.

Another accomplishment of this study was that, through the process, ARC Fund managed to bring various potential stakeholders at the same table, and introduce the benefits a TA-centred approach could bring the public policy process in terms of knowledge creation and infusion, publicity and debate, as well as more openness, transparency and accountability of the decision-making processes. In light of the above, we believe that the establishment of a TA-body can happen through and be based upon a wide consultative process, which involves stakeholders since the very early stages of policy elaboration. The TA infrastructure should provide space for stakeholder collaboration, communication and joint decision-making.

ARC Fund used the National Working Meeting in the PACITA project (organised on September 13$^{th}$ 2012) to probe stakeholders' opinions of the formation of a national cross-disciplinary TA network, formed among expert-based organisations, think tanks and analytic centres, policy institutions representatives. This network will have a multi-layer governance and strategic planning structure, ensuring wide representation of stakeholders and opinion sources. ARC Fund will serve as its operation and strategic leadership core (**network secretariat**), at least for the duration of the PACITA project, and will seek to multiply PACITA-provided opportunities in the TA establishment process in Bulgaria. The network will additionally feature a **Coordination Council** where each participating organisation will be represented by one individual. The Coordination Council's will serve as a space for communication and exchange of ideas among members, and its key responsibility will be to guide the development of the network by setting priorities, identifying new TA issues, and distributing relevant tasks among network members. The highest decision-making body in the TA network will be the **TA Network Forum**, which will gather annually for a public debate on the most pressing societal issues where S&T are involved.

Such a pluralistic structure is believed to guarantee the impartiality of produced TA analyses, and with that – their public and policy legitimacy. It will further include multiple expertise sources in a coordinated way, so that no available knowledge is lost, and as a wide a range of opinions and perspectives as possible is taken into account.

## 2.5 Case study – Parliamentary Committee for the Study of Best Practices in Shale Gas Exploration and Extraction

This case study will look into the first formal PTA-like experience in Bulgaria, and will analyse its implications to the public policy process, while additionally trying to draw policy-relevant lessons from applying a TA perspective into the Parliament's work. The case study is based on desk research and a review of publicly available information, namely protocols from Parliamentary sessions that include complete transcripts of parliamentary debates; protocols from standing committee meetings; media publications.

### *2.5.1 Introduction*

Bulgaria does not have any tradition or experience in carrying out parliamentary technology assessments, and technology assessment as a method is not popularly associated with public policy making. That situation applies to both legislators and decision-makers, on the one hand, and to citizens and civil society groups or organisations, on the other. The most obvious consequence is that newly adopted legislative texts, especially S&T-related, suffer from additional lack of transparency in terms of the consulted expertise, from lack of legitimacy due to the uninformed voting on largely misunderstood propositions, and of course from lack of sustainability due to the inability of legislators to foresee the range of negative consequences the newly adopted regulations might cause in the future and the resultant (reactive) new amendments shortly afterwards.

### *2.5.2 Background*

In 2011 a large international company obtained a permit from the Bulgarian government to start explorations for shale gas deposits. To some, the prospects of domestic shale gas extraction would mean the reduction of the country's dependency on Russian energy resources, particularly on Russian natural gas. Bulgaria's dependency on energy imports from Russia forms one of the most critical geopolitical issues in the country's public policies, and is frequently an object of public debate and speculation. The Bulgarian energy sector remains highly non-transparent due to the lack of publicly available information about critical price formation mechanisms of natural gas – both current and prospective, as well as due to the high degree of lobbying and political interests vested in it. That precludes serious public debates, and opens up an opportunity for misinformation, thus also at the same time rendering any expert opinions or analyses doubtful, unpopular and hard to trust, not least because of the objective inability to judge their impartiality and methodological correctness.

The same situation has long plagued parliamentary debates in Bulgaria when the issue has had something to do with S&T, or with any other expert-level subject matter, limiting the debate to very few discussants, whose vocal presence additionally legitimizes them as subject experts. Thus, all such debates are only formal, with little opportunity to make substantive contribution in terms of either legislative content or discourse enrichment.

The debate about shale gas has been mostly defined by two underlying issues. One is economic and political in nature, and has to do with shale gas as an opportunity to break dependency on Russian natural gas supply

(obviously, resting on the assumption, which – as some would argue – is still premature, that shale gas is abundant on the Bulgarian territory). The other is mostly environmental, and has to do with the impact of the technologies used to extract the gas from underground shales. For the public, it is this latter layer that has spurred the most debate and public outcry, especially since it became clear that the interested corporation was allegedly granted a license to perform exploration in specific geographic locations, close to populated areas. The Minister of the Economy, Energy and Tourism dispelled those allegations in front of Parliament, claiming that formal license has not been granted, and only negotiations are under way.

### *2.5.3 The Parliamentary Debate*

This debate grew out rather quickly, and was fueled mostly by environmental concerns, on the one hand, and political stakes, on the other. At its core, this was not a debate on the S&T aspects of shale gas extraction – i.e. the merits of alternative technologies, although the specific technology used in the processes, popularly referred to as "fracking" (hydraulic fracturing), seemed to be the cornerstone of public concerns. The technology was believed to be harmful to the land areas where it was applied due to the injection of specific chemicals into the earth's crust, causing long-term pollution of the soil and all plants, allegedly man-made earthquakes, and contaminating irreversibly underground water flows. Thus a significant threat was introduced not only to the immediate environment, but also to human health. In terms of public discourse, shale gas gained a lot of momentum as a topic, although economic benefits of shale gas deposits and their subsequent exploitation were only marginally mentioned, and no arguments based on that have been regularly featured. In fact, society learned about shale gas' very existence not in any knowledge terms, but rather through the bringing to public space the alleged harm of a specific technology used in its extraction, without any further background of the process.

Although granting a license to the interested corporation, and negotiating the parameters thereof, was strictly a matter for which the Government (through its Ministry of the Economy, Energy and Tourism) was solely responsible and did not need parliamentary sanction, the issue was promptly introduced in the parliamentary agenda in late 2011, mostly in response to widely expressed public concerns. In October and November three different motions were submitted by different Parliamentary groups (none coming officially from the ruling party) – one as a draft Act for the Prohibition of Exploration and Extraction of Shale Gas, and the other two as draft parliamentary decisions featuring the adoption of a moratorium on shale gas extraction and exploration. One of the drafts featured an overall ban of shale gas exploration and extraction, while the others were targeting specifically the technology that is popularly referred to as "hydraulic fracking".

According to the Parliament's rules of procedure, all submitted legislative drafts are assigned to a Standing Committee with the same policy focus in order to review and prepare an opinion statement whether the draft should be supported in plenary or rejected. The three motions were supposed to be presented at a session of the Standing Committee on Economic Policy, Energy and Tourism on November 30th, 2011, but it was not until January 16th that they were finally included in the Committee's agenda. The reasons for the two-month delay remain unclear and speculative. Choosing the Economic Policy, Energy and Tourism committee reflects the policy logic of the submitted drafts, namely their focus is seen as economy and energy-related, which is an important, but not the only, aspect of the shale gas exploration debate. However, such a choice also highlights the Parliament's being poorly equipped to analyse technological and other S&T-specific aspects, thus possibly "flattening" the debate and limiting the full understanding of the issue at hand.

Debates in the Economic Policy, Energy and Tourism Committee represent the first stage in the Parliamentary debate on the shale gas issue. One of the key criticisms voiced during that stage concerned the lack of public information about what shale gas is, and how it is being extracted; this criticism was addressed at both the Ministry of the Economy, Energy and Tourism, and the Ministry of the Environment and Waters.

The former was further criticised that it was negotiating with a foreign corporation without prior study of the possible impact on the environment and on human health. Further arguments presented focused on the availability of international studies proving the hydraulic fracturing technology, intended also for use in Bulgaria, as dangerous and harmful – studies, which were not taken into account by the negotiating Ministry.

Another criticism pointed out that no Bulgarian legislative act contains the concept "shale gas", nor the mention or description of any technology used in its exploration and/or extraction. Neither does the available legislation require interested companies to reveal the technologies they employ or the chemical compounds used in the process. Essentially, such a criticism legitimizes the need for technology assessment analyses, and highlights some of the currently present gaps in the legislative process in the country.

Implicitly, this proves the need of technology assessment (1) performed sufficiently early in the decision-making process, (2) addressed at studying the impact and consequences, and (3) obtaining sufficient information that could be shared with the public. In effect, those criticisms meant also a confession that the responsible policy bodies "trail" behind civil society, where the shale gas debate allegedly began.

The Standing Committee on Economic Policy, Energy and Tourism voted on just two of the proposals, concerning the adoption of a moratorium on all shale gas exploration and extraction, rejecting the one proposing a general ban, and favouring the one specifically banning the use of the hydraulic fracturing technology. Critics of this decision noted that choosing a memorandum over a dedicated law made it very easy to change back. Had the MPs opted for a prohibitive law, the institutional impact would have been much greater and much more demanding, proving the serious intentions of the legislators.

The proposal for a Memorandum was voted by the plenary. However, this did not help settle the debate, but instead introduced a whole other set of new problems. Article 1 of the moratorium became the focal point of all subsequent discussions, as it elaborated the ban on the specific technology. However, the ban was applied to all exploration and/or extraction used to obtain oil or natural gas and their derivatives. That prompted a reaction from stakeholders who claimed that it is not only shale gas that is being affected but also many conventional gas extraction platforms where the described technology was allegedly used. From that debate however it was not made clear to the public whether hydraulic fracturing (or relevant technologies) is indeed already used in a way precluding its replacement, or whether it is *the only* available technology to be used in shale gas exploration and extraction. What seemed like a technological confusion led to premature policies and caused serious economic concern, in addition to failing to persuade the public in the sustainability and benefits of the chosen course of action.

Soon after the adoption of the memorandum, the newly voiced concerns spurred another debate – namely about the prematurity of the banning decision. Concerning the technologies in question, some stakeholders pointed out that the specific wording of the ban in fact applies to a much wider range of technological applications, thus halting undergoing processes, for which proper permits were already acquired. Thus the Parliament decided to form a temporary, ad-hoc Committee, whose main task was, within a time frame of several months, to study, analyse and discuss good practices and legislative decisions for the regulation of activities for the environmentally safe exploration and extraction of underground resources. The Committee also had to determine whether Article 1 of the adopted Memorandum should be amended, and how.

### *2.5.4 The Temporary Committee*

According to Bulgarian Parliament's Rules of Procedure temporary ad-hoc parliamentary committees are formed for a specific purpose, usually either to investigate into an issue of public concern or to carry out a public inquiry process thus increasing Parliamentarian's knowledge on a particular subject. In this case, the ad-hoc Committee had to help legislators become more informed about specific uses and applications of

technologies in other countries, which were deemed economically successful and environmentally safe. More specifically, the aggregation of good practices should, in theory, have determined whether hydraulic fracturing or other not-so-popular technologies, can be safely applied, and what are the specific risks involved. In this way, the Parliament actually admitted it needed more knowledge with respect to certain technologies, in order to be able to transform such knowledge into political capital and eventually into economic gains.

From a PTA point of view, this is a very interesting experience, because the task of this committee reflects the purpose of a typical PTA study. At least officially, the Committee had to perform a study of good practices in the use of a specific technology and then also study the possible impacts, as well as the range of policy responses when those impacts were negative, so that the harmful consequences were mitigated and no economic opportunity was lost. However, in no debate or decision was the term "PTA" ever mentioned, thus echoing the general unpopularity of the term within the Parliament (and very likely – beyond it). Though positive as an intention, the formation of an ad-hoc Committee did hardly support knowledge generation and information sharing, but instead came as a response to a mostly political debate – one that is largely outside the impacts (in terms of societal relevance) of the specific technologies involved. The stakes in this debate were more about specific actors' economic opportunities or losses, with little, if any, relevance to the public interest.

Furthermore, a Parliamentary Committee, even a temporary one, is always capable of drawing additional public attention, not least in terms of media coverage. Its potential to stir public debate however, especially one that is both impartial and informative, is minimal at best because the leading figures (or those best known to the public) behind such a debate are party officials, political figures whose public appearances will be judged through the prism of their respective party affiliation. The names of experts, though featured in the Committee's protocols, as well as their organizational affiliations, are short-lived in the public discourse. To the extent that such a committee's purpose would be to inform MPs in order to enable them to vote basing on greater knowledge and improved understanding of the issue at hand, reaching out to the public might well not be expected on its agenda.

The typical "model" of Parliamentary committee's work allows for the hearing of external experts, who are being invited during committee's sessions to present their opinion on the issue under discussion. The three meetings the Temporary Committee had were dominated by the contributions of experts, as explained below, with little input from MPs. The minutes from those meetings however reveal a rather interesting trend. It turns out that even though this Committee's mandate is to "study", it is not the most proper "venue" for soliciting expert information. Almost every time the discussion targets a specific technology or a scientific process (albeit in lay terms), some Committee members complain, while others seem to feel offended by the willingness of invited experts to provide thorough explanations. Therefore, it is hard to judge the legitimacy of expert contributions.

A brief look into the composition of this Committee reveals some interesting facts. The mean age of the 13 MPs who are its members is 44, with the youngest being only 29. They have, on average, served for 2 parliamentary terms, including the current one, yet the majority (9) of the members are MPs for the first time. The Committee's Chairpersons is also a first-time MPs. In terms of professional backgrounds, 5 of the members are engineers, 5 are economists (including the Chairperson), one is a lawyer, one – a bibliographer, and one (the youngest) has not declared any profession. The research experience (or at least knowledge) among the members of this committee remains elusive at best.

The Committee had a total of three meetings, whose minutes were made publicly available on the Parliament's web site. During the first meeting, held on April 11$^{th}$ 2012, 7 of the 13 members did not speak even once, and 37% of all statements were made by non-MPs, including the Minister of the Economy, as

well as invited experts and representatives of interested NGOs. Nearly 40% of the statements belong to the Committee's Chairperson, which includes the formal thanks and invitations to speak. Two of the Members spoke only once each. At the second Committee meeting that took place on May 10th 2012, non-MPs, mostly experts, made 43% of all statements, and 8 of the MP members did not speak at all. The Chairperson's statements account for 44%. During this meeting, the length of the statements increased, and expert contributions dominated the discourse. The third, and last, Committee meeting took place on May 17th 2012. The distribution of statements is not much different, with 8 of the MPs having not spoken even once, and the non-MPs dominating the discussion with 36% of all statements.

Written submissions are also taken into account. The web site of the Temporary Committee featured several such contributions - scanned letters from private companies, with professional layout and eloquent arguments, as well as such from experts who also took part in the meetings. One such letter is signed simply by "a natural gas expert", whose professional affiliation is not cited or known. Moreover, during the committee meetings, that same expert was quoted as well-known due to the numerous publications he had in the media.

The Committee however has been subject to strong criticism due to doubts of its objectivity, impartiality and "actual" tasks. Many, mostly from the opposition, claimed it was only formed as an excuse, and that it will be used to legally and legitimately lift the ban on the hydraulic fracturing technology. In effect, the result of the Committee's deliberations and analyses was a slight amendment to the Moratorium, which allegedly elaborates more fully the application of the hydraulic fracturing technology, as well as the exact locations where it could be applied, so that conventional gas and petrol extractions and explorations would not be affected or seized, if already undergoing. However, when it comes specifically to shale gas exploration or extraction, the amended moratorium text is still prohibitive.

### *2.5.5 Lessons Learned*

What can hardly be contested is that the ad-hoc Committee in effect had a PTA mandate, as it aimed to study good practices in the applications of certain technologies. Due to the prevalent political culture however, this Committee was never recognised as a legitimate PTA practice, nor named as such. Furthermore, an ad-hoc Committee, even if PTA was formally part of its mandate, does not mean any PTA capacity was developed.

It is certainly hard to judge the Committee as successful or not. In terms of a final result, an amendment was introduced to the Memorandum's text, allegedly altering it to (1) preserve the ban of hydraulic fracturing f

or shale gas exploration or extraction, and (2) to be more specific so as to not interfere with technologies used in conventional natural gas and oil extractions. There is however no comprehensive study report, citing the good practices studied, nor specific risk assessments and their policy implications, nor evaluation of alternative policy proposals. Furthermore, it turns out that the leading role of MPs actually precludes an expert-focused debate, and does not help facilitate an analytical inquiry process. That however might be due to the current specifics and composition of the Parliament, but it is more likely a systemic "defect" stemming from the dominant political culture and reflected in the Rules of Procedure.

The specific role of the MPs who were members of this Committee was also hard to judge unequivocally, especially since five of the thirteen members never made any (public) contribution during Committee meetings. In fact, the majority of contributions (in terms of discussion) were made by non-members – mostly by external experts specifically invited to present. At first glance, this is a formal recognition that experts are available, but it nonetheless remains unclear how these experts were identified. Hence, the Committee did not really demonstrate an effective interface between expertise and the integration thereof within public

policy developments. It further illustrated the lack of accountability in considering expert contributions when amending laws.

The conclusion of the Committee's work did not help settle the debate on shale gas. Controversies still exist, and they are both politics- and expert-founded. Hence, even though there is a concrete legislative decision made, the concerns that spurred the debate and that were used as an argument to introduce a Memorandum and later to form the Temporary Committee, were not addressed and are currently latent at best.

There is absolutely no guarantee (and it has not been sought) that in the future similar ad-hoc committees will be formed when S&T issues are at the core of a policy debate. In fact, hydraulic fracturing and shale gas are but one of many other S&T-related policy issues that the Parliament has had to deal with.

### *2.5.6 Conclusion*

It remains to be seen whether institutional stakeholders would recognise more formally the impending need for using and trusting technology assessments when planning and designing certain public policies. Due to the heavily politicised public discourse, truly independent and impartial expertise may have a hard time in finding its place in policy deliberations, specifically when S&T are the focus.

The shale-gas debate however clearly demonstrated that a Parliamentary Committee as a PTA alternative is clearly not the best option for TA for the long-run, as long as PTA aims at increasing transparency of decisions made while also guaranteeing all expertise is consulted and pros and cons of available alternatives are "weighed" against policy options.

## 2.6 References


Presidency of the Republic of Bulgaria (Ed.) (2012): Bulgaria 2020. National Priorities in Education and Science. Sofia: Presidency of the Republic of Bulgaria.

Innovation.bg (Ed.) (2011): Innovation Policy and Sectoral Competitiveness Available from http://www.csd.bg/artShow.php?id=15609. [Retrieved on July 24th, 2012]. Sofia: ARC Fund.

Council of Ministers (Ed.) (2004): National Innovation Strategy. Sofia: Council of Ministers.

Ministry of Education, Youth and Science (Ed.) (2008): National Strategy for Scientific Research to 2020: Available from http://www.minedu.government.bg/opencms/export/sites/mon/en/top_menu/science/national_research_strategy-2020.pdf [accessed on October 1st 2012] Sofia: Ministry of Education, Youth and Science.

National Assembly of the Republic of Bulgaria (Ed.) (2012): Rules of Organisation and Procedure of the National Assembly. Sofia: National Assembly of the Republic of Bulgaria.

## 2.7 Appendix

### *2.7.1 National Workshops*

***First National Workshop, 20.04.2012, Sofia***

***Agenda***

| | |
|---|---|
| **09:00 – 09:30** | Registration of participants |
| **09:30 – 09:40** | Welcoming Address<br>**Ms. Zoya Damianova,** Program Director at ARC Fund, PACITA Project Manager for Bulgaria |
| **09:40 – 10:00** | **Session 1** *About PACITA and Parliamentary Technology Assessment*<br>**PACITA Project Presentation** – Ms. Zoya Damianova and Mr. Ventseslav Kozarev (ARC Fund)<br>**Introduction to Parliamentary Technology Assessment** –<br>Mr. Geert Munnichs, PhD (Rathenau Institute, the Netherlands) and Mr. Walter Peissl, PhD (Institute of Technology Assessment, Austria) |
| **10:00 – 10:45** | **Institutional Solutions in the Netherlands, Austria, Germany** – Dr. Peissl (ITA, Austria), Dr. Munnichs (Rathenau Institute, the Netherlands)<br>**Examples of successful TA projects in Europe** |
| **10:45 – 11:00** | Q&A, Discussion |
| **11:00 – 11:15** | Coffee Break |
| **11:15 – 12:45** | **Session 2** *TA Options for Bulgaria*<br>Expert-level Discussion:<br>- Current gaps in stakeholder interactions;<br>- Options for a TA institution in Bulgaria – who is in need of support; demand for scientific knowledge in the policy-making process; appropriate institutional designs;<br>- Key tasks of the TA body in the country (target audiences, stimulating public/policy debates, policy delivery, stakeholder interaction);<br>- Key challenges for the further development of a TA body which is advising the Government and/or the Parliament. |
| **12:45 – 13:00** | **Adjourn** |
| **13:00 – 14:00** | Buffet Lunch |

***First National Workshop, 20.04.2012, Sofia***

***List of Participants***

*Moderators*

| | |
|---|---|
| 1) Ms. Zoya Damianova | ARC Fund and Mr. Ventseslav Kozarev, ARC Fund |

*Keynote speakers*

| | |
|---|---|
| 2) Dr. Geert Munnichs | senior researcher at the department "Technology Assessment" at Rathenau Institute, the Netherlands |
| 3) Dr. Walter Peissl | researcher and a deputy director of the Institute of Technology Assessment, Austria |

*Participants*

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|---|---|
| 4) Emiliya Krilcheva | Ministry of Environment and Water |
| 5) Diyana Todorova | Ministry of Environment and Water |
| 6) Marierlya Grigorova | Ministry of Environment and Water |
| 7) Nikola Gazdov | Bulgarian Photovoltaic Association |
| 8) Rossica Chobanova | Bulgarian Academy of Sciences |
| 9) Lychezar Avramov | Bulgarian Academy of Sciences |
| 10) Teodora Georgieva | Higher International Business School |
| 11) Ruslan Stefanov | Centre for the Study of Democracy |
| 12) Denitsa Marinova | ARC Fund |
| 13) Andrey Nonchev | Centre for the Study of Democracy |
| 14) Boiko Denchev | Federation of Scientific and Technical Unions |
| 15) Pravda Dobreva | Bulgarian National Television |
| 16) Malina Krumova | Ministry of Environment and Waters |
| 17) Julia Velcheva | Ministry of Environment and Waters |
| 18) Tanya Jeliazkova | Teia – Bulgarian Industrial Association |
| 19) Blagovesta Chonkova | ARC Fund |
| 20) Adriana Dimova | ARC Fund |

***First National Workshop, 20.04.2012, Sofia***

***Minutes by Blagovesta Chonkova***

**Session 1**

Ms. Zoya Damianova, a Project Manager of PACITA for Bulgaria, presented shortly the PACITA project to the participants, as well as the concept and objectives of the parliamentary technology assessment (TA). Her introduction was followed by presentations of Dr. Geert Munnichs and Dr. Walter Peissl, who elaborated on the parliamentary technology assessment as a policy analysis tool and provided illustration of some of its benefits through giving examples of successful TA projects in Europe (ICT and Privacy in Europe, PRICE – Privacy and Security Supporting Activity Online, and CIVISTI (Citizens' Visions on Science, Technology & Innovation)). The experts discussed the institutional solutions in the Netherlands, Austria, and Germany, focusing on the institutional arrangements and historical development of technology assessment in these countries.

**Session 2**

The discussion during the second part of the working meeting focused on the following main issues: The institutionalisation of a TA unit in Bulgaria, such that it ensures its *sustainability* and *effectiveness for the policy-making processes* in the long run, would be one of the greatest challenges for the successful establishment of a TA unit in the country. Dr. Munnichs and Dr. Peissl shunned from giving an advice on the exact model that Bulgaria should follow in the institutionalisation of TA. The participants jointly agreed that the institutionalisation should take into account the specific features of the Bulgarian institutional arrangements and political landscape.

The ***main impediments*** in the process of institutionalisation of TA in Bulgaria, as outlined by Prof. Andrey Nonchev (CSD), are:

- Insufficient ***human capacity*** in the field of TA, and
- General lack of ***public debate*** and public interest on S&T.

There was a general agreement among the participants that the *educational institutions* should also be included in the overall process of strengthening human capacity for the successful TA institutionalisation in the country. The establishment of a master's program in one of the Bulgarian universities to support the process of capacity building in the field was advanced as an idea by one of the participants from the academic field.

*Public debate* in the field of S&T: public discussions on S&T developments happen only late in the process of policy-making. Generally, public debate is reactive, rather than proactive. A TA body would stir the discussion on the usage of S&T developments before decisions are taken and technologies are in use. As such, one of the main roles of the TA body should be to inform the public and provide an "interpretation" of new developments in S&T, as well as new usage of already existing technologies. This would promote strengthening of the link between science and society. Dr. Munnichs encouraged the participants that although it would be a long and difficult process, a well-functioning TA body will demonstrate its added value to the public (together with its impartiality and trustfulness, which are crucial in this respect) and thus, promote the public debate in the field of S&T.

- ***Financial resources*** for the establishment and the continuous and effective functioning of a TA unit in Bulgaria.

A general concern with the willingness of the decision-makers to provide financial resources for such an organisation was expressed by the participants of the event. Financing of science and innovations in Bulgaria is fragmentary and does not provide for a sustainability of the process. One of the BAS participants promoted the idea that the financing of a TA-like activities could be regulated by the Law on Innovations, which is currently being under discussion. There was an appeal by one of the participants for the continuous advocacy for the cause of TA in the Parliament in order to ensure its financial sustainability.

- ***Lack of political will*** to increase the transparency in the policy-making process.

Technology assessment promotes transparency within the process of policy-making and legislative development, which might be preempted by politicians. This might be a further hindrance to the establishment of a TA body, which should be cautiously considered. Thus, according to one of the participants, the NGO sector should aim to play a vital role in this process with its active promotion of the idea. Another one of the participants expressed skepticism that although some TA-like activities have been undertaken by some NGOs in the past, these have not lead to any consequence for the policy-making process and the decisions taken in the Parliament.

Despite the impediments in the process of institutionalising of TA in Bulgaria, the opportunities it provides were recurrently underlined during the discussion. ***There was a general agreement that there is a need to establish a TA-body in Bulgaria.*** As further steps in the development of TA in Bulgaria, the following ideas were promoted:

- Start with the already existing TA-like instruments: *impact assessment* as part of the legislative process (regulated in the Law on Legal Acts). This might serve as a starting point of a broader process of assessment of the consequences of proposed legislative acts, including technology assessment.

- As a possible localisation of the TA body, opinions were expressed that it should be close to the governmental structures, taking into account that the great majority of the legislative acts stem from the Ministries and not from the Parliament.

- Another recommendation made was that strategic documents (national programmes, national strategies for development, etc.) can also benefit from technology assessment. Therefore, depending on the different levels of decision-making, different institutions and stakeholders should be involved in the process.

At the end of the discussion, Dr. Munnichs and Dr. Peissl appealed to the participants and their organisations to show to the general public the added value of TA for the policy-making process in the country. They stressed that the process of establishment of a TA body in Bulgaria will take time, similarly to the development of similar organisations in Germany and the other countries where it already exists. Yet, Bulgaria can take advantage of the willingness of the European Commission to stir such a process through the PACITA project, as well as of the already existing knowledge and infrastructure in the countries with institutionalised TA bodies.

**Concluding remarks**

A general agreement was expressed by all participants taking part in the discussion that TA will make a needed contribution to the policy-making process in Bulgaria. Despite the serious obstacles in the process of institutionalisation of TA in the country, such as the scarce availability of human and financial resources, as well as the potential lack of political will, the country should take advantage of the opportunities TA provides and ensure its effectiveness and long-term sustainability. To do this, stakeholders should aim to demonstrate the added value of such an organisation to the policy-makers and the public in general.

***Second National Workshop, 13.09.2012, Sofia***

***Agenda***

| | |
|---|---|
| **09:30** | Introduction<br>**Ms. Zoya Damianova**, Program Director at ARC Fund, PACITA Project Manager for Bulgaria |
| **09:40** | *Technology Assessment in Public Policy*<br>**PACITA Project Overview** – Ms. Zoya Damianova and Mr. Ventseslav Kozarev, ARC Fund<br>**Presentation of initial results from TA opportunities study in Bulgaria** – Ms. Zoya Damianova and Mr. Ventseslav Kozarev, ARC Fund |
| **10:10** | **Technology Assessment – The Practitioners' View**<br>Dr. Geert Munnichs, Rathenau Institute, the Netherlands, and Dr. Walter Peissl, Institute of Technology Assessment, Austria |
| | Discussion |
| **11:00** | Coffee Break |
| **11:20** | *Building TA Capacity in Public Policy*<br>- Added value of TA<br>- Possible forms of organisational collaboration<br>- Further PACITA opportunities for TA capacity development (***Healthy Aging*** and ***Sustainable Consumption***) |
| **12:45** | **Adjourn** |
| **13:00** | Buffet Lunch |

***Second National Workshop, 13.09.2012, Sofia***

***List of Participants***

*Moderators*

| | |
|---|---|
| 1) Ms. Zoya Damianova | ARC Fund and Mr. Ventseslav Kozarev, ARC Fund |

*Keynote speakers*

| | |
|---|---|
| 2) Dr. Geert Munnichs | senior researcher at the department "Technology Assessment" at Rathenau Institute, the Netherlands |
| 3) Dr. Walter Peissl | researcher and a deputy director of the Institute of Technology Assessment, Austria |

*Participants*

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|---|---|
| 4) Georgi Yanakiev | expert, Ministry of Environment and Waters |
| 5) Dessislava Lesova | business projects manager, Bulgarian Photovoltaic Association |
| 6) Edi Emirian | chief expert, Council on Electronic Media |
| 7) Vessela Katreva | expert, Institute for Energy Management |
| 8) Krassimir Naydenov | CEO, Agency for Sustainable Energy Development |
| 9) Blagovesta Chonkova | expert, ARC Fund |
| 10) Marin Petrov | chief expert, ARC Fund |
| 11) Robert Hickey | expert, ARC Fund |
| 12) Bilyana Ilieva | senior expert, Ministry of Environment and Waters |
| 13) Kostadinka Simeonova | professor (retired), Bulgarian Academy of Sciences |
| 14) Kostadin Kostadinov | scientific secretary, Bulgarian Academy of Sciences |
| 15) Georgi Stoev | vice-president, Bulgarian Chamber of Commerce and Industry |
| 16) Tanya Zheliazkova | Teya, parliamentary secretary, Bulgarian Industrial Association |
| 17) Teodora Georgieva | vice-rector, International Business School |
| 18) Maria Alexandrova | senior expert, ARC Fund |
| 19) Boyko Denchev | chief expert, Federation of Scientific and Technical Councils |
| 20) Daniela Chonkova | programme coordinator, ARC Fund |

***Second National Workshop, 13.09.2012, Sofia***

***Minutes by Blagovesta Chonkova***

**Session 1-Technology Assessments in Public Policy**

Ms. Zoya Damianova, a Project Manager of PACITA for Bulgaria and a Programme Director at ARC Fund, presented shortly the PACITA project to the participants. She also elaborated on the concept of TA, its purpose and ways of institutionalization in Europe. Her introduction was followed by presentations of Dr. Geert Munnichs and Dr. Walter Peissl, who talked about the institutions that they represent, including their missions, structure, financing, procedural features, and topics being worked upon. They also provided insights into the way their organizations measure the impact their studies have on the decisions taken by public authorities in the field of technologies in their countries.

One of the questions provoked by their presentations was connected to the issue of budgeting and how their organizations manage to secure their independence from the parliament and the governmental institutions in the respective countries. Dr. Munnichs pointed out that although the Rathenau Institute is financed by the Ministry of Education, Culture and Science, the way of decision-making within the organization is such that it ensures high degree of independence of the agenda of the body (which is consulted with an entirely independent Board). He also pointed that his organization aims to keep distance from excessive communications with the members of the Parliament.

Another issue raised was that the Bulgarian political context might prove to be unfruitful for the establishment of such an organization and the process might not flow as "smoothly" as in the countries, which Dr. Munnichs and Dr. Peissl represent. The participants also raised the issue that often the usage of new technologies faces controversial ethical issues, which are difficult to reconcile. The experts ensured the participants that the process of establishing TA in their countries, as well as the way TA is functioning in their countries is not that "smooth" and the experts working in the field have to overcome many issues related to lack of interest to their studies by decision-makers and difficulties in communicating with them.

At the end of the first session, Mr. Ventseslav Kozarev presented the conclusions of his research in the frame of the project on the prospects and stakeholders' views for establishing TA in Bulgaria. He highlighted the challenges in the process of establishing TA in Bulgaria, based on the opinions from the interviews taken in the process of investigating the prospects for TA in Bulgaria. The differences in opinions of the stakeholders, as well as the point that provoked consensus were also summarized in the presentation. Considering the investigation made by ARC Fund and the PACITA team, Mr. Kozarev described the most probable configuration of TA in Bulgaria as a first step to its institutionalization process.

**Session 2-Capacity building for technology assessment in the public policy**

In the discussion part of the event, participants expressed their general support to the idea of introducing TA in Bulgaria. Although according to some opinions in the beginning it might not be established "in a pure form" as the TA bodies from abroad, some supported the idea of initiating a smaller scale TA body (for example: a sector-specific TA), which in the future might be endorsed by a larger scope of stakeholders and can develop to a full-scale TA body.

Some of the participants stressed the importance of TA for Bulgaria and for taking informed decisions by the policy-makers in the field of technological developments, thus, financial support by the state would be logical, so the European Union should not remain as the sole source of financial support.

The discussion during the second part of the working meeting focused on the following main issues:

- the value added of TA

The weak development of civil society in the country might to a certain extent impede the establishment and functioning of TA in Bulgaria. TA could be an instrument to support the process of strengthening civil engagement in the field, namely through improving public understanding of issues related to S&T. This would also leave less room for politicizing the S&T debates, which can be attributed namely to the general lack of understanding by the public of the risks and opportunities associated with the developments of new technologies. In addition to strengthening the societal debate in the field, TA would also bring more in-depth knowledge from a scientific point of view in regards of new technologies and would also provide a more interdisciplinary in considering the possible consequences of the newly developed technologies. Another participant pointed out that TA contributes to the policy-making processes in the S&T field by providing the bottom-up perspective in the debate, which makes TA an instrument for taking into consideration the interests of a broad range of stakeholders. Moreover, it was stressed that TA would bring more strategic thinking into the policy-making process of Bulgaria.

- probable structure of an inter-institutional consortium for TA

Mr. Naidenov from the Agency for Sustainable Energy Development (ASED) stressed the importance of technology assessment processes for the work of the Agency and pointed out that there is no alternative to TA in the energy field. In regard of this, he expressed willingness to collaborate in a form of inter-institutional consortium for TA in the future, provided that there would be an agreement about this in his organization.

As possible addressee for the TA analysis one of the participants mentioned the Council of Ministers, considering its influence on the legislative process in the country, as well as the Presidency, with its commitment for giving strategic direction in the policy-making process in the country.

One of the participants pointed out the access to information as a potential challenge for any TA-organization, which does not involve governmental bodies. Considering that only governmental institutions have timely access to relevant information, an inter-institutional consortium for TA should involve a governmental body, which will ensure the access to needed information and databases for doing quality TA analysis.

The independence of the institution was pointed out to be one of the most important features for a TA-body, which will ensure its neutrality in providing scientific advice to the law-makers. Thus, an opinion was expressed that an NGO would be the most appropriate organization to serve as a linking body/secretariat in a consortium of organizations involved in TA in Bulgaria.

- Additional opportunities for capacity building through the PACITA project (*Healthy Aging* and *Sustainable consumption*)

Mr. Kozarev and Ms. Damianova informed the participants about the additional opportunities for capacity building within the frame of the PACITA project, namely the two pilot projects on Healthy Ageing and Sustainable consumption. They will allow applying the methods of TA to a real-life problem and in a real-life case and will, thus, build organizational and analytical capacity in a concrete TA method. Other advantages include working with a broad range stakeholders and partners as well as publicity on a national and European level. Some on the participants expressed willingness to collaborate on these projects.

At the end of the workshop, Mr. Peissl encouraged the participants that there is no one right way and no receipt for establishing a functional TA body in a country. The process depends on the specific circumstances in the country. However, in his opinion, the country should take advantage of the window of opportunity provided by PACITA and use its resources to build capacity and move forward in this direction.

### *2.7.2 Interviewed Experts*

| Category | Organisation | Expert | Expert´s position | Date of Interview |
|---|---|---|---|---|
| Governmental authorities | Ministry of Economy, Energy and Tourism | Emil Komatichev | Chief expert in the Unit "Business development and innovations", Enterprise Policy Directorate | April 19th 2012 |
| Governmental Authorities | Ministry of Education, Youth and Science | Lora Pavlova | Senior expert – Directorate "Science" | April 27th 2012 |
| Government authorities | Ministry of Environment and Waters | Malina Krumova | Director "Cohesion Policy" | June 6th 2012 |
| Parliament | Parliament | Martin Dimitrov | MP, Chairman of the Standing Committee on Economic Policy, Energy and Tourism | April 12th 2012 |
| CSO | Center for the Study of Democracy | Ognyan Shentov, PhD | Chairman of the Board of Directors | April 19th, 2012 |
| Media | Bulgarian National Television | Pravda Dobreva | Journalist | April 10th 2012 |
| CSO | Center for the Study of Democracy | Prof. Andrey Nonchev, PhD | Director of Sociology Programme | June 7th 2012 |
| Science | Bulgarian Academy of Sciences | Rossitsa Chobanova, PhD | Science Secretary of BAS | April 19th 2012 |
| Industry | Holding Zagora<br>Bulgarian Industrial Capital Association | Rumen Radev, PhD | Economic Director (HZ)<br>Vice-Chairman of the Governing Board (BICA) | April 9th 2012 |
| Science | International Business School | Teodora Marinova, PhD | Vice-Rector | April 19th, 2012 |
| Science | Bulgarian Academy of Sciences, Institute of Sociology | Todor Galev, PhD | Research Fellow | June 5th 2012 |

# Chapter 3 Explorative Country Study: Czech Republic

Ondřej Pokorný, Lenka Hebáková, Tomáš Michalek (TC ASCR)

## 3.1 Introduction

The PACITA[33] project aims 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 TA (PTA).[34]

During April and May 2012, 15 interviews on Technology Assessment (TA) potential and institutionalisation in the CR were held within the framework of the PACITA project by the TC ASCR as well as by other 6 PACITA partners where TA is not institutionalized yet (i.e. *non-PTA countries*: Bulgaria, Wallonia/Belgium, Portugal, Lithuania, Ireland and Hungary). For these interviews, key TA stakeholders in the following six categories have been chosen: government authorities, parliament, science, industry, media and civil society organisations. Most of the interviews were conducted in Czech, some of them in English in cooperation with the Flemish project partner from the Institute Society & Technology (IST), Brussels, Belgium. These interviews enhanced the debate on the concept and use of TA and its institutionalisation potential in the CR. They also contributed to determining expectations, barriers, possibilities and interests in relation to future TA activities in the CR. In this context, two Czech national PACITA workshops were organised by the TC ASCR in Prague,[35] and the "Final Report on Expanding the TA Landscape in Europe" would be prepared.

This study offers a starting point for the discussions amongst Czech stakeholders (policy-makers, scientific experts, companies, civil society organisations, interested citizens, etc.) concerning the use of TA and a model of institutionalizing the Czech TA unit in the mid-term perspective. Five types of resources have been used:

1. Descriptions of the national RDI governance system – International Audit of the RDI System in the CR (2011); Erawatch Country Fiche and Country Reports 2010 and 2011; National RDI Policy 2009-2015 etc.;
2. Descriptions of three basic models of TA institutions in Europe – country studies of from the second half of 2011 provided by *PTA countries* of the PACITA project: Denmark, Germany, Austria, Flanders/Belgium, Netherlands, Norway, Switzerland and Catalonia/Spain;
3. Interview with 15 key stakeholders in the CR, representing the following categories: government institutions, parliament, civil society organizations, media, industry and academia – see Annex 1 for the interview questions and Annex 2 for the stakeholders list;
4. Discussion of stakeholders during the first and second PACITA national workshops in April and September 2012;

[33] PACITA is a four-year EU project financed under FP7 (www.pacitaproject.eu).

[34] Such practices involve a range of methods of cross-disciplinary expert studies, stakeholder involvement, citizen consultation and parliamentary discourse. The key practices in focus are interactive in the sense that they engage science, civil society organizations, stakeholders, citizens, parliaments and/or governments directly in the activities in order to activate different kinds of knowledge, engage the actors, create common ownership to the results and enhance the communication between the societal actors.

[35] First workshop took place on April 16, 2012; the second one, entitled "Opportunities and challenges for building up a national TA infrastructure", was held in the Czech Parliament on September 24, 2012. Outputs of both workshops are available on the Czech PACITA website: pacita.strast.cz/en/outputs

5. In SOTEC[36] project report for the CR – case study topic: nuclear power.

## 3.2 Description of governmental system and general R&D structure

The Czech research and development (R&D) system underwent a radical transformation along with the post-Communist economic and social transformation of the 1990s. The key changes were linked with cuts in public spending of the early 1990s, which resulted in a reduction of research capacity in the Academy of Sciences, as well as a reduction in the number of former sectorial applied research institutes. The enterprise sector also underwent large-scale privatisation and lost much of its R&D capacity in order to quickly reduce costs. The consequences are still being felt at present, especially in the context of the virtual absence of applied research institutes to act as partners for the business sector.[37]

The Czech R&D system is a centralised one, with a nearly equal balance between public and private funding. Private investment in R&D accounts for some 49% of total R&D investment (2010) and is characterised by a level of domination by foreign-controlled companies that is one of the highest in the EU.[38] The public sector is split between universities and public research institutes. The former is less research-oriented and more focused on education while the latter deals mainly with research activity, predominantly in basic research. In financing research from public sources, expenditure on basic research prevails with the share of basic research in the total R&D expenditure growing over the past few years. In the business sector, on the other hand, experimental development prevails and the proportion of applied research is decreasing. Links between public research and the business sector are unsatisfactory; in public research there is a negligible contribution from corporate sources and patent protection of new knowledge from research is used insufficiently. Universities and research institutes are not adequately motivated to transfer knowledge, to utilize R&D results in form of patents and to establish new technology-based enterprises. There is a positive trend in this matter, as the Technology Agency of the CR (TA CR), established in 2009, aims at implementing applied research programmes and some of the public research institutes start to split their activities between the applied and basic research area.[39]

For the first time in its history, the CR has one single multi-annual policy document for RDI – the new National R&D&I Policy 2009-2015[40]. Major players in the R&D policy making are: the Council for Research, Development and Innovation (CRDI) is an expert and advisory Government body for RDI. At the political level, the CRDI plays the main strategic and coordinating role in the RDI governance system. The Ministry of Education, Youth and Sports (MEYS) is a central administrative authority responsible for research and development. Ministry of Industry and Trade (MIT) is responsible for industrial research and development and for innovation in business sector. The ministry prepares and implements programmes of industrial research and manages the Operational Programme Enterprise and Innovation.[41]

In the Czech R&D&I system, national public funding is divided between two major groups of instruments: institutional funding and "targeted" funding. The term "targeted funding" – in international terminology 'competitive' or 'project' funding - stands for 3 funding modes: institutional funding, related only to basic

[36] http://www.insotec.eu/

[37] Klusáček, K.; Kučera, Z.; Pazour, M. (2008): Zelená kniha výzkumu, vývoje a inovací v CR [Green Book of Research, Development and Innovation in CR]. Praha (in Czech).

[38] Dinges, M. (2011): Assessment of Public R&D Expenditures in the CR. Final Report 1. International Audit of Research, Development and Innovation in the CR. Joanneum Research Forschungsgesellschaft mbH.

[39] Arnold, E., Mahieu, B., Horvath, A. (2011): R&D Governance in the CR. Final Report 2. International Audit of Research, Development and Innovation in the CR. Technopolis Group.

[40] http://www.vyzkum.cz/storage/att/316EDE80438A49F64BF884897F06F6C1/Narodni%20politika%20vyzkumu%20vyvoje%20a%20inovaci%20CR%20na%20leta%202009_2015.pdf

[41] Erawatch Country Profiles, Czech Republic. http://erawatch.jrc.ec.europa.eu

research; competitive funding for research programmes in the field of applied research; and public tenders for projects that have the public administration as sole future user.

In 2011, there was an approximate 20:80 ratio of institutional / programme based, which in the current system implies also a similar ratio in the national 'targeted' public funding for basic versus applied research. The National RDI Policy 2009-2015 recognised that funding for basic research is considerably lower than in other countries and declared the intent to increase it – predominantly in the form of targeted funding. The main rationales for public authorities to put project funding mechanisms in place are to spur competition between researchers and research organisations in order to allow for building up critical masses and excellence in research. In addition, project funding mechanisms allow public authorities to steer the scientific community by setting distinct priorities in research in terms of topics and framework conditions (i.e. application requirements, co-funding requirements, public-private partnership requirements).[42]

### *3.2.1 General information about R&D system in the CR*

In 2007, a political debate about the future of the innovation system began in the CR. This political debate was held between members of the government, members of the Council for Research and Development, heads of government authorities, who are providers of state support for R&D, representatives of the Czech Academy of Sciences, and representatives of the Grant Agency of the CR. In this context, a document entitled *Reform of the research, development and innovation system in the CR* was approved by the Government on March 26, 2008. This document presents an action plan to reform the institutional arrangements, legal issues (revision of the basic laws of RDI) and the system of financing of R&D. It sets out seven key objectives:[43]

- Efficiency of the R&D support system. The essential feature in achieving this objective is improvement of the evaluation system for public financed R&D.

- Simplification of the R&D support by reducing the number of budget lines which allocate public resources to R&D activities from the present level of 22. Simplification of the administrative procedures for R&D support will be further achieved through establishment of the TA CR, which is responsible for providing support to industrial research projects.

- Encouragement and support of excellence in R&D (basic and industrial), and facilitation the application of R&D results in innovation.

- Strengthening the cooperation between the research sector and the users of R&D results by providing project-oriented support to research projects that are co-financed by the private sector.

- Establishment of a more flexible organisational structure of public research organisations in order to promote better collaboration with the business sector and to create suitable conditions for the commercialisation of research results.

- Provision of qualified human resources for RDI. This objective is primarily addressed within the framework of the Operational Programme Education for Competitiveness.

- Intensification of the CR involvement in international RDI cooperation, especially within the European Research Area.

[42] Dinges, M. (2011).
[43] Klusáček, K.; Kučera, Z.; Pazour, M. (2008).

Some steps of the reform plan were carried out, particularly the approval of the new National RDI Policy 2009-2015. Coordination of implementation of innovation policy has been strengthened by new competences of the CRDI and the Act No. 130/2002 on public support of research and development has been reformed as well. The number of public R&D funders was reduced from 22 to 12, which simplified the whole system.[44]

Acceptance of the reform plan was complicated by the critique of representatives of public research institutions and universities. Several Ministries, Czech Rectors Conference, Council of Higher Education and the authorities of the Academy of Sciences submitted comments on the proposal of the reform. But CRDI decided not to include them in the proposal. According to the representatives, the reform proposal, prepared by CRDI, with the significant strengthening of applied research funding, allowed zero increase in funding of basic research and attenuation of institutional funding, which is associated mostly with higher education research and overemphasis on R&D projects with participation of business sector. This gave rise to suspicion that the reform will primarily serve the interest of private companies to get public funds for their research activities. The representatives of research institutions were convinced that the reform is directly against the existing academic system and that reform will not allow its further development. The main reason for criticism of the reform proposal from research representatives was the conviction that the purpose of science and education is not primarily creation of direct economic gain, but the development of cultivation of knowledge, critical thinking and building creative potential of the society. Thus the research organizations criticized the whole purpose of the reform.[45]

### *R&D investment levels*

The CR is among the most R&D active new EU member states and has considerably increased its R&D investments in the past 15 years. Since 1995, total R&D expenditures of the CR have more than quadrupled. In 2010, R&D investments summed up to 2.3 million EUR, which corresponds to R&D intensity of 1.56%. Overall, the composition of the financing structure has shown considerable fluctuations in the last decade, which was mainly due to varying trends in the Business Enterprise Sector. Even though, in 2010, only 2.1 % of total government outlays were reserved for research expenditures, the CR has set itself a goal to increase public R&D investments to 3% of GDP by 2020.[46]

The international comparison of the R&D financing and performance structure shows that the Business Enterprise Sector already accounts for a total of 62 % of R&D expenditures in the CR, whereas the Government Sector accounts for 21.4 % and the Higher Education Sector for 18 % in 2010. In terms of financing, the Business Enterprises Sector accounts for 48.9 % only. This, however, is mainly due funding from abroad, which accounts for an additional 10.4 % of R&D investments, of which the majority of sources (> 70 %) stem from foreign parent companies. Despite the economic crisis, the enterprise sector itself has increased its own R&D financing by 40 % in the period 2005-2009. Direct government support to enterprises increased by 44 % in the same period. The public authorities have also increased the support for the Government Sector (+58%) and for the Higher Education Sector (+63%).[47]

### *R&D Performance*

The CR is characterised by three performance sectors: the Business Enterprise Sector, the Government Sector, and the Higher Education Sector. As in many Central and Eastern European Countries, the majority

[44] Arnold, E., Mahieu, B., Horvath, A. (2011)
[45] Klusáček, K.; Kučera, Z.; Pazour, M. (2008).
[46] Dinges, M. (2011).
[47] Dinges, M. (2011).

of Higher Education Institutions in the CR were mainly teaching universities. Whereas the Higher Education Sector gained importance in terms of R&D performance in the last decade, the Academy of Sciences (which is the main R&D performer of the Government Sectors) has been drastically reduced in size in the early 1990s, but its overall contribution to R&D performance has stabilized since then. In the CR, the Government R&D sector and the Higher Education Sector concentrate to a large extent on the performance of academic oriented research activities, aiming at high shares and high quality of scientific publications.48 The number of private entities active in R&D in the CR equalled 2,130 in 2010.49 The Czech private R&D is dominated by investment of large enterprises. Businesses with more than 250 employees account for approximately 62% of total private R&D investment while SMEs invest the remaining 38 %. The share of foreign-controlled businesses of the total private R&D investment is very high (57%), which makes the Czech business R&D sector one of the most internationalised in the EU.[50]

#### *The distribution of public R&D support among different beneficiaries*

The Czech system of public R&D funding is still largely dominated by institutional funding. The Reform of the System of RDI in the CR stipulates, however, that the institutional funding should, within several years, reach a level comparable with the competitive funding.[51] The Reform has also changed the allocation system and the institutional funding is newly allocated predominantly on the basis of past results reported to the central database of research results. The largest shares of institutional funding are distributed between the Academy of Sciences and the Ministry of Education, Youth and Sports, which in turn provide this type of funding to individual recipients, predominantly to universities and public research institutes. The main provider of project-based funding is the Czech Science Foundation, which provides smaller grants for basic research and newly the Technology Agency CR, which provides project-based funding for applied research. Still a major part of the budget for applied research is administered by the Ministry of Industry and Trade and allocated through project funding, namely through the TIP research program. Thematic funding programmes are relatively underdeveloped in the Czech R&D system and the thematic focus in R&D funding is not very strongly present.[52]

### *3.2.2 Governance of R&D system in CR*

In recent years, the CR has set the fundaments for a radical change in its R&D&I governance system. These were based on the Reform approved in 2008 and the subsequent National R&D&I (further R&D&I) Policy document (2009) for the years 2009 – 2015 and other necessary legislative interventions. Applying the model of research and innovation organisation and the current R&D&I Governance Structure in the CR can be depicted as illustrated in the next figure.

[48] Klusáček, K.; Zuna, P.; Kadlečíková, K.; Váchová, D. (2001): Návrh Národního programu orientovaného výzkumu a vývoje a způsobu jeho realizace. Závěrečná zpráva [Draft of the National Programme on Oriented Research and Development and on its Implementation. Final Report]. Praha (Technologické centrum AVČR i Inženýrská akademie ČR [Technology Centre ASCR and Engineering Academy of the CR]) (in Czech).

[49] The highest concentrations of these were in the capital, Prague (22%) and in South Moravia. The largest share is businesses active in manufacturing, followed by the service sector. In terms of sectors, the biggest spenders are: the manufacturers of cars and other means of transport (the whole sector represents almost 30% of the total private R&D), ICT services, mechanical engineering and petrochemical, chemical and pharmaceutical industries.

[50] Klusáček, K.; Kučera, Z.; Pazour, M. (2008).

[51] Erawatch Country Profiles, Czech Republic. http://erawatch.jrc.ec.europa.eu

[52] Klusáček, K.; Kučera, Z.; Pazour, M. (2008).

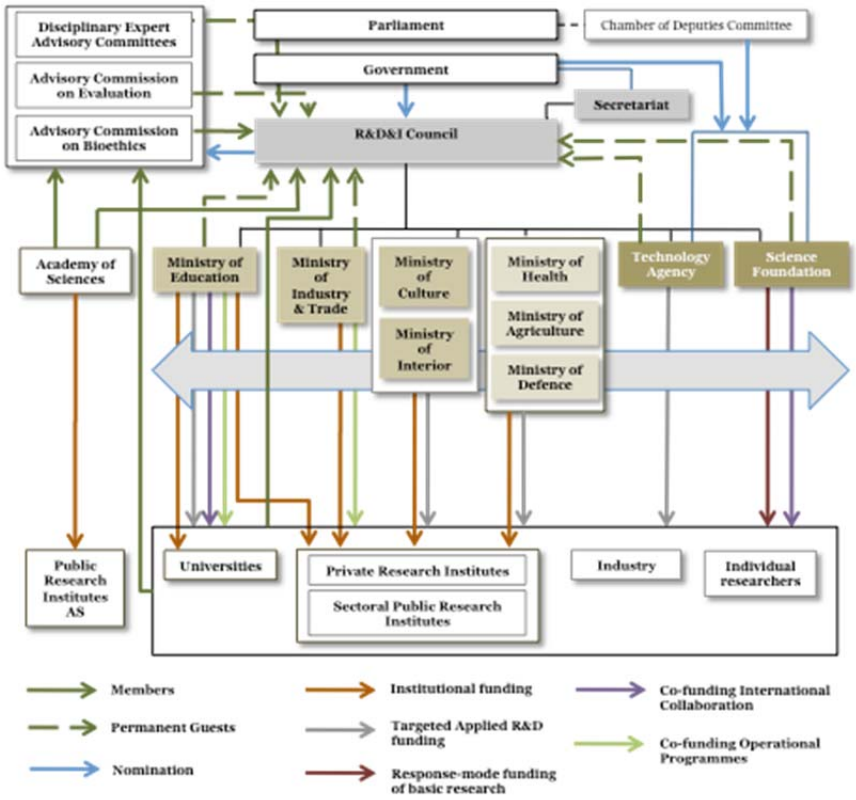


Figure 2: The current structure for R&D Governance in the CR[53]

In the CR, the CRDI is a high-level advisory body to the Government on research, development and innovation, setting overall directions and priorities across the National Research and Innovation System. It currently counts 16 members (not including the Chairman), nominated by the Government. CRDI is composed of representatives of the Academy of Sciences (4), higher education (6), industry (3) and other institutions (3). According to the Prime Minister[54], members of CRDI are experts, which defend the interests of Czech R&D, rather than the interests of individual research organizations.[55] Most of CRDI members represent the natural sciences and engineering, the humanities are represented only by one member of CRDI. A member of Government (normally the Prime Minister) acts as a Chair of the CRDI, thus ensuring its legitimacy. At least from a structural point of view, it can be seen that there are serious limits to the capacities of the CRDI to perform one of its key roles, i.e. *coordination* of all actors involved in RDI.[56] Industry stakeholders are involved only to a limited extent and only some of the intermediaries (the two agencies, the Ministry of Education and Industry) have the possibility to attend the CRDI meetings as permanent guests, i.e. without voting rights.

The National R&D&I Policy 2009-2015 made the implementation of the RDI policies a responsibility of 7 ministries and 2 agencies (SF and TA CR). The agencies and most of the Ministries provide support to RDI through the development of competitive research programmes.[57] All Ministries distribute institutional funding to the research institutes under their responsibility. The research community is predominantly

[53] Arnold, E., Mahieu, B., Horvath, A. (2011).
[54] http://www.ceskapozice.cz/domov/veda-vzdelavani/kritici-nove-vedni-rady-moc-inzenyru-nepruhledny-vyber-troji-clenstvi-v-rade
[55] Arnold, E., Mahieu, B., Horvath, A. (2011).
[56] Interviews and analysis of the current R&D system and outputs in the Czech Republic, which TC ASCR made in the last few years
[57] An exception is the Ministry of Industry and Trade that officially does no longer have the responsibility for targeted funding programmes, even though it currently runs a programme that will last until 2017.

composed of public research institutes constituting the Academy of Sciences, universities, 'sectorial' public research institutes, private research institutions, and industry. Finally, the involvement of the Government and Parliament in the current R&D&I system is limited. The two agencies have a unique status, with their governing bodies being nominated by the Government – upon proposal by the CRDI, while their supervisory bodies are nominated by the Parliament. The Government also nominates – or removes - members of the CRDI; and the Secretariat of the CRDI is part of the Office of the Government.

### *The role of the CRDI*

The CRDI furthermore plays an unusual role in the management of R&D in the country, operating almost as a virtual science ministry. Unlike the international policy councils, the CRDI effectively assumes the role of principal to TA CR and SF. Equally unusual is the breadth of its tasks, covering long-term strategy development, monitoring and evaluation, and decision-making on budget allocations – and especially the level, at which these tasks are being performed: in contrast to normal practice in international policy councils, the CRDI tends to fully centralise all activities, even taking responsibility of the micro-management.[58]

The CRDI thereby increasingly assumes a role of an executive body. This sets a heavy burden on its members and advisory committees – and most of all on the Secretariat and the Secretary in person in terms of time and resources availability as well as expertise and competences needed to adequately respond to multiple and sometimes highly professional R&D governance tasks. Seeing the limited number of staff in the Secretariat, CRDI also has a low level of internal analytical capacity and heavily relies on external experts for the development of its strategic intelligence while the budget allocated for these external services remains insufficiently low.

The TA CR currently fulfils a double role, acting as an executive agency for the seven ministries with competence for RDI, taking up a role of a multi-principal intermediate research funder, and acting as a technology/innovation agency for a single policymaking organisation, i.e. the CRDI (mono-principal intermediary). Following the model of the Scandinavian innovation agencies, the mission of the TA CR can be seen as encompassing two components: first, to fund research and innovation activities that would not be done in response to market forces alone – i.e. compensating for 'market failure' and adopting a broad policy mix; second, to act as a change agent by encouraging interest in new and emerging technologies and encouraging needed structural changes.[59]

Evaluation is an on-going challenge in the CR. Essentially; the *Evaluation Methodology for Completed Programmes* is currently the only framework for programme evaluations. Rather than being "methodology" papers, the descriptive documents merely indicate the basic information that the administration bodies should provide to the CRDI for the implementation of the Collective Programme Evaluations. The methodology adopted for this 'collective' evaluation is purely quantitative, based on a calculation of an input/output ratio. Its declared key objective is to provide the CRDI with a view on the efficiency of programme implementation by the intermediary bodies.

### *Critical View on the Process of Creation and Governance of RDI policy*

In general, within the CRDI, there is little willingness - and even reluctance sometimes - for an open discussion with broader stakeholder communities and the general public. It is also possible to note an

[58] Arnold, E., Mahieu, B., Horvath, A. (2011).
[59] Klusáček, K.; Kučera, Z.; Pazour, M. (2008).

apparently difficult collaboration between the Expert Committees that act as advisory bodies to the CRDI and the CRDI itself. There are clear signs of dissatisfaction and frustration on both sides.[60]

At the level of the ministries and agencies, external experts are intensively involved in both the policy-making and programme management processes. For the development of the concepts and programmes, experts´ involvement was in most cases direct, or indirect through the ministerial advisory bodies. The "distribution of labour" that was adopted for the development of the Strategic Concepts and the Programmes varied from Ministry to Ministry, depending on the role that advisory bodies traditionally play within these public agencies. There are two ministries with fundamentally different approaches: the Ministry of Health that essentially delegated the development to the stakeholder communities, with a minimal involvement of the ministerial staff; and the Ministry of Industry that exclusively relied on its own internal expertise.

Consultation with key staff members of the ministerial departments provide an important opportunity for the creation of distributed strategic intelligence; i.e. the transfer of sectorial knowledge from the stakeholders to the institutional programme managers, which is a crucial factor for the overall efficiency and effectiveness of R&D support administration. The distribution of this intelligence is even more enforced in the procedures implemented by the Ministries for their programme management, creating ad-hoc programme committees for each programme that involve external experts as well as Ministry employees.

## 3.3 Barriers and opportunities for building up a national TA landscape

The majority of economically developed countries, including the CR, have a very detailed formulation of research and innovation policies, which lays down future direction of S&T system organisation. Preparations, negotiations and approval of these political documents is a time-consuming process that is not trivial to organise, especially because interests of the individual involved parties – mainly from the political and research sectors but also from the business sector – are actually very different. It tends to be difficult to reach a compromise. It is clear that the root of most disagreements is the question of who should participate in the creation and who should participate in the management of the national innovation and technology policy. The users of S&T results – political, business and public entities – enter the negotiations regarding the new national S&T policies with ideas about and requests for future development and innovation intentions, which will eventually be clearly reflected in an improved competitiveness of the country and in an improved standard of living. Impact assessment of R&D programmes and results financed from public funds, and impact assessment of new technologies for the society is performed very vaguely in the CR. The R&D results have been evaluated according to a pre-selected methodology, which doesn´t take society into account. Although TA has wider consequences than impact assessment / evaluation and monitoring of R&D programmes and results, it is clear TA uses similar methods as these activities. Business, research organizations, researchers and politicians prefer evaluation that entails quantitative indicators. Quantitative indicators are relegated to the background.

Activities in the area of TA that have already taken place in the CR were of a formal, theoretical and methodological character. Elements of the TA concept have partially surfaced in the environmental projects (environmental TA) or in the area of new medical procedures or medicines (health TA).[61] As mentioned in the previous sections, there is still no consensus on how to carry out and institutionalize TA in the CR. In particular, there is a lack of demand for TA activities and a lack of concentration of capacities, which would address consistently the TA issues in the CR. Moreover, there is no mechanism for the involvement of experts and the general public (technology providers, researchers, journalists, sociologists, business or

[60] Conclusions related to the chapter on management of R&D, based on the interviews and analysis of the current R&D system and outputs in the Czech Republic, which TC ASCR made in the last few years.

[61] Heger, L. (1996): Zavádění a hodnocení nových technologií ve zdravotnictv. Institut postgraduálního vzdělávání lékařů, Praha, 37 p.

patients and health insurance companies) in the TA process. There is a lack of awareness of a need to deal effectively with technology and R&D results within the available funds in the CR. However, all of these activities feature a common trait of having significant limits in the main characteristics of the TA process, i.e. the collective debate between politicians, public and research.

### 3.3.1 Democratic structures in S&T

#### Transparency, accountability and openness of the decision-making system to public debate

The system of decision-making in the area of S&T in the CR is still not sufficiently open for public discussion. The Parliament itself has almost no influence on decisions regarding the area of S&T. The executive bodies of the CR strongly exercise their legal authorities. At the same time, it is obvious that the decision-making procedures are relatively fast, which makes it difficult for the public to take part in it. The decision-making process in the area of S&T is usually based on expert information and analyses supplied to the responsible authorities by external entities. This implies that the responsible authorities do not have their own strategic knowledge, and the inclusion of interested entities (including the professional public) that could contribute to the political discussion regarding S&T would be highly desirable. At the same time, it would be beneficial if the decision-making process in the area of S&T also involved different levels of the government.[62]

However, discussions about the area of S&T are often problematic even within the CRDI, which is the expert and advisory Government body for RDI. They take a form of searching for an acceptable consensus among CRDI individual members (representatives of the academic and industrial sectors). Overall, it is possible to observe an apparent lack of will or reluctance to negotiate with the broader community of interested parties and with the public during discussions within the CRDI. At the same time, it can be said that the cooperation and discussion between CRDI individual commissions is relatively difficult.

There are other entities involved in the process of creating policies and background analyses for managing S&T. The most important one is the Technology Centre ASCR,[63] which has relatively broad experience with preparations of major analytical and strategic background materials for elaboration of S&T policies of the state administration – National Research Programme, National Innovation Policy and National R&D Priorities. The structure of management and organisation of the system of S&T in the CR is not open enough to a public discussion. There have been some cases, in which the political decision-making about technologies adopted opinions of both the professional and lay public. Nevertheless, these cases are fairly rare and tend to be initiated by NGOs active in different fields and represented in the Government Council for NGOs. The government is not the initiators of public discussion in this regard.[64]

### 3.3.2 Public debate about S&T

#### Attentive and critical public discourse on S&T

Unlike the older member states of the EU, the CR still lacks suitable conditions for a truly participative evaluation of existing, new and emerging technologies; and there is no institutional support for active

[62] Svačina K., Konopásek, Z. (2012): Identifying remaining socio-technical challenges at the national level: Czech Republic. Working Paper on InSOTEC project.
[63] Activities of the TC ASCR and its competences in relation to the development of TA in the CR will be described below.
[64] Machleidt, P. (2010): Komunikace mezi expertem, veřejností a politikou. In: Rozvoj lidských zdrojů ve vědě a výzkumu. Sborník příspěvků z odborného symposia, Liberec, p. 50-56.

participation of all affected parties (political, expert and public). An essential precondition of a participative model of TA is the need to encourage a positive attitude towards public discussion. The political sector's weak role in the creation of conditions for accepting new technologies and R&D results in the society is apparent in this regard. Essentially, the problem lies in low awareness and insufficient efforts to publicise the political steps that require the adoption of major technological innovations and technological solutions and that will have direct influence on the country's future economic and social development.[65]

On the other hand, a large part of the public in the CR passively relies on the decisions taken by the government and politicians when presented with pressing social problems. Conversely, in some cases, the form of expression of the (professional) public regarding decision-making about S&T transforms into mass protests. However, these protests are usually about the system framework of S&T and about the impact of political decisions (S&T financing, S&T evaluation, university tuition); and not about the influence of technologies on the society (i.e. TA).[66] This problem could be eliminated, to a certain extent, by development of information technologies and digital networks, which would contribute to a virtual public discussion. The possibility of interactive communication on the Internet, as a part of the TA process, may bring about an advantage of combining and providing both expert and lay evaluation.[67]

***The hottest S&T issues leading to public debates during the last years and the most relevant actors or driving forces in these debates***

Recently, there have been some efforts to engage the public in relevant discussions regarding S&T-related issues. These have been primarily local initiatives that initiate discussions about S&T with direct influence on the region's inhabitants. The discussions are chiefly concerned with the power engineering industry, water management and waste disposal. These discussions are often moderated by external experts and representatives of the municipal government who provide the public with relevant information or consulting.[68]

There have even been several public discussions, during which the public could express their opinions about given matters. They have been related to such environmental topics as a construction of sewage treatment plants, landfills establishing, implementing or expanding mining sector, establishment of industrial activities with a potential direct impact on the air and groundwater quality, etc. All these activities must have been approved by the municipal council. The general public has been invited to participate in the approval process; however, the final decision is the responsibility of the municipal council. So far, it has not been possible to find out whether the conclusions from these discussions have had any real effect on the decisions concerning the use of specific technologies in the given regions. These public discussions are usually initiated by the local civic initiatives or non-profit organisations. Media are usually not involved in them. Their results are occasionally mentioned in the local newspapers; usually the results of debates are briefly mentioned in the local council meeting minutes.[69]

*Example of public discussions about the S&T in the CR*

The most controversial S&T issues, which led to public debates during the last years, were related to *environmental policies* (e.g. discussions on forests in the National Park of *Šumava* in the summer of 2011 and a new law concerning rules in the different zones of this park in relation to the wood felling and bark

[65] Hanč, R. (2008): Sociální hodnocení techniky a technologie a inovační politika v České Republice a Evropské unii. Univerzita Karlova v Praze, Fakulta humanitních studií. Bakalářská práce.
[66] Čada, K. a kol. (2006): Věda jako věc veřejná: vědní politiky a média. Sociologický ústav AV ČR.
[67] Kass, G. (2000): Science and citizens. Science and Public Policy, vol 27, n. 5. Beech Tree Publishing, p. 321-326.
[68] Arnold, E., Mahieu, B., Horvath, A. (2011).
[69] Arnold, E., Mahieu, B., Horvath, A. (2011).

beetle; GMOs; old ecological loads), *energy policies* (solar panels, biomass, the discussion on the role of nuclear power is very topical – debates about finishing another part of the *Temelín* nuclear power plant in relation to the Austrian contradiction etc.); *demographic changes* and debates on *active ageing*, preventive medicine, change of the health and social system of the CR to ensure better response to these societal challenges in the future. The most relevant actors or driving forces in such debates have been environmental organisations, local-level citizen movements and protests.. In some cases, the media, especially the TV, invites experts to discuss hot public issues.

The aforementioned examples of an informal TA in the CR are rather rare. Other projects work mainly with a theoretical analysis of the evaluation and use of technologies. However, this theoretical basis has not been used sufficiently in practice. At the same time, there is no clear political orientation at TA and its regular use for political decision-making in the CR. Therefore, the PACITA project could significantly contribute to improve the overall situation in the field of TA in the CR.

#### *Role of the media in S&T debates*

Historically, technological development has been relatively positively perceived in the CR. Despite the fact that a lot of attention is given to publicising, promoting and popularising S&T in the CR, more needs to be done. Results of individual media activities are hard to measure, but it could be said that the impact of these activities on the target groups is very small. One of the main reasons may be the non-existence of a national concept or a system for giving publicity to the area of S&T. Attempts at publicising S&T in the CR are limited to isolated activities of several entities and individuals. The media image of S&T is mainly the work of expert journalists. Scientific institutions, leading figures and other key actors participate in publicising activities lot less. One of the reasons may be the limited possibility of securing an appearance in more important media.[70]

There are several media that focus on the area of S&T (left alone to what extent): Czech TV, Radio Leonardo (science is its sole focus), and Czech Radio 6 (science section); newspapers, such as *Hospodářské noviny*, *Lidové noviny*, and *Mladá fronta Dnes*; Internet news servers, such as *Česká pozice, Aktuálně.cz* or Businessinfo.cz; weekly magazines, such as *Respekt* and *Týden*; and several popular scientific magazines, such as *Století vědy, Epocha, Vesmír* etc. There are also specialised websites about the area of S&T, but they have only small numbers of visitors.[71]

Generally, the media tend to categorise S&T as additional news, sensational events or curiosities. They do not consider S&T to be a normal part of everyday life. The media are thus contradicting the traditional understanding of S&T, which emphasises that it is a serious and intellectually-challenging activity. The result is that the media offer stereotypic views of the work of scientists and report about it as if it was a monotonous and routine repetition of identical experiments. This approach probably explains why the media report more about S&T results than about S&T's contributions to everyday life or about their ability to quickly react to possible problems.[72]

Articles about S&T in the Czech media are authored both by journalists and researchers. In both cases, however, an article comes into existence following an interaction between a journalist and a researcher (or another expert). Two types of cooperation between media (journalists) and researchers can be distinguished. The first consists in a publication of a scientific article in the media written by a researcher, with the journalist only choosing the form and type of the article. In this case, both parties cooperate on a long-term

[70] Čada, K. a kol. (2006).
[71] Čada, K. a kol. (2006).
[72] Čada, K. a kol. (2006).

basis. The other type of cooperation consists in a researcher providing additional explanation about a particular issue to a journalist who has read about it in an expert literature, found out about it from a press release, or wished to provide a scientific explanation to some current events. The researcher represents an expert voice for the audience in the final text. The journalist then sets the issue into the Czech scientific environment and, in case of a foreign research, provides context for the research and demonstrates the erudition of Czech scientists in the matter.[73]

Although media usually offer various "scientific" answers to S&T questions, they rarely formulate their own questions. On the other hand, it is possible that journalists consider communication with scientists some sort of a bonus that is not automatic. As opposed to, for example, political topics, which are featured in the media every day because they are a public matter, the area of S&T is not perceived as something the citizens should know, but rather something that could be of interest to them. And that even if a given S&T topic is as much a public matter as it is politic. In this regard, the fact that researchers, similarly to politicians, handle public resources to a great extent, and their decisions have a significant impact on the society is reported about only from the economic point of view.[74]

### *3.3.3 Policy advice*

Some cases of successful cooperation between political and research sphere can already be found in the CR. This cooperation was in the form of searching for new R&D&I priorities; and it frequently utilised foresight methods.[75] Two expert Advisory Commissions (commission for evaluation of research institutions and research results, and bioethical commission) and three S&T Expert Committees (commission for life sciences, commission for technical sciences and engineering, and commission for humanities and social sciences) support the CRDI in its activities, as well as Secretariat with a staff of 16 employees (in 2011).[76]

Analyses and proposals regarding new priority areas are prepared at a request of a state administration body (e.g. Ministry of Education, Youth and Sports; or CRDI), by an independent institution (e.g. the TC ASCR) and in cooperation with external experts.[77] During the implementation of the projects, expert panels were created with a task to identify (1) key short-term opportunities that could be used for technological innovation and R&D (e.g. the last project had a time horizon of 2030); (2) scientific and technical barriers that could be eliminated with the help of R&D. Subsequently, a set of related research areas and research trends was identified that could lead to improve the CR competitiveness. A special emphasis was placed upon the interdisciplinary links of individual research topics and the multidisciplinary expert approach.[78]

Generally, it can be said that the cooperation of external expert institutions and the state administration is more oriented at analyses and studies that look into the future and are thus concerned mainly with preparations of development strategies or searching for suitable thematic priorities for R&D&I. At the same time, according to information obtained during the interviews, various think-tanks composed of top experts exist on the level of government (NERV – National Economic Council of the Government) or as independent NGOs (LI – Liberal Institute; CI – Civic Institute or CESES). These think-tanks supply their

[73] Machleidt, P. (2010)
[74] Machleidt, P. (2010)
[75] Machleidt, P. (2011): Technological Foresight and TA. Methods for Enabling Innovations in the CR. In: Banse, G., Grunwald, A., Hronszky, I., Nelson, G. (eds): On Prospective Technology Studies. KIT Scientific Reports 7599, KIT Scientific Publishing, Karlsruhe, p. 195-198.
[76] Arnold, E., Mahieu, B., Horvath, A. (2011).
[77] The TC ASCR, in cooperation with Ministry of Education, Youth and Sports and the CRDI, prepared a proposal for topical priorities of the National Research Programme (I, II, III) and, in cooperation with the Office of the Government and CRDI, a proposal of Priorities of Research, experimental research and innovation (http://www.priority2030.cz). These projects represent a practical demonstration of the close ties between foresight activities and TA in the area of assessing R&D, innovation and technology trends, which, in the end, leads to wide-ranging support for innovations.
[78] Arnold, E., Mahieu, B., Horvath, A. (2011).

respective parent entities with their positions and opinions on individual steps of the government. It is not clear however, to what extent the government uses these studies for its decision-making. An example of cooperation between the government, relevant ministries and the professional public could be seen in the CR during the preparation of the Czech position on the Horizon 2020 programme. The aim of the meeting was to introduce information related to the individual areas contained in the proposal of this programme. The subsequent discussion was to contribute to the formulation of positions and opinions that the CR representatives at the EC were to push during negotiations regarding the final form of the Horizon 2020.[79]

It is the interviewed stakeholders' view that there is a need to establish a specialised TA institution in the CR. However, there is no clear consensus as to how and where this institution should be established and who should finance it. This means that, in this case, the aforementioned agreement can be considered more or less a formality. Nonetheless, it is apparent that the representatives of the state administration, as well as of both chambers of the parliament, consider TA an interesting concept, which should be further developed in the CR. The outcomes of PACITA project could contribute to clarify an appropriate form of the institutionalization of a TA unit in the CR. Project financing is one of the possibilities to start-up operations of TA unit.

*Example: Use of TA elements in the CR*

The process of passing the law on the electronic signature in the CR is a good illustrative example of using TA elements and activities. In this case, a very important role was played by a civic initiative called the Association for Information Society (SPIS).[80] SPIS joined the public to the legislative process concerning on electronic signature. At the beginning of the legislative process, SPIS introduced the issue to the general public and started a public discussion. The round table at the IT-oriented INVEX trade fair in Brno was used as a platform for the discussion. The use of the conference environment made it possible to overcome the barrier between experts and the end-user public. This example shows a concept of a consensual discussion, which is still very little developed in the CR. The round table was primarily dedicated to the matter of building an information society in the CR. The level of participants at the round table was very high; it was attended by the deputy prime-minister, minister of finance and chairman of the Government Council for Information Policies. Some members of the parliament were also present.

At the same time, when a draft of the law on electronic signature was prepared by the Office for State Information System (USIS), SPIS drafted its own proposal of the law on electronic signature in cooperation with one member of the parliament. The result was that the Government Legislative Council debated two proposals. Following a parliamentary discussion, the parliament passed the SPIS proposal, which was prepared on the basis of a discussion with the professional public, experts and political representatives. SPIS then initiated discussions about other government-proposed laws, especially about the amendment of the law on public orders. It also actively comments on government documents (e.g. National Reform Programme) and regularly submits substantive proposals of laws in the area of e-Government and its correct and ethical operation.

***Potential institutional structures for policy consulting in the field of S&T that could be regarded as TA activities***

At this time, the CR does not have its own institution specialised at TA, which is why the CR follows experiences of the specialised institutes (PACITA partners), which have dealt with TA for decades. Research

[79] Arnold, E., Mahieu, B., Horvath, A. (2011).
[80] SPIS – Sdružením pro informační společnost [Association for Information Society] (2005): Manifest znalostní společnosti [Knowledge Society Manifesto]. Praha (SPIS) (in Czech).

teams from the CR actively participated in the TA project for the first time during the years 2002–2003 – particularly as one of the TAMI and INES projects[81] partners.

**Technology Centre ASCR**

The TC ASCR provides strategic, analytical and foresight studies and strategies for government bodies, especially for the Ministry of Education, Youth and Sports and the CRDI. It also unites the National Contact Points of the EU Framework Programmes, who serve as information providers and promoters for research organisations in the CR. Furthermore, the TC is the national coordinator of the Enterprise Europe Network encompassing advisory services for SMEs, technology transfer centres as well as information services on European programmes of subsidies.[82]

The TC ASCR is a leading national institution specialising in analytical and conceptual activities oriented at the area of research, development and innovation. The TC Department of Strategic Studies (STRAST) systematically develops methodologies for strategic studies and utilises the latest findings in this field to prepare conceptual background materials for the public administration on the European, national and regional levels. STRAST identifies research priorities and/or evaluates results and impacts of implemented policies. STRAST also develops methodologies used for its activities, such as methods for the evaluation of programmes and results of research, development and innovation, evaluation of participation in projects of international cooperation in research, development and innovation, and technological foresight and determination of thematic and system priorities, evaluation of impacts etc.

STRAST primarily deals with the following activities:

- Preparing of analytical studies in the R&D&I in order to form the conceptual material for a qualified decision-making of government, regional authorities and the EU institutions.

- Evaluation of R&D&I support programmes is an important part of the strategic approach towards the creation and realization of research and innovation policies. The TC cooperates with public administration authorities in the development of methods for this evaluation; and uses its results while preparing proposals for new programmes.

- Preparing of outlook studies used by the public administration on the national and regional levels for the formulation of R&D&I policies, and also by the individual research organizations. For these purposes, the TC uses modern foresight methods that are being constantly improved in cooperation with leading foreign institutions and the UNIDO organization.

- Monitoring of trends in the development of national innovation systems in developed and developing countries and participating in a complex audit of these systems performed with a goal of attaining a suitable configuration of innovation policies on the European, national and regional levels.

The main clients of the TC ASCR in the area of strategic studies on the national level include the Ministry of Education, Youth and Sports; the Ministry of Industry and Trade; the Research and Development Council; and local government authorities (in the Prague region). On the international level, the TC ASCR cooperates with a number of foreign partners in the preparation of analytical and conceptual studies for the European Commission, UNIDO, and the Joint Research Centre of the European Commission. Results are also

[81] The TAMI (TA in Europe: Between Method and Impact) project focused on evaluating impacts of TA results (including political impacts) and on comparing TA methods (identification of criteria, classification of TA methods, legitimisation of TA results. The investigation resulted in the monograph Bridges between Science, Society and Policy. TA - Methods and Impacts. The same project team participated in the INES project. For more information visit: stss.flu.cas.cz/index.php?reloadMenu=true&action=&

[82] More information on TC activities can be found here: www.tc.cz and more information on TC involvement in the PACITA project is available here: pacita.strast.cz/en/about-the-project

published in professional literature, which is a way TC contributes to the development of this field on an international level.

**Czech Environmental Information Agency**

Among other things, it performs regular evaluations of technology impacts on the environment (EIA, SEA). However, the agency's scope of authority is limited to the ministry, and its results are intended for internal use only.

The Czech Environmental Information Agency (CENIA) participates in the Regulatory Impact Assessment (RIA) process, which includes a set of methods designed for systematic evaluation of negative and positive impacts of proposed or existing legal regulations. Assessment of impacts is a support tool for the decision-making process involved in the passing of all generally binding legal regulations planned by ministries and other central administration bodies.

CENIA was established on the basis of a decision of the Ministry of the Environment, and it has a statute of a non-profit organisation. Its main task is to provide information on the natural environment. In accordance with the law on information about the natural environment, CENIA ensures the transfer of information from the political sector to the public. It also provides the Ministry of the Environment with background material for better decision-making. CENIA cooperates with important experts from the field. The result of this work has been the establishment of an evaluation centre, which methodically controls and systematically deals with the state administration tasks in the area of the natural environment (including identification of political and socio-economic connections). The network of experts supported by CENIA goes beyond the natural environment and the CR. Participants include university institutions, which represent the base of research. Outputs of the expert network include evaluation reports regarding the state of the natural environment for the government and the parliament of the CR, coordinative and methodical management of the creation of scenarios and outlooks in the area of the natural environment, and cooperation on practical application and use of new technologies for the protection of the natural environment. As a part of its activities, CENIA is also active in the EIA and SEA processes. The aim is to identify, describe and thoroughly evaluate the expected impacts of planned goals and concepts on the environment and public health in all determinative aspects. The process strives to mitigate adverse effects of realisation on the environment.

CENIA represents the CR in the Environmental Technologies Action Plan supported by the EC. The aim of the programme is to eliminate obstacles in the development and introduction of environmental technologies and ensure that the EU becomes the leader in the development and introduction of environmental technologies. The main goal is to fully utilise technological potential in order to ease the pressure off natural resources, to increase the quality of life for the Europeans and to stimulate economic growth. To that end, CENIA coordinates support for environmental technologies, which can be seen from specific measures projected into individual branch policies and programmes, and takes appropriate steps towards implementing the entire programme in the CR.[83]

### *3.3.4 Science/Academia*

#### *Discussion on S&T policy in academia*

Discussions about S&T policies within the Czech academic community are in relation to the whole organization of S&T system. The main topic is the way individual institutions are funded and also evaluation of R&D results (which is related to funding). Apart from that, research institutions set their direction

[83] For more information visit: www1.cenia.cz/www/o-cenia/profil-organizace

themselves. The government will pass the prepared priorities of R&D&I in the near future. It can be expected that the publication of the priorities will be a hot topic in the academic community, as was the planned university reform.[84]

When the academic community shows some activity during the discussions about S&T consequences, its opinions usually reflect its own interests. For academia, the most important point is funding sustainability and preservation of its own research plans, which will reflect the interests of individual researchers. The majority of research organisations do not apply the concept of planning future research activities, additional evaluation of research results, nor sufficient participation in cooperation with the application sector, which could give the research organisations adequate feedback in the area of new R&D results. The Academy of Sciences of the CR uses its relatively strong position in this regard. The ASCR is the only research organisation in the CR with its own chapter in the public budget of the CR. To a certain degree, this status allows representatives of the ASCR to lobby the decision-making bodies when deciding about the amount of public funding for R&D or when passing important laws or other legislative regulations in the area of R&D.[85]

The academic community in the CR does not play an active role when it comes to demand for TA. Moreover, it does not pursue the area of TA even as a problem-oriented research, for which it has theoretical capacities. At the same time, the academic community does not act as a mediator of social communication between the political sector, academia and the general public.

#### *Institutes active in TA research or in TA-related fields*

Even though TA is yet to be developed in the CR, there are several institutions that carry out foresight activities, create scenarios, evaluate risks, and assess impacts on the environment etc.; however, these activities are not coordinated and the individual institutions rarely cooperate with each other. The problem lies in the fact that TA activities are only carried out within individual projects, and there are no provisions for their continuity.

### *Centre for Science, Technology and Society Studies*

The Centre for Science, Technology and Society Studies of the Institute of Philosophy of the ASCR is concerned with the theoretical-methodological area of TA. The Centre conducts systematic interdisciplinary research into mutual relationships of science, technology and society. Its research is based on the broad theoretical background of philosophy, economy, and sociology (of science and technology), innovation studies, science-policy studies and TA. Changes in the current forms of knowledge production are followed in the form of theoretical analysis. Those changes comprise higher rate of social accountability of knowledge, more emphasis on its economic application, increasing heterogeneity of its resources, the problem of evaluation, and more stress on social and cultural values applied in research programmes. The emerging knowledge society is being analysed from the viewpoint of transformation of science and research. The centre's researchers have taken part in several important international projects that either dealt with or were thematically close to TA.[86]

[84] Heger, L. (1996).
[85] Špok R., Weiss T., Kříž J.: Regulation of Lobbying in the CR – History, Debate and Perspective. Europeum, 2011
[86] The first such project were TAMI and the INES project. For more information visit: stss.flu.cas.cz/index.php?reloadMenu=true&action=&

*Centre for Social and Economic Strategies*

The Centre for Social and Economic Strategies of the Faculty of Social Sciences of Charles University (CESES) continually performs quality-oriented social and scientific research. Being an interdisciplinary institution, the CESES develops theories, methodologies and future scenarios, as well as applications of analyses and prognoses in management practice. The centre prepares partial and summarising analyses, scenarios, visions and strategies of social, economic, environmental and political development of the CR in the European and national contexts. Even though the CESES is an academic institution, its results are largely available to the public. Nevertheless, the Centre offers specific expert outputs and substantive or methodological services to the state administration, political parties, international institutions, research institutions, non-profit organisations, companies and media, too.[87]

*Charles University Environment Centre*

The Charles University Environment Centre (CUEC) was founded in 1992. Similarly to CENIA, it conducts environmental research and provides environmental expertise and information for students, university staff and the general public. The Centre collaborates with parliamentary bodies, state administration, non-governmental organizations and many academic and research institutions, both domestic and foreign. CUEC consists of three units: sustainable development indicators, environmental economics, and education and information for sustainable development. The Centre cooperates with other departments of the University, as well as with other specialised institutions. For these purposes, it uses public support from ministries and agencies of the CR and grant support from the European Union (in particular the Framework Programmes) and from other foreign institutions. Using various forms of publications, the Centre's staff disseminates the results of their research activities to the public and academia. Within their capacities, its employees also provide answers to questions, consultations and expertise in the area of the natural environment and sustainable development.[88]

*Council on HTA*

In 2012, in reaction to an EC initiative,[89] legislation was passed in the CR that supports the implementation of HTA. The HTA Council works at the Ministry of Health of the CR, and its competencies include preparation of a methodology, selection of technologies for evaluation, selection of opponents and preparation of evaluations of the selected technologies. The council should closely cooperate with the Commission for Medical Technologies, which consists of representatives of the Ministry of Health, health insurance companies, professional companies and non-profit organisations. The Commission should take into consideration Council's assessments when publishing its final opinions on the individual assessments.

*Czech Technical University*

A HTA team was as well established at the Department of Biomedical Technology at the Czech Technical University (CTU). The team is principally financed from the grants paid by the Ministry of Health and the Ministry of Education. It operates within a CTU Master Study programme called the Systematic Integration

[87] For more information visit: ceses.cuni.cz/CESESENG-1.html

[88] For more information visit: www.czp.cuni.cz/czp/index.php/en/about-the-center1

[89] See Article 15 of Directive 2011/24/EU of the European Parliament and of the Council on Cooperation on Health TA. In accordance with the valid legislation, health TA (HTA) is considered a multidisciplinary process, which summarises information about health, social, economic and ethical issues related to the use of medical technologies in a systematic, transparent, impartial and robust way. The goal of HTA should thus be to provide information for the formulation of safe and efficient patient-oriented medical policies that strive to achieve the best possible results. In spite of its political motivation, HTA must be always based on research and scientific methods.

of Processes in Health Services, and specializes in the medical technology, health economy and management from the engineering point of view.[90]

## 3.4 Policy options and national recommendations

### *3.4.1 Conclusions from the above description with regard to possible TA structures in the country*

#### *Barriers*

It is relatively difficult to assess possibilities of institutionalising TA in the CR. The main reason is the fact that nobody has pursued the concept of TA in the CR on a permanent basis so far. It is not currently clear whether the decision-making sector is interested in this approach. Even despite the CR appreciable lack of advisory think-tanks that would be capable of producing relevant and generally accepted expert opinions regarding new technologies and R&D results. Possible institutionalisation of TA in the CR would, according to our opinion, struggle against structural and system barriers. The barriers are mostly technological, economic, political and cultural.

There is a shortage of people who have been continuously researching technology trends and technology foresight. The shortage of suitable researchers who could carry out TA activities is related to the structure of study programmes at technical and liberal-arts universities. It is clear that no specialised schools are interested in teaching the very multidisciplinary TA, and it is also clear that it would be beneficial if inter-university collaboration could be started with the aim of introducing an interdisciplinary TA study programme. Only one university features a training seminar about TA, and it is only optional. Certain problems for TA development could be posed by an insufficient methodology base and a related shortage of suitable pilot projects that could serve as good examples in the future. The insufficiently developed methodology, lack of interest from research experts and poor awareness about TA among stakeholders could lead to a misunderstanding of the whole concept of TA in the CR.

On the political level, there is no political patronage over TA institutionalisation. There are no structures that would be capable of defining and partially managing individual projects. There is no political culture for broader discussion on S&T. While preparing legislative proposals, deputies and senators do not cooperate with the public or experts. There are only informal TA-like activities by some non-profit or local initiatives that would specialise in technological development that could be used for discussions with politicians. Another problem, which stems from insufficient political discussions about S&T by politicians and other decision-making bodies, is the inability to generate project proposals for the TA unit. This is an ever-repeating problem in the CR. Governing bodies often use material and studies for their decision-making that were prepared in-house. However, such materials often lack sufficient expertise. And if the political sector or other governing bodies outsource the preparation of an expert study, question remains of how much its conclusions and recommendations influence political decisions.

On the social and cultural level, the TA concept collides with the public generally poor awareness of the area of S&T. It is clear that to improve the understanding of technology issues certain changes to the way

[90] The areas of its interest are studies of economic efficiency and clinical efficiency of medical devices and technologies with a major employment of medical technology in the CR, including assessment related to quality of life; issues of efficient purchase, distribution and operation of medical devices; creation of partial methodologies for HTA surveys localized in the CR; expert reports in the area of purchase and operation of medical devices; health care systems, their strengths and weaknesses, influence of individual actors on the health care system, health care resource allocation, health insurance systems; and management of hospitals and clinics, implementation of novel methods in the health care organizations. The CTU provides more information on Czech HTA here: czechhta.cz/en/

technological topics are publicised will be required. The public's active interest will also be needed. Interviews with stakeholders imply that political decision-making cannot be based on a broad consensus with the public participation because the public is not sufficiently informed, and thus does not represent adequately strong partners for members of the government and the parliament during the decision-making process. This raises the question of the importance of publishing background studies and analyses used by the government to make political decisions, so that they can be offered for public discussion.

On the economic level, it is obvious that the CR lacks sufficiently strong ties between the research and application sectors, and public and political sectors. There is a shortage of research topics and research studies in the CR, in which all of the sectors would participate. For this reason, there may come a moment when relevant actors feel the need for a TA institution but no one wants to finance it. Funding of a TA institution activities is very important for its impartial advice and for its autonomous operation. The institution should not be based on project basis. It might be a good idea to find some way of co-financing the TA institution, in which the state administration, research institutions and the enterprise sector would all participate.

Assessment of R&D results and new technologies for society in terms of their specific outcomes for productivity growth, competitiveness, innovation potential or increased standard of living, which would be done through a public discussion with the users of results or an expert peer-review at least, is not developed in the CR. This is one of the reasons why TA is still not being used in the CR.

#### *Opportunities*

Positive factors that could contribute to TA institutionalisation are systemic in character. It is clear that despite a certain reluctance of the political sector towards regulating or, conversely, stimulating technological development, TA or a similar process will be more and more necessary. This trend is indicated by on-going activities that have already been legally endorsed. These are mainly activities related to evaluations of the impact of technologies on the environment, the performance of which is required by the law. At the same time, ethical committees are established under the CRDI that are supposed to ensure that R&D activities are carried out in compliance with the ethical codex.[91]

There will be a growing pressure on evaluating results of S&T produced by the Czech research organisations. Evaluations are not yet very common in the CR, and evaluation methodologies are not quite developed. The need to perform evaluations might provide a positive impulse to start a discussion about the institutionalisation of a TA unit.

In the CR, it is possible to build on the relatively comprehensive theoretical analysis of TA methods (TAMI and INES projects) and technology foresight. Even though there are some obvious methodological and specific differences between foresight and TA, on a general level, they provide answers to similar questions and problems. The use of both of these approaches clearly accentuates the seeking of solutions to social issues related to the use of new technologies and R&D results. Both foresight and TA clearly encourage an approach to future social development that is based on R&D&I and new technologies, which is in the best accord with the concept of a knowledge-based society. This theoretical capital is not yet sufficiently utilised in practice – due to a lack of legal framework for TA, no appropriate institutions established and a lack of political focus on TA problems.

When discussing possible ways of institutionalising TA in the CR, it is possible to consider three classic models:

[91] For more information about CRDI, see section 0

1. The model of **parliamentary committees** for TA, which is characteristic for some countries (Italy, Finland, Greece). Following their establishment, the committees (according to their agendas) invite experts to meetings or organise workshops and conferences in order to gain scientific support for their debates. In the case of France, individual members of the committee carry out TA studies on their own and deliver the results in the form of reports to their parliament. It is clear that this model would be very difficult to use in the CR. The main reason being the significant fragmentation of R&D management in the CR, which is also reflected in the parliament work in this area. There are several committees (education, economy, health etc.) that have the area of S&T in their competence. This means that the parliamentary committee for TA would not have one responsible partner in the parliament, with which it could quickly and effectively communicate. Another reason is the fact that the parliament itself has almost no influence on decisions regarding the area of S&T. Thus, the parliament committee model seems not to be a viable option for the CR.

2. The second model of TA institutionalisation, one which has the **parliament running a scientific office on a contract basis with a scientific institute** (Germany) or as a part of the parliamentary administration (UK) from which TA studies are commissioned according to information needs of the parliament. These studies may result in short parliamentary briefing notes or in fully fledged TA reports, which draw on in-house research and also on input from a number of external scientific experts and stakeholders. **This model of TA institutionalisation would have the best positive impact and the greatest effect in the CR**. However, it needs to be said that a think-tank institutionalised in this way should collaborate with some other entity than the parliament. It would be more efficient if the **TA institution was answerable directly to the government**, which is, according to our opinion, capable of defining problems with relative ease and of commissioning TA studies. Another possibility would be for the potential TA unit to be answerable to the CRDI. The main reason is that the CRDI (despite being only advisory body) *de facto* controls the entire national R&D system and has a strong decision-making authority. The prime minister only rarely rejects recommendations of the CRDI when passing a decision on the R&D system. **A close cooperation of the TA unit with the CRDI** would ensure a relatively quick transfer of results of expert TA studies to the decision-making sector. The direct connection of CRDI to the Prime Minister could link TA process to the other members of government. Another advantage is a secured and permanent financing of CRDI from the state budget and professional composition of CRDI members (as there are representatives of the research community, political sphere and industry). CRDI is also used to cooperation with external entities, because it used relatively frequently professional services in the field of analytical and strategic documents. This could facilitate future cooperation with the supplier of inputs for TA process in the CR.

3. The third type of parliamentary TA bodies is characterised by **close cooperation between parliaments and external independent institutes** that support parliamentary deliberations with policy reports and organisation of workshops or hearings. This kind of arrangement often involves an additional – interactive – mission of the institute, which opens up the classical TA setting of experts and policy makers to an additional third party: the general public. The mission of TA then is not only to support politics by providing in-depth and unbiased analysis of possible effects of science and technology on society but also to inform and intervene in public debates (Denmark, the Netherlands, Switzerland, Flanders and Norway). This kind of orientation of the consulting process towards the public, stakeholders, societal groups and the citizens can be regarded as the European "improvement" of the classic TA model. The public is not only involved as an object of research but also as a participant in the TA process exercising its own rights. **This type of TA institutionalisation would be also possible in the CR**. The advantage would be that there could be

no need to establish a new institution, and capacities of existing entities would be used. However, it is necessary to choose such an institution, which will have the ability to work effectively with researchers, politicians and as well the general public. The general public has to perceive a TA unit independent of political decision-making and industrial lobbies. The Technology Centre ASCR seems to be a suitable candidate for performing TA activities (based on conducted interviews) as it has already had experience with similar studies and cooperates with the CRDI on a long-term basis (see section 2.1.2). It has very good contacts with the academic community as well. Certain limitations of this model lie in the public participation in the TA process. The public in the CR is yet to participate actively in politics, and non-profit organisations still operate only in an ad hoc and coercive manner. Only a small part of them creates a sustained pressure on political decision-makers. On the other hand, it is also evident that the decision-making sector does not accept the general public as a suitable partner for political discussion. Groups of citizens participating in political decision-making, as seen in Denmark or the Netherlands, do not seem very realistic in the CR.

### *3.4.2 Next steps and principal conclusions*

The most serious problem of a potential TA institutionalisation is that mutual relations between experts, public and the political representation are not sufficiently developed, which is vital for the entire TA process. In the CR, the user sector and the public generally decide about R&D results and new technologies only ex-post and on the basis of market mechanisms whereas the TA concept builds on ex-ante evaluation. The Czech public is thus, in the majority of cases, denied the possibility of deciding about the acceptability and manageability of S&T results beforehand.

Other major objectives of TA in CR should be investigating and assessing industry applications of technological innovations to promote the use of best available and safest technologies with the highest value for society. As decisions about accepting or rejecting a given technology or result must be adopted ex-ante by the relevant state administration bodies, they should make use of expert recommendations for these decisions. It is an important aspect because when considering the interconnected mix of technological, organisational, legal, economic, social and cultural problems, relatively substantial social, economic and environmental dangers can be avoided by preventing undesired consequences of technological solutions. To that end, TA activities and outputs could be linked to a mandatory attachment to every submitted law – RIA. However, the RIA process would have to be modified, so that its output would not be only formal – it would be used during the decision-making process. RIA inputs should thus be based on expert recommendations, or the professional public could be included in the RIA process.

Values held by the broader public regarding S&T in the CR indicate a relatively positive appreciation of all factors and activities related to new technologies. Despite the fact that TA stems mainly from a critical view of technologies, it can expected greater political interest in TA activities only in relation to future overall technological, cultural and social development. It is likely, however, that the Czech public will not be able to avoid problems related to the upswing of new technologies and their evaluation. It has become apparent that TA is an important part of political culture in democratic societies in developed countries, which is proved by existence of TA institutes in any other European countries and Japan and by the renewed interest for TA in USA.

In the CR, the public has a small interest in an active participation in dealing with issues of technical development. There seems to be a lack of sufficiently developed awareness of personal responsibility for the way science and technology develop, which the public still perceives as hard-to-influence matters. The expert and research community needs to start with methodical deepening and developing of its knowledge of TA principles. The main thing is a shift from prognoses to discussions about possible variants of future

development (foresight) and a shift from strict expert analyses towards the willingness to publicly discuss future technological development. The experts should avoid trying to push results of professional TA analyses through to political measures. Conversely, they should endeavour to provide the decision-making bodies with simple explanations of the results of their work. The entire TA concept should not serve only selected institutions but also the professional and general public.

The state administration (or its involved bodies) should, together with the research sector, define a mission, a vision and a strategy of the TA institution. The TA institution must be involved in early identification of socially controversial questions related to S&T developments, and in doing so it strengthens co-evolution, builds up trust, and mediates in conflicts. The institution will have to function independently as much as possible and impartially because otherwise the parties involved will not allow the TA organisation to perform these functions. An important exception would be a TA organization that is a part of the parliamentary system.

In its relations with the citizenry, the TA institution will always have to be open and honest. Many public debates and participatory procedures organised by the government fail because NGOs and other stakeholders always have reasons to suppose that the governmental body organising or mandating the activity acts from some ulterior motive. The same is true for scientific organisations. TA institutions operate out in the open, in public and political networks, and endeavour to identify problems in the society and to formulate recommendations for political and administrative agendas. In order to do that, it is necessary for the TA practitioners to be familiar with the political and administrative domain and able to act authoritatively in the media. The TA institution must have a relationship based on mutual trust with universities and other research institutions. Good relations must also be maintained with the business community because both groups may entrust the aforementioned tasks to TA institutions.

Cooperation with foreign partners within the PACITA project may help us learn important experiences, good practices and demonstration activities for the development of TA in the CR. From the CR point of view, the Technology Centre participation in the project may improve the culture of political decision-making and the creation of S&T policies based on efficient utilisation of R&D. In this regard, the TA concept could help with better transfers of information and conclusions of expert recommendations towards the decision-making sector, which is responsible for official preparation and submission of proposals for these policies. For pilot TA activities, the CR could also make use of good practices and methodologies from the countries that have long-term experiences with involving the public in their TA activities.

In relation to the above discussion about the potential for TA use in the CR, the following entities could further participate in discussions about the possibility of institutionalising a TA unit:

- CRDI (possible coordinator of the TA institution),
- Parliamentary Committees (education, economy, health, foreign affairs etc.) (possible consulting bodies for TA institution)
- Technology Centre ASCR (possible TA institution),
- Technology Agency of the CR (consulting body for the area of support for applied research, possible consulting body for TA institution),
- CENIA (possible consulting body for the area of environment - CSO),
- CTU (possible consulting body for the area of environment)

- CzechHTA – FBMI CTU (possible consulting body for the area of health care)
- CESES (possible consulting body for economic social impacts of new technologies - CSO)
- Media partners (*Česká pozice* etc.),
- Ministry of Industry and Trade, Ministry of Education, Youth and Sports, Ministry of Agriculture,
- Ministry of Defence and other ministries (possible TA project contractors).

## 3.5 Case study – Public debate on Nuclear Waste Management in the Czech Republic

The case of the nuclear power engineering in the CR has been chosen as an example of a currently publicly discussed topic with a global dimension, where TA can be considered as a tool for a more effective interaction and cooperation of the different spheres and interested actors in the future. The discussion about this topic in the CR is provided by CSOs and media, politicians, citizens, industry as well as by the academic community. But these communities do not seem enough inter-connected to bring consensual strategic solutions concerning the role that the nuclear power engineering shall be playing in the future in the overall energy mix of the CR.

### *Nuclear power engineering in the CR*

The CR has a relatively long tradition in the area of nuclear power engineering. The first nuclear power plant on the territory of former Czechoslovakia was built in *Jaslovské Bohunice* in 1956. It was put into operation in 1972. Today, there are two active nuclear power plants in the CR that produce approximately 30% of the country's electric power. The *Dukovany* nuclear power plant was activated in 1987;[92] *Temelín* was gradually put into operation between 2000 and 2002.[93] The Czech public generally agrees with the construction. According to a *Eurobarometr* survey from 2010, over 65% of the Czech respondents support nuclear power engineering. Radioactive-waste handling in the CR is a responsibility of the state. For this reason, and on the basis of the so-called Atomic Act,[94] the Ministry of Industry and Trade founded a state-owned organisation, the Radioactive Waste Repository Authority (RAWRA), in 1997. This institution is responsible for handling all radioactive waste, for operation of low-level and intermediate-level radioactive waste and especially for the preparation of a future deep geological repository for high-level radioactive nuclear waste. The organisation's budget is approved by the CR government every year. The financial means that the RAWRA uses for radioactive-waste-related activities are acquired mainly from originators of this waste who are legally obliged to pay regular fees to a government-owned account in the Czech National Bank.[95]

### *Handling radioactive waste and spent fuel*

Throughout the entire life cycle of both nuclear power plants, approximately 3000 tonnes of spent fuel will be generated. This spent fuel can be safely stored for decades, reprocessed to new fuel or used as fuel for

[92] In June 2012, 7-year modernisation was completed in the power plant, during which all generators and other power-producing parts were replaced, which increased the power plant operational life from previously planned 30 years. It now features four pressurized water reactors with overall output of approximately 2000 MW.

[93] Operation is also planned for 30 years. Two nuclear power plant blocks have output of approximately 2000 MW. The Czech government and the ČEZ group, the dominant producer and distributor of electric power in the CR, have prepared a plan for the construction of two additional blocks in the Temelín power plant. The construction of the new reactors should commence in 2013.

[94] § 26 of Act no. 18/1997 Coll. on Peaceful Utilisation of Nuclear Energy and Ionising Radiation.

[95] RAWRA (2011c). "Plán činnosti a rozpočet Správy úložišť radioaktivních odpadů na rok 2012, tříletý plán a dlouhodobý plán." Prague: RAWRA.

new types of reactors in the future. If not, it will be designated waste. According to the Atomic Act every originator of radioactive waste, i.e. including ČEZ, the operator of the *Dukovany* and *Temelín* nuclear power plants, must bear all costs associated with the handling of radioactive waste – from its formation to its definitive storage. The spent fuel will be stored in the interim storage facilities for several decades.[96] Unless it is used otherwise, it will then be stored in a deep geological repository. There is also a backup variant for temporary storage of spent radioactive fuel – a project of a third interim storage facility located outside of the premises of the already standing nuclear power plants in the *Skalka* locality near *Bystřice nad Pernštejnem*.[97]

### *Deep geological repository in the CR*

Overall costs of preparing a deep geological repository, including its construction, were estimated to be CZK 47 billion in 1999 prices. A major part of these costs is intended mainly for investigating suitable locations and studying rock environment in the chosen location. Money for the construction of the deep geological repository is being gradually deposited to a special account managed by the Ministry of Finance of the CR, which receives millions of crowns every year from the operator of nuclear power plants, the ČEZ Group, and from other originators of radioactive waste.[98] A deep geological repository is the only safe, technically-viable and economically acceptable solution today. Even with positive development of new technologies, it can be expected that the advantages of a deep geological repository, consisting in its safety, technical feasibility and economic acceptability, will outweigh potential benefits of other solutions for a long time.

The search for a suitable location for the deep geological repository is formally divided in two stages: research stage (searching for potentially suitable areas and qualities of the rock environment) and investigation stage (collection and verification of data about geological structures and underground environment prior to the start of construction works and during them as well). The search for a suitable location for the deep geological repository has commenced in the 1980s. The first studies evaluating the potential of rock environment in the CR were prepared in the 1990s. The research stage was completed at the beginning of this century. The second investigation phase was cancelled by a government order. Meanwhile, some geological works were being carried out in the locations. They tested various techniques and procedures that could be later used during the investigation of the locations. Apart from that, the number of selected locations was increased (at the expense of military areas). In order to select two locations for detailed investigation while being in compliance with the CR concept for the management of radioactive waste and spent nuclear fuel, a condition needs to be satisfied, and that is the consent of municipalities with the investigation works.[99]

### *Benefits for involved municipalities*

In view of extremely long-term effects of the waste, uncertainties related to the long period of impact and an emotional character of the problem, the storage of radioactive waste has ceased to be the exclusive domain of technical experts. Requests asking for the decision to reflect not only technical aspects but also interests of

[96] Spent radioactive fuel from the Dukovany nuclear power plant used to be sent to an interim storage site at the Jaslovské Bohunice nuclear power plant in Slovakia from where it was supposed to be taken away by the then Soviet Union in accordance with an international treaty. The Russian Federation, being the successor state following the dissolution of the Soviet Union, withdrew from these obligations. Following the split of Czechoslovakia, the spent fuel found itself in a foreign country and needed to be transported back to our own interim storage facility built at the Dukovany nuclear power plant.

[97] MPO ČR (Ministry of Industry and Trade of the CR) (2001). "Koncepce nakládání s radioaktivními odpady a vyhořelým jaderným palivem v ČR." Praha: MŽP ČR.

[98] The Atomic account had approximately CZK 3 billion in 2009, and a sum of about CZK 1.4 billion is added every year.

[99] SÚJB (2011). "Spent Fuel Management." Available from <http://www.sujb.cz/?c_id=1031>.

affected entities are heard ever more frequently. The interests are often conflicting and can be only overcome by seeking and creating shared values.[100]

The newly established *Workgroup for dialogue about the deep geological repository* is being set up in collaboration with the Ministry of Industry and Trade and in association with the Ministry of Environment. The Workgroup was established in 2010 and its goal is to contribute to the transparency of the process of selecting a suitable locality for the deep geological repository of spent fuel and high-level wastes while respecting the public interest. This is to be achieved by encouraging more active participation of the public and the affected municipalities in the decision-making process. A majority of the group members are representatives of local administrations from the municipalities in localities considered for the deep geological repository and representatives of local environmental organisations. Other members of the group include representatives of both chambers of the parliament, representatives of state-owned institutions responsible for radioactive waste storage, experts in the field of humanities and technical experts, and representatives of environmental initiatives with national reach.[101]

The greatest disadvantage of the deep geological repository, which is the changes in the appearance of the original landscape, is compensated – in the long-term and in the short-term – by benefits for municipalities in the vicinity of the potential repository. Short-term benefits include mainly detailed mapping of the locality (new sources of drinking water etc.), preparation of development projects for affected municipalities, maximum utilisation of capacities of local companies, guaranteed employment (during research, realisation and operation of the repository), introduction of information infrastructure etc. Main long-term benefits include an increase in the number of permanent jobs and especially high financial subsidies from the state budget for the development of affected municipalities.

#### *Public participation development*

There are several national and regional non-profit organisations active in the planning of the deep geological repository for radioactive waste. The most active ones are "*Hnutí Duha*" and "*Calla*".[102] While *Hnutí duha* focuses mainly on the area of power engineering concepts and policies, *Calla* is directly active in the area of nuclear waste storage. Regionally-active non-profit organisations closely cooperate with a number of municipalities on organising regular public meetings with representatives and citizens of the affected municipalities and organise discussion seminars. Apart from these more or less formal activities, regional non-governmental agencies created, in cooperation with the Environmental Law Service,[103] an advisory and auxiliary body for holding communal referendums. Representatives of *Calla* and the Environment Law Service are also permanent members of the Workgroup for dialogue about the deep geological repository. Besides these non-governmental organisations, a representative of the national association of non-governmental organisations, the "Green Circle", is also a member of the Workgroup. Activities of non-profit organisations have most likely initiated some of the legal changes that the Workgroup proposed to the government.

All of the listed organisations are critical of the plans to build the deep geological repository. Even though some non-governmental organisations acknowledge the need to have a plan for storing radioactive waste (and some consider deep storage the best solution), there are no non-governmental non-profit organisations

[100] Eurobarometer (2008). Attitudes towards radioactive waste. Special Eurobarometer 297. European Commission.
[101] The establishment of the Workgroup is a step that follows from the results of a conference called "Nekonfliktně k hlubinnému úložišti" (Without conflicts towards the deep geological repository), which took place in November 2009, and of "round-table" negotiations in June 2010.
[102] Matoušek, L. et al. (2003). "Politika nakládání s radioaktivními odpady a její nedostatky." Brno: Hnutí Duha.
[103] For more information visit http://en.eps.cz/

in the CR that would support the government plans.[104] Non-governmental organisations have also been instrumental in organising protest events and local referendums about the construction of the deep geological repository. The referendums took place between 2004 and 2010, and they were special for two reasons. The first reason was the fact that despite the relatively limited role of referendums in the Czech political environment, these referendums took place in all of the affected municipalities. The second interesting thing is that public participation in them was extremely high (compared to other elections in the CR). In these referendums, a large part of the population has voiced its disapproval of the construction of the deep geological repository in the proposed localities.

***Public participation today***

The current participation of the public in the debate regarding the radioactive waste is formed mainly by activities of the Workgroup for dialogue about the deep geological repository. The Workgroup's work with the public is partially based on the results of the *Argona* project[105] and on the RISCOM methodology[106]. RISCOM represents a method for leading a structured, controlled and organised dialogue.

The Workgroup currently focuses mainly on two questions. The first concerns the implementation of the power of veto for municipalities in the CR system of law, so that municipalities could officially and definitively reject the nuclear waste repository on their territory. The second question is related to the issue of financial contributions for the affected municipalities. In this way, the Workgroup directly proposes changes to the Atomic Act that would solve these problems. Right now it looks like the proposal regarding the financial contributions will be reflected in the law, and the proposal concerning the power of veto will not. Some members of the discussion group think that this problem has to do with the supposedly insufficient interest in the power of veto from RAWRA[107]. Some non-governmental organisations are joining the political discussion and pointing to the unbalanced and unjust relationship between the state and municipalities.

The Workgroup tries to support discussions that lead to the consensus of all parties, but it is clear that such a goal cannot be always achieved. While some municipalities openly reject the project on the basis of their citizens' opinion, others are mainly interested in the financial contribution to their budget in case the construction of the deep geological repository was investigated and potentially carried out on their territory. RAWRA is answerable to the Ministry that created it, so it must represent its interests. In practice, it is not so much a consensual dialogue as it is a discussion between groups with different interests. For some members of the Workgroup (municipalities and NGOs), the discussion is a tool used to achieve a possible change in the relationship between municipalities and the state.

A separate problem is the relationship between the Workgroup, RAWRA and the Ministry of Industry and Trade. If the Workgroup proposes the power of veto, and RAWRA does not approve it, the proposal does not get to the Ministry and into the legislative process. The Ministry representative stated, during the last meeting, that the Ministry did not think it was necessary to modify legal regulations concerning the rights of municipalities. The ministry is of the opinion that the municipalities already have effective tools they can use

[104] On the other hand, there are great many organisations, websites and blogs that support nuclear power engineering, including all of its aspects. These non-governmental organisations include, for example, "Jihočeští taťkové" (Fathers of South Bohemia), which was established to counterbalance the anti-nuclear non-government organisation "Jihočeské matky" (Mothers of South Bohemia). Activities of organisations that support the CR activities in the area of nuclear power engineering are not directly related to the issue of deep geological storage of radioactive fuel, but they do well to reflect the overall general support for nuclear power engineering in the CR.

[105] For more information visit http://www.argonaproject.eu/

[106] The Riscom model ensure that decision-makers and the public can validate claims of truth, legitimacy and authenticity. For more information visit e.g. http://www.karita.se/our_approach/riscom_model.php

[107] Radioactive Waste Repository Authority

in their defence. In reaction to the Ministry's position, members of the Workgroup proposed reassessing the Workgroup legal status because despite it being the Ministry advisory body, the Ministry does not respect its recommendations. This situation clearly demonstrates the unclear and problematic relationship between

Workgroup and the Ministry.[108]

Technological aspects of the construction of the deep geological repository do not feature in public discussions. The state administration does not ask for an expert explanation of the whole issue. The public expects that potential technical problems will be dealt with by experts separately from other aspects of the construction. The reason for the absence of discussions regarding technological aspects could be that the majority of engineering work takes place in laboratories, and information about these research and engineering activities usually do not find their way to the media. The public also tends to think that technological problems will only occur in the future. It seems that in general the citizens mainly feel the need to reach a consensus within the society regarding the construction – technical and research problems will be dealt with later.

The separation of technical topics from social aspects in the discussions about the repository then results in misunderstandings between representatives of RAWRA, the state and the municipalities. The state must build the deep geological repository, and the municipalities fear that it will not be safe. The only way to guarantee a totally safe construction is to carry out a very thorough geological and morphological investigation and find the best possible locality. The municipalities have no guarantee that the investigation will be also carried out in other localities that could be more suitable for the construction and fear that if they permit the investigation, the repository would be built on their territory. For this reason, the municipalities often decide to reject the project. The subject of the deep geological repository has thus become a real socio-technical problem. The result is a situation, in which the potential location is not decided upon by an anticipated geological suitability as the decision-making is not based on heterogeneity of additional information.

### *3.5.1 Conclusion*

The public discussion, which should lead to the decision about the location of the deep geological repository of radioactive waste, is based on the separate aspects of the whole issue, which is the greatest problem of the entire process. It separates the basic aspects of the project – social, technological and political dimensions. The public discussion regarding radioactive waste is mainly concerned with the technical part in the sense of the geological investigation. Another problem is the fact that the public is only included in the decision-making process through the Workgroup, which is controlled formally from above (the RISCOM model). The Workgroup negotiations are mainly concerned with legal aspects and special-purpose cooperation. Other forms of cooperation (including informal meetings of representatives from the affected municipalities) only take place very seldom in the CR.

The social dimension of the effort to localise the repository is only discussed as a peripheral topic. The Workgroup is seen as a tool to prevent social tensions, but, in reality, it was created on the basis of an already existing social conflict. The result is that the formal involvement of the public in the general discussions leads only to passive participation of representatives of the municipalities in technical discussions, which lack sufficient political impact, and the conclusions of these discussions have no influence on legislative decisions of the government or of other decision-making bodies. On the other hand, complaints made by members of the Workgroup can be considered. They usually concern the adoption of

[108] Arnold, E., Mahieu, B., Horvath, A. (2011).

recommendations made by the Workgroup. When a recommendation or a decision is formally agreed on by the Workgroup at the round table, politicians often do not accept it. Despite the Workgroup's undeniable contribution in the form of kick-starting a public discussion regarding a sensitive political, technological and social topic, its effective output is very low.

If we were to summarise the preceding description of efforts to arrive at a decision regarding the storage of radioactive waste, then we must say that social-technological aspects remain separated while the public discussion focuses on political negotiations concerning the locality of the whole project. During these negotiations, an emphasis is being placed on isolated aspects of the suitability of the facility's location, which deepens the emphasis on the technological side of the matter. The public's participation in the decision-making process is thus turning into a debate about a technological solution of the whole project and about the way geological investigation is carried out. The discussion is starting to lose the social and political context of the whole problem, and there is no discussion about potential positive or negative impacts for local inhabitants.

### 3.6 References


Arnold, E., Mahieu, B., Horvath, A. (2011): R&D Governance in the CR. Final Report 2. International Audit of Research, Development and Innovation in the CR. Technopolis Group.

Čada, K. a kol. (2006): Věda jako věc veřejná: vědní politiky a média. Sociologický ústav AV ČR.

Dinges, M. (2011): Assessment of Public R&D Expenditures in the CR. Final Report 1. International Audit of Research, Development and Innovation in the CR. Joanneum Research Forschungsgesellschaft mbH.

Erawatch Country Profiles, Czech Republic. http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/cz/country

Eurobarometer (2008): Attitudes towards radioactive waste. Special Eurobarometer 297. European Commission.

Hanč, R. (2008): Sociální hodnocení techniky a technologie a inovační politika v České Republice a Evropské unii. Univerzita Karlova v Praze, Fakulta humanitních studií. Bakalářská práce.

Heger, L. (1996): Zavádění a hodnocení nových technologií ve zdravotnictv. Institut postgraduálního vzdělávání lékařů, Praha.

Kass, G. (2000): Science and citizens. Science and Public Policy, vol 27, n. 5. Beech Tree Publishing, p. 321-326.

Kiepas, A. (2011): TA - Possibilities and Limitations of Application in Poland. In: Banse, G., Grunwald, A., Hronszky, I., Nelson, G. (Eds): On Prospective Technology Studies. KIT Scientific Reports 7599, KIT Scientific Publishing, Karlsruhe, pp. 199-204.

Klusáček, K.; Kučera, Z.; Pazour, M. (2008): Zelená kniha výzkumu, vývoje a inovací v CR [Green Book of Research, Development and Innovation in CR]. Praha (in Czech)

Klusáček, K.; Zuna, P.; Kadlečíková, K.; Váchová, D. (2001): Návrh Národního programu orientovaného výzkumu a vývoje a způsobu jeho realizace. Závěrečná zpráva [Draft of the National Programme on

Oriented Research and Development and on its Implementation. Final Report]. Praha (Technologické centrum AVČR i Inženýrská akademie ČR [Technology Centre ASCR and Engineering Academy of the CR]) (in Czech).

Machleidt, P. (2008): Hodnocení důsledků techniky. Masarykův ústav vyšších studií ČVUT v Praze.

Machleidt, P. (2010): Komunikace mezi expertem, veřejností a politikou. In: Rozvoj lidských zdrojů ve vědě a výzkumu. Sborník příspěvků z odborného symposia, Liberec, pp. 50-56.

Machleidt, P. (2011): Technological Foresight and TA. Methods for Enabling Innovations in the CR. In: Banse, G., Grunwald, A., Hronszky, I., Nelson, G. (Eds.): On Prospective Technology Studies. KIT Scientific Reports 7599, KIT Scientific Publishing, Karlsruhe, p. 195-198.

Matoušek, L. et al. (2003): Politika nakládání s radioaktivními odpady a její nedostatky. Brno: Hnutí Duha.

MPO ČR (Ministry of Industry and Trade of the CR) (2001): Koncepce nakládání s radioaktivními odpady a vyhořelým jaderným palivem v ČR. Praha: MŽP ČR.

Postnote no. 189 (2002): Public Dialogue on Science and Technology. The Parliamentary Office of Science and Technology, London. www.parliament.uk/post/home.htm

SPIS – Sdružením pro informační společnost [Association for Information Society] (2005): Manifest znalostní společnosti [Knowledge Society Manifesto]. Praha (SPIS) (in Czech).

Svačina K., Konopásek, Z. (2012): Identifying remaining socio-technical challenges at the national level: Czech Republic. Working Paper on InSOTEC project.

Špok R., Weiss T., Kříž J. (2011): Regulation of Lobbying in the CR – History, Debate and Perspective. Europeum.

RAWRA (2009): Výroční zpráva o činnosti Správy úložišť radioaktivních odpadů v roce 2008. (RAWRA 2008 Annual Report). Prague: RAWRA.

RAWRA (2011): Annual Report 2010. Prague: RAWRA.

RAWRA (2011c): Plán činnosti a rozpočet Správy úložišť radioaktivních odpadů na rok 2012, tříletý plán a dlouhodobý plán. Prague: RAWRA.

SÚJB (2011): Spent Fuel Management. Available from <http://www.sujb.cz/?c_id=1031>.

## 3.7 Appendix

### *3.7.1 National Workshops*

***First National Workshop, 16.04.2012, Prague***

***Agenda***

**Technology Centre ASCR would like to invite you to the**

**FIRST CZECH NATIONAL WORKSHOP**

**of the**

**PACITA PROJECT**

**that will take place on April 16, 2012**

**in the Technology Centre ASCR, Ve Struhách 27, Prague 6.**

**Agenda of the workshop**

| | |
|---|---|
| 10.30 – 10.35 | **First Czech PACITA workshop opening** |
| | Petr Hladík (TC ASCR) |
| 10.35 – 11.00 | **PACITA project and planned activities** |
| | Lenka Hebáková (TC ASCR) |
| 11.00 – 11.40 | **TA models and institutions in Europe** |
| | Robby Berloznik (IST, Belgium) |
| 11.40 – 12.00 | **Discussion – questions and answers** |
| 12.00 – 13.00 | Lunch |
| 13.00 – 13.20 | **Czech TA country study – structure and aims** |
| | Ondřej Pokorný (TC ASCR) |
| 13.20 – 13.40 | **Nuclear waste management in the Czech Republic** |
| | Karel Svačina (CTS UK) |
| 13.40 – 14.00 | **TA use example – Nuclear waste management in Belgium** |
| | Gunter Bombaerts (Ghent, Belgium) |
| 14.00 – 15.00 | **Conclusions and discussion on TA potential in the Czech Republic** |

**Workshop languages are Czech and English, simultaneous translation provided.**

***First National Workshop, 16.04.2012, Prague***

***List of Participants***

| | |
|---|---|
| 1) Vaclav Friedrich | GEOMEDIA s.r.o. |
| 2) Záruba Jiří | Arcadis Geotechnika a.s. |
| 3) Miroslav Vlasák | CENIA |
| 4) Radek Čajka | VŠE Praha, FMZ |
| 5) Michal Petkov | Technology Agency of the CR |
| 6) Marta Salavová | NVF o.p.s. |
| 7) Pavlína – Slavíková | CENIA |
| 8) Aleš Havlín | Czech Geological Service |
| 9) Veronika Koudelová | Ministry of Industry and Trade CR |
| 10) Lucie Krčmářová | Ministry of Industry and Trade |
| 11) Lenka Krušinová | Ministry of Education, Youth and Sports CR |
| 12) Jana Hofmanová | Czech Technical University, Prague |
| 13) Petr Machleidt | Institute of Philosofy, ASCR |
| 14) Karel Aim | Academy of Sciences |
| 15) Jiří Bendl | Ministry of Environment CR |
| 16) Yvona Tesařová | Botanical Institute ASCR |
| 17) Zdenek Losos | Masaryk University, F. Of Science |
| 18) Jana Holmanova | TC ASCR |
| 19) Dmitry Khersonskiy | Czech Technical University, Prague |
| 20) Václava Křečková | SZÚ |
| 21) Jana Kobzová | Czech Agricultural University |
| 22) Jaroslav Skopal | ÚNMZ |
| 23) Hana Ali | CityPlan |
| 24) Petra Benešová | |
| 25) Jaroslav Doležal | Honeywell spol. S.r.o. |
| 26) Eva Křováková | Úřad průmyslového vlastnictví |
| 27) Michal Pacvoň | TC ASCR |
| 28) Karel Svačina | CTS, Charles University |
| 29) Vladislav Čadil | TC ASCR |

***First National Workshop, 16.04.2012, Prague***

***Minutes by Vančurová Iva, TC ASCR***

***First Czech PACITA workshop opening***

Moderator: TC ASCR, Petr Hladík

***PACITA project and planned activities***

The PACITA project has been introduced to the participants, overall aims and tasks, history of the preparatory phase of the project, partners, action plan, work packages, planned events.

The TC ASCR and the Czech Republic in the context of technology assessment has been introduced.

Moderator: TC ASCR, Lenka Hebáková

***TA models and institutions in Europe***

TA has been introduced as a scientific, interactive communication process aiming to contribute to the formation of public and political opinion on societal aspects on S&T. Plurality in institutional setting and plurality in missions has been demonstrated by examples of the TA practices in Europe.

Moderator: IST, Belgium, Robby Berloznik

***Discussion on TA model in Belgium***

The questions on experience of the Belgian experts with the TA issues have been asked: How they manage to promote the objectives. How important is the role of public debates in decision making process etc.

Moderator: TC ASCR, Lenka Hebáková and IST, Belgium, Robby Berloznik

***Czech TA country study – structure and aims***

The conditions and impacts in the context of technology assessment in the Czech Republic have been introduced. The structure and aim of the Czech country study has been described- The case study focus on the nuclear waste management has been indicated.

Moderator: TC ASCR, Ondřej Pokorný

***Nuclear waste management in the Czech Republic***

The preparatory phase of the deep geological repository as a high- level radioactive waste management from the socio-technical aspects in the frame of the ISOTEC project has been presented.

Moderator: CTS UK, Karel Svačina

***TA use example – Nuclear waste management in Belgium***

Strengths and discussion points of the partnership model on low level waste decision making have been introduced.

Moderator: UB, Belgium, Gunter Bombaerts

***Conclusions and discussion on TA in the Czech Republic***

The discussion was based on the Czech TA country study and the Nuclear waste management presentations. The Second Czech National workshop to be held on September 2012 in the Parliament has been announced.

Main points raised during the discussion:

- Suggestions focused on the technical point of view with regard to the experience with the deep geological gas storage in the Czech Republic
- The purpose of the environmental impact assessment as a tool for decision making
- The important role of the public debate on the issues of environmental treats
- Media involvement
- The Second Czech National Workshop to be held on September 5, 2012 in the Parliament has been announced.

Moderator: TC ASCR, Lenka Hebáková

For information on the workshop outcomes can be found here:

***http://pacita.strast.cz/en/outputs/outputs-list/first-national-pacita-workshop-in-prague***

*Second National Workshop, 24.09.2012, Prague*

*Agenda*

**Technology Centre ASCR and Foreign Committee of the Chamber of Deputies of the Parliament CR would like to invite you to the**

**SECOND CZECH NATIONAL WORKSHOP**

**„FUTURE DEVELOPMENT OF THE CZECH TECHNOLOGY ASSESSMENT INFRASTRUCTURE – CHALLENGES AND OPPORTUNITIES "**

**that will take place on September 24, 2012**

**In the Chamber of Deputies, Parliament CR, Sněmovní 4, Praha 1 – room "STATNI AKTY"**

**AGENDA OF THE WORKSHOP**

| | |
|---|---|
| **10.00 – 10.15** | **Workshop opening**<br>**David Vodrážka (chairman, FC Chamber of Deputies, Parliament CR)**<br>**Karel Klusáček (director, TC ASCR)** |
| **10.15 – 10.35** | **HORIZON 2020**<br>**Rita Lečbychová (EC, DG RTD)** |
| **10.35 - 11.00** | **PACITA project in the context of the TA in Europe - aims and outcomes**<br>***Anders Jacobi* (DBT)** |
| **11.00 – 11.20** | **PACITA project – outcomes and activities in the Czech Republic**<br>**Lenka Hebáková (TC ASCR)** |
| **11.20 – 11.40** | **National country study on TA potential in the Czech Republic**<br>**Ondřej Pokorný (TC ASCR)** |
| **11.40 – 12.20** | **Discussion** |
| **12.20 – 13.20** | **Lunch** |
| 13.20 – 13.30 | **Parliamentary Debate in Copenhagen – information on the event**<br>Jana Fischerová / David Šeich (FC Chamber of Deputies, Parliament CR) |
| **13.30 – 14.00** | **TA use examples in Germany**<br>**Leonhard Hennen (ITAS-KIT)** |

**14.00 – 15.10** **Opportunities for the TA future potential development – stakeholders´ statements and expectations**

**Václav Pačes (AS CR)**

***Ladislav Rabušic (FSS MU)***

***Jan Hrušák (MEYS)***

***Rom Kostřica (Parliament CR)***

**Jaroslav Doležal (CRDI, Honeywell)**

**Ivan Dvořák (Societas Rudolphina)**

***Martin Rychlík (Česká pozice)***

15.10 – 15.40 **Discussion and conclusions**

**Workshop languages are Czech and English, simultaneous translation provided.**

***Second National Workshop, 24.09.2012, Prague***

***List of Participants***

| | |
|---|---|
| 1) Adam Pártl | CENIA |
| 2) Marcela Přesličková | Not representing any inst. |
| 3) Kateřina Čihařová | ILA s.r.o. |
| 4) Marcela Příhodová | Ministry of Industry and Trade CR |
| 5) Vladimir Rogalewicz | Czech Technical U. – CzechHTA |
| 6) Pavel Hozák | UMG ASCR |
| 7) Jaroslav Doležal | Honeywell |
| 8) Rita Lečbychová | EC |
| 9) Karel Klusáček | TC ASCR |
| 10) Ondřej Bajar | TC ASCR |
| 11) Anders Jacobi | DBT |
| 12) Leonhard Hennen | ITAS |
| 13) Iva Vančurová | TC ASCR |
| 14) Michaela Blšťáková | TC ASCR |
| 15) Peter Mišúr | KAIROS |
| 16) Ondřej Pokorný | TC ASCR |
| 17) Lenka Hebáková | TC ASCR |
| 18) Ondřej Valenta | TC ASCR |
| 19) Michal Pazour | TC ASCR |
| 20) Jana Fischerová | Parliament of the CR |
| 21) Dmitry Khersosnkiy | Czech Technical University |
| 22) Tomáš Michalek | TC ASCR |
| 23) Pavlína Slavíková | CENIA |
| 24) Hana Ali | AF-CITYPLAN |
| 25) Andrea Peková | ÚNMZ |
| 26) Marie Živcová | ÚNMZ |
| 27) Jan Kolomazník | ÚNMZ |
| 28) Ales Hornal | RADANAL |
| 29) Petr Kužel | Chamber of Commerce CR |
| 30) Rostislav Čihák | VUOS a.s., Centre of toxicology |

| | |
|---|---|
| 31) Jakub Dvořáček | AIFP |
| 32) Jan Křivka | ÚNMZ |
| 33) Petr Kubeš | ÚNMZ |
| 34) Junona Böswartová | VÚBP Praha |
| 35) Michal Dalibor | ÚNMZ |
| 36) Petr Beneš | Univ. Chem.-Technical |
| 37) Jaroslav Skopal | ÚNMZ |
| 38) Vojtěch Helikar | CzechInvest |
| 39) Eva Křováková | ÚPV |
| 40) Naděžda Witzanyová | Ministry of Education, YS |
| 41) Marian Piecha | Ministry of Industry and Trade |
| 42) Miroslav Janeček | Assoc. Of Res. Organisations |
| 43) Miroslav Ryska | Charles Univ., 2nd Medical F. |
| 44) Petr Machleidt | FLÚ ASCR |
| 45) Jana Hofmanova | CTU-Inovacentrum |
| 46) Johan Evers | IST |
| 47) Markéta Morská | ÚMG ASCR |
| 48) Jozef Sabol | CTU |

***Second National Workshop, 24.09.2012, Prague***

***Minutes by Vančurová Iva, TC ASCR***

**Second Czech PACITA workshop opening**

Moderator: David Šeich, vice-chairman, FC Chamber of Deputies, Parliament of CR &

Karel Klusáček, director, TC ASCR

***HORIZON 2020***

The EU Framework programme for Research and Innovation Horizon 2020 has been introduced to the participants as a core part of Europe 2020 responding to the economic crisis, addressing people´s concerns about her livelihoods, safety and environment, strengthening the EU´s global position in RIT. Three following priorities have been indicated: excellent science, industrial leadership and societal challenges.

A bridging role of TC ASCR and the Czech Liaison Office for Research and Development in Brussels has been appreciated.

Moderator: EC, DG R&I, Rita Lečbychová

***PACITA project in the context of the TA in Europe – aims and outcomes***

TA as a part of the Knowledge - based policy-making has been introduced, as a scientific, interactive communication process aiming to contribute to the formation of public and political opinion on societal aspects on S&T. Plurality in institutional setting and plurality in missions has been demonstrated by examples of the TA practices in Europe. The PACITA project and the PACITA action plan including Training TA, Documenting TA and Debating TA have been presented.

Moderator: DBT, Denmark, Anders Jacobi

***PACITA project –outcomes and activities in the Czech Republic***

The PACITA project has been introduced to the participants, overall aims and tasks, activities, planned events and outcomes are to be found on the Czech project site: http://pacita.strast.cz

First European TA Conference has been announced, next steps of the preparatory phase and the main thematic sessions have been introduced.

The TC ASCR and the Czech Republic in the context of technology assessment has been mentioned.

Moderator: TC ASCR, Lenka Hebáková

***National country study on TA potential in the Czech Republic***

The conditions and impacts in the context of technology assessment in the Czech Republic have been introduced. 15 interviews with key stakeholders from the Czech Parliament, ministries, industry, academia, CSOs and media and the Czech country study main outputs has been presented. TA potential and institutionalisation has been indicated.

Moderator: TC ASCR, Ondřej Pokorný

***Discussion on TA potential for the Czech Republic***

The questions on the public debate role in the decision making process and on the advantage and disadvantage of the different TA institutionalisation models in Europe have been asked.

The support of the Czech office for standards, metrology and testing which missions is to perform tasks set out in Czech legislation on technical standardization has been offered.

Moderator: TC ASCR, Lenka Hebáková, DBT, Anders Jacobi, IST, Johan Evers

***TA use examples in Germany***

The German model of TA institutionalisation with regard to the TA Cross Europe has been described.

The mission and working practices on the selected projects have been demonstrated. TA achievement in non-PTA countries learned from the national country studies has been presented.

Moderator: ITAS-KIT, Germany, Leonhard Hennen

***Opportunities for the TA future potential development – stakeholders´ statements and expectations***

Main aims of the Technology Agency of the CR as a funding agency focusing on the oriented research projects have been presented.

Moderator: TA CR, Miroslav Janeček

TA future potential general comments, requirements and expectations from the stakeholder´s point of view have been indicated.

Moderator: CRDI, Honeywell, CR, Jaroslav Doležal

Project EURO-BIOIMAGING as a new European project reflecting a revolution in Bio-imaging Technologies has been presented.

Moderator: IMG ASCR, Pavel Hozák

Health Technology Assessment in the frame of the healthcare system in the Czech Republic has been described.

Moderator: CTU, CzechHTA, Vladimír Rogalewicz

Knowledge Transfer Partnership project as an activity focusing on the university and industry collaboration.

Moderator: MIT CR, Marcela Příhodová

TA potential for new technologies implementation in the Healthcare has been indicated.

Moderator: ILA, CR, Kateřina Čihařová

***Conclusions and discussion on TA potential in the Czech Republic***

Main points raised during the discussion:

- The necessity of setting a platform to discuss on public level, what is a public interest, what is role of the parliament etc.
- The important role of the coordination body, institution, procedure on TA issue.
- Next steps and ambition of the PACITA project in the future.

Moderator: TC ASCR, Lenka Hebáková

More information on the second national workshop can be found here:

http://pacita.strast.cz/en/outputs/outputs-list/second-czech-national-workshop

### *3.7.2 Interviewed Experts*

| Category | Organisation | Expert | Expert´s position | Date of Interview |
|---|---|---|---|---|
| Governmental authorities | MEYS | Jan Hrušák | Director of the R&D&I Section | May 2nd, 2012 |
| Governmental authorities | CRDI | Petr Fiala | Prime Minister´s Chief Science Advisor, Rector emeritus of MUNI Brno | April 19th, 2012 |
| Governmental authorities | MIT | Petr Očko | Director of Investment and Innovation Section | April 4th, 2012 |
| Governmental authorities | TACR | Rút Bízková | Member of the Research Council of the TACR | April 24th, 2012 |
| Parliament | COMMITTEE ON EDUCATION, SCIENCE | Petr Bratský | Member | May 25th, 2012 |
| Parliament | COMMITTEE ON SCIENCE, EDUCATION | Anna Putnová | Chair | April 12th, 2012 |
| Science | Charles University Environment Centre | Bedřich Moldan | Director | April 11th, 2012 |
| Science | BIOCEV, IMG | Václav Pačes | Former president of the ASCR, president of the Learned society of the CR since 2010. | April 5th, 2012 |
| Science | Faculty of Social Sciences CESES | Martin Potůček | Head of the Centre for Social and Economic Strategies, professor | April 5th, 2012 |
| Industry | CI | Radek Špicar | President of the Confederation of Industry of the CR + Aspen Institute think tank in the CR | April 17th, 2012 |

| | | | | |
|---|---|---|---|---|
| Industry | Honeywell | Jaroslav Doležal | National Executive, Prague Laboratory Manager | May 24th, 2012 |
| CSO | CSO | Ivan Dvořák | Chief Knowledge Officer | May 29th, 2012 |
| CSO | Agency | Jan Prášek | Department Director | May 31st, 2012 |
| Media | Česká pozice | Martin Rychlík | Journalist | May 9th, 2012 |
| Media | Lidové noviny | Josef Matyáš | Journalist | May 30th, 2012 |

# Chapter 4 Explorative Country Case Study: Hungary

Judit Mosoni Fried, Attila Zsigmond, Éva Pálinkó (Hungarian Academy of Sciences)

## 4.1 Description of governmental system and general R&D structure

*General situation of R&D in HUNGARY*

Over the past two decades, Hungary has made significant progress in building a market-oriented economy which is fully integrated into the European Union (EU) and the world economy at large. Judged by policy documents science, technology and innovation has also been a priority in policy making in this period. However, taking the Hungarian GERD (Gross Domestic Expenditure on R&D) into account, neither the science policy makers nor the scientists and engineers would confirm the priority status of the R&D sector in Hungary. GERD as a percentage of GDP has suffered serious cuts in the early 1990s and only recovered slowly and partially by 2011 (it was 1.6% in 1990 and 1.21% in 2011). In terms of human resources dedicated to science and technology the tendency is more positive, however, the increased share of researchers and engineers in total employment is to a large extent due to the decreasing total number of employees on national level.[109] In the last few years only the Hungarian Academy of Sciences (HAS) and the Hungarian Scientific Research Fund (OTKA) enjoyed a preferential status among the major actors of public scientific research.

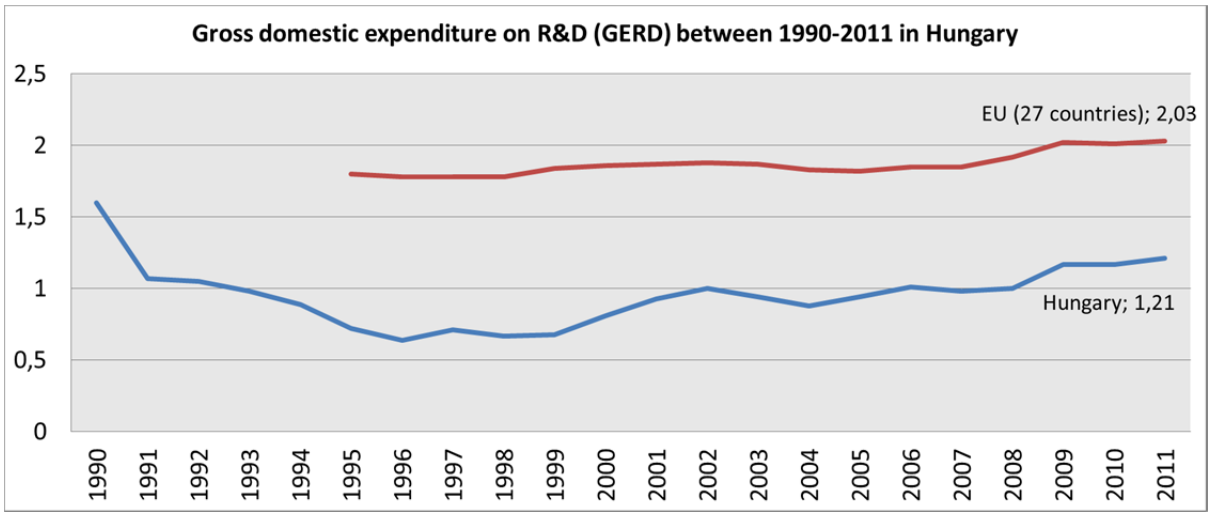


Figure 3: Eurostat 2011

Hungarian spending on R&D is below the EU average in international comparison, and a large number of further R&D indicators also need improvement. Research expenditures per capita are low in absolute terms with a slow increase in the recent years (105.4 € in 2008, 106.4 € in 2009 and 112.4 € in 2010, while the EU average is 490.2 €). The actual target for R&D financing is to reach 1.8 % of GDP by the year 2020, with an intermediary target of 1.5 % by 2015 set by the New Széchenyi Plan (a comprehensive national development plan to improve Hungary's competitiveness) are also well below European targets.

[109] The share of FTE researchers in total employment increased from 0.39% in 1990 to 0.56% in 2010. (Source: KSH, Hungarian Central Statistical Office: Research and development. Budapest, 2011)

As shown by various indicators in the Community Innovation Survey, and also acknowledged by official policy statements, the exploitation of R&D results is not sufficiently fast and widespread. Each actor should do her/his/its best to meet the ambitious target: the benchmark by the complex innovation scoring system should reach the EU average by 2020.

R&D indicators for 2011

| | |
|---|---|
| Number of R&D employees (in FTE) | 33 960 |
| Percentage of R&D employees in all active earners (%) | 0.89 |
| Percentage of researchers in the total R&D staff (%) | 68.0 |
| Percentage of women researchers in total researchers (%) | 33.2 |
| GERD (Gross Domestic R&D expenditures), billion HUF | 336.5 |
| Percentage of GERD in GDP (%) | 1.21 |
| Financial sources of GERD (%) | Enterprises: 47.0<br>Government: 38.0<br>Funds from abroad: 13.0<br>Non-profit organisations: 2.0 |

Source: KSH (Hungarian Central Statistical Office): Research and development. Budapest, 2012.

In international comparison the Hungarian scientific output was ranked 37 in terms of publications recorded in Scopus in 1996-2010, and 35 (between the Czech Republic and Argentina) in terms of citations in the same period.[110] The number of papers per researcher is close to the EU average (90.8%), while the cost per publications is much lower: 56.7% of EU[111].

It must be noted however, that in a regional comparison Hungary performs relatively well among Eastern and Central European states both in terms output indicators and R&D expenditures only being behind Estonia and the Czech Republic. As for traditions and public recognition towards science Hungary is still in a highly favourable situation. This attitude is revealed in most value surveys[112] and is demonstrated by the highest reputation and trust towards the Hungarian Academy of Sciences among all public institutions in the country.

The structure of the sources of R&D expenditures still shows the central role of public spending in promoting research activities. However the share of private R&D has increased from 37% (2003) to 47,5% (2010)[113]. The growing access to European research funds has had a major role in triggering this increase, but

[110] URL: http://www.scimagojr.com
[111] Havas Attila (2012): Country reports 2011: Hungary. URL: http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/galleries/generic_files/file_0169.pdf
[112] For example European Social Survey (2006-2010)
[113] National Innovation Office (Kaleidoszkop report)

the slow uptake of total R&D spending in the same period highlights the fact that public R&Đ has basically stagnated in the same period.

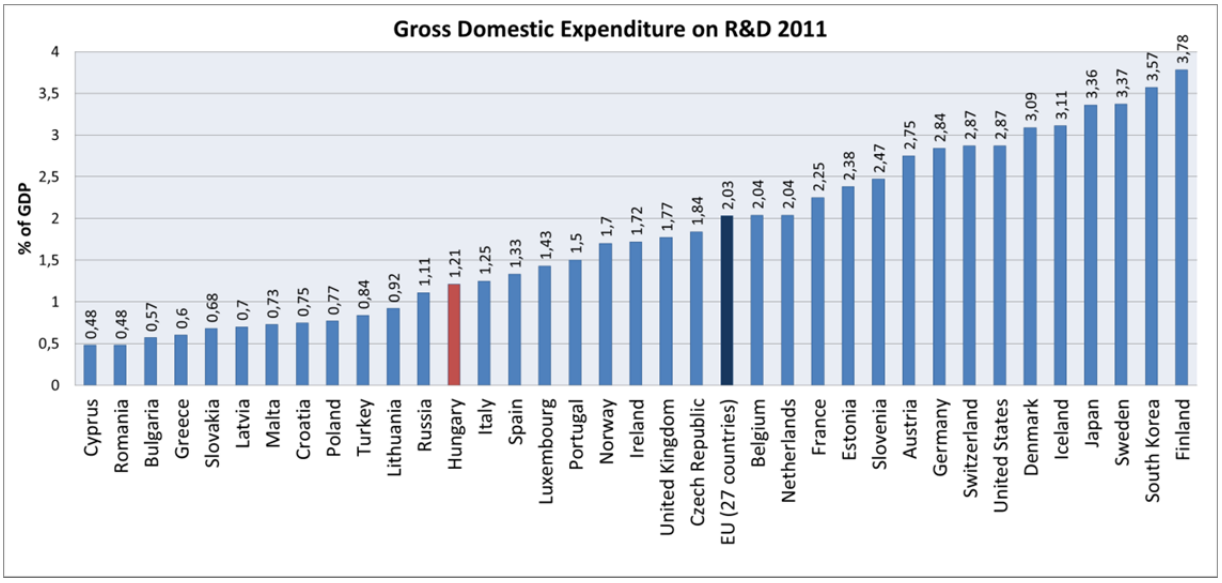


Figure 4: Eurostat 2011

*Research and innovation strategy of Hungary*

The comprehensive research strategy of the government including an action plan is being worked out presently after being delayed on a number of occasions. According to political intentions, the new system of innovation promotion and financing must reach maturity by 2014. It will include measures for creating an innovation-friendly economic environment and a new financing model for the national innovation system. New tax incentives for increasing the efficiency of the system as well as investment-friendly measures are being considered, including innovative public procurement and involvement of risk capital. The new financing model will create a more diverse system compared to the previous, mainly project-based approach and will include elements of adaptive innovation and technology transfer to boost the capacities of SMEs, promote the formation of networks and clusters and reduce regional disparities. Although the strategy has not been announced yet the strong criticism is apparent for the lack of focus and for the fact that it does not involve additional public resources to boost innovation, but it merely relies on potentially growing EU-funding.

The RDI strategy will in harmonize with the basic strategy, principles and practices of the "New Széchenyi Plan", the current development plan of Hungary.

The fifth priority area (among a total of seven) of the "New Széchenyi Plan" is the Science – Innovation Programme. The objective of the programme is to dynamise the economy through innovation in the 4 years of its duration. The Science – Innovation Programme sets similar broad aims as the government's mid-term STI policy strategy for 2007-2013:

- enhance competitiveness;
- create jobs of higher value added;

- achieve sustainable economic and social development;
- improve quality of life.

Strategic key sectors identified in the New Széchenyi Plan include automotive industry and logistics, health and medical industry, info-communication, new energy and environment developments, creative industries, agriculture. In order to reach its economic goals it sets the objectives of reaching 1.5% of GDP in R&D expenditures by the mid-decade, and to reach the EU average and enter the top third of EU countries during the next cycle in innovation performance by the accumulated innovation index. Hungary intends to achieve an increase in the level of research and development expenditures by growing corporate R&D spending in the share of overall research and development expenditures.

Public funding of RDI activities is allocated via the Operational Programmes of the New Hungary Development Plan (support for innovation and R&D activities); the funding of universities, the Hungarian Academy of Sciences and other minor research performing organisations, the Hungarian Scientific Research Fund (OTKA); the Research and Technological Innovation Fund; and other less important schemes financed mostly from international resources.

### *Rough description of the governmental system and the role of S&T policy making*

Hungary has developed all major elements of a potentially successful national R&D and innovation system. The most important actors are listed below.

#### ***Parliament***

At the legislative level, the main actor is the Parliament, specifically the Committee for Education, Science, and Research. An ad hoc parliamentary Committee on Innovation and Development was set up in October 2011. Another parliamentary committee potentially relevant for technology assessment is the Committee for Sustainable Development. The committee is the successor of the previous parliamentary committee for the protection of the environment. Its portfolio covers closely interacting areas: climate change, energy policy, water management and biodiversity.

#### ***Government***

At the executive level, the whole governmental structure underwent drastic changes after the elections in 2010 with strongly reduced number of ministries (8 ministries in total), many of them embracing multiple areas with heterogeneous activities. The division of responsibilities within the new government (since May 2010) in the field of R&D is broadly the following:

The Ministry of Human Resources (until mid-2012 Ministry of National Resources) is responsible for shaping the science policy of the country, in close cooperation with the Hungarian Academy of Sciences and the interested governmental institutions.

The Ministry for National Economy through its State Secretariat for Parliamentary and Strategic Affairs is responsible for shaping the strategies for research and development, innovation and creative industries, as well as for working out the main lines of the application system for the state support of innovation.

The task of the Ministry of National Development is to shape the Hungarian development policy in accord with European Union development policy. A priority goal is that development in various sectors should operate in harmony with each other, and an important area is the high-level provision of developments in tourism, research and development, technical innovation and tasks related to space research.

The fragmented structure of RDI policy making seems unfit to cope with the task of creating a unified strategy and with the prominent role of the Ministry of National Development in the government its focus is on short term objectives of economic growth, and the long-term, strategic importance of education and scientific research is disregarded.

The practical implementation and execution of funding schemes (calls for proposals, allocation of national and international funding resources, etc.) is carried out by the subordinated units of the Ministry of National Development, the National Development Agency, in cooperation with the Ministry for National Economy.

Besides the „core ministries" dealing with RDI issues, only the Ministry of Rural Development promotes RDI activities via its own research institutes.

The coordination of science, research and innovation policy is the task of the government. Until the end of June 2012 the National Research, Innovation and Science Policy Council (NKITT) was responsible for this task. The council was chaired by the Deputy Prime Minister responsible for RDI coordination. The president of the Hungarian Academy of Sciences was co-chairman of the Council and all interested ministers were present. Invited members included presidents of the Rectors' Conference, the National Innovation Office, the Hungarian Intellectual Property Office, the Hungarian Scientific Research Fund and the Hungarian Association for Innovation. Furthermore, leaders of R&D oriented enterprises were often invited by the president of the Council as consulting members. With regard to long term, strategic issues related to the national innovation system, the National Research, Innovation and Science Policy Council served as the Government's advisory body. In addition to the coordination tasks, the Council launched own initiatives and proposals and could present its opinion on issues of RDI including the budget, RDI strategy and the use of the public funds, evaluation strategies and results of research programmes, etc.

In July 2012 the Council (NKITT) was dissolved. A new operative body, the Development Cabinet was created with four members only. They are the prime minister and three ministers of the government who are supposed to make the most urgent and significant S&T and innovation policy decisions. Moreover an Advisory Body for Innovation was set up at the Ministry of National Development. The invited experts are involved in the elaboration of the R&D strategy till 2020. Leaders of important S&T actors including the president of the Academy are not members in the new body.

#### *Other important institutions in R&D*

Hungarian Academy of Sciences

The Hungarian Academy of Sciences (abbreviated as MTA in Hungarian) is the largest research performing organisation of 15 research institutes and 2800 researchers in Hungary and at the same time a learned society. As a public body it is committed to the advancement, of Hungarian science it supports and represents various scientific fields, and distributes scientific results. The MTA contributes not only to the conduct of scientific research in Hungary, but also aims to connect Hungarian science internationally, it promotes scientific integrity and scientific values in society.

The Hungarian Academy of Sciences, as a public body of scientists, also works out long-term science policy concepts. In this aspect it is the only public institution that has the infrastructure and human potential to investigate policy alternatives related to scientific issues in various strategic areas.

To fulfil its role in scientific policy advisory in 2008 the Academy of Sciences launched Strategic Programmes in seven most important fields for Hungary's future. The development of the Strategic Programmes mobilizes intellectual capacities to investigate the problems identified for each field, providing a platform for unbiased in depth discussions and the setting of strategic goals. The topics discussed in these

programmes were the followings: Long-term energy strategy, water management, our future environment, food safety, demography and financing of the pension system, the future of education and social stability of the state in cooperation with citizens.

The Academy presents a report to the Parliament on the results and current state of scientific research in Hungary biannually and reports on its own activity to the Government year by year.

In order to concentrate its financial resources and to promote interdisciplinary research the Hungarian Academy of Sciences reorganized its research network at the end of 2011. Nine new research centres have been formed incorporating 32 former research institutes. This concentration allows for a more sustainable strategically-driven approach. For the years 2012 and 2013 the Academy has managed to provide funding for the renewal of the research infrastructure as well including the construction of a new state-of-the-art research centre building.

Since 2009 the Momentum (Lendület) Programme initiated by MTA president József Pálinkás has also promoted excellent research in Hungary. The objective of the programme is to fight brain-drain by offering similar to Western European conditions for young talented researchers and an opportunity to build up their own research school in Hungary contributing to a dynamic renewal of the research communities and the institutions. The impact and success of the model is highly acclaimed and recognised even by the international scientific community and has provided new career opportunities for many researcher not only in the research network of the academy, but at Hungarian universities as well.[114]

The Hungarian Scientific Research Fund Programmes (OTKA)[115]

OTKA is the major agency for basic research funding in Hungary. OTKA's tasks are to provide independent support to scientific research activities and infrastructures, to promote scientific achievements of international standards, and to provide assistance to young researchers.

The National Innovation Office[116] (NIH)

NIH was established by Government decree 303/2010 (XII. 23.) as the governmental body responsible for research, development and technological innovation. It replaces the previous National Office for Research and Development (abbreviated in Hungarian as NKTH) which was operational from 2004 to 2010. The Office operates under the direction of the Minister for National Economy; its president and vice-president are appointed by the Minister.

The National Innovation Office supports the development and implementation of national science, technology and innovation policy and aims to enhance innovation activities in the corporate sector including support for SMEs and young innovative enterprises. It supports national and international exploitation of R&D results and is responsible for the harmonisation of international and European cooperation activities in the areas of STI policy and bilateral science and technology cooperation. By the cut of almost 50% in its budget (2010 to 2012) the role of NIH is in transformation. Its former role of R&D funding has become less relevant while its activities in monitoring and analysing R&D activities have become more apparent.

The following diagram presents the main roles in the Hungarian R&D system (abbreviations in Hungarian):[117]

[114] http://mta.hu/articles/momentum-program-of-the-hungarian-academy-of-sciences-130009
[115] Source: OTKA's webpage www.otka.hu
[116] Source: www.nih.gov.hu
[117] NIH Yearly Report 2010 (in Hungarian)

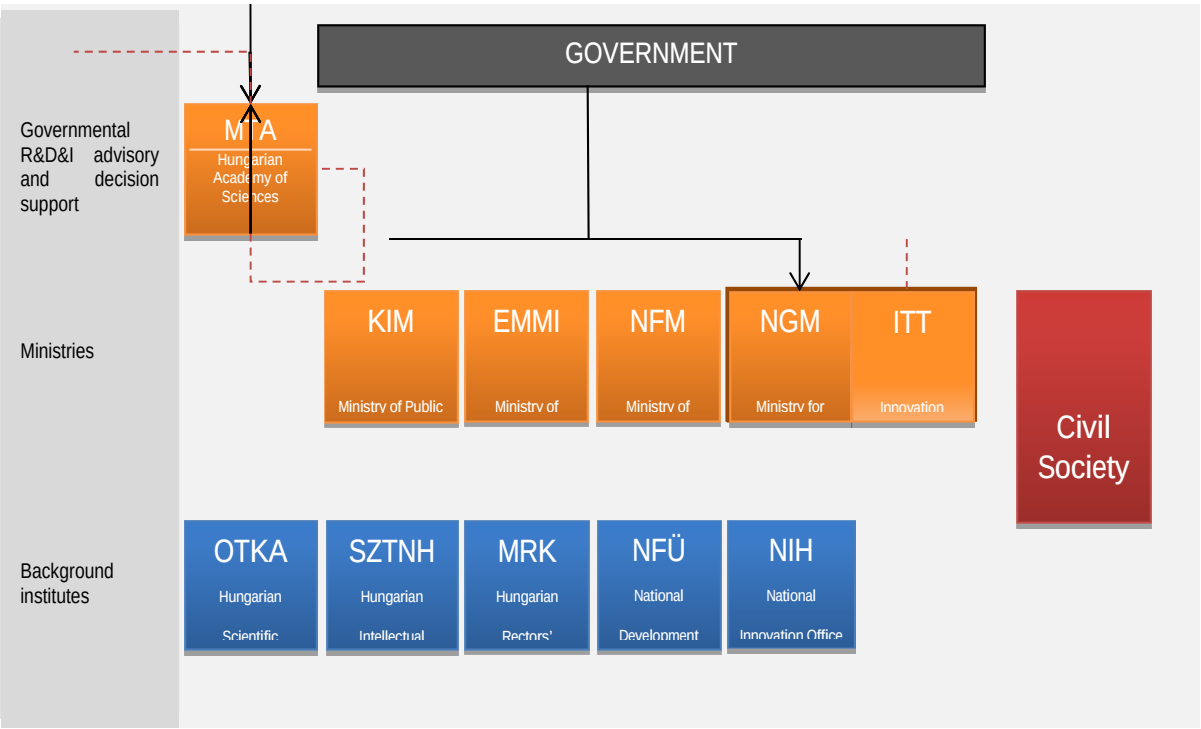


Figure 5: Hungarian R&D system

### 4.1.1 Research performers

#### Higher Education Institutions

The number of state accredited universities was 25, while the number of colleges amounted to 44 in the 2009-2011 academic year. As for the distribution of higher education organisations, 18 universities and 11 colleges are run by the state, 2 universities and 13 colleges are run by private organisations, while 5 universities and 20 colleges belong to religious organisations. Only the top ten universities are major research performers. Higher Education organisations employed 26.0% of scientists and engineers of the national total in FTE, but the share of GERD performed by the HE sector is significantly lower (20.0% in 2011). The average size of R&D units at universities is rather small: 4.4 FTE researchers.

#### Public research organisations

*The government sector*'s share was 23.0% in 2011 in the total number of (FTE) researchers. This figure reflects about a double weight of PROs in the Hungarian NIS compared to the EU-27 average. The most important player is the Hungarian Academy of Sciences (MTA). The MTA has a substantial weight in the Hungarian research system: its share was 13.4% in the total R&D personnel (FTE) and 11.8% of the GERD in 2011.

The other public research organisations include dozens of research units operated at/ by hospitals, museums, libraries, national and regional archives, etc. Some ministries also have their own R&D units.

#### *Business enterprise sector*

*Businesses* have maintained their position as the largest employer of (FTE) researchers since 2006, reaching 51.0% in 2011, and had the biggest share in performing GERD (59.8%) too. Both R&D and innovation activities of firms are highly skewed by size, ownership and sector. The R&D activity is firmly concentrated at large companies, a great share of which is run by foreign or multinational owners. The pharmaceutical industry, the automotive industry, the transportation and the energy sector invest a relatively high proportion of their turnover in research and development. According to the yearly statistical report of the Central Statistical Office, in 2010 the average R&D expenditure was 567 million HUF (about 2 000 000 EUR) at firms partially or fully in foreign ownership, while it was not higher than 64 million HUF (about 223 000 EUR) at firms of Hungarian owners.

The Hungarian Association for Innovation (MISZ) as a professional and employer's business federation focuses its activities on the economy stimulating role of innovation. It was established in 1990.

The association intends to promote the creation, spread, transfer, adoption and the practical utilization of intellectual products so that the performance and the income generating potential of the companies in Hungary is increased. The association also works as an interest representation body of its member companies.

### *4.1.2 Other Relevant Actors and Institutions in R&D policy making*

#### *Civil Society Organisations*

Society for the dissemination of science (TIT)

The Society for the dissemination of science is an association of 39 national civil organisations working for the propagation of scientific results within the country. The members comprise traditional societies for wide disciplinary areas (Hungarian Society for Sciences, Hungarian Society for Social Sciences etc.) as well as local societies covering all disciplines organised county-wise.

The Federation of Technical and Scientific Societies (MTESZ)

Now there are forty societies in the federation; almost all Hungarian professional-scientific organizations belong to MTESZ. These organizations have approximately 70,000 members altogether, mainly engineers, researchers, agrarian, financial experts and of natural sciences, economists. In addition corporate bodies, enterprises and business can also be the members; the societies have thousands of such relations with enterprises, firms and institutions.

Energiaklub

Energiaklub was founded as a non-profit organisation in 1990. Its staff is primarily composed of economists, engineers, lawyers and teachers working in cooperation with numerous Hungarian and international partners, experts, advisors and institutions. It is dedicated to the rational and clean production and use of energy, together with the search for practical answers to the pressing problems posed by climate change. The programmes of the two divisions - Climate Policy Institute and Applied Communications - focus on energy policy, climate change, energy efficiency, renewable energy, traditional energy resources and the field of transportation.

Energiaklub prepares policy recommendations for decision-makers, undertakes research, communication and awareness-raising campaigns, holds trainings and organises conferences.

Védegylet (Protect the Future)

Védegylet is a civil organization encouraging people to participate in local and national public affairs. It is dealing with issues concerning environmental problems, social justice, human rights and the state of democracy using a wide array of tools from lobbying and education to demonstrations and civil disobedience.

Clean Air Action Group (Levegő Munkacsoport)

The Clean Air Action Group (CAAG) is one of the best-known environmental NGOs in Hungary. Founded in 1988 by three local green groups, it is now a national federation of 127 NGO's. Its Experts' Board consists of more than 100 specialists of various professions. It is open to anyone who wants to help clean up the environment.

Main fields of activities are the following: greening the state budget, sustainable transport, sustainable energy policy, sustainable urban development, protection of green areas in cities, clean air in the cities, sustainable chemical and pesticide use.

## 4.2 Barriers and opportunities for building up a national TA landscape

In order to understand the TA-related barriers and opportunities, it is important to clarify the concept of TA and PTA in our report.

TA is defined here as a tool for the evaluation of the economic, social and environmental consequences of technical and scientific developments. In this sense TA can be conducted as a policy-oriented activity on governmental level, but also as a research-oriented activity of universities, scientific academies, etc.

To the contrary, parliamentary TA (PTA) is identified here as a political decision-making endeavour to discuss socially relevant technological issues with stakeholders in a broad sense. Several actors with special attention to representatives of science and society can be included in the process, but the Parliament, or at least some political parties must be open to consider the public, scientific and economic views on technological issues and the technical, environmental, economic and/or social risk of their use to make informed decisions. Due to the differences in the political systems all over Europe, governments are often the most influential actors in the process of policy-making and they may replace parliaments as the main targets of technology assessment.

Responsibilities for science and technology policy making, transparency

At present, responsibilities for science and technology policy making are divided among four ministries (Ministry of Economic Affairs, Ministry of Human Resources, Ministry of Administration and Justice, Ministry of National Development). A very limited number of other actors are involved, with the Hungarian Academy of Sciences having the greatest influence among them. The main actors in the Parliament are the Committee for Education, Science, and Research and the Innovation and Development Committee, but one can hardly recognize their influence on S&T matters. Another parliamentary committee, potentially relevant for technology assessment, is the Committee for Sustainable Development.

A newly established operative body, the Development Cabinet consisting of the prime minister and three ministers seem to prepare the most urgent and significant S&T and innovation policy decisions. The strategy making is supported by a Council of Innovation. Twenty-five highly acknowledged professors – representing their civil or public organisations and/or themselves, and business leaders are invited to the Council's meetings.

### 4.2.1 Democratic structures in S&T

Since 1990 the strategic planning, policy co-ordination and implementation at governmental level have been subject to constant reorganisation in Hungary. Each government restructured the system at least once during their 4-year terms (Nyiri, Havas, 2007).[118] Increasing the level of transparency, accountability and openness of the institutions has always been among the main goals of the reorganisations.

Despite the decent goals and some positive measures (for example, several new laws have been passed by the parliament ensuring, among others, that concerned institutions and citizens express their opinion on relevant questions) S&T policy-making in Hungary cannot be regarded as a democratic process. According to our *civil* interviewees (elected high officials in the academic sector, university professors, researchers, research administrators), formally they are often requested to play the game, namely to take part in the preparatory phases of decision making, but they cannot be sure that their views are taken into consideration. "It is rather the exception than the rule, since decision makers prefer political improvisation rather than relying on professional (scientific) and civil knowledge."

Administrators in the government sector don't contradict this view. However, instead of searching for the opportunity to involve academia and civil stakeholders, they criticize the short span of time given for the preparatory phase and the meagre knowledge of some civil partners on the questions concerned. The views depend mainly on the interviewees' status in the state hierarchy.

*Group 1: Representatives of parliamentary committees and the government*

- In certain fields the concerning law states that social discussion is needed before passing (modifying) a law by the parliament. In these cases the responsible ministry is obliged to consult the social partners. *Comments:* It can quite easily happen that a) the deadline at the ministry cannot be met by the social partners; b) some partners are not really competent – the ministry cannot accept and use the views of these partners.

*Group 2: Representatives of the academic community*

- The high officials and a few distinguished professors of the academic community are often requested by the government to express their opinion on S&T or related questions. *Comment:* In many cases these are formal requests. Their utilization is possible, but not feasible.

- In 2008 studying of seven top priority topics of national significance was launched by the President of the Hungarian Academy of Sciences in order to inform the decision-makers about the tendencies and expected scientific developments of the given areas, taking also the social aspects in consideration. The seven committees of the public body of HAS elaborated reports (Strategic Programs) on critical issues as follows: (1) Hungary's long term strategy on energy supply; (2) Water management; (3) Environment (incl. climate); (4) Food security; (5) Sustainable pension system; (6) Education; (7) The general state of the society (relationship among the state, the public institutions and the citizens). *Comment:* The parliamentary and the government representatives (our interviewees) argue that the reports of the academic committees are (have been) utilized in making strategic decisions. The scientists are not firmly convinced that this is always the case. Among our interviewees it was the head of the Food security program who reported on the direct utilization of her committees' strategic principles by the Ministry of Rural Development.

[118] Nyiri, L and Havas, A (eds): National System of Innovation in Hungary. Background report for the OECD Country Review 2007/2008, manuscript.

- The Hungarian Academy of Sciences (HAS) is member of the European Academies Science Advisory Council (EASAC). Reports and studies are published by the Council in order to inform decision-makers at the European Union and the European public. Some of the reports are available also on the HAS' website. *Comment:* There is no information on the use of the reports in lawmaking, regulation, decisions on infrastructure development, etc.

- About 40 so called national technology platforms were formed in the last few years by the Office for Technology Development (former NKTH – now National Innovation Office). Mutual learning, exchange of experiences, public communication of the networks' results were (are) supported by European and Hungarian financial resources in order to enhance the bottom-up design of innovation activities that seem to be needed for increasing competitiveness in given fields. *Comments:* Decision makers didn't find time yet to exploit the stakeholders' knowledge.

Taking the above mentioned examples and comments into consideration we can say that the national political setting and the cultural contexts do not claim and do not enhance more democratic structures in decision making. Critical public discourse is limited to a few fields of policy making only. These include for example environment, food security, energy supply. Economy seems to be the only field where the stakeholders' views on political decisions are covered by the media to a greater extent.

### *2.1.1 Institutional structures that would be appropriate to take up (or already include) TA functions*

#### *Legislative background for technology assessment*

The Law on Research and Technological Innovation (2004) does not contain reference to the application of methods indispensable for preparing policy decisions (e.g. systematic data collection and analysis of techno-economic issues, technology assessment or technology foresight), although it was suggested by independent experts on several occasions when the draft legislation was discussed.

Technology assessment as a state task is explicitly mentioned in the Government's mid-term (2007-2013) science, technology and innovation policy (STI) strategy issued in March 2007 (Government decree 1023/2007. (IV. 5.)).

"Managing the R&D statistical data system and operation of methodology tools which serve the policy making and implementation (technological foresight, technology watch, technology assessment, etc.) is an important task of the state. The definition of objectives, programme planning, control and feedback, as well as evaluation of quality and performance are more and more built on indicators. In many EU countries separate national science and technology policy analysing institutes (S&T observatories) coordinate these processes. The strengthening of expert activity that establishes strategic decisions is also necessary in Hungary. The Hungarian Academy of Sciences, as national adviser, can play a role in this."

However, the Action Plans to the above strategy paper (Government decree 1066/2007. (VIII. 29.) and an update in 2009 by Government decree 1019/2009. (II. 19.) did not envisage concrete measures for implementing this task. Moreover, the validity of the strategy prepared under the previous government was not confirmed under the present government.

The only exception for the institutionalisation of TA in Hungary is the field of health technology assessment. The Office of Health Technology Assessment of the National Institute for Strategic Health Research was formed in 2004 with the aim of establishing in Hungary, similarly to other EU member states, an independent institution to support decision-makers in their rational use of healthcare resources, through the provision of analyses and recommendations.

***Science/Academia***

The Academia could be an ideal forum for a lively discussion on S&T policy issues. However, in Hungary this has only been the case in a limited number of issues and in most cases it lacks direct public involvement or open discussions.

Regarding TA and/or TA-like activities, the Institute for Sociology of the Hungarian Academy of Sciences has been involved in TA-related research for many years. Moreover, also the public discourse in nuclear waste management and food safety has been supported by the Institute's researchers. Researchers of the Institute for Soil Science and Agricultural Chemistry, as well as scientists from the Institute of Psychology had leading roles in supporting the public in the red sludge catastrophe in Ajka (Hungary) in 2010. There are TA-oriented specialists also at the Szent István University, Gödöllő (Hungary) as well as at the Budapest University of Technology and Economics (BME), the University of Miskolc, the Corvinus University of Budapest.

It is important to note the successful initiatives of the Hungarian Academy of Sciences to provide scientific advice in the past

- In 1996, the government assigned the Academy with the task of preparing a long-term survey of the state of Hungarian science at the turn of the millennium. The Academy launched the Strategic Studies program in the autumn of 1996 in several fields of public life. The strategic investigations and syntheses of selected issues resulted in about 100 books dealing with relevant problems of science, health issues, industry, agriculture, environment, energy, etc.

- The Project VAHAVA, a joint scientific co-operation of the Hungarian Ministry for the Environment Protection and Water (KvVM) and the Hungarian Academy of Sciences (MTA) carried out in the period of 2003-2006, was dealing with the impacts of climate change. The impacts of climate changes raise several issues, among them those that can be handled and solved by the scientists of the field of agro-economy. Climate changes are actually under way and in Hungary we are probably facing warming and dryness and the amplification of the frequencies of extreme weather events and their damages. In the agricultural sector this demands the urgent development of measures of prevention, preparedness, mitigation and recovery. It would be desirable to serve with these measures the protection of the atmosphere and the process of adaptation in such a way as to get some advantages out of the eventual disadvantages. The role and options of agriculture are changing, upgrading and revalorisation, upon the impact of climate change and this opens new horizons in rural development, power production, etc. The two most important results of Project VAHAVA are making the public and the decision makers aware of the severity of the situation we are facing and the development of the basic concept of the National Climate-change Strategy. The project also resulted in more than 200 papers and a book.

- Another example is the continuous long term monitoring of the ecosystem and the water quality of Lake Balaton, the largest lake in Central Europe, by the research staff of the Balaton Limnological Institute. Agriculture and the quickly growing tourism had a disastrous effect on the quality of water which brought about among others the devastation of fish and important changes in the ecosystem of the lake in the 1970's. Due to the activities of the institute Lake Balaton became one of the most intensively studied lakes of the world. After changing agricultural practices and improving sewage treatment water quality improved significantly. The institute continually monitors water quality, issues yearly reports and provides scientific advice for an ecologically sound water quality protection program.

- Advice in applied research, connected with urgent problems of industry. The example is the Paks Nuclear Power Plant which has been in permanent contact with two institutes of the Academy and

consulted with a few other institutes on an ad hoc basis. Their main cooperating partner was the KFKI Atomic Energy Research Institute (presently MTA Centre for Energy Research) which revised regularly the reactor safety strategies. However, in 2003 an accident took place with fuel spilling into a cleaning tank. On the basis of the model calculations of the institute, the removal of the fuel was successfully completed and the consequences were healed by 2006. Another significant contribution of the institute was upgrading one of the units (Unit 4) of the NPP from 1375 MW to 1485 MW. The institute also prepared a study for the Hungarian electricity company MVM on the main tasks needed for starting the actions aiming at installing new nuclear units in Hungary.

The Hungarian Rectors' Conference gives opinions on issues that would affect the operation of the higher education (HE) system and makes proposals for decision-makers or experts involved in preparing decisions.

#### *Government organisations*

In the past 15-20 years, the former government office responsible for technology development (in Hungarian: OMFB, afterwards NKTH, now NIH) played a significant role in the introduction of TA in Hungary. The following list contains a few example of their efforts.

#### *Study book on the institutionalisation of TA*

In 1992 a group of experts was invited by the president of the OMFB to compile the first comprehensive publication on the TA concept in Hungary. The book „Bevezetés a technológiai hatáselemzésbe" (Introduction to Technology Assessment) was published by OMFB in 1994 in order to give an overview of the state-of-the-art of technology assessment in the most active countries in this field. The publication was aimed at

- arouse interest in TA,
- disseminating relevant knowledge on the issue,
- enhancing adaptation of existing TA practice in Hungary
- involvement of lay people and the media in the exchange of information.

The institutionalisation of TA activities was not regarded as a direct goal of the government in 1994. However, OMFB as a government organisation was ready to investigate the potential benefit of introducing TA in the decision-making process in Hungary.

#### *Technology foresight programme*

The first achievement of OMFB's TA-related efforts in Hungary was the launch of a national technology foresight programme (named TEP after its Hungarian acronym) in 1998. It was the first foresight programme in Central and Eastern Europe, with the overall objective to contribute to a strategy for a socially, economically, and environmentally sustainable development. Detailed objectives were to provide a comprehensive analysis of trends in technological development, market opportunities as well as identifying the strengths and weaknesses of the Hungarian economy and R&D system in order to increase the competitiveness of the country and enhance the quality of life. TEP was a national foresight programme, covering seven broad thematic fields. Its starting point was to consider socio-economic needs, that is, not scientific and technological issues per se. The final reports, including policy recommendations, were discussed by parliamentary committees, and were received favourably. TEP has been evaluated by an

international panel of experts, which revealed that although the findings and recommendations were valuable resources for policy-makers, its impact was rather modest. The most important effects were mainly in the area of cultural change in introducing thinking in longer-term perspectives and greater interdisciplinarity. Besides, rich experience has been accumulated in this field by the experts co-ordinating and/or participating in the project.

In terms of the original objectives, particularly in influencing the research directions of industry or the public sector the outcome was rather negative.

Although it was stipulated among the tasks of the National Office for Science and Technology (NKTH) – predecessor of the present National Innovation Office established in 2011 – to conduct foresight activities, no national foresight programme had been launched since 2004, when the government decree establishing the NKTH was issued. Neither technology foresight nor technology asessment are mentioned in the description of tasks of the present National Innovation Office.

Recently, a system of national consultation was initiated with main stakeholders (research performers and researchers of higher education) on the Horizon2020 proposal of the European Commission by the Ministry of National Economy.

Business enterprises conduct cost-benefit analysis, risk analysis, but they don't consider the wider societal impacts of new technologies, products, etc. In the case of large technology investments Environmental Impact Statements are required before projects can be implemented.

### *4.2.2 Public debate about S&T/ Public engagement in S&T issues*

A great share of the new governance topics (good governance, dialogue with the citizens, dialogue between the science and the society, etc.) have been on the agenda in Hungary for at least 15-20 years. However, the interested stakeholders are first of all social scientists (e.g. Anna Vári, Pál Tamás, Imre Hronszky, Márta Fehér, György Pataki) and those legislators who are responsible for enacting of laws on the involvement of the public.

Among the so called grand societal challenges, environmental sustainability and some environment-related issues can be mentioned as public discourse matters in Hungary. Other global problems, for example food supply, migration, terrorism or ageing are covered by the media, but we cannot refer to any open public discussion on these issues.

#### *Civil initiatives and ecological challenges*

It is well-known that many public participation successes were achieved during the 1970s and 1980s in North-America and also in Western-Europe. Demands for participation in ecological decision making were indicators of problems in economic challenges as well as in democratic institutions. It was true also for Hungary from the mid 1980s, when the crisis of state socialist structure was becoming more and more visible. This resulted in the emergence of a number of civil initiatives and discussions. One of the strongest areas of civil activism has been environmental protection. Although in the 1990s environmental protection was no longer such a significant priority, environmental civil society organisations were among the most prominent and active groups of the civil sector (Vári, 1999).[119] Cases include the followings:

[119] Vári, Anna (1999): Hungarian Experience with Public Participation in Water Management (keynote paper). In: Participatory processes in water management. Proceedings of the Satellite Conference to the World Conference on Science (Budapest, Hungary 28-30 June 1999).

- The Gabcikovo-Nagymaros dam project
- Siting of the hazardous waste incinerator in Dorog
- The North-east Pest County Waste Management Program, solid municipal waste 2002-2004
- North-Balaton Region landfill solid municipal waste 2001-2010
- Battery waste recycling facilities hazardous waste 1985-2009
- Alternative fuel in the cement factory hazardous waste 2002-2005
- Low-level nuclear waste repository nuclear waste 1987-2009[120]
- Building a NATO radar at Zengo Hill in southern Hungary 2001-2011

(Hungary's environmentally conscious president, László Sólyom, also personally protested against the building of the radar on Zengo Hill.)

Civil participants in most cases had the feeling that key decisions were made above their heads, without considering their knowledge and interests. This general disappointment didn't enhance their further interest and enthusiasm with regard to their participation in public discourse.

***What role do the media play in S&T debates?***

Science is present in the current Hungarian media, focusing first of all on the dissemination of new scientific results and promising new applications, but it is not meant to initiate scientific discussions. The most popular programme of this kind was a TV programme "Mindentudás Egyeteme" initiated by the Hungarian Academy of Sciences and co-funded by the telecommunication company "Telekom". Two series were available: Encompass 1 and 2.0. Both series are archived on the web and the lectures, the background documents and the e-learning materials are freely downloadable. The first series of Encompass had ten semesters until 2007, completed with a one-semester master course. While the courses of the first series were focused on classic scientific lectures, the second series (2011) contained also round-table discussions on the social aspects or practical use of the scientific area in question. The programme series also initiated further discussions.

### *4.2.3 Policy advice*

One of the public duties of the Hungarian Academy of Sciences is to provide scientific advice "to the nation" that is to the representatives of the nation. This advisory scheme is not automatic it can either be initiated by the Government or the committees of the Parliament.

[120] Szántó, Richárd (2011): Waste Management Facility Siting and Social Conflicts – the Case of Hungary. In: Integrated Waste Management Vol I, Mr. Sunil Kumar (Ed), ISBN: 978-953-307-469-6, pp. 41-55

Some of the tools of advising in STI policy making in Hungary:

#### *Evaluation*

STI policy evaluation culture is not developed to Western European standards in Hungary. However, as for the nationally funded support schemes, one of the basic principles of the Law on Research and Technological Innovation (Act CXXXIV of 2004) was that publicly financed STI policy measures shall regularly be evaluated by independent experts. Based on the Law, the Government Decree no. 198/2005 specifies the precise range of measures to be evaluated ex-post. As a general rule, one-off schemes above 1 bn HUF (4 million EUR) are to be evaluated within 3 years following the closure of the scheme, whereas continuous programmes (with a cumulated funding over 1 bn HUF) within 2 years of the closure of the given programme cycle. For continuous programmes, irrespective of the volume, ex-post evaluation is compulsory within 4 years of the launch of its first call. Despite these stipulations, only four external evaluations have been conducted until recently. (These reports are available in Hungarian; but for one – on the use of the Research and Technological Innovation Fund – the executive summary was also published in English.). Following the EU rules, schemes co-funded by the EU Structural Funds must also be evaluated, (ex-ante, mid-term and ex-post evaluations).

#### *Consultation processes*

Universities, research institutes, and chambers of commerce are represented in the Higher Education and Research Council, advising and assisting the secretary of state for education (at the Ministry of Human Resources) in tasks and decisions related to higher education and academic research.

There are few examples of the sporadic and unsystematic use of other decision-making advisory tools in STI policy making. Technology foresight, technology assessment are largely unexploited, just as policy reviews and evaluations, and systematic international comparative policy analysis to STI policy assessment.

#### *Science- and technology policy observatory*

The National Innovation Office established a science- and technology policy observatory in early 2012. Delivering factual data for strategic decision-making in RTD policies is one of the main responsibilities of this new department. Monitoring RTD activities, presentation of data for the stakeholders and contribution to the data-management for EU and OECD statistics are also listed among the planned tasks of the new unit. Some of the interviewees claimed the observatory as a useful basis and background institution for technology assessment-like activities in the future.

## 4.3 Policy options and national recommendations

### *4.3.1 Institutionalisation of TA*

At the beginning of the 1990s institutionalisation of TA seemed to be a realistic goal of S&T policy makers in Hungary. Starting from an analysis of the present S&T policy landscape in Hungary, we could hardly regard it as a realistic option at present.

Hindering factors:

- lack of future-oriented thinking in S&T policy making (both on national, organisational and often individual level)
- public neglect towards innovation/technology-related ethical and safety issues
- separation of the political arena from other arenas (scientific, public)
- scarcity of TA competence
- The parliamentary control over the Government is only formal.

Despite these hindering factors, most interviewees have become rather enthusiastic about the topic, namely to develop human and organisational competences in TA. „At least we could learn more about modern tools of decision making". Not only the researchers but the policy administrators could imagine one or more TA platforms or forums in Hungary. They even say that some institutions have elements of TA right now. Most of the interviewees suggest beginning the institutionalisation process in a small scale and develop it organically by the growing needs and recognition. According to most it is more adequate to stick to a small institute (think tank?) in one of the existing organisations (eg.: the Hungarian Academy of Sciences, or the National Innovation Office, particularly the National Technology Platforms initiative) and develop the capacity in one of these organisations instead of creating a new institution first. According to experts' view, a TA institution should be capable to thoroughly analyse basically any the policy issue by the involvement of external expertise. Coordination or discussions are necessary but these not sufficient tools in a TA exercise.

It has been often recommended that a TA institution should be set up as an independent not far from the Parliament and the Government in order to be heard and recognized.

Learning TA as a tool to use scientific advice in a democratic decision making process are viewed as necessary developments in S&T policy making. Participation in European TA and related projects seems to be the best opportunity for capacity building in this field. The role of the academic community in providing policy-advisory is essential. Any TA institution should be able to (1) consider the grand future challenges and the social consequences of S&T development; (2) transmit public interest to policy-makers. Civil actors (NGOs and citizens) should also develop their TA competences in order to be accepted as informed stakeholders by non-civil partners.

### *4.3.2 PACITA interviews in Hungary (Summary)*

#### *Abstract*

R&D structure has been changing continuously in the past 20 years in Hungary, thus, making organisational learning difficult. There is a lack of well defined aims in the field of policy making – because of the variety of different purposes and the variety of documents, these aims are dispersed. Implementation is weak.

Effective organisations in this structure do exist, but these are not harmonised enough. A National Innovation Strategy is being developed nowadays at the Ministry of National Economy. This document is based on many other documents made by professionals from various fields.

Decision makers from the governments and parliaments of the past 20 years at all times have not expressed a real need for public debates, even not for real professional debates but there are particular topics and fields in

which substantive debates happened and multi-participant collaboration materialised (ministries, researchers, NGOs). Participatory approach is nearly totally missing.

The Hungarian Association for Innovation and representatives of the Hungarian Academy of Sciences are the most respectful advisors of decision makers both for the government and parliament.

There is no institution with TA competence today in Hungary, but most interviewees can imagine one, and say that some institutions have elements of TA right now. There were institutional predecessors of TA in Hungary but these were more foresight programmes than TAs.

When trying to describe an imaginary TA organisation, most of the interviewees suggest to begin it on a small scale basis, and develop organically by the growing needs and respect. According to their opinion, it should be part of one of the existing organisations (eg.: National Innovation Office, National Technology Platforms, HAS) or should be developed by one of these organisations rather than creating a new institution as a first step.

The best solution would be to keep it independent from the Parliament and government but not totally far from these actors in order to be heard and respected enough. (Frequent answer is in the middle or a bit closer to the first two vertices of the triangle (1) Politics – (2) Science&Technology – (3) General Public).

Ideally, this organisation should be flexible: having competences in the field of research, economy, finance, law and administration; but have to be able to communicate its advices to the decision makers, and organise public debates, too, so it is best to be a research institution with a huge network of professional advisors from different fields and having the capacity to organise public debates.

#### *Description of the general RTD structure*

Almost all the representatives of the government, scientific community and civil organisations agree that the Hungarian RTD structure has effective institutions and aims but these are not harmonised and focused enough. Representatives from the government are more satisfied with institutions and policy making processes than the members of the other groups. The Ministry have just made the National Innovation strategy in which it emphasizes well-defined aims and directions to develop a better focused RTD strategy. This new strategy which is under public debate nowadays is based on different stakeholders' opinion and advices.

A supposition - arising from the socialist past - that science is pure good and unquestionable, still rules the scene of research, innovation and decision making in RTD. It determines the level of openness of the debates on innovation issues, too. The participation of scientists and professionals in decision making is nearly adequate in many fields but public participation is extremely weak. Laypeople are left out of the decision making processes or just formally asked as considered incompetent. Nor decision makers neither scientists let in laypeople's opinion in the process. Participatory approach is not recognised as a good practice out of some university departments.

#### *Strengths and weaknesses of the RTD structure*

*Weaknesses*

Commonly mentioned:

R&D structure has been changing continuously in the past 20 years, thus, making organisational learning impossible. Organisations are changing due to the different governments so nor the stuff neither the

organisations themselves could develop well during these times and the system was unpredictable for the stakeholders, too.

*"… policy maker organizations are constantly being transformed. In brief, they destroy the possibility of the organizational learning."*

*"The unpredictable change of the institutional system is characteristic, i.e. governments come and go."*

There is a lack of unified terminolgy and well defined aims in the field of policy making – because of the variety of different purposes and the variety of documents, these aims are dispersed. Implementation of the written aims is very weak and inconsequent.

*"My first main problem is that the whole theme is not in its right place… Research, research development and innovation. The naming is not unified. In the past, minister Pungor gave a different interpretation to certain concepts, today Mr. Pálinkás introduced the topic of discovering research. All of them can be agreed, the only problem is that naming is not unified, that's why there is a misunderstanding and it is a big problem that there is not a unified terminology in everyday language. Unfortunately in connection with this leaders of the state, politicians do not use it properly in many cases."*

Real interest is often missing in examining the social impact and social applicability, and economical expedience of an innovation. It is not common to question innovations' wide and long term possible effects before developing one. Engineers and researchers are still HOMO FABERs, not considering enough the social impacts of their innovations, precautionary approach is missing.

*"It is not enough to test the social impacts of an innovation when it is already there. It is better to ask people about it and measure its possible impacts before developing it."*

Rarely mentioned:

Instead of having a well focused and strong representation in policy making processes and it's organisational structure, RTD deputy is dispersed in three ministries.

*"I find it very weak (syllabified), as I mentioned, when the theme gets to three departments then there is a trouble from the beginning"*

*"No minister is in charge of RTD issues, not even an under-secretary. RTD is represented only at the head of department level and that is not enough. It would be better represented at one ministry which is dedicated to RTD and higher education only"*

There is no effective cooperation between higher education, research and policy making in RTD.

Higher education is being destroyed and the conditions of general education are worsening financially and in quality too. There are not enough engineers and researchers with natural science degrees in the country to make more innovations. Young researchers' career is unpredictable so there is a risk that they are likely to leave the country.

*"There is chaos in higher education. And the radical transformation of the whole higher education can easily lead to a loss. A high number of the young Hungarian researchers orientates to abroad unanimously"*

Well structured, consequent and reliable data about innovation and the state of the research infrastructure is missing. Under these circumstances without valid indices substantive evaluation is impossible.

Individually mentioned:

During the years of the crisis RTD can play an accessory role only.

Formerly it was part of the curriculum, but now there is a lack of TA related subjects in higher education.

Lifelong education is weak in Hungary.

*Strenghts*

Commonly mentioned:

Human resources - some research groups, institutes and motivated scientists are one of the strenghts themselves.

The Hungarian Association for Innovation, which is more of a professional organisation than a public one, and the Hungarian Academy of Sciences are the most respectful and effective advisors of decision makers both for the government and parliament.

Rarely mentioned:

The National Innovation Strategy is being developed nowadays at the Ministry of National Economy in order to better define aims and to unify them. This document is based on many other documents made by professionals from various fields e.g.: industry, science and civil organisations. Nowdays this document is available online for public debate and there will be open workshops organised in 7 regions cooperating with civil partners.

*"That is the NGM, isn't it. In this commitee there are twenty or more of us so a lot of corporate leaders, significant scientists and the leaders of civil organizations. So the preparatory materials were public in this circle."*

*"The work group of the Ministry of Economics have recently displayed that during the course of social consultation they wish to consult with the Hungarian Association for Innovation about the strategy of innovation."*

Individually mentioned:

Share of the high technology industry in the export of the country

Decision makers have recognised a new type of ICT startups and their potential and are trying to find a way to support them optimally.

*Mixed*

Commonly mentioned:

Effective organisations and legislation in the RTD structure do exist, but these are not harmonised enough.

*"It is a type of problem that in the policy of innovation, policy of support ninety percent of the means known in the international specialist literature are present. So if you like, the bad news is that there is not a philosopher's stone. So those solutions exist that are present in majority in Hungary. At the same time these do not compose a harmonious system. So somehow the cogwheels are not in harmony, this is the main problem as far as I am concerned."*

The TripleHelix kind Innovation Advisory Board with representatives of the industry, science and government at the Ministry of National Economy is a group of good professionals, but not at it's best place: it can play only a particular role there.

Decision makers from the governments and parliaments of the past 20 years at all times have not expressed a real need for public debates, even not for real professional debates but there are particular topics and fields in which substantive debates happened and multi-participant collaboration materialised (ministries, researchers, NGOs). Professionals, scientists, and reserarchers have good respect in such debates nowadays, but p*olicy makers and researchers are not open for laypersons' opinion so they keep them away from debates.*

*"In our case, I think politics have considered us as partners for ten years and to tell you the truth it had done it earlier as well. So in this respect, at least the consultation reaches the point that it asks for our opinion. It is quite variable when and to what extent our opinion is taken into consideration."*

Rarely mentioned:

Participatory and precautionary approach has appeared at universities, but in an embryonic form. However, this approach is forgotten when it comes to research realisation or policy making.

***Role of the groups of actors in S&T policy making***

*Government*

The Government through the ministries is on the top of the hierarchy in the decision making connected to RTD. Commonly said to be in a strong ruling position with all the before mentioned weaknesses and strengths of the RTD system related to its working processes.

One problem is the relatively low weight of RTD among all the other fields in the Ministry of National Economy which is concerned of RTD. There are only thirteen people who are in charge of RTD at government level. Because of this, they work step by step, slower than it would be optimal and there is not enough time for as much and as detailed public debates as it would be desirable. State officers are not seclude themselves from the public totally but they are far more open for researchers' and scientists' opinion considering the latter more competent.

There are good professionals communicating intensively with advisory boards of scientists at the ministry responsible for RTD. After making enough interviews it became visible that the ministry has recognised the needs of the industry and science institutions in innovation and is trying to respond to them, but it's means are limited.

*Parliament*

It is commonly said to be a simple executive actor without real knowledge about and interest in RTD issues. Two comitees are working on RTD related issues at the Parliament: an Ad Hoc Comitee on Innovation and a Comitee on Sustainable Developement but these comitees does not have real power to form RTD policies.

*Scientific community*

It is commonly said to be a strong and respectful group which can be often heard but its opinion is just occassionally being considered by policy makers. There are many scientists and researchers who try to help decision making processes in their competence either through civil organisations; informal groups of professionals or personally. This community is best represented in decision making processes throught respectful civil organisations as the Hungarian Association for Innovation and HAS.

Around 2010, HAS academics delivered Public Body Strategy Programmes to ministries about issues considered to be the most important in the country at that time (eg.: water economy, food safety). Only

occassionally have the results of these studies been built in the national concepts, dependig on the personal openness of the deputy of the topic at the decision making level.

Some respondents mentioned that researchers are independent people who do not want to take part in policy making processes.

*"It is characteristic of them, I think of the scholars around the world that they are devoted to science 25 hours a day. And they aren't interested in academic politics – I think rightly. As a matter of fact it is not their business."*

The representative of the Ministry of National Economy mentioned that HAS has far greater strength and vindication of interests than its economical benefit would entitle it for. Anyway, he is not against every civil organisation in STDI because really respects the contribution of the Hungarian Association for Innovation in decision making processes.

A representative of the HAS mentioned that beside the fact that HAS is the top organisation for science in Hungary with its research institutions and scientists, HAS has an extraordinary strength compared to other nations' academy: it acts as a ministry of science in some cases.

*"The Academy is in a very strange situation because, I think, there is not a country where the academy would play such a part. As it is the citadel or fortress of the world of science and at the same time it functions more or less as a ministry. Its positive role is unequivocal, but at the same time its negative role is also unequivocal."*

### *Industry*

Big companies can lobby successfully, but only some of them keep their research and innovation departments in Hungary.

*"In the field of innovation the representatives of companies may get or get themselves into such a state that they can lobby, I am saying it in a good sense. They are doing it as usual. They do it when there is something they can lobby for"*

Technology Platforms are built and maintained to bring state officials and the biggest actors of the industry together in order to figure out their specific needs and enabling them to work out better fitted STD policies. These platforms are open and underregulated; therefore their aims cannot be synthetised and used practically to establish a national RTD strategy. There is an opinion that the idea of these platforms was taken from the developed countries without adjusting it to the Hungarian conditions, so these platforms can not work properly.

SMEs in Hungary are struggling for survival, that's the reason why they don't have a chance to innovate without targeted support. There is no significantly visible interest from their side in taking part in the policy making proccesses of RTD.

*"Small companies do not lobby for anything because they do not have innovative acitivity, it is zero."*

There is a new emerging type of entreprises in the ICT sector: innovative and successful startups with a new approach of cooperation and way of thinking about research and innovation. They have special needs in networking and fundraising - which latter is recognised at the proper ministry.

### *Civil society organisations*

There are strong and respectful organisations like the before mentioned Hungarian Association for Innovation and HAS which can affect decision making but these are not for the public but for scientists, researchers, engineers, so professionals only.

There are no general, well known, widely used and available civil organisations or open forums for the public to express their needs, opinion or to ask questions on scientific issues. There was only one initiative on science shops, and science cafés in Hungary – such forums are not widespread in the country.

*"In the first place it is not in the bureaucratic order. But it is in it that the under-secretaries of state have to try to reconcile with each other between the different government offices – where can we find what connection has to be established with the social organizations?"*

### *Citizens*

Citizens are the least involved actors in innovation and S&T issues in Hungary. However, there are some topics, particularly those in which citizens are closely and personally involved as local environmental and agricultural issues, alternative energy sources. In these topics, they express their opinions in citizen forums, which is then collected and used by policy makers, but it is not the common practice, only sporadic, often formal in the decision making processes.

RTD policy makers and researchers are not open enough to citizens' opinions, as they consider civil society organisations more adequate for citizen representation, though such forums do not exsist widely for the public. Laypersons are often said to be emotional and incompetent in scientific issues by scientists and policy makers. They met lack of interest in becoming well informed and competent.

*"I would say all citizens have a share, but at the same time I state that I feel that it is the business of civil organizations"*

There are tiny groups of reserachers at universities which are in charge of participatory methods. They are involved in science shops, science cafés and participatory action researches in different fields, mostly in environmental and social issues. They have recognised the importance and usefulness of laypersons' opinions even before developing an innovation not only after that.

#### ***Recent Important policy making issues***

It is commonly said there is always something to dispute about. The most recent and important mentions were:

**The National Innovation Strategy** has been opened for the public on the internet during the days of the last interviews. Workshops are planned to be organised in seven regions of the country about the concept, too. The strategy itself is based on different stakeholders' contributions.

**GMO** was an openly disputed issue in Hungary. There was a wide public and professional debate on it which resulted in the refusal of GMO in the coutry. It proved to be a satisfying result for the public and for most of the scientists. All the interviewees from representatives of scientific or civil organisations, even mavericks were satisfied with the debate itself and its outcome, too, but burning it into the Constitution was more than what they had expected.

**Food safety** was told to be another succesful debate among scientists and decision makers. The National Strategy on Food Safety is based on the Public Strategy Programme on food safety which was prepared by HAS academics. It is a strong professional study on the topic and it was built in the national strategy correctly. It has not arrived to the public debate phase during the time of the interview, but the public debate was said to be well prepared.

**Water economy** is the opposite of the previous: HAS academics made a Public Strategy Programme on water economy and sent it to the responsible ministry but have not received a formal reaction at all. Only informal indignated commets arrived about its strong critical voice.

### *Level and mode of public debate on S&T issues*

Policy makers and scientists are said to be well connected to each other in the decision making processes. State officers usually ask advisory boards and take scientists advices and comments seriously but still, occasionally, they ignore them.

Nor policy and decision makers neither researchers are really interested in citizens' opinion on innovation and scientific issues. It is said they are not informed enough in such topics to be asked during the process. A common problem is, that the policy makers' interest is only obligatory and formal. This empty interest sometimes leads to useless and dead debates or simple online data collection on even important issues

There is a weak but definite group among social scientists which is engaged to participatory methods e.g. participatory research techniques, consesus conferences and public debates on scientific issues. They have a Y view of people instead of the common X which means they believe that people are good, and competent in such issues even if they cannot express their needs in a sophisticated or scientific way. And for the researchers and entreprises it is an easy way to be economically effective to ask the users about their needs even in such issues like medicine research. Many innovators and researchers could be better grounded if they had asked their potencial users first before – and not after - developing something. Participatory methods are best for such information collection.

### *Barriers and opportunities for a national TA institution*

### *TA awareness in Hungary*

TA is not thoroughly known by all the interviewees and there are huge differences in the level of knowledge about it. Every interviewee had heard abouth TA before and had known something about it but some of them were better informed than others. Representatives of the university had the most detailed knowledge and were the most enthusiastic about it, but the representative of the ministry was surprisingly well informed about TA, too.

*"I do not know exactly what technology assessment means"*

### *Mission and concept of TA*

The main task of TA is to evaluate the possible immediate and long term positive and negative impacts of scientific products on the environment, society and economy - this could be the common interpretation of TA in Hungary. It means that nearly all the interviewees were talking about TA as a complex research done by professionals only. The public was usually left out of the definition and the explanation of the working process of TA. In some answers the need for better public involvement in these processes emerged spontaneously but a positive answer usually arrived only after a definite question about the importance of it.

### *TA related activities in Hungary*

Most of interviewees say that some institutions have elements of TA in Hungary right now.

Predecessors of TA in Hungary are TEP (1997-2002) and NEKIFUT (nowadays) but these are more foresight programmes than TAs. Leaders of the former TEP said TA and its approach is not widely accepted in Hungary so there is no use to build a new institution on TA right now, first more important to build the background of it and form the outlook of the decision makers about public debates to recognise these as important.

TA was taught at the Budapest University of Technology and Economics from 1991 till 2010 when the professor left the university. He said students had been interested in TA but when they started to work they had no possibility to use their knowledge because at that time TA was not part of the reserach and innovation system yet. TA has partially been built into the everyday practice e.g.: risk assessment in environmental issues, environmental impact assessment and evaluation of negative effects in medication research but no other kind of TA related techniques are used widely.

#### *TA kindred fields*

### *Risk Assessment*

Risk assessment works very well in particular fields where risks are big and dangerous e.g.: finance, disaster defence, army. In other fields it works poorly or does not work at all. It is commonly mentioned, that it is only formal or not substantive enough even if it is ordered by regulations. Precautionary approach is totally missing. A common misinterpretation in this field is that when experts try to measure risks, they do not receognise that there are no risks but insecurity in the system which is uncountable so qualitative data is needed. It is evidence in the literature of risk assessment but not in the practice.

*"There are certain laws, rule of law obligations. Apart from this experience shows that this is arranged very formally."*

### *Environmental Impact Assessment*

Out of the TA kindred fields it is the best represented in Hungary. It is ordered by law so works very well in many situations but can have the same problem as the previous one: often becomes a simple formal act and can end up in simple number making actions. There are situations when experts try to force the public to accept their opinion and are not concerned about the raised problems. Shortsitedness can be another problem in this field: not seeing far enough into the future effects of innovations can cause later serious negative environmental impacts so it is important to consider the later implications not only the short term ones.

*"We are talking about that all kinds of investments the environmental impact assessment has to be done whose professional depth is not surely as big"*

*"We may be a bit in a more advanced state in the field of culture."*

### *Philosophy of Technology and Ethics*

Ethics are embryonic or missing – being present only through law and some popular topics in the media. Three interviewees mentioned that we should have been more honest to have it substantially. There is a Code of Ethics in every scientific field but these are not unified into one general Code of Ethics.

*"In this sense, I do feel, that the responsibility of scientists is not (stressed) on the ball. It is in theory, but not in practice."*

One interviewee from a university said in every research group an ethics professional should be employed with background in science and ethics too, and would be able to recognise those points during the research processes which rise serious ethical questions.

### *Social Studies of Science and Technology*

It is said to be very important by the interviewees but only sporadic, formal, or missing from nowaday's research and innovation practice in advance. If there is an evalutation about the social impacts of an

interposure or innovation it happens usually after and not before the interventions or the developement. Good mathematical models are missing to do it correctly.

"*They use utterly wrong mathematical methods e.g. data analysis, claster analysis etc. All of them should be used or multi variables statistical methods. Now these are totally mixed, they do not even understand what the thing is… so I had a lot of data and I applied a mathematical method which is covered by computing and I got this"*

### *Technology Foresight*

There was a programme between 1997-2000, called TEP, but nowadays technology foresight is forgotten. TEP was a successful, strong technology foresight programme that time, to the extent, that two interviewees said it was even too strong. By their opinion technology foresight is less calculable than it seemed to be so it should play an accessory role beside TA. It is extremely complex and there is no reliable methodology developed to do it well. A better approach would be to build different scenarios instead of predicting the one and only future.

*"Technology has an open future. So to be very straightforward, in the majority of the cases there is nothing left for me than to plan scenarios. And it doesn't make sense for me to trying to predict the future."*

### *Science Communication*

It is commonly said by everyone that there are really successful examples in science communication from the near past e.g.: Mindentudás Egyeteme, Science Cafés, but these are not enough. If we would like to have proper debates with the public involved we need good science communication. First there should be citizens with a better knowledge and interest in these topics. Only with such well informed citizens can be democratic the system later at this level.

The representatives of the two universities emphasized that science communication in Hungary is usually a one way communication, in which the scientist teaches his knowledge or invention to the public. There is a lack of two way communication forums like science shops in Hungary, and correlated with it, the participatory approach is missing, too. They said we need more and better real dialogues, participatory approach, and the public understanding of science.

*"What Hungary did really well, is the scientist communicating new, scientific information to the masses, which learns it."*

#### ***Imagining a national TA institution***

There is no institution with TA competence in Hungary today but most interviewees can imagine one and see some exsisting organisations as its predecestors. Nearly all of the respondents suggest not establishing a new institution dedicated to TA first. It is commonly said that it should be started on a small scale basis, and developped organically by the growing needs and respect. According to their opinion, it should be part of one of the existing organisations or should be developed by one of these organisations or to run as a professional network rather than creating a new institution as a first step.

*"So this is what should be developed gradually. First, through the work of a small team its usefulness should be proven, and than it should be permanent . Small team means, that … beside some full-time professionals people with technical development skills and innovation skills should be recruited. I the beginning, they should focus on particular tasks."*

Institutions mentioned where this new TA organisation or department could belong to, were: National Innovation Office, National Technology Platforms, Hungarian Academy of Sciences, one of the ministries.

In the question about the optimal organisational structure of the TA there were huge biases in the answers: there were interviewees who thought that it should be a totally independent research institution, or a civil organisation; others mentioned that it should belong to the Parliament or to a ministry as a background organisation, even a department at a ministry was mentioned. The best solution for most of the interviewees would be to keep this imaginary stepwise built institution independent from the Parliament and government but not totally far from these actors in order to be heard and respected enough.It was frequently answered that it should be positioned in the middle or a bit closer to the first two vertices of the triangle (1) Politics – (2) Science&Technology – (3) General Public.

*"I would place it under the Parlianment. I would not allow that the ministries momentary interests ..... it all up."*

*"One can imagine a civil organisation in which the government, other civil organisations, the industry, scientific and proffessional boards, I don't know who ever else could take part doing technology assessment, so many-many organisation could establish a foundation."*

The possible role of TA in Hungary was commonly seen rather in supporting the executive branches of government than supporting the parliament. Its secondary role was sometimes mentioned as organising public debates, making participatory researches and organising consensus conferences for a consensus based decision making - but these mentiones were sporadic, and enforced by questions not spontaneous out of some.

Ideally, this imaginary TA organisation should be very flexible: having competences in the field of research, economy, finance, law and administration; but have to be able to communicate its advices to the decision makers, and organise public debates, too, so it is best to be a research institution with a huge network of professional advisors from different fields and having the capacity and commitment to organise substantive public debates. A debating institution was commonly said not to be enough, it was preferable for everyone if it would be a complex research institute combined with advisory and communication features.

*"Serious analytical activities should be done by this organisation, with the involvment of the public, and in a methodologically grounded and transparent way. Discussion platform is a part of it. It means that it is not a discussion platform in itself; buti n order to make an analysis grounded and in order to involve all the stakeholder discussion platforms are needed. These should have a consulting or even a stronger role int he model. It means, that these should play a substantial role int he decision preparation process. Almost up until influencing decisions."*

The answers about the imaginary TA institution seemed to be unfinished and a bit impulsive because the interviewees did not have enough time to think it over as much as they thought they needed to; and they sometimes felt to be forced to find out something that they did not think was really necessary or possible. Some of them said that under the current circumstances in RTD in Hungary it is hopeless to think about a TA organisation; some of them said that after some interventions and changes it can be built, some of them thought it was possible to try to introduce TA now.

*"Within the existing circumstances it would practically be needless. Nobody would pay attention to it."*

#### *Recommendations of the interviewees*

Finally here comes the table of the suggestions of the interview partners to make a better ground for a TA institution and a more effective RTD system in Hungary.

| **Recommendations of the interviewees** | |
|---|---|
| Recommendations | Frequency<br>(**...** frequent, **..** rare, **.** individual) |
| Introduce well defined and focused general aims in the RTD field for policy makers and researchers, too | ... |
| Observe the implementation of the aims | ... |
| Introduce unified terminolgy | .. |
| Dedicate one ministry for STD.<br>Higher education should be better represented and should get wider means | . |
| Support research and innovation activity of foreign companies in Hungary | .. |
| Strenghten SME's innovation activity | .. |
| Strengthen the connection between industry and researchers | . |
| Introduce consequent data collection on STD and research infrasrtucture | .. |
| Make career paths more calculable for young scientists and support them to stay in the country | . |
| Teach TA and TA kindred fields in higher education | .. |
| Both Policy makers and researchers should be educated in TA and related fields | .. |
| Involve the public more in debates about scientific issues | .. |

## 4.4 Case study – Preparation of the National Food Safety Strategy

Hungary is enrolled among the safest countries regarding the current state of food safety with a strict food law and regular monitoring. To maintain this position, the Ministry for Rural Development has been preparing the national strategy on food safety with the involvement of all relevant stakeholders. The main goals are to further reduce the risks of illnesses related to food, particularly to cases occurring in the households. Further goals are to filter out unfair enterprises and to enhance consumer awareness in order to

effectively prevent undesirable events that would risk the health of citizens and cause considerable moral damage and financial loss.

The process of the National Food Safety Strategy preparation was chosen as a positive example of TA-related activities in Hungary with government, science and society involvement under the coordination of the Ministry of Rural Development. The Ministry takes actions to draw all interested parties in the effective development of the strategy: the consumers, the enterprises of the food industry (from agriculture to food processing , trade and the catering industry), and the scientific experts of the Hungarian Academy of Sciences and other research establishments.

### *Background*

The Complex Food Security Committee of the Hungarian Academy of Sciences started preparing the study ”Recommendations for developing the national food and nutrition policies” as early as 1993. The study was presented to the Prime Minister’s Office and to the ministers directly or indirectly involved in the matter in 1999.

In 1997 acknowledging the strategic importance of food safety with a view to similar international examples, the Food Safety Advisory Board (Élelmiszerbiztonsági Tanácsadó Testület, ÉTT) was formed on government initiative with the involvement of relevant ministries and agencies responsible for the area, research establishments, professional representative bodies and consumer associations.

Although more comprehensive government programmes were conducted in the field, a study prepared by the Food Safety Advisory Board in 2000 clearly showed worsening trends concerning Hungary’s food safety situation indicated by the statistics of food poisonings, infectious diseases and microbiological testings. The results reaffirmed the need for a coordinated, concentrated and well prepared government policy approach with a view to formulate a uniform national food safety programme based on determining the national goals and priorities. The Board considered its most important task to support the formulation of the programme. Basing political action upon scientific evidence was considered indispensible for effective interventions.

### *First Food Safety Programme*

### *National and International Cooperation*

There have been valuable initiatives and research programmes concentrating on specific segments of food safety in many areas of science and society, but in many cases they remained isolated and unknown to the whole community. The National Food Safety programme aimed at coordinating these efforts to maximise their benefits on national level.

As a result of the Food Safety Programme, the Hungarian Food Safety Office (Magyar Élelmiszerbiztonsági Hivatal, MÉBIH) was founded in 2003 and became a partner organisation of the European Food Safety Agency (EFSA), as well as the national contact point of the Rapid Alert System for Food and Feed (RASFF) and the WHO INFOSAN Emergency. The government agency’s tasks are to provide the necessary know-how and technology for the collection and evaluation of food safety data, detection and characterisation of new risk factors, risk assessment, risk communication, scientific support for risk management and crisis management, elaboration and operation of the rapid alert system, initiating proposals for scientific research programmes, coordination and control of the work of different laboratories, cooperation with the Food Safety Advisory Board and international cooperation.

The First National Food Safety Programme was eventually elaborated by 2004 as the result of the joint efforts of the Hungarian Food Safety Agency and the Food Safety Sub-Committee of the Environmental Presidential Committee of the Hungarian Academy of Sciences coordinating the work of several hundred experts. The programme leaders were Mária Szeitzné Szabó, director of MÉBIH, Professor József Farkas, full member of HAS, chief scientific advisor at Central Food Research Institute (KÉKI), and Diána Bánáti, the director of KÉKI.

### *Food Safety Public Body Strategic Programme of the Hungarian Academy of Sciences*

With Hungary's accession to the European Union on 1 May 2004, legislation underwent significant changes. Several provisions of law had to be annulled, and replaced by EU regulations. The Hungarian food safety government authorities had undergone major changes. The role of the Hungarian Food Safety Office was further strengthened and its legal competence broadened; however its resources were reduced. In 2007, the entire food safety institutional system came under the direction of one ministry.

To tackle the new challenges that have arisen since 2004, the Hungarian Academy of Sciences launched the Food Safety Public Body Strategic Programme in 2008. Prof. Dr. Diána Bánáti, Head of Department of Food Science at the Szent István University and Head of Department of Food Regulatory Sciences and Consumer Science at the Budapest Corvinus University, Chairperson of the European Food Safety Office (EFSA) (2006-2010) and former member of the European Group on Ethics in Science and New Technologies (EGE) coordinated the work of the Committee assessing the implementation and the actualisation of the previous programme.

The findings of the extensive research on elaborating the requirements of strengthening national food security were published in a volume. The authors investigated the crucial factors of the agri-food industry, food safety and food security, pointed out the unsound decisions of the past twenty years, defined the principles of food safety policy, the major strategic goals and priorities, as well as defined sub-programmes that serve their implementation aiming to serve as a guide for all involved parties. The volume came out in 2010 and was presented for political decision makers emphasising the common responsibility the government and representatives of the scientific community share.

### *National Food Safety Strategy*

The work of the committee convinced the government of the importance of renewing the national food safety strategy as part of a broader National Rural Development Strategy, in effect until 2020. The Minister for Rural Development invited Prof. Dr. Diána Bánáti to fulfil the post of Ministerial Commissioner and Chief Scientific Advisor at the Ministry of Rural Development responsible for the development of the National Food Safety Strategy. She coordinated the events until June 2012, when she became Scientific Director at International Life Sciences Institute Europe, ILSI. It is considered a success by participating stakeholders that the ministry took into consideration the same general principles that are outlined in the strategic materials of the Academy.

It was agreed on that succeeding the stage of scientific experts and policy makers consultation, the strategic plans shall be discussed with market participants, consumers and end-users in an open and transparent manner.

The strategy plans were made publicly available on the Ministry's website and a survey was conducted inviting stakeholders for discussion of the material between September and October 2012.

All written submissions, questionnaire replies and correspondence provided by interested parties were compiled and discussed in early December at the joint Committee Meeting of the Ministry of Rural Development, The Food Safety Committee of the Hungarian Academy of Sciences and the National Food Safety Office.

The Ministry of Rural Development aims at finalising the National Food Safety Strategy by early 2013 and set up a programme within the framework for its implementation.

## 4.5 Appendix

### *4.5.1 National Workshops*

***First National Workshop, 22.05.2012, Budapest***

***Agenda***

**PARLIAMENTARY AND CIVIL TECHNOLOGY ASSESSMENT**

WORKSHOP 1.

22 MAY, 2012

**PROGRAMME**

Venue: Room 29, 7 Nádor street, Budapest

10:00- 10:05 Welcome and introduction of participants

Tamás Németh, Secretary General of the Hungarian Academy of Sciences

10:05- 10:15 PACITA project objectives

10:15- 10:25 New challenges, developing structures- PTA practices in Denmark

Lars Klüver, Pacita Project Coordinator, Director of The Danish Board of Technology

10:25- 10:30 Questions and Answers

10:30- 10:45 Parliamentary Technology Assessment models and institutions in Europe

António Moniz, Invited Researcher of The Institute for Technology Assessment and Systems Analysis, Germany

10:45- 10:50 Questions and Answers

10:50- 11:05 A Research Institute devoted to Technology Assessment

Michael Nentwich, Director of The Institute of Technology Assessment, Austrian Academy of Sciences

11:05- 11:10 Questions and Answers

11:10- 11:25 Technology Foresight in Hungary

Attila Havas, Senior Research Fellow, Institute of Economics, Research Centre for Economic and Regional Studies, HAS

11:25- 11:30 Questions and Answers

11:30- 11:45 Coffee Break

11:45- 12:00 Guidelines of psychological assessment after natural and industrial catastrophes

Valéria Csépe, Deputy Secretary General of the Hungarian Academy of Sciences

12:00- 12:05 Questions and Answers

12:05- 12:45 Demands and Interests in TA related activities and TA outcomes

moderator: Ádám Kégler, Head of International Relations Department, HAS Secretariat

Balázs Borsi, Scientific Advisor, Ministry for National Economy (NGM)

Valéria Csépe, Deputy Secretary General of the Hungarian Academy of Sciences

Attila Havas, Senior Research Fellow, Institute of Economics, Research Centre for Economic and Regional Studies, HAS (confirmed)

Lars Klüver, Director of The Danish Board of Technology

António Moniz, Invited Researcher of The Institute for Technology Assessment and Systems Analysis, Germany

Judit Mosoniné Fried, Head of Science Policy and Scientometrics Department, HAS Library

Michael Nentwich, Director of The Institute of Technology Assessment, Austrian Academy of Sciences

Tamás Németh, Secretary General of the Hungarian Academy of Sciences

Ágnes Osztolykán MP, Vice Chair of Education, Science and Research Committee

István Szabó, Head of Observatory and Monitoring Department, National Innovation Office (NIH)

László Szilágyi, Head of Department, Ministry for National Economy (NGM)

13:00- 14:00 Lunch

**The language of the workshop is English.**

***First National Workshop, 22.05.2012, Budapest***

***List of Participants***

| | |
|---|---|
| 1) Tamás Németh | Secretary General, Hungarian Academy of Sciences (MTA) |
| 2) Valéria Csépe | Deputy Secretary General, Hungarian Academy of Sciences (MTA) |
| 3) Ádám Kégler | Head of Department, Department of International Relations, MTA |
| 4) Judit Mosoni-Fried | Head of Science Policy and Scientometrics Department, MTA Library |
| 5) Gergely Bőhm | Deputy Head of Department, Department of International Relations, MTA |
| 6) Attila Havas | Senior Research Fellow, Institute of Economics, Research Centre for Economic and Regional Studies, MTA |
| 7) Attila Zsigmond | Senior Adviser, Department of International Relations, MTA |
| 8) Katalin Fodor | PACITA project manager, Department of International Relations, MTA |
| 9) Zsuzsa Kaján | Department of International Relations, MTA |
| 10) Lars Klüver | Pacita Project Coordinator, Director of The Danish Board of Technology |
| 11) António Moniz | Invited Researcher of The Institute for Technology Assessment and Systems Analysis, Germany |
| 12) Michael Nentwich | Director of The Institute of Technology Assessment, Austrian Academy of Sciences |
| 13) Balázs Borsi | Scientific Advisor, Ministry for National Economy (NGM) |
| 14) Ágnes Osztolykán MP | Vice Chair of Education, Science and Research Committee |
| 15) István Szabó | Head of Observatory and Monitoring Department, National Innovation Office (NIH) |
| 16) László Szilágyi | Head of Department, Ministry for National Economy (NGM) |
| 17) András Révai | President, Regional Development Agency for Central Hungary |

***First National Workshop, 22.05.2012, Budapest***

***Minutes by Katalin Fodor***

Tamás Németh welcomed the participants, opened the workshop and shortly introduced the participants to the activities and structure of the Hungarian Academy of Sciences.

Lars Klüver gave an overview of the PACITA project and the general practices of technology assessment. He introduced the Danish Board of Technology in details and informed the participants of its transformation. As a result of the termination of Government funding the Danish Board of Technology will work in form of a foundation. He made a presentation on the most successful projects of DBT and emphasized the effect they made on political decision-making.

Antonio Moniz highlighted the differences of European models of technology assessment in his presentation, pointing out that although both practices and the institutional background vary largely in different European countries, some major elements including the scientific background and the involvement of stakeholders are essential elements in the TA process.

Michael Nentwich presented the Institute of Technology Assessment of the Austrian Academy of Sciences and gave an insight to the clientele of their research projects. They include the Parliament of Austria, the Science and Technology Options Assessment institute of the European Parliament (STOA), regional governments, ministries and the European Commission. They are involved in the work of both Austrian and international scientific and development funds, and the OECD. They work and co-operate with numerous civil organisations.

Attila Havas summarised the history of technology assessment in Hungary and past initiatives that were related to TA. He made a distinction between TA and technology foresight programmes and introduced the Hungarian initiative, TEP.

The presentations of European TA institute leaders were followed by a roundtable discussion in the second session of the workshop. The discussion was opened by Valéria Csépe with a thorough overview on the role of psychological assessment after natural or industrial catastrophes. Taking the recent red sludge catastrophe as an example, she introduced a case study on the role of MTA experts in the management of the catastrophe and the right measures of socio-psychological help in case of such cases.

Ágnes Osztolykán emphasized the MPs need for more information on TA and on the practices and possible outcomes of a TA process. She agreed that TA could be very useful for members of the Parliament and she highlighted the importance of scientific policy-advisory as a tool to make informed decisions. At the same time she expressed her concerns with use of TA in Hungary and added that the parliamentarians themselves also need information and education to become partners is such processes.

The representatives of the Ministry of National Economy presented their work in relation to science policy-making and also agreed with the importance of TA methodology, something they had been informed of earlier as well, but could not implement in practice. As for the introduction of TA in Hungary they were concerned with the problems of selecting the right institute for this purpose. They agreed to take part in an initiative to inform decision-makers and policy analysts on the importance of scientific advisory and TA in particular.

The participants offered to provide a more detailed insight to their views in time of personal interviews.

Lars Klüer thanked the participants for the contribution and invited Valéria Csépe to participate in the next PACITA parliamentary day in Copenhagen on Science-based policy making.

***Second National Workshop, 28.02.2012, Budapest (planned)***

***Agenda***

***PARLIAMENTARY AND CIVIL TECHNOLOGY ASSESSMENT***

*WORKSHOP 2.*

*28 FEBRUARY, 2013*

***PRELIMINARY AGENDA***

*Venue: Room 29, 7 Nádor street, Budapest*

***Welcome and introduction of participants***

***Session I. TA institutes in Europe***

*- Presentation of Deliverable 2.1 Description of Parliamentary TA institutes in Europe*

*- Questions and Answers*

*- Invited guests from European TA institutes: -brief structure of institutes and projects introducing best practices of TA*

*- Questions and Answers*

*- Presentation of the TA portal and presenting an example project on the TA portal*

*- Questions and Answers*

***Session II. TA related expectations in Hungary***

*- Presentation of the main findings of the Hungarian country case study*

*- Roundtable discussion I.: Assessing needs for TA related activities in Hungary- stakeholders´ expectations*

***Session III.***

*- Roundtable discussion II.: Possible roles of a TA unit*

*- Roundtable discusson III.: Opportunities for the potential future development of TA in Hungary– possible place of a TA unit in existing structures*

***Second National Workshop, 28.02.2012, Budapest (planned)***

***List of Participants***

| | |
|---|---|
| *1) Balázs Borsi* | *Scientific Advisor, Ministry for National Economy (NGM)* |
| *2) Valéria Csépe* | *Deputy Secretary General of the Hungarian Academy of Sciences* |
| *3) Attila Havas* | *Senior Research Fellow, Institute of Economics, Research Centre for Economic and Regional Studies, HAS (confirmed)* |
| *4) Judit Mosoniné Fried* | *Head of Science Policy and Scientometrics Department, HAS Library* |
| *5) Tamás Németh* | *Secretary General of the Hungarian Academy of Sciences* |
| *6) Ágnes Osztolykán MP* | *Vice Chair of Education, Science and Research Committee* |
| *7) István Szabó* | *Head of Observatory and Monitoring Department, National Innovation Office (NIH)* |
| *8) László Szilágyi* | *Head of Department, Ministry for National Economy (NGM)* |
| *9) Antal Nikodemus* | *Head of Department, Department of Innovation)* |
| *10) Ferenc Kováts* | *Chairman of the Steering Group, (TEP program) The Hungarian Technology Foresight Programme (TEP 1997-2001)* |
| *11) László Somlyódi* | *Leader of HAS Public Body Strategy Programme, Water* |
| *12) Diána Bánáti* | *Leader of HAS Public Body Strategy Programme, Food Safety* |
| *13) Tamás Tóth* | *Head of Department, (Magyar Energiahivatal) Hungarian Energy Office* |
| *14) László Pósán* | *MP, Chair of Innovation and Development Committee* |
| *15) Benedek Jávor* | *MP, Chair of Sustainable Development Committee* |
| *16) Imre Hromszky* | *Professor Emeritus, Former Head of Department of Innovation Management, Budapest University of Technology and Economics* |
| *17) György Pataki* | *Researcher, Department of Environmental Science and Technology, Corvinus University of Budapest,* |
| *18) Gábor Szabó* | *President, Hungarian Association for Innovation /professional and employer's business federation/* |
| *19) Gábor Veress* | *President,The Federation of Technical and Scientific Societies, Member of the National Board of Sustainable Develoment* |
| *20) Lívia Dömölki* | *Food Safety Expert, National Association for Consumer Protection in Hungary* |

***Interviewed Experts***

| **Category** | **Organisation** | **Expert** | **Expert´s position** | **Date of Interview** |
|---|---|---|---|---|
| Governmental Authorities | Ministry for National Economy, Department of Innovation | Antal Nikodémus | Head of Department | November 2012 |
| Governmental Authorities | Ministry for National Economy, Department of Innovation | Balazs Borsi | Councillor | October 2012 |
| Governmental Authorities | Hungarian Technology Foresight Programme (TEP 1997-2001) | Attila Havas | Programme Leader | September 2012 |
| Governmental Authorities | Hungarian Technology Foresight Programme (TEP 1997-2001) | Ferenc Kováts | Chairman of the Steering Group | September 2012 |
| Governmental Authorities | Hungarian Energy Office | Tamás Tóth | Head of Department | October 2012 |
| Parliament | Ad Hoc Comittee for Innovation and Developement | László Pósán | Chair | October 2012 |
| Parliament | Comitee for Sustainable Development | Benedek Jávor | Chair | November 2012 |
| Science | Hungarian Academy of Sciences<br>Environmental Presidential Committee of the Hungarian Academy of Sciences (KÖTEB) | Tamás Németh | Secretary General<br>Chair | October 2012 |
| Science | Hungarian Academy of Sciences<br>Environmental Presidential Committee of the Hungarian Academy of Sciences (KÖTEB)<br>Educational | Valéria Csépe | Deputy General Secretary<br>Member<br>Chair | October 2012 |

| | | | | |
|---|---|---|---|---|
| | Presidential Committee of the Hungarian Academy of Sciences | | | |
| Science | Hungarian Academy of Sciences<br>HAS Public Body Strategy Programmes Water Economy | László Somlyódi | Leader | October 2012 |
| Science<br><br><br><br><br><br><br>Government | Hungarian Academy of Sciences<br>HAS Public Body Strategy Programmes Food Safety<br>International Life Sciences Institute Europe<br>Hungarian Ministry of Rural Development (2011.- June 2012.) | Diána Bánáti | Leader<br><br>Scientific director<br><br>Ministerial Commissioner responsible for the preparation of the Hungarian National Food Safety Strategy Programme and Chief Scientific Advisor at the Hungarian Ministry of Rural Development (2011.- June 2012.) | October 2012 |
| Science | Budapest University of Technology and Economics Department of Innovation Management | Imre Hromszky | Former Head | November 2012 |
| Science | Corvinus University of Budapest Department of Environmental Science and Technology, | György Pataki | Professor | November 2012 |
| Business<br>CSO | Hungarian Association for Innovation /professional and employer's business federation/ | Gábor Szabó | President | October 2012 |

| | | | | |
|---|---|---|---|---|
| CSO | The Federation of Technical and Scientific Societies<br>National Board of Sustainable Development | Gábor Veress | President<br>Member | November 2012 |
| CSO | National Association for Consumer Protection in Hungary | Lívia Dömölki | Food Safety Expert | November 2012 |

# Chapter 5 Explorative Country Study: Ireland

Paidi O'Reilly, Frederic Adam (Business Information Systems, University College Cork)

## 5.1 Description of governmental system and general R&D structure

### *5.1.1 Governmental System*

Dáil Éireann (or Dáil) is the lower house within the Oireachtas, the Irish Parliament. The Irish Gaelic word 'dáil' means an assembly and 'Dáil Éireann', therefore, can be translated as the 'Assembly of Ireland'. It is the more dominant house of the Oireachtas, which also includes an upper house, Seanad Éireann (or Seanad). Most bills passed by the Dáil ultimately become law as the Seanad can only delay laws with which it disagrees and cannot veto them outright.

When first established in 1919, Dáil Éireann was the single chamber and it was not recognised by the British Government or the governments of other countries as the 'lawful' parliament of an Irish state. It was not until the signing of the 1922 Anglo-Irish Treaty, which brought the Irish War of Independence (fought against the controlling influence of the British government and its forces in Ireland) to an end, that the single chamber Dáil became the lower house in a bicameral parliament for a new Irish Free State. In addition to the Dáil and Seanad, the Oireachtas also consists of a largely non-executive ceremonial office of President of Ireland (Uachtarán na hÉireann), who is the head of state in Ireland.

The current constitution, Bunreacht na hÉireann, which came into force in 1937 following a national plebiscite, establishes an independent state based on a system of representative democracy, whereby citizens vote to elect representatives to the Dáil as well as electing the President. The representatives elected to the Dáil are called Teachta Dala (TDs). The head of government (Taoiseach) is selected by TDs on the basis of a simple majority and is then formally appointed to office by the President. The Taoiseach in turn selects members of the cabinet from the deputies in the Dáil. The Government delegates roles and responsibilities to other organs, such as, for example, the Central Bank and Financial Regulator.

The Dáil has 166 TDs who are directly elected at least once every five years under a system of proportional representation known as single transferable votes (STV). The Dáil electorate consists of citizens over the age of eighteen who are registered to vote in the Republic of Ireland. Membership of the Dáil is open to citizens who are twenty-one years or older. Currently every constituency elects between three and five TDs. Under the Constitution there must never be less than one TD for every thirty thousand citizens and not more than one TD for every twenty thousand citizens. Since the 1990s the norm in the state has been coalition governments. Prior to this, single-party government by the Fianna Fáil party was common. Unlike the Dáil, the Seanad is not directly elected but consists of a mixture of senators chosen by various methods. The President is usually directly elected by the people for seven years, and can be elected for a maximum of two terms.

The Dáil has the power to pass laws, approve budgets, ratify treaties, approve the Taoiseach's nominees for government ministers and other positions, but also to nominate or remove the Taoiseach. The President can only veto signing a bill into law if it is in conflict with the Constitution. After consultation with the Council of State (Chomhairle Stáit), the President may refer a bill to the Supreme Court in order to test its constitutionality. The Council of State is a body established by the Constitution to advise the President of Ireland in the exercise of such discretionary powers. The Taoiseach can at any time make a request to the President to dissolve the Dáil, in which case a general election must occur within thirty days. But the

President has the right to refuse dissolution of the Dáil and instead ask existing TDs to consider alternative arrangements for formation of a government.

The chairman of the Dáil (Ceann Comhairle), is elected by TDs from among their number in the first session after each general election. The Ceann Comhairle is expected to observe strict impartiality. In order to protect the neutrality of the position, an incumbent Ceann Comhairle does not seek re-election as a TD at the next election but rather is deemed automatically re-elected. The Ceann Comhairle does not vote in Dáil affairs except in the case of a tie.

The Dáil determines its own standing orders and TDs are protected by certain rights arising from parliamentary privilege. Except in exceptional circumstances, the Dáil meets in public. The Dáil does an increasing amount of its work through a committee system.

### *5.1.2 General STI System*

State interest in science and technology was largely concentrated on agricultural science until the 1980s[121]. Ireland is a relatively late-comer to research policy with the first science, technology, and innovation (STI) policy[122] having been published as recently as 1996. But since then STI has gained increasing prominence in policy debates in Ireland. Initially, the developmental agenda in Ireland was dominated by the broad national objective to achieve '*industrialisation by invitation*', whereby prominent multinational firms were invited to develop operations in Ireland, mostly in the manufacturing sector. This successfully developed industrial employment in Ireland from the 1960s on. Now there is broad consensus among policy-makers that the era for positioning Ireland as a low cost manufacturing-based economy has passed and in order for the country to maintain and increase its prosperity it must re-build itself as a leading knowledge-based economy. With this in mind a large number of major initiatives have taken place since the late 1990s and that continue to drive much of the current STI policy. These policy initiatives have succeeded in creating considerable awareness among Irish policy makers and citizens of the importance of science and technology to the Irish economy but also in creating external recognition among investors that Ireland is an attractive location for science- and technology-based investments. The result is that there is almost universal awareness among Irish stakeholders that in order for the country to continue both competing for international investment and protecting indigenous enterprises, it needs to further increase its investment in STI. This focus is very clear in the current National Development Programme (NDP) 2007-2013 and the Strategy for Science, Technology and Innovation (SSTI) 2006-2013[123].

Irish STI policy is, therefore, largely viewed as an instrument for economic growth and as a result science and technology has moved further centre stage in the economic debate, where the attraction of foreign-direct investment (FDI) has been a longstanding policy aim. The SSTI strategy stresses that Ireland must significantly grow its world-class research capabilities through achieving a number of overarching, interlinked goals. Key ingredients in the achievement of these policy goals, apart from Ireland's low corporation profits tax, R&D tax credits, and other fiscal incentives, are the following: (1) to build a sustainable system of world class research teams across all disciplines; and (2) to double Ireland's output of PhDs; and (3) strengthening the IP/Commercialisation functions within the higher education sector.

[121] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[122] "White Paper on Science, Technology and Innovation", Department of Jobs, Enterprise, and Innovation. Available from http://www.djei.ie/publications/science/1996/whitepaper.pdf

[123] "Strategy for Science,Technology and Innovation 2006 – 2013". Department of Jobs, Enterprise, and Innovation. Available from http://www.djei.ie/science/technology/sciencestrategy.htm

While the SSTI strategy is the country's first comprehensive strategic approach to developing STI on an integrated basis, it also is realistic in noting the following difficulties that have to be overcome if Ireland is to achieve this vision:

- The relatively underdeveloped nature of science, technology and innovation (STI) in Ireland;
- The need to improve the science and education system at all levels (primary, secondary, third and fourth levels);
- The underdeveloped nature of the research system in terms of capacity, quality, and coherent needs;
- The weakness in terms of the lack of balance and connectivity between discovery research, development, and commercialisation;
- The need to complement existing priority research areas (e.g. ICT and biotechnology) with more emphasis on strategic research areas (e.g. sustainable foods) and key disciplines (e.g. mathematics);
- The lack of participation in international research, collaborative agreements, and networks.

However, in December 2008 and just two years after the launch of the SSTI strategy, the Government in response to the rapidly deteriorating public finances produced a new policy framework[124] for a Smart Economy, which set out its vision for the next phase of Ireland's economic development while at the same time seeking to restore stability both to the public finances and to Ireland's competitiveness. The strategy seeks to position Ireland as an international innovation hub for Europe and re-prioritises the need for continued investment in science, research, and infrastructure to stimulate the economy. It anticipated that by 2013 one third of gross expenditure on research and development would be provided by the State and two thirds by the private sector. It stresses that Ireland's future economic success depends on increasing levels of innovation across all aspects of Irish enterprise — from large Irish-owned and foreign multinationals (MNCs) located in Ireland to small-medium enterprises (SMEs) and start-ups. In policy terms, this will be implemented, in part, by the convergence in the remits of the Industrial Development Authority (IDA), which concentrates on bringing Foreign Direct Investment into the country and will now increasingly focus on SMEs rather than just MNCs, and Enterprise Ireland (EI), the agency charged with developing indigenous enterprise, which will now also focus on bringing entrepreneurs from abroad to Ireland.

### *5.1.3 Core STI Structure*

Irish STI policy is both formulated and implemented at a national level. While the structure of the STI system has evolved considerably since the 1990s, it has remained highly centralised with two government ministries (the Department of Jobs, Enterprise and Innovation and the Department of Education and Skills) at its core. The regions have little or no involvement in policy development.

The current Irish STI structure can largely be traced back to changes made in 1998 and 2004. The undertaking of a technology foresight exercise in 1998 achieved a high degree of consensus on the actions Ireland needed to take to maximise future industrial competitiveness. Major changes emerging from this initiative included: (1): the establishment of Science Foundation Ireland (SFI) to manage Ireland's Technology Foresight Fund; and (2) the increased funding (through the Higher Education Authority (HEA)) of a Programme for Research in Third Level Institutions (PRTLI) including improved infrastructures in the higher education institutions. The introductions of the SFI and HEA were complemented by the

[124] "Building Ireland's Smart Economy: A Framework for Sustainable Economic Renewal". Department of the Taoiseach. Available from http://www.taoiseach.gov.ie/eng/Building_Ireland's_Smart_Economy/

establishment of two Councils under the aegis of the government's ministry for education and science: (1) the Irish Council for Science, Engineering and Technology (IRCSET); and (2) the Irish Research Council for Humanities and Social Sciences (IRCHSS). These took responsibility for funding postgraduate research across a broad range of disciplines.

Further changes to the governance structure for STI were agreed and implemented by the Government in June 2004 and centred on the following activities and players:

- The political agenda and STI policies are set by a Cabinet Sub-Committee on Science and Technology whose membership comprises the Taoiseach, the Tanaiste[125], and ministers from various Departments[126] having a significant research agenda.

- This Sub-Committee draws upon the expertise of a Chief Scientific Adviser as well as an Advisory Council for Science, Technology and Innovation.

- Additionally, the Office of Science, Technology and Innovation within the Department of Jobs, Enterprise and Innovation has an important STI policy development role.

- The implementation of research policies is driven by an Inter-Departmental Committee (IDC) on Science, Technology and Innovation. It is composed of senior officials from the ministries having a significant research budget.

- Forfas has a role on providing national policy advice for enterprise, trade, science, technology and innovation to the Government.

In addition three new bodies were established circa 2007 to oversee the implementation of the SSTI - Technology Ireland, the Higher Education Research Group, and the Health Research Group. All three entities report to the IDC. These entities are included in Figure 6, which purports to represent the main science and technology structures in Ireland.

[125] Deputy Prime Minister
[126] Ministries

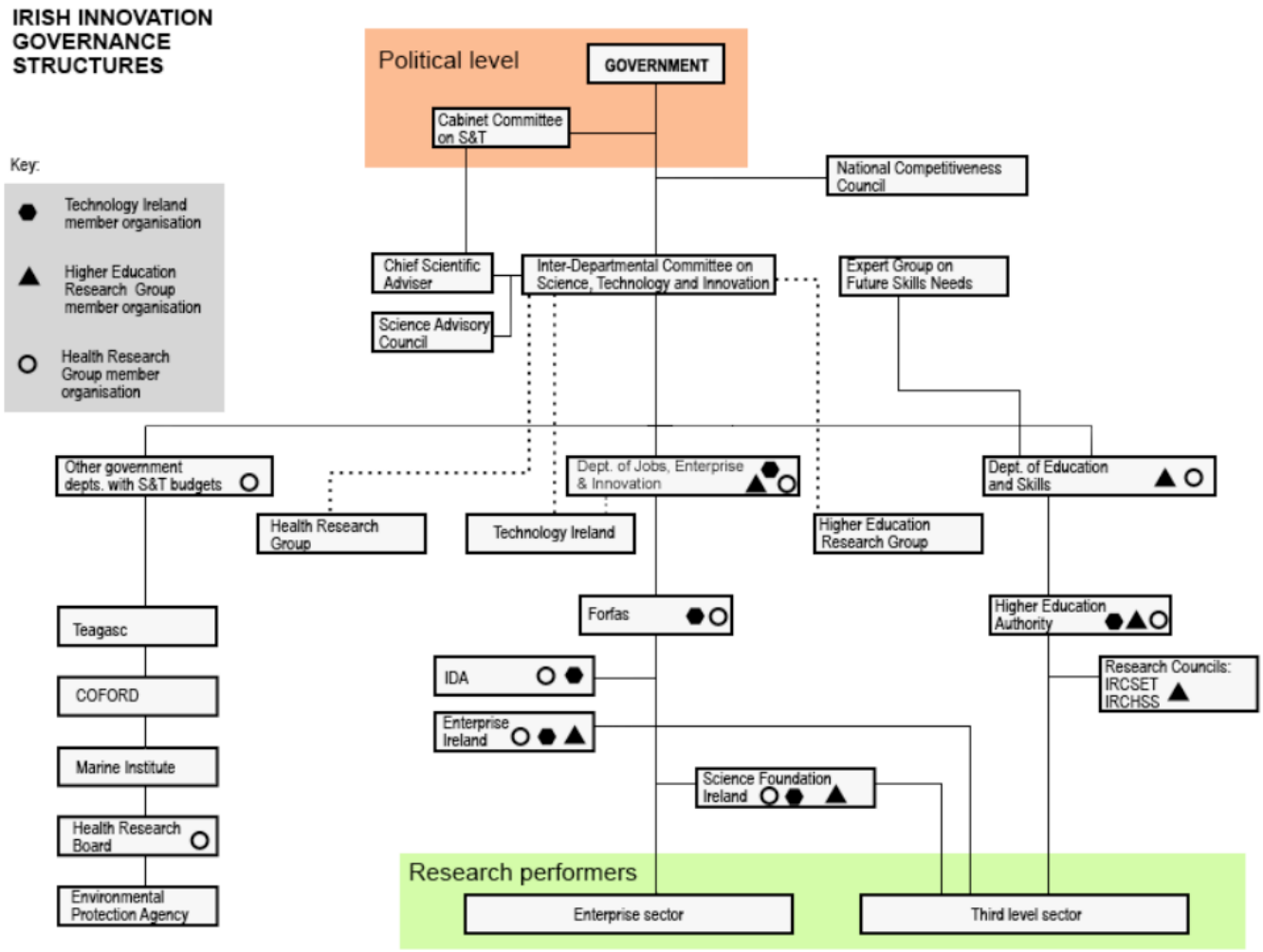


Figure 6: Science and Technology Structures in Ireland [Source: ERAWATCH Research Inventory Report. For: IRELAND]

### *5.1.4 Recent Policy and Structural Changes*

Any analysis of Ireland's STI policy since 2008 must be set against the very difficult economic and fiscal climate that the country finds itself in as well as the political changes that took place in the national election of March 2010. Concern over the crisis in Irish banks and its impact on national funding was one of the key factors which led a new Irish Government - a coalition of the Fine Gael and Labour parties - to seek financial assistance of up to €85bn from the EU and IMF in November 2010. At the same time, there has been a very sharp decline in economic activity with weak domestic consumption. For example, in 2010 the Irish economy contracted for the third consecutive year with the result that real GDP and GNP decreased by 12% and 15% respectively. Unemployment increased and the unemployment rate remains high at just under 15%. The data indicates that the domestic economy remains extremely fragile, with consumption forecasted to remain in negative territory. The contribution of net exports to economic growth is continuing to play a major role in 2011 and 2012.

In March 2010, the Taoiseach in response to an increasingly poor economic outlook announced a major re-organisation of responsibilities among government ministries. The Department of Enterprise, Trade and Employment became the Department of Enterprise, Trade and Innovation, while the Department of Education and Science became the Department of Education and Skills. The Government also moved responsibility for the Programme for Research in Third Level Institutions (PRTLI) from the Department of

Education and Skills to the newly formed Department of Enterprise, Trade and Innovation. The intention of this change is to bring together a streamlined and focused programme of funding of research and development that is aligned with the objectives of enterprise policy.

The National Recovery Plan 2011-2014, which has been endorsed by the EU and IMF, recognises the importance of STI to the Irish economy and emphasises R&D as an infrastructure investment priority and includes a number of support measures to stimulate innovation in the economy. There is a particularly strong emphasis on the need for commercialising research and supporting start-up enterprises. In its Programme for Government the Government stated that it will promote and support investment in technology research, development and commercialisation beyond basic research, as well as to remove barriers to innovation and accelerate exploitation of new technologies. The Government has set a target of improving the conditions for research and development, in particular with the aim of increasing combined public and private investment levels to 2.5% of GNP.

The Government to date has undertaken a number of initiatives, including the following:

- In July 2010, the Government announced the launch of the Innovation Fund Ireland, a €500m fund to support enterprise development and job creation. Some €250m would come from venture capital companies.

- In 2011, the Government published a strategy for the higher education sector which recommended a number of major structural changes including a smaller number of higher education institutions of greater strength, critical mass and governed according to international best practice. The Strategy also provided for the establishment of Technological Universities.

- In March 2012, the Government launched its **Prioritisation Action Plan** with the aim of focusing the State's €500m annual expenditure on scientific research in areas with the greatest potential for economic return for Ireland. All future STI investments would need to ensure: (1) A global market exists in which Irish-based enterprises can compete; (2) Public R&D in Ireland is required in order to exploit the potential; (3) Ireland has strengths in related research disciplines; and (4) A national or global challenge exists which Ireland should respond to.

- The resulting Action Plan recommended fourteen priority areas, deemed to have the greatest potential for Ireland, including (1) future networks and communications; (2) data analytics management, security and privacy; (3) digital platforms, content and applications; (4) connected health and independent living; (5) medical devices; (6) diagnostics; (7) therapeutics - synthesis formulation, processing and drug delivery; (8) food for health; (9) sustainable food production and processing; (10) marine renewable energy; (11) smart grids and smart cities; (12) manufacturing competitiveness; (13) processing technologies and novel materials; (14) innovation in services and business processes.

- The Government also announced the establishment of a Research Prioritisation Implementation Group, chaired by the Minister for Research and Innovation, which would report to the Cabinet Committee on Economic Recovery and Jobs.

- Recent policy emphasis has focused on measures, such as the Technology Centres and the Industry Led Research Programme initiatives, to foster industry-higher education collaboration and particularly on ‘close-to-market’ research. Additionally, Science Foundation Ireland (SFI) has developed new support measures also targeted at applied research.

There have also been a number of changes in the STI structure since 2010. While in theory the Cabinet Sub-Committee on Science, Technology and Innovation sits at the apex of the governance structure, it has met

infrequently. Many of its functions have now been subsumed into a new Cabinet Committee on Economic Renewal, chaired by the Taoiseach and whose members include those ministers with significant STI budgets. In March 2011, the Government created a new junior ministerial position - the Minister for Research and Innovation - in the Department of Jobs, Enterprise and Innovation. As part of the Budget 2012 measures announced in December 2011, the Government announced it had decided as a cost-cutting measure to merge the two research councils - the Irish Research Council for the Humanities and Social Sciences (IRCHSS) and the Irish Research Council for Science, Engineering and Technology (IRCSET). It also said that it is examining the possibility of amalgamating some of the other institutions (e.g. Forfas into the Department of Jobs, Enterprise and Innovation). In August 2011 the Chief Scientific Advisor retired and it is unclear whether or when this position will be refilled.

## 5.2 Barriers and opportunities for building up a national TA landscape

### *5.2.1 Democratic structures in S&T*

As already mentioned the Irish STI policy is formulated and implemented mostly at a national level with the regions having little or no involvement in policy development. The current approach to decision making on issues of science, technology, and innovation must, therefore, be understood against the backdrop of the national democratic process.

Many things have changed in Ireland since the 1970s when the country had an economy that was largely dependent on an agricultural system with small family holdings and a society that was largely influenced by the teachings of the Catholic Church[127]. In 1973 Ireland (along with Britain and Denmark) joined the European Union (EU) and that move has had a major influence on the country's transformation into a more industrial economy and an increasingly liberal society. These changes together with all its past characteristics combine to produce Ireland's distinctive political culture, which has a powerful influence on the decision making process on issues of science and technology. We will briefly look at this political culture before examining how it influences the STI system.

Because of the highly competitive single transferable votes (STV) system, TDs feel they have little alternative but to spend much of their working time focused on their local constituency and on serving the individual and collective demands of their constituents. This is deemed necessary in order to fend off the threat posed by rival politicians, both from within their own political party and also from competing parties. In turn the most important criterion for voters when deciding for whom to vote is the ability of candidates to look after the needs of the local constituency. This is understandable given that Ireland has one of the weakest systems of local government in Europe and (outside of local TDs) there is an absence of public representatives with the powers to serve local needs. This places an onus on TDs to think and act locally, often at the expense of thinking and acting in the national interest.

At the same time, Ireland has a strong political party system dominated by a small number of parties that possess a strong legacy going back to the foundation of the state. TDs that are members of political parties are generally mandated to vote en-bloc according to their party's policy. This sometimes leads to a conflict between the internal values of a TD, the demands of a TD's constituents, and the mandate of the TD's political party. In most cases such conflicts are resolved in favour of the political parties. TDs, therefore, do not generally vote in accordance with their consciences or the wishes of their constituents, but instead follow the instructions of their political parties. At the same time the political parties strive to avoid such conflicts by carefully formulating policy that is likely to satisfy its electoral base.

[127] Source: John Coakley, Michael Gallagher (2004) "Politics in the Republic of Ireland". Routledge. London.

Ireland has a political culture that can be seen as authoritarian. This is particularly true of the past where voting preferences can be largely understood as a deep respect for the legacy of political parties and the ideologies behind their formation and intolerance for those that possess alternative views. The Catholic Church would also have had a strong influence on the views of voters. However, this trust in major institutions has eroded rapidly owing to scandals pertaining to the behaviour of some politicians and clergy and the perceived lack of an adequate response from political parties and the Catholic Church to those scandals. Indeed many would claim that the inadequacies of successive governments contributed directly to the crises facing the country, particularly the latest financial crisis.

In summary the Irish political culture can, therefore, be described as '*local and clientelist*', where TDs compete for political support by delivering local services in exchange for votes. The current system is also characterised by low levels of trust. Next we will examine the approach to policy making.

The Dáil is relatively weak in the power it exercises over the Government, but the Government in turn is weak in monitoring the Civil Service. The Dáil generally follows the Westminster System whereby the Government raises proposed pieces of legislation and the Dáil provides a discussion forum for the proposal but at the end of the day the Government generally does not need to take into account the views of the Dáil as it is sufficiently strong to 'force' through any proposed legislation. While the Dáil should have a role in making policy, it is not seen as an active participant. Power, therefore, is devolved to a small group – the Government and senior officials in the Civil Service – to make crucial decisions of local, regional, and national importance and with little oversight. In some cases legislation is an interpretation of the laws made by the Council of the EU. The result is a process that is increasingly distant from and largely invisible to the public with little transparency over who is making decisions, why the decisions are being made, and on what grounds the decisions are made. Instead it seems that once a government is in power it can do as it sees fit. Once legislation is raised in the Dáil there is little that the public can do to alter it. This greatly reduces democratic accountability and democratic engagement[128]. In addition, trust in the European and national entities making the decisions is now at an all-time low.

The inadequacies of the Irish political system have been brought into sharp focus recently with concerns raised about the appropriateness of decisions that were made in relation to the current economic crisis. For example in 2010 a former politician was reported as saying that: "*The Oireachtas was not an effective actor in the period leading up to the crisis. There was little serious attempt to engage with the emerging issues and at times the Oireachtas was more of a cheerleader than serious watchdog. There are two major inherited characteristics of our parliament. The first is the dominance of the Executive. It started with the Civil War, was strengthened by long years of one-party rule and quickly became the norm. The second characteristic is a direct consequence of this – parliament accepted its subordinate status and has never asserted its own authority or developed its own distinctive personality*" [129]. Another observer noted how "*Decisions were made behind closed doors for years. ... One of the more entrenched Irish cultural problems, which has arguably contributed to this and previous crises, is a cult of secrecy which enables the absence of evidence-based decision-making and permits elite dominance*"[130].

It is little surprise that concerns about democratic accountability as well as participation and representation have "*contributed to academic and wider public debates about whether or not the Irish political system is fit for purpose*"[131] Examples include the 2005 '*Report of the Democracy Commission*'[132] and the more recent PSAI (Political Studies Association of Ireland) politicalreform.ie blog – each offering ideas and

[128] Shane Martin (2010) "Monitoring Irish Government", Working Paper available from webpages.dcu.ie/~martins/mig.pdf
[129] In a speech reported at http://politicalreform.ie/2010/12/09/parliament-must-lead-and-aks-serious-questions-of-itself/
[130] Jane Suiter in an Opinion piece available at http://www.irishtimes.com/newspaper/opinion/2012/0801/1224321232851.html
[131] Clodagh Harris in a blog available at http://politicalreform.ie/2012/05/22/democratic-innovations-for-engaging-and-empowering-citizens/
[132] Available at www.tascnet.ie/upload/Democratic%20Renewal%20final.pdf

recommendations for the reform of the Irish political system. It should also be pointed out that all of the major political parties' manifestos for the 2011 general election recognised the need for change. The need to strengthen the role of the Dáil and in particular its committee system is recognised by the main political parties. For example, Fine Gael, one of the two dominant parties in the country, in a strategy document drawn up prior to entering Government, identifies that the "*legislative process is currently dominated by the Government*" and "*recommends empowering TDs through major changes in the process of legislation and by establishing a powerful committee system*" [133]. In addition, it suggests "*that there must be a fundamental shift in power from the state to the citizen*", because there is "*a growing lack of citizen involvement in the democratic process*". The Labour Party, the other member of the current two-party coalition Government, in 2010 advocated the "*break-up of the Government monopoly on legislation and its stranglehold over the business of the Dáil*"[134] through empowering the work of committees. In addition it recognised that "*fewer and fewer people feel any sense of ownership of their politics and that we need to bring about a more practical democracy, that empowers citizens and ends the sense of exclusion of so many of our people, and to ensure that individuals have a far greater involvement in the decisions that shape their lives*"[135].

The process around decision making on issues involving science, technology, and innovation inherits many of the characteristics of the democratic process. As discussed in the previous section, the structure of the STI system has evolved considerably since the mid-1990s. However, decision making remains largely centralised and is not particularly transparent, accountable or open to public debate. Indeed "*there is little or no mention of public engagement in the Strategy for Science, Technology and Innovation (SSTI) in Ireland ... Public policy for STI in Ireland has tended not to include marginal voices representing social and environmental matters*"[136]. For example, there is no formal mechanism for individual citizens or civil society organisations (CSOs) to provide input into priority setting and decision making with regard to STI policy[137]. While public consultations have taken place in the past on some national issues (e.g. genetically modified organisms (GMOs), fluoridation of water supplies, biofuels, geothermal energy) these are organised on an *ad hoc* basis at the discretion of policy makers. In any case, these national consultations generally take place after the agenda is set by the relevant minister or department. Public consultations are, however, more formalised at a local level where, for example, part of the planning process is managed by local government and allows responses from interested parties to proposed construction plans e.g. major roadways, incineration plants, etc.

Despite weakness in the democracy of Irish STI decision making, it would be remiss not to highlight the fact that there is a technology assessment presence (TA) in Ireland with TA-like activities being performed across a wide range of entities. Some of these entities will now be briefly described in addition to some of their activities.

Forfas is the national Board responsible for providing policy advice to Government on enterprise, trade, science, technology and innovation in Ireland. Legal responsibility for the promotion and development of indigenous and overseas enterprise and the promotion of science and technology in Ireland is vested by the State, through the Department of Jobs, Enterprise, and Innovation, in Forfás. The Board fulfils its mandate either directly, or by delegating responsibility to associated agencies with which it has close working relationships. These agencies include Enterprise Ireland for the promotion of indigenous industry, IDA Ireland for the attraction of inward investment, and Science Foundation Ireland for supporting scientific and

[133] In a New Politics document available at … http://www.finegael2011.com/pdf/NewPolitics.pdf
[134] In a Dail motion available at http://www.labour.ie/policy/listing/128939316115984373.html
[135] In a Dail motion available at http://www.labour.ie/policy/listing/128939316115984373.html
[136] Source: Padraig Murphy (2010) "Nanotechnology: Public Engagement with Health, Environment and Social Issues" Strive Report Series.
[137] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

engineering research and its infrastructure. IDA and Enterprise Ireland have additional statutory responsibility respectively for the development of research capabilities in the foreign-owned and indigenous enterprise sector. Science Foundation Ireland was established in 2000 to administer Ireland's Technology Foresight investments programme in biotechnology and Information Communications Technology (ICT). Its remit was extended in March 2008 to include sustainable energy and energy efficient technologies.

The Office of the Chief Scientific Advisor (CSA) was established in 2004 to provide independent expert advice on any aspect of science as requested by the Government. The CSA formerly reports, via the IDC, to the Cabinet Sub-Committee on Science and Technology in order to: (1) Provide high-level advice on scientific issues of concern to Government across the spectrum of disciplines; (2) Provide scientific input to the development and review of the Government's national strategies for science, technology and innovation; and (3) Provide scientific input to the work of the Advisory Science Council as requested by it. The CSA has access to a panel of experts, mostly academic scientists, to advise on particular issues, as the need arises. The future of the CSA is currently in doubt.

The Advisory Council for Science, Technology and Innovation (or Science Advisory Council) (ACSTI) provides policy advice to the Irish Government on medium and long term science, technology and innovation (STI) issues and contributes towards the development and implementation of a coherent and effective national strategy for STI. This council is a sub-board of Forfas and comprises members from academia, enterprise and professional sectors, and a representative from Forfás. It acts as the primary interface between various stakeholder groups and policymakers in the Science, Technology and Innovation (STI) arena.

Each of these entities has to some extent been active in performing TA-like activities. For example, the first ever Technology Foresight exercise in Ireland was undertaken in 1998 at the request of the then Minister for Science, Technology, and Commerce. The time horizon set for the foresight exercise was 2015 and the exercise was to provide an input to Government for the preparation of the National Development Plan that was being prepared at that time. The exercise was conducted by Forfas personnel on behalf of the Irish Council for Science, Technology and Innovation (ICSTI), the predecessor to the ACSTI. Panels were established in the following key areas: chemicals and pharmaceuticals; information and communication technologies (ICT); materials and manufacturing processes; health and life science, natural resources (e.g. agri-food, marine, forestry); energy; transport and logistics; and construction and infrastructure. Each panel consulted a diverse range of stakeholders relevant to its area of focus and with the aim of achieving a high degree of consensus on the actions Ireland needed to take in order to maximise future industrial competitiveness. The panels were chaired by ICSTI members and were composed of representatives from industry, the higher education sector, research institutes, state agencies, and government departments. The involvement of industrialists on the panels and within ICSTI was felt to be central to the success of the foresight exercise. The final report[138] built on the Technology Foresight panel findings and the key recommendation was to re-position the Irish economy to be widely recognised internationally as a knowledge-based economy and as an attractive location in which to undertake R&D. The report recognised the need for an active partnership between the stakeholder groups in order to combine their efforts to deliver: (1) Research and technology development (RTD) intensive and advanced technology-based indigenous and overseas companies; (2) A vibrant, cohesive, durable and internationally recognised competitive RTD base; (3) An environment conducive to innovation; (4) Investment in the physical and human infrastructure; and (5) Citizens well informed on scientific issues in the context of an innovation culture. One of the main tangible outcomes of the exercise was the establishment of Science Foundation Ireland (SFI) to manage a

[138] Available from … http://www.forfas.ie/publication/search.jsp?ft=/publications/1999/Title,3695,en.php

new technology foresight investment fund in biotechnology and ICT. In addition, each government department was expected to incorporate Panel Report conclusions in their own strategic planning.

In the mid-2000s, Forfás at the request of the Department of Enterprise, Trade and Employment managed a consultative technology assessment of nanotechnologies, called NanoIreland. The work was guided by a high level Nanotechnology Task Force and its aim was to aid policy decision-making by gathering stakeholder views of the future potential of nanotechnology in the Irish context. The outputs were to be robust strategy options, which were to be used by the Government to focus and guide national investment priorities in its Strategy for Science, Technology and Innovation 2006-2013. The technology assessment approach to NanoIreland was to involve considering: (1) Balancing of nanotechnology developments, economic and social factors; (2) Monitoring impacts of nanotechnology developments worldwide; (3) Identifying viable areas of competitive advantage for Ireland; (4) Developing approaches for special nanotechnology applications in Ireland; (5) Proactive addressing of public concerns and perceptions; and (6) Public science education with emphasis on Nanotechnology. Despite the importance that at the time was accorded to the initiative, NanoIreland's impact is far from certain. For example, one observer noted that "*Ireland's attempts at technology assessment, NanoIreland, carried out in the mid-2000s did not deliver on its promise to scope out the terrain in any real sense*" [139]. Indeed the same observer stated that Forfás "*has not demonstrated any interest in attending to the social take-up or response of nanotechnology*" and the initiative "*quickly ran out of steam*" [140].

In the past technology assessment has also been performed by other entities. Several government departments have in-house scientific expertise in the form of scientific officers or medical officers (as in the case of the Department of Health and Children) or research co-ordinators (as in the case of the Department of Communications Energy and Natural Resources). In addition, some government departments utilise on an *ad hoc* basis scientific advisory groups that include external experts in order to deal with particular circumstances. For example, the Department of Agriculture was advised throughout the foot-and-mouth disease outbreak of 2001 by a scientific advisory group that met daily to monitor the spread of the disease, propose counter measures, and assess the effectiveness of the counter-measures. Similarly at the time of the avian flu epidemic the Government established a scientific advisory group to perform a similar role. Some state agencies (such as the Food Safety Authority and the Environmental Protection Agency) have more permanent scientific and advisory committees to support their activities. The Irish Council of Bioethics is an example of another entity that had a technology assessment role. However, the Council was closed in 2010. This case is discussed in more detail later.

While there are TA-like activities being performed in the Irish STI System it is also clear that many of the initiatives offer limited involvement to many stakeholder groups. For example, while the *Strategy for Science, Technology and Innovation 2006-2013* states that technology assessment is important in order to "*provide a basis for establishing a clear industrial input into the overall research agenda*"[141], it subsequently gives little or no priority to input from society in general.

### *5.2.2 Public debate about S&T*

At one time Ireland had a rich tradition of 'science popularisation', which can be traced back to the work of the Royal Dublin Society (RDS) [142]. The RDS was established in 1731 and was active in agriculture, science, industry, and arts through promoting research, publication, education, and popularisation. During the 19th

[139] Source: Padraig Murphy (2011) "Anticipatory Goverance: Can We Imagine a Future Scientific Ireland?", The Irish Review, Jan 1, 2011
[140] Source: Padraig Murphy (2010) "Nanotechnology: Public Engagement with Health, Environment and Social Issues" Strive Report Series.
[141] Available from … www.djei.ie/publications/science/2006/sciencestrategy.pdf
[142] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

century it was not unknown for public lectures at the RDS by leading national and international scientists to draw audiences of several hundred people. However, the work of the RDS in popularising science declined in the late 19th and early 20th century as scientific activity in Ireland declined.

Today science plays a relatively weak (by European standards) role in the everyday agendas of Irish citizens and politicians. European public opinion surveys from the 1970s to the present day have indicated that the Irish population as a whole shows less interest in scientific information than the average for the EU[143]. This has held true even with the enlargement of the EU. It also remains largely true even though the past decade has seen a significant increase in public science initiatives. Discover Science and Engineering (DSE) is a government initiative aiming to increase interest in science, technology, innovation and engineering. In addition to the wider public, it targets students at all levels, as well as their parents and teachers. For example, DSE's Discover Primary Science launched in October 2003 is a programme which aims to promote science to primary school children, parents and teachers through facilitating teacher training in primary science and providing the teachers with both online resources and classroom activity packs. The activities include hands-on induction days hosted throughout the country in colleges of education, institutes of technology, universities and education centres[144]. The professional society for engineers, Engineers Ireland, runs a programme for schools called Science, Technology and Engineering Programme for Schools (STEPs), which supports primary school teachers in doing engineering projects in the classroom through supplying them with activity packs, kits, and competition prizes. In addition, they run an annual seminar for secondary school girls about women in engineering. While these initiatives are having some impact and participation in some quarters is growing, the increases are largely concentrated in '*well-educated, urban, younger sectors of the population*'[145]. Within the larger population, outputs from science are having '*little resonance, except where they bear on pressing topical issues in, e.g. health, energy or environment*'[146].

Despite low levels of participation in Irish democracy and the absence of a formal mechanism for stakeholder groups to provide input into decision making, this does not mean that special interest groups and members of the general public do not try to influence through lobbying the Government and individual Ministers before proposals are presented to the Dáil. The country has seen a strong increase in the number of groups formed to influence policy. Unlike sectional groups which are more permanent and expend much of their resources on maintaining direct links to policy makers, cause-centred groups are generally ad hoc and aim to influence policy-making through increasing public awareness of a pressing issue. An example of successful lobbying by cause-centred groups and also perhaps the first on a national scale in Ireland on an issue of technology is what happened around the nuclear debate of the 1970s and 1980s.

The emergence of a popular eco-movement can be traced to the protests against the planned nuclear plant at Carnsore Point (in County Wexford) in the late 1970s[147]. Against the backdrop of the 1973 energy crisis, the Irish Nuclear Energy Board was established in November, 1973 and Carnsore Point was the proposed location for the first nuclear plant to be built by the Board. In 1974 planning permission was sought for four reactors with Wexford County Council. The plan was strenuously opposed by environmental groups. Local anti-nuclear groups sprang up all over the country and were active in producing their own leaflets, newsletters, and magazines; as well as organising events such as marches and pickets. One activist provides

[143] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[144] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[145] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[146] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[147] Liam Leonard (2006) "Green Nation: The Irish Environmental Movement from Carnsore Point to the Rossport Five". Ecopolitics Series Volume 2. Choice Publishing.

an interesting insight into how the groups worked: "*Throughout all this there was no leader or central committee who the government could negotiate with, flatter or buy off. There was nothing we wanted to bargain about, everyone was agreed that we wanted no nuclear power in Ireland, full stop*".[148]Although local in membership the groups were successful in organising large national gatherings, such as a series of free festivals held at Carnsore Point in 1979, 1980 and 1981. The concerts attracted thousands of attendees, many of which camped at the location. The festivals were particularly successful in building public awareness of the concerns of the groups around nuclear energy.

The majority of the groups refused to take up an invite from the Government to take part in an inquiry to investigate the pros and cons of the proposed project saying they had no confidence in an inquiry set up and financed by the Government. Instead some groups called for a mass occupation of the site if construction were started – an idea that won much support. The Minister responded by threatening to use the army if necessary to remove what he called "*20,000 hippies*"[149]. It appears that the inquiry never took place. The project was repeatedly delayed owing to the economic downturn of 1974 and 1975, the 1975 establishment of Bord Gáis that moved the emphasis to gas energy, a change in government, and the fallout from the incident at Three Mile Island. Finally in 1981 the Government announced that the project was no longer national policy and the Board gradually faded from public attention.

In addition to the protests around Carnsore Point, various eco-groups have protested with mixed results against anti-mining (at Tynagh, Donegal, and Croagh Patrick), anti-toxics (in Cork), incineration (in Cork, Galway, and Meath), a natural gas pipeline (in Mayo), major road developments (at the Glen of the Downs, Carrickmines, and Tara), among others[150]. Examples of issues currently exercising the collective mind of citizens include nano-technology, electromagnetic fields, genetically modified organisms, stem cell research, assisted reproduction, assisted suicide, as well as general waste and energy policies. We will briefly turn our attention to one of these in order to highlight some of the dynamics at play when addressing such issues.

Hydraulic fracturing (aka. fracking) is a technique involving the pressurised injecting of large volumes of water, chemicals and sand into rock formations in order to fracture them and extract previously inaccessible fossil fuel deposits, such as gas from shale. By 2011 the Department for Energy had licensed three companies to explore for onshore gas in the Lough Allen and Clare basin areas, which straddle 8,000 square kilometres across 12 counties. It has been reported[151] that there is an estimated total of 4.4 trillion cubic feet of gas present in the island of Ireland, with the amount split equally between the North and the Republic of Ireland. For example, Tamboran Resources reported that a gas field on the Fermanagh/Leitrim border alone "*could deliver security of energy supply in Ireland for the next 40 years providing 600 jobs with up to 2,400 indirect jobs*"[152]. Another media report suggested that "*Beneath counties Leitrim, Roscommon, Cavan, Sligo, Donegal and Fermanagh, there is an estimated natural gas deposit valued at a minimum €120 billion at current market prices*" [153]. Despite the promises, fracking is causing concern among some citizens in these areas due to its potential environmental and health side effects. There are concerns that the debate at a local level is becoming increasingly divisive with one report stating that "*fracking is set to divide communities across the northwest if it gets the go-ahead*" [154]. The division is largely centred on the conflicting desires to maintain a rural way of life based on a strong relationship with the environment and at the same time a desire to ensure economic development that brings increased employment and prosperity to rural Ireland. The fact

[148] http://flag.blackened.net/revolt/wsm/talks/carnsore2002.html
[149] http://flag.blackened.net/revolt/wsm/talks/carnsore2002.html
[150] Liam Leonard (2006) "Green Nation: The Irish Environmental Movement from Carnsore Point to the Rossport Five". Ecopolitics Series Volume 2. Choice Publishing
[151] http://www.naturalgaseurope.com/irish-committee-visits-leitrim-fracking
[152] http://www.rte.ie/news/2012/0201/fracking.html
[153] http://www.thejournal.ie/readme/column-never-heard-of-%E2%80%98fracking%E2%80%99-you-will-soon/
[154] http://www.irishtimes.com/newspaper/ireland/2011/0903/1224303429614.html

that these regions are economically and industrially underdeveloped contributes to making this a very bipolar debate with many irreconcilable views, as the promise of some local new-found prosperity is evenly balanced by the fear of potential local ecological disasters.

To-date resistance to fracking in Ireland has largely been at a local level where the fears of many citizens have been heightened by viewings of Gasland - a 2010 documentary film by a US producer that focuses on communities in the United States impacted by fracking[155]. Public viewings of the film have been central to raising awareness and galvanising community responses in counties such as Leitrim and Sligo. In September 2012 there was a '*Global Frackdown Day of Action*' where events in Galway, Leitrim, Cork and Belfast attracted a range of speakers, including TDs, councillors, and farmers[156]. In August 2012 a coalition of twenty seven environmental groups called on the Government to "*put a stop to all fracking activity*" in Ireland and referred to the "*proposed industrialisation and degradation of our environment*" [157]. Michael Ewing, co-ordinator of the coalition, said the environment and long-term development of rural Ireland was "*at risk from the secrecy surrounding the polluting processes involved – the damage done to communities, water supplies and wildlife*". The group called for a study to be performed by either a national or European regulatory body to include "*a full cost-benefit analysis of the socioeconomic and environmental impacts ... with full public participation of stakeholders*". In addition to mounting pressure from lobby groups, it is also interesting to note that the Minister for Energy is coming under increasing pressure from members of his own political party. For example, in January 2012 one TD is reported as publicly requesting that the Minister "*halt the controversial practice of fracking until further reports on the safety of the system are conducted*" and for a "*moratorium to be introduced nationally*"[158]. Some local authorities have seized the initiative and taken steps to prevent fracking in their own areas by making provisions in their development plans to prevent fracking, regardless of what decision is made by the Minister. For example, in 2012 councils in Clare, Leitrim, Roscommon, Donegal and Sligo all banned fracking in their counties[159].

In late 2011 that Minister for Energy commissioned the Irish Environmental Protection Agency (EPA) to research the '*environmental dimension*' of fracking[160]. In Oct 2011 The EPA commissioned experts at the University of Aberdeen (UK) to undertake the study. The report released in May 2012 warns that risks to water are an "*important concern"*, but that "*current opinion shared by several agencies is that all scientifically documented cases of ground water contamination associated with fracking are related to poor well casings and their cements, or from leakages of fluid at the surface, rather than from the fracking process itself"* [161]. The study makes clear that EU Directives on Mining Waste and Water Protection place significant constraints on shale gas extraction activities in Europe – such directives do not exist in the US. In response to the report the Minister stated that no hydraulic fracturing for gas would take place in Ireland pending further "*detailed scientific analysis and advice*" and that the initial EPA report would provide a "*useful basis*" for the terms of reference for a further study that he would commission into the matter[162]. In most cases the local media welcomed the report as being a "*balanced study*"[163]. But the conclusion with respect to the safety of groundwater has been attacked by some local anti fracking groups. For example, The North West Network against Fracking said the EPA conclusion that "*there would be a low and probably manageable risk to groundwater from fracking*" is "*refuted by every anti fracking group in the country, as it*

[155] http://www.thejournal.ie/readme/column-never-heard-of-%E2%80%98fracking%E2%80%99-you-will-soon/
[156] http://www.irishtimes.com/newspaper/ireland/2012/0924/1224324324666.html
[157] http://www.irishtimes.com/newspaper/ireland/2012/0807/1224321631679.html
[158] http://www.irishtimes.com/newspaper/ireland/2012/0111/1224310101330.html
[159] http://www.thejournal.ie/fracking-study-reveals-potential-impact-on-groundwater-and-earthquakes-447604-May2012/
[160] http://www.irishtimes.com/newspaper/ireland/2011/1212/1224308954032.html
[161] Available from http://www.epa.ie/news/pr/2012/name,33317,en.html
[162] http://www.irishtimes.com/newspaper/ireland/2012/0512/1224315982310.html
[163] http://www.irishtimes.com/newspaper/ireland/2012/0512/1224315982310.html

*does not take into account the geology of the region, the intended depth of the wells"*[164] According to the group a recent report has shown "*that running directly below the shallow layer of shale, runs the Ballyshannon Limestone, an aquifer of regional importance*" which would be threatened by the process.

The role of the media in communicating issues, such as the fracking controversy, has been central in both instigating and forming the debates at both a national and local level. But the media in Ireland has limited capacity for reporting on these issues. For example, only one Irish newspaper, The Irish Times, has a nominated science specialist and the national broadcaster, RTE, has no science specialist among its correspondents[165]. The Irish Science and Technology Journalists Association (ISTJA) has a membership of less than twenty mainly freelance journalists[166]. While the media does cover science and science-related topics reasonably frequently, the material is drawn to a large extent from news agencies and syndicated services and more often than not relates to health issues[167]. Among the Irish media, The Irish Times has been by far the most active in providing public information and a forum for public debate on these issues. There has been strong news coverage on at least some of these issues, including the fracking debate, as well as some lively correspondence in Letters to the Editor. However, one observer notes how science is often only covered if there is an associated controversy and even then the coverage may not be sufficiently in-depth[168]. What is also noticeable is that local media often takes a more hard line approach to the issues – often reflecting or perhaps influencing local opposition to proposed developments.

According to Dr. Liam Leonard, Environmental Change Institute, NUI Galway, "*Ireland's recent social history has been characterised by a series of environmentally based community challenges. Throughout the decades of state-sponsored, multinational-led development and infrastructural expansion in Ireland, the voice of the grassroots environmentalist has always been heard. Local communities have proven themselves to be adept at mobilising responses, framing arguments and establishing the networks and alliances that become possible in a populist society*"[169]. These campaigns have been primarily rural and even when the campaigns are in cities such as Cork and Galway they retain a rural perspective in pitching the rural way of life against modernisation. While largely local and rural these campaigns are increasingly being fought using a powerful mix of local meetings, local print media, and the wider social media. At the same time the capacity for state entities to become involved in such dialogue appears to be hopelessly limited. When these local campaigns remain unheard in the wider national debate then the country is sometimes seeing an increased radicalisation in activism. In some case communities and individuals have responded to national policies by putting forward planning and legal challenges. In other cases people are being imprisoned because of their activities and their subsequent refusal to abide by court decisions.

### *5.2.3 Policy advice*

In the past there has been an "*almost complete absence of parliamentary debate"* around Ireland's commitment to STI[170]. This lack of debate can be put down to the fact that there was almost universal acceptance that such a policy is the correct course of action. There appeared to be an unquestioning unanimity on the policy from both the main political parties as well as social partners, such as trade unions,

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[164] http://www.leitrimobserver.ie/news/fracking-is-not-without-risk-epa-report-calls-for-more-research-and-monitoring-1-3847029

[165] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[166] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[167] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

[168] Barbagallo, Fiona (2003) Public participation and controversy involving science: an Irish perspective. PhD thesis, Dublin City University

[169] http://www.nuigalway.ie/about-us/news-and-events/news-archive/2006/july2006/nui-galway-lecturer-publishes-new-book-green-nation-1.html

[170] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011

business groups, farmers' groups, etc. "*Up to 2008 there were very few public commentaries on the knowledge economy that did not represent endorsement of this policy, albeit sometimes qualified endorsement*" [171]. However, since the mid-2000s there has been an increase in questioning of STI policy and also a related increase in the perceived importance of technology assessment. For example the Minister for Jobs, Enterprise and Innovation stated in 2005 in relation to nanotechnology that "*given the range of potential applications of this technology – where and how does Ireland best position itself to be able to compete on the global market against other countries ... Policy makers need to develop and use more strategic policy intelligence tools, (such as technology foresight, assessment and road-maps and evaluations), to enable them to identify and assess the potential socio-economic opportunities and impacts arising from the development and application of such technologies*"[172].

In 2006 Forfas noted that "*National foresight should draw from international foresight*" and also "*focus on national / local specificities*" through adopting "*consensus/partnership processes, policy evaluation, technology assessment*" [173]. In addition it pointed out that "*Foresight, TA and evaluation should be seen as an integral part of improved innovation policy governance*". It is clear from Forfas literature produced at the time that technology assessment and foresight were to be complementary and together werte to act as a '*policy intelligence tool*' to contribute to better decision making.

There has also been recognition within the policy making entities of the need for more participatory methods. For example, a report in 2000 by the Irish Inter-Departmental Group on Modern Biotechnology recommended that "*Forfâs should examine the use of [public participation] mechanisms in other countries with a view to developing and piloting proposals for implementation in this country*" [174]. This may represent the first time that an Irish government report has actively encouraged a government agency to undertake public participation initiatives[175]. In relation to the nano-technology assessment being undertaken in 2005, the Minister recognised the need for "*a consultative, interdisciplinary and inter-organisational approach that will bring key stakeholders together in a shared and structured process to access information, identify and analyse impacts and to develop and evaluate options for policy-makers*" [176].

On the more recent issue of fracking, it is interesting to observe the engagement between policy makers and the various stakeholder groups. Engagement has not been forthcoming from entities such as the Environmental Protection Agency (EPA), the Office of the Chief Scientific Advisor (CSA), or the Advisory Council for Science, Technology and Innovation (ACSTI), who each have limited capacity to do so. Instead there has been limited engagement directly initiated by politicians. For example, in October 2012 the Joint Committee on Transport and Communications (with representatives from both the Dail and Seanad) heard from a group of policy-makers (from the Department of Communications, Energy and Natural Resources), experts (from the EPA), and representatives from a campaigning group on the possible environmental and social implications of fracking in Ireland. The chairman of the Committee stated that: "*Today our Committee heard a series of thought-provoking and insightful presentations on what is an emotive and divisive issue. ... Our Committee is particularly concerned with the social and environmental impact of hydraulic fracturing. Committee Members emphatically put forward the view that local communities must have a meaningful input into the decision-making process on future development*"[177]. Eager to gain a first-hand insight, the Committee subsequently undertook a visit to North Leitrim in order to "*engage with a wide range of opinion*

[171] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011
[172] Address by Minister Micheál Martin at the NanoIreland International Symposium 2005 … http://www.djei.ie/press/2005/20050915.htm
[173] Available from … www.regstrat.net/download/12-Acheson-RegStrat.pdf
[174] Barbagallo, Fiona (2003) Public participation and controversy involving science: an Irish perspective. PhD thesis, Dublin City University
[175] Barbagallo, Fiona (2003) Public participation and controversy involving science: an Irish perspective. PhD thesis, Dublin City University
[176] Address by Minister Micheál Martin at the NanoIreland International Symposium 2005 … http://www.djei.ie/press/2005/20050915.htm
[177] http://www.oireachtas.ie/parliament/mediazone/pressreleases/name-9496-en.html

*within the communities living there*". Thus politicians and policy makers do see a need for being better informed when making decisions on issues related to science and technology and are increasingly taking the initiative in this regard.

### *5.2.4 Science/Academia*

In the past decade the country's higher education institutions (HEIs) and research centres have become increasingly active in disseminating information about their research activities. Funding organisations, such as SFI, are increasingly demanding that major research centres maintain a dissemination or '*education and outreach'* (E&O) function. The number of E&O officers working out of HEIs and research centres has grown to the extent that they have their own professional network and they are the main constituents of a virtual network, Science Communicators Ireland, that now has over 800 members. But coverage of the outputs from E&O activities in the mainstream media is at best sparse. Instead the information is more likely to be found on institutional web sites and in specialist publications. In addition to the activities of any E&O officers, most higher education institutions also promote engagement with the public among their academic staff. This includes participation in Science Week Ireland, open days at the institution, or school visits.

Research funding into science in society remains much undeveloped in Ireland and is largely concentrated in PhD-level projects or EU funded projects. While research funding in many areas does aim to address social needs and especially those related to health, environment and energy, the social dimensions of the research is not the primary concern with the result that they are often treated as a lesser issue. The result is that social research is not well embedded in such projects and programmes. Overall, the funding opportunities for science in society research is "*sparse and sporadic*" and there are no dedicated programmes of funding for research on Science in Society[178].

While courses on science policy, history of science, and philosophy of science are included in various undergraduate and Masters programmes available from Irish HEIs, Ireland has only one Masters programme focused on science in society: the MSc in Science Communication at Dublin City University[179].

The Environmental Protection Agency's (EPA) research programme, Science, Technology, Research and Innovation for the Environment (STRIVE), is currently providing supports at PhD or post-doctoral levels for research contributing to the protection and improvement of the natural environment. In addition the Irish Research Council for Science Engineering and Technology (IRCSET) and Irish Research Council for Humanities and Social Sciences (IRCHSS), which are now amalgamated as the Irish Research Council, have also in the past supported a small number of research projects on science in society or with science in society elements[180].

The Science Gallery[181] is an interesting initiative located at Trinity College Dublin. It was opened in February 2008 to provide a space for exhibitions, debates and discussions of current issues in science. Up to the end of 2011, it had seen more than 800,000 visitors to 18 diverse exhibitions, ranging in theme from contagion to the future of fashion, as well as lectures and panel discussions delivered by well-regarded national and international speakers. The Gallery has made extensive use of online and social media to attract participants to events and also to extend the reach of those events beyond those who attend in person. The Gallery has had the support of its host university, the government agency Discover Science and Engineering,

[178] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011
[179] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011
[180] Brian Trench (2011) "National Report, Ireland", Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research, October 2011
[181] See www.sciencegallery.com

as well as several major technology-based companies. In 2011 the Gallery was awarded 1m euro from Google in order to scale its impact internationally and to develop a Global Science Gallery Network (GSGN). The plan is to create "*eight Science Gallery hubs around the world by 2020, developed in partnership with leading universities in key cities such as London and Moscow*" [182].

## 5.3 Policy options and national recommendations

### *5.3.1 Conclusions from the above description with regard to the opportunity structures for TA in the country*

As previously stated any analysis of Ireland's STI policy since 2008 must be set against the very difficult economic and fiscal climate that the country currently finds itself in, as well as the political changes that took place in the national election of March 2010. Recent years has witnessed the merging and closing of some entities in the Irish STI structure, as well as rumours of further changes. The changes and rumoured changed have impacted organisations that perform TA-like activities, such as the Irish Council for Bioethics (ICB), Forfas, the Office of the Chief Scientist Advisor (CSA), and the Advisory Council for Science, Technology, and Innovation (ACSTI). For example, the ICB was closed in 2010. The current Government has announced that it is examining the possibility of amalgamating Forfas into the Department of Jobs, Enterprise and Innovation. In August 2011 the Chief Scientific Advisor retired and it is unclear if the Government intends refilling the role and retaining the Office of the Chief Scientific Adviser (CSA). The future of the Advisory Council for Science, Technology, and Innovation (ACSTI) also remains unclear.

#### *Challenges to Establishing TA in Ireland*

The current Irish STI system should be understood in the context of current economic and fiscal difficulties, in addition to its relatively recent emergence. Many elements of the system have emerged in the past 20 years and often through 'subterfuge' – whereby the elements were justified under the umbrella of supporting jobs creation. Subterfuge was necessary as it was perceived to be easier for policy makers to request funding for '*job creation*' rather than '*science*' per se. Hence funding was sought for science by promoting it as an instrument for job creation and economic development – consistent with the objective of industrialisation by invitation - rather than being of value to broader society.

This may well explain why to-date Ireland has focused almost exclusively on institutionalizing the relationship between *science and economy* while largely ignoring the relationship between *science and society*. In comparison to best international standards, Ireland has an impoverished engagement model whereby there are few formal structures for promoting open and transparent engagement between policy makers and various stakeholders (including scientists and citizens) on issues of science and technology. The result is that many decisions involving science and technology continue to be justified solely in terms of economic impacts while largely ignoring important societal impacts.

While it could be argued that the Irish policy-making approach on issues of science and technology is largely *analytical*, it would be difficult to view it as being wholly *democratic* as many stakeholder groups are not involved in decisions affecting them. This can result in a democratic deficit whereby many Irish institutions are falling short in fulfilling the principles of parliamentary democracy. A symptom being the occasions when people feel they are not included in decisions that impact them. Mistrust is often an issue and is sometimes borne out of suspicions that some lobby groups are getting their voices heard and have undue influence whereas others have little or no influence. It is true to say that the issue of trust is multi-sided with,

[182] http://www.siliconrepublic.com/innovation/item/24990-google-gifts-1m-to-science

for example, citizens losing trust in the political system but politicians in turn losing trust in the Civil Service. Heightened feelings of frustration sometimes result and manifest themselves in more radical behaviour.

TDs are in general not well informed on issues of science and technology. There is no designated entity to provide unbiased independent advice to them on these issues. Instead they often use *ad hoc* networks of personal or political party contacts in order to access knowledge but of an unknown quality. There is a need to create more open, transparent, and fair methods of participation on questions of science and technology. In addition to economic impact, new approaches must focus increasing attention on the societal impact. But existing entities in the STI system are almost exclusively focused on economic concerns and they appear ill-equipped to make this transition. In addition, there appears to be either an inability or a reluctance to place a value on societal impact. Attempts to do so are often overridden by the default concern for economic impact. Existing TA-like functions are often performed in entities whose main remit is to implement policy as opposed to question or assess policy. This can be construed as giving rise to a conflict of interest.

So while some existing entities may be performing TA-like functions they are not necessarily doing TA in its true sense. The result is that such activities are in many cases not seen as open, transparent, independent, or trusted.

#### *Building a Case for PTA in Ireland*

Ireland has a weak parliament and a relatively powerful civil service. TA can be seen as a means for addressing this imbalance through returning more decision making to parliament, especially to those TDs that do not hold influential positions within their parties (the so-called back benchers), and also in reconnecting citizens with parliament and with politics. TA would give some control back to TDs by providing them with the additional knowledge they may otherwise not have when attempting to make contributions to decisions involving science and technology and also by giving them viable options when making such decisions. TA would '*do the heavy lifting*' without necessarily getting the full credit for its efforts.

Establishing TA in Ireland would feed into the current political reform agenda of political parties and the Government by offering a route towards empowering the Dáil and giving backbenchers more power and responsibility. TA would be about rebuilding links and trust through encouraging richer dialogues between citizens, politicians, and institutions of the state. It would also offer a part-solution to the problem of disengaged voters who are increasingly feeling they are not being listened to or taken into account when decisions are being made.

TA in Ireland should also leverage the tradition for foresight and innovation through supporting the country in '*looking out in front'* and leading the curve in relation to advances in science and technology. It is about providing parliament with *'strategic intelligence'*. It should front-load Irish efforts in order to pre-empt advances rather than respond to advances retrospectively. It is, therefore, about *'turning on the radar'* and proactively matching the solutions offered by science and technology to problems and in so doing improving both society and the economy.

In summary TA would assist TDs and policy makers in having access to comprehensive insights on both the opportunities and consequences of technology adoption and non-adoption. It would be built on open, transparent, and honest dialogue between stakeholder groups, ensuring that the advice emerging is both informed and legitimate. The adoption of TA in Ireland would assist in addressing an increasing democratic deficit while concurrently moving the country towards a truly evidence-based approach that examines both the economic and societal aspects of policy options. It would re-connect the Dáil with increasingly

disengaged voters, whereby deputies are informed of citizen views in a timelier manner. The Dáil would be re-energised by granting it additional power and responsibility for the direction of science and technology in Irish society. Such 'strategic intelligence' is increasingly at the disposal of policy-makers across the European landscape – its absence in Ireland places the country at a considerable disadvantage.

### *5.3.2 Next Steps*

The TA role would appear to be best filled by a trusted and impartial third party entity – separate from those entities charged with implementing policy. Such an entity should provide evidence-based advice primarily to both TDs but also other stakeholders, including citizens. It should provide impartial advice built on Irish and international – notably European – sources of knowledge, as well as insights from various stakeholder groups interested in the topic under consideration. It could utilise participatory approaches if and when required. It should become part of the wider international technology assessment community in order to leverage the capabilities, knowledge, networks, outputs, etc. available from such sources. In addition to benefiting from the advantages of scale and diversity offered by being a member of such a community, it would also increase the perception of Ireland as being at the forefront of responsible science and technology.

In order to get TA established in Ireland it appears that the size of the initial investment cannot be substantial and that an existing entity should be utilised as the political agenda militates against the formation of new entities. The TA role could be filled by an existing entity, such as the Advisory Council for Science, Technology, and Innovation (ACSTI) or the Office of the Chief Scientific Advisor (CSA) and could use existing expertise in addition to the pro bono work of scientists, researchers, industrialists, etc. The focus would not be on employing internal expertise but instead on reaching out to external expertise to deliver quality outputs. An internship and/or secondment programme would be utilized in order to supplement available resources while building a capacity for TA that would subsequently disperse back into the Civil Service and beyond. The approach can be reasonably cost neutral whereby certain activities currently undertaken in a disparate and distributed fashion across different entities would be centralized in order to achieve the benefits of TA while also garnering the savings from centralisation. In this way some of the existing TA-like activities performed by states institutions and external consultancies could be diverted to the new TA function. This would support the Government's plan to streamline existing institutions and save costs accruing from reducing redundant activities.

At the current time Ireland is witnessing considerable societal and political change. It is hard to determine if such a time will open the door to opportunities for establishing TA in Ireland or close existing doors that may be slightly ajar. The Pacita Team at UCC has met with a large number of Irish stakeholders either individually or through two national workshops held in Dublin during May and September 2012. This has resulted in the formation of a group of individuals, including politicians, policy makers, policy advisers, academics, etc., with an interest in furthering the agenda for TA in Ireland. We have presented a progress report on the Irish situation to members of the European Commission during ESOF 2012, held in Ireland during June. While establishing TA in Ireland may not require a large financial investment, it does require political support in order to bring about political reform. With this in mind we have held a number of productive meetings with the Minister for Research and Innovation who has requested an outline of a road map for establishing TA in Ireland and has given an undertaking to seriously examine the matter and bring it to the attention of his colleagues in Government.

## 5.4 Case study – Closure of the Irish Council for Bioethics

Advances in biology and medicine have given rise to increasingly complex ethical questions surrounding the likes of assisted human reproduction, stem cell research, genetic engineering, and cloning. Controversies have been a driving force behind the emerging role that bioethics are playing in examining the ethical

dimensions of these developments. Many countries have responded to the need for well-informed decision-making with the formation of national bioethics councils to facilitate dialogue among a variety of actors on bioethical issues. Such councils are central to a new form of science governance that fills the role of mediator between scientific progress and societal concerns.

In comparison to other European countries, institutionalisation of bioethics in Ireland emerged rather late. This case study will follow the story of the Irish Council for Bioethics (ICB), from its emergence in 2002 as Ireland's first, and to date only bioethics entity, to its subsequent demise in 2010. The decision to abolish the Council was an unusual one, particularly given the international trend towards establishing bioethics councils and the emergence of their key role within science governance. The case study involved the authors analysing material gathered from various sources, including academic studies, various media sources, interviews with stakeholders, as well as content produced by the Council itself.

In its final report[183], the Council summed up its own dismay at the decision and issued a number of parting shots at the decision-makers: "*It is the worst of times to make this decision. It is a decision that has all the hallmarks of an expediency that is rash rather than reflective, damaging rather than deliberative. While significant funding has been allocated to science and technology research during the last decade, with the exception of the establishment of the ICB, similar investments have not been made in the area of research governance. Having made the important and well informed decision of establishing the ICB and having taken a lead in the area, the decision to disband the ICB is a retrograde step, especially in a time when many other international jurisdictions have established such bodies and continue to do so*".

### *Establishment of the Council*

In 1999, an Inter-Departmental Group on Modern Biotechnology, mainly made up of civil servants, was convened with the specific aim of examining issues related to genetically modified organisms (GMOs), but also had a broader remit to look at how in the future ethical difficulties arising from biotechnological advances might be best dealt with. In October 2000 the group reported[184] that it was time "*to establish a forum in this country to consider the ethical issues raised by biotechnology in an informed, dispassionate and independent way*" and it recommended that "*the Royal Irish Academy[185] be invited to consider how it might set up and maintain a national biotechnology ethics committee*" to examine and formulate these issues in moral terms and to communicate them to policy-makers, scientists, and the general public. It also proposed that the committee should be permanent and fully independent in its operations.

In response to an official request by the Department of Enterprise Trade and Employment the Irish Council for Bioethics (Comhairle Bitheitice na hÉireann) was subsequently established in 2002 by the Royal Irish Academy as an independent, autonomous, non-statutory body charged with considering the ethical issues raised by developments in science and medicine. It was to be funded through Forfas, which itself is a state-funded enterprise, but it was independent in so far as the appointment of both its members and recruitment of its secretariat would be performed by the Royal Irish Academy. In January 2003 the Council was formally inaugurated by the Minister for Enterprise, Trade and Employment.

During its first term of office (2002-2005), the Council was made up of twenty-one members consisting of theologians, a philosopher, lawyers, and a variety of physicians, scientists, and journalists who gave their time and expertise on a voluntary basis. The members were invited to join the Council "*by virtue of their personal expertise, distinction and authority*" rather than as representatives of particular bodies or

[183] Irish Council for Bioethics. Compendium of Work 2002–2010. Dublin: ICB; 2010
[184] Report of Inter-Departmental Group on Modern Biotechnology. Dublin: TSO
[185] The Royal Irish Academy is an autonomous body of scholars in both the sciences and the humanities.

professions[186]. The Council established three working groups, one for each of the main topics on the Council's work programme (i.e. research ethics, human biological material, and genetically modified organisms). The groups were comprised of Council members as well as co-opted external experts. In 2006, at the start of its second term of office, the Council changed the way in which it executed its work programme from using working groups to sitting in plenary. When choosing the topics, criteria such as national relevance, level of public concern, and the potential of the Council for making a positive contribution were used. A number of rapporteurs from the Council membership were appointed for each project. These rapporteurs liaised with the secretariat in the preparation of opinion documents and reports, as well as meeting with stakeholders as part of the consultation process. Public consultations were deemed a cornerstone of the Council's modus operandi. The final draft of each document agreed by the rapporteurs was subsequently submitted to the full Council for approval prior to publication.

In 2008, the status of the Council was altered and it became a company limited by guarantee and without share capital. At this stage, membership of the Council had been reduced to fourteen. The company had three directors all of whom had previously served on the Council and from this point onwards, they were responsible for the appointment of council members. The Council met in a plenary session once every two months. The terms of reference of the Council were as follows[187]:

1. To identify and interpret the ethical questions raised by biological and medical research in order to respond to, and anticipate questions of substantive concern.

2. To investigate and report on such questions in the interests of promoting public understanding, informed discussion, and education.

3. In the light of the outcome of its work, to stimulate discussion through conferences, workshops, lectures, published reports and where appropriate suggest guidelines.

The Council produced many reports, including ones focusing on research ethics (2004), human biological material (2005), genetically modified crops and food (2005), stem cell research (2008), and biometrics (2009). In addition a series of information packs were produced on a variety of subjects, including euthanasia, forensic DNA databases, environmental ethics, organ donation, and human enhancement. These emerged from a Bioethics Radio Series, broadcast nationally with the title *The Big Science Debate: Exploring the Ethical Issues*.

The next section discusses a report that was to be the Council's most widely known study but also proved to be its most controversial.

### *The Embryonic Stem Cell Research Controversy*

Until recently there has been a close connection between the views of the majority of Irish citizens, the laws of the Irish state, and the teachings of the Catholic Church, which long occupied a dominant position in Irish society. For example, mainstream Catholic teaching holds that life begins at conception and in tandem the Irish Constitution guarantees the right to life of the 'unborn' from the moment of conception. This, therefore, creates moral and legal uncertainty over the status of stem cell research and its use of human embryos. Despite some limited initiatives to develop policy in this area, Irish political leaders have failed to adequately address the question of whether embryonic stem cell research should be permitted to take place within

[186] Documented at http://www.biotechnologyireland.com/news/article/?id=22796
[187] Documented at http://www.bioethics.ie/index.php/about-the-council

Ireland. In the absence of political leadership, there continues to be no legislative framework in Ireland regulating this area of research. This situation has become increasingly untenable owing to judgements during high profile cases in Irish courts as well as the European Union funding of embryonic stem cell research. As things stand there is currently no legal impediment to the production, importation, and use of embryos by scientists for stem cell research in Ireland.

In light of the political and legal vacuum, the Council decided to appoint a group to consider the scientific, ethical, and legal questions surrounding stem cell research and in particular the use of embryos. "*Following extensive research, careful consideration of stakeholder and public views, and much deliberation*", the Council in 2008 *released* the report, *Scientific and Legal Issues Concerning Stem Cell Research*[188]. The report summarises the consensus opinion of council members on the scientific, ethical, and legal issues of stem cell research as follows:

1. The embryo has *significant* rather than *full* moral value.

2. The moral value of human in vitro fertilization (IVF) embryos that would otherwise remain frozen or be destroyed (known as supernumerary IVF embryos) must be balanced against the moral value of those members of society who are suffering from debilitating illnesses.

3. Because of an obligation to care for humankind, embryonic stem cell research is acceptable in certain contexts. The Council expressed support for people's decisions to donate their supernumerary embryos.

4. The creation of embryos specifically for research is currently unjustified, although this may change with the advancement of science, when again the balance of the ethical concern over the creation of embryos versus the value to society of such research may have to be re-evaluated.

5. A failure to provide a comprehensive and cohesive regulatory system to govern stem cell research and its application undermines the moral value of the human embryo and may hinder the development of this field of research in Ireland. Thus, the Council recommended the establishment of an appropriate regulatory authority.

Members of the public were invited to provide their views on stem cell research through either an online or postal questionnaire. Aware of the diversity of ethical views on this highly emotive topic, the working group consequently sought submissions from a broad range of stakeholder groups representing different disciplines and viewpoints. The report makes it clear that "*the purpose of the consultation was to inform the deliberations of the Council, rather than serve as an opinion poll on the topic of stem cell research. The Council has made every attempt to reflect the differing views expressed and to weigh the associated arguments with diligence and objectivity*". However, the recommendations provided by the report were ultimately to be a consensus position formed from the "*personal*" and "*informed views*" of the individual Council members. It is, therefore, difficult for anyone not present at the deliberations of the Council to conclude on the relative weights given to *objectivity* and *subjectivity* in the production of the final recommendations. How did the make-up of the Council membership and the views of its members differ from (say) larger society and the general views of citizens? To what extent did 'external views' and 'personal views' conflict and how were these conflicts reconciled? With such unanswered questions, one is left wondering if the recommendations are the consensus among a small group of like-minded experts, whose views are at odds with those of larger society. While this may not be the case, such questions should have

[188] Can be accessed at http://www.bioethics.ie/index.php/stem-cell-research

been expected and, therefore, explicitly addressed in the report. The methodology used in the study should have been clearly stated.

Given the stated importance of the public consultation in the study, it appears rather incongruous that it was decided *"[r]ather than interrupt the main flow of the Opinion proper ... to place the details of the consultation process, including the findings, in an Appendix"*. What is clear is that there is some considerable distance between the views expressed during the consultation processes and those enshrined in the final recommendations. All members of the Council appear to have shared the same views but these views are difficult to reconcile with the positions held by a majority of public submissions. This is particularly the case in relation to the substantive issue of the moral status of the embryo. Of the 2,188 individuals who provided a submission, 69 percent believed an embryo acquires full moral status at fertilization, and a very low 4 percent held that this was acquired after birth. Just over 70 percent thought it was not acceptable to use embryos produced for (but not used during) IVF treatment for stem cell research and a similar number felt it unacceptable to import embryonic stem cell lines into Ireland for this purpose. It would, therefore, seem that the members of the Council had more liberal attitudes toward science in general and stem cell research in particular, than those providing public submissions. While the report was welcomed from many quarters, it can be of little surprise that others questioned how the Council could have arrived at: (1) a unanimous position on a topic that is as divisive as this; and (2) a position that did not reflect the views of the majority of public submissions received. Because the report does not provide ready answers to either question, the Council '*left the door open*' for its modus operandi to be both questioned and criticised; particularly in relation to how members of the Council and its working groups were chosen, how the external stakeholders to be consulted were selected, and what methodology was adopted to analyse and synthesise diverse views.

Like any call for public submissions, it can be argued with some legitimacy that this one was most likely biased toward those with a particular interest in the matter. While it may be suggested that the public submissions do not reflect the actual opinions in the Irish population as a whole, it can also be argued with some justification that a majority of the general population continues to supports the position that life begins at conception. When dealing with questions of ethics, entities must tread carefully when prioritising the views of some over those of others. Why should citizens trust and accept the opinions of an expert group over the opinions of a wider group? Science is no longer seen as value free and scientists are no longer viewed as impartial. The Council had correctly recognised that an approach to bioethics must involve public engagement where lay expertise is valued as being crucial. But in this case, it must be assumed that the Council was giving the collective opinion of its own members and, therefore, gave more weight to its own views over those expressed in the public consultation. Perhaps this could be justified but the report does not appear to provide such a justification. This matter deserved some attention and its absence left unanswered questions about the role of public consultation in the work of the Council and also the rigour of the methodologies surrounding the Council's work with the public.

It is, therefore, of little surprise that some observers[189] took the opportunity to raise questions about the validity of the Council's work on this report. For example, in an Oireachtais debate, one member of the Seanad lamented the composition of the Council: "*I wish to raise a question about the Irish Council for Bioethics. . . . Recently, by a margin of 13 to nil, its board came to a decision that affects life. Approximately 60% of the country holds pro-life views, yet 13 people on a committee, unanimously, made a decision that affects life. State funding is going to this organisation and the Commission on Assisted Human Reproduction.*

[189] Such as in Lyons B. (2012). The Irish Council for Bioethics. Cambridge Quarterly of Healthcare Ethics, 21 , pp 375-383 doi:10.1017/S0963180112000096

*Out of the 38 members of each body's board, only one spoke out for pro-life values*".[190] Another politician was similarly unhappy: "*It is essential that people of independent opinions be appointed to such bodies. If people with predispositions are appointed, the outcomes on which Government policy are based are predetermined and inevitable*"[191] A group of academics expressed publicly[192] their "*strongest possible dissent from the ICB opinion ... This opinion has no sound ethical, medical or scientific basis ... [and should] ... have no role in the framing of legislation*". It is possible that many of these individuals may have been less outspoken had the Council's report been perceived as more 'pro-life'. But it is also probably true that the concerns being raised resonated with other politicians, academics, and members of the public. In any case the issues being raised did little to increase confidence in the quality of the report.

Ultimately, the report left politicians and policy makers in a difficult situation where some suspected the position taken by the Council with regards to the moral status of the embryo was at odds with the position held by many citizens. In addition the report provided little assistance in articulating these alternative positions, which are downplayed in the research.

### *Closure of the Council*

On the 3rd December 2009, the Irish Council for Bioethics officially announced that it would be closing its doors. The pronouncement came in the midst of a major fiscal crisis caused by international events as well as systemic governance and regulatory ineptitude at a domestic level. The Government responded by announcing plans to save 7.5billion euro between 2011 and 2014. A specially formed *Special Group on Public Service Numbers and Expenditure Programmes* examined spending across all Government departments and agencies in an attempt to identify potential expenditure and staff savings. It asked all government departments to propose areas for major cuts in their budgets. In January 2009 the Department of Enterprise, Trade and Employment proposed, among other items, to discontinue the funding of the Council. The Special Group's report, more commonly known as the *McCarthy Report*, was released after six months deliberation in July 2009. It recommended the abolishment or amalgamation of a large number of quasi-autonomous non-governmental organisations (Quangos). It estimated a saving of 400,000 euro through discontinuing the Council - a very small portion of the overall saving that was being sought.

In any case the saving from its closure would end up being much less. The budget allocation of the Council for 2010 was 270,000 euro, a large percentage (i.e. probably circa 70%) of which covered the salaries of the secretariat – a managing director, a research officer, and a communications and outreach officer. But these three salaried members were permanent staff members and under national agreements could not be dismissed. Instead they would need to be redeployed to other public sector roles and so their salaries and pension contributions should have been discounted from the potential savings. In addition, the Council was located in a building that was held on a lease costing about 48,000 euro annually. The building would need to be re-leased before any saving in rent would be realised. By 2011[193] the building had yet to be re-leased and remained on the balance sheet of the Department of Health.

The impact created by the Council during its lifetime was far in excess of that expected from an entity with its budget. The Council had fourteen members who each gave of their time and expertise on a voluntary basis and were obviously both passionate and dedicated to the Council and its work. Although the final closure of the Council in December 2010 was undoubtedly met with disappointment on the part of its secretariat and members, who fought for its survival, there was a noticeable lack of media coverage and little or no public

[190] http://debates.oireachtas.ie/seanad/2008/04/30/00004.asp
[191] http://debates.oireachtas.ie/seanad/2008/11/26/00006.asp
[192] http://www.independent.ie/opinion/letters/academics-against-embryo-destruction-1370167.html
[193] http://www.imt.ie/news/latest-news/2011/08/department-seeking-new-use-for-premises.html

indignation. Nor was there any objection from the Government or opposition benches in the Dail. There are a number of reasons for this. Despite some public discussion around a number of the Council reports and in particular the one dealing with stem cell research, the Council remained largely off the public radar. The public, for the most part, was not well informed on the need for bioethics nor was it very aware of the existence of the Council. In a time when there were rapid increases in unemployment and the threat of cuts to welfare, health, and education services, it was never going to be the case that the Council and its closure would be at the forefront of the public consciousness. It was, therefore, a relatively easy target as strong public or political feeling (either for or against the proposed cut) was not there. In the end the Council fell to political expediency and the desire for the Government to portray an image of '*waging war*' on wastage in public expenditure and in reducing the number of quangos. At the time, this was a hot political issue and was on the political agenda of the main political parties.

In relation to external support for the Council, at least some elements of the political body and the public had grown wary of it. For example an article[194] written by Dr. Simon Mills concurred with this view arguing, "*the closure will probably be welcomed by certain grassroots elements (party political or otherwise)*". Some of this may be a direct fallout from its contentious report on stem cell research. By publicly calling for regulation of stem cell research, the Council was unlikely to have gained many supporters among politicians who remembered the bitter debates that surrounded the abortion referenda of the 1980s and 1990s and who would be wary of revisiting any issues touching on the status of the embryo. Politically, it might be argued, many politicians would have been reluctant to be associated with the Council and its report on stem cell research.

In the end the Council was closed and its remit was said to be moved under the Department of Health. It is unclear, however, which elements of this remit have been taken up by the new entity and how the loss of independence has impacted on its activities and in particular in relation to public engagement.

### *Impact of the closure*

Since the demise of the Council, biotechnological advances have continued to alter and complicate the ethical landscape with the result that well informed and comprehensive policy-making is becoming increasingly difficult[195]. Policy-making is becoming progressively more difficult in such an environment and an institution that originates and facilitates debate, provides expert opinion, and informs both public and policymakers would seem helpful. Recent events, which have added to the pressure on the Government to legislate on the use of embryos and their status within the Irish constitution, have further exemplified the loss of the Council. For example, in 2009 a legal case on assisted reproduction determined the fate of three frozen embryos, which were at the centre of a dispute between a separated couple. The Supreme Court unanimously ruled that the frozen embryos were not the '*unborn*' as protected under the constitution. The justices involved in the case were most scathing in their criticism of successive governments who reneged in their legislative responsibility for tacking this issue. One justice noted[196] the reluctance on the part of the legislature to legislate on these issues, and warned that if the "*legislature does not address such issues, Ireland may become by default an unregulated environment for practices which may prove controversial or, at least to give rise to a need for regulation*". A subsequent case in the European Court of Human Rights also pointed to legislative failure on the part of the Irish State in the provision of abortion services when there is a risk to the life of a pregnant woman. Such services are not unlawful in Ireland but little or no progress has

[194] http://www.imt.ie/opinion/guests/2010/03/council-was-pluralist-forum-for-ethical-debate.html
[195] Particularly the work of Lyons, B. (2012). The Irish Council for Bioethics. Cambridge Quarterly of Healthcare Ethics, 21 , pp 375-383 doi:10.1017/S0963180112000096
[196] See http://www.irishexaminer.com/text/ireland/kfauqlsneysn/

been made in their provision. Despite the pressure caused by such high profile court cases, legislation or regulation pertaining to the embryo is still not imminent.

It is strange that the closure of the Council coincided with the Supreme Court ruling and the increasing pressure on the Government to deliver legislation in very complex areas. In essence it could be argued that it was closed at the time it was most needed. Stephen Simpson, SFI's director of Life Sciences, expressed concern[197] at the demise of the Council arguing that "*its absence is going to be felt at a time when we really need ethical clarity"*. This is particularly important in a time when much of the legislation in Ireland concerning the regulation of biotechnology and biomedicine is emanating from the European Commission and Council of Ministers but the State appears to have little means for examining such legislation in an Irish context. It can also be argued that the closure damaged Ireland's international status and that scientific investment into the country is less as a result. Abbott (2009)[198] highlights how the country's biomedical research community hoped "*that legislation [would] make it easier to carry out research using human embryonic stem cells*". Indeed in its final report[199], the Council observed how "*a smart economy cannot be achieved without a society built on strong ethics and values*".

### *5.4.1 Conclusion*

The closure of the Council leaves Ireland as one of the few and perhaps only country in the EU without an effective bioethics organisation. The Council was well regarded by its peers in Europe and was very productive in delivering many high quality outputs despite limited resources. However, it is also true to say that the Council was not without some flaws.

## 5.5 References


Barbagallo, F. (2003): Public participation and controversy involving science: an Irish perspective. PhD thesis, Dublin City University.

Coakley, J., Gallagher, M. (2004): Politics in the Republic of Ireland. Routledge. London.

Leonard, L. (2006) : Green Nation: The Irish Environmental Movement from Carnsore Point to the Rossport Five. Ecopolitics Series Volume 2. Choice Publishing.

Lyons, B. (2012). The Irish Council for Bioethics. Cambridge Quarterly of Healthcare Ethics, 21, pp. 375-383.

Martin, S. (2010) Monitoring Irish Government, Working Paper available from webpages.dcu.ie/~martins/mig.pdf.

Murphy, P. (2010): Nanotechnology: Public Engagement with Health, Environment and Social Issues. Strive Report Series.

Murphy, P. (2011): Anticipatory Goverance: Can We Imagine a Future Scientific Ireland?. The Irish Review.


[197] See http://www.nature.com/news/2009/091217/full/news.2009.1148.html
[198] See http://www.nature.com/news/2009/091217/full/news.2009.1148.html
[199] Available from http://www.bioethics.ie/

Trench, B. (2011): National Report, Ireland, Monitoring Policy and Research Activities on Science in Society in Europe (MASIS), DG Research.

Various: Building Ireland's Smart Economy: A Framework for Sustainable Economic Renewal. Department of the Taoiseach. Available from http://www.taoiseach.gov.ie/eng/Building_Ireland's_Smart_Economy/

Various (2010): Compendium of Work 2002–2010. Irish Council for Bioethics. Dublin: ICB.

Various. ERAWATCH Research Inventory Report for Ireland. Available from http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/search/countryprofiles/country_profile_IE.pdf

Various: *Strategy for Science, Technology and Innovation 2006 – 2013*. Department of Jobs, Enterprise, and Innovation. Available from http://www.djei.ie/science/technology/sciencestrategy.htm.

Various: *White Paper on Science, Technology and Innovation*, Department of Jobs, Enterprise, and Innovation. Available from http://www.djei.ie/publications/science/1996/whitepaper.pdf.

## 5.6 Appendix

### *5.6.1 National Workshops*

#### *First National Workshop, 08.05.2012, Dublin*

#### *Agenda*

| | |
|---|---|
| 10:00AM - 10:30AM | **Workshop Registration and Light Refreshments** |
| 10:30AM - 11:00AM | ***Introductions, Welcoming Remarks, and Overview of Agenda***<br><br>Presenter: Prof Frederic Adam, PACITA Principal Investigator, UCC |
| 11:00AM - 11:30AM | Presentation: ***How Different European Countries are Managing the Interface between Science, Society, and Politics;*** Presenter: Tore Tennoe, Norwegian Board of Technology |
| 11:30AM - 12:30AM | Round Table Debate: ***The Irish Technology Assessment Landscape*** |
| 12:30PM - 1:15PM | Lunch Break |
| 1:15PM - 1:45PM | Presentation: ***How to Engage Politicians, Scientists, and Citizens to Drive More Effective Policy Making;*** Presenter: Jon Fixdal, Norwegian Board of Technology |
| 1:45PM - 2:45PM | Round Table Debate: ***An Engagement Model for Irish Policy Making on Issues of Science and Technology*** |
| 2.45PM - 3:00PM | Break with Light Refreshments |
| 3:00PM - 3:30PM | Presentation: ***How to Push the Boundaries of Foresight, Prioritization, and Measurement;*** Presenter: Tore Tennoe, Norwegian Board of Technology |
| 3:30PM - 4:15PM | Round Table Debate: ***Achieving a Balance in Irish Policy Making on Issues of Science and Technology*** |
| 4:15PM - 5:00PM | **Closing Remarks and Deciding on Future Actions**<br><br>Presenter: Prof Frederic Adam, PACITA Principal Investigator, UCC |

***First National Workshop, 08.05.2012, Dublin***

***List of Participants***

| | | |
|---|---|---|
| 1) | David Dodd | Environmental Protection Agency |
| 2) | Emily DeGrae | Department of Health and Children |
| 3) | Frederic Adam | University College Cork |
| 4) | George Kiely | Enterprise Ireland |
| 5) | Jane Suiter | We the Citizens |
| 6) | Jon Fixdal | Norwegian Board of Technology |
| 7) | Josephine Boland | NUI Galway |
| 8) | Leonhard Hennen | Karlsruhe Institute of Technology |
| 9) | Mary Murphy | GAMBA/NUI Galway |
| 10) | Maura Hiney | Health Research Board |
| 11) | Padraig Murphy | Dublin City University |
| 12) | Paidi O' Reilly | University College Cork |
| 13) | Patricia Clarke | Health Research Board |
| 14) | Siobhan O'Sullivan | Department of Health and Children |
| 15) | Tom McCarthy | Advisory Council for Science, Technology and Innovation |
| 16) | Tore Tennoe | Norwegian Board of Technology |

*Apologies*

| | | |
|---|---|---|
| 17) | Claire O'Connell | Irish Times |
| 18) | David Farrell | We The Citizens |
| 19) | Ellen Byrne | Dublin City of Science 2012 |
| 20) | Féilim Ó hAdhmaill | Claiming Our Future/UCC |
| 21) | Graham Love | SFI |
| 22) | Stephen Sullivan | Irish Stem Cell Foundation |

***First National Workshop, 08.05.2012, Dublin***

***Minutes by Paidi O'Reilly, Frederic Adam***

### *Introduction*

The event held on the 8th May, 2012 in the Science Gallery (Trinity College Dublin) was the first Irish national workshop dealing specifically with technology assessment. For the purposes of the event technology assessment (TA) was defined as the *analytic and democratic practice which aims at broadening the knowledge base of policy decisions by comprehensively analysing the socio-economic preconditions as well as the possible social, economic and environmental impacts in the implementation of science and new technology*. The workshop was supported by the PACITA project, which is a pan-European project funded by the EU Commission that aims to strengthen the institutional foundation of European technology assessment by helping countries establish and improve their TA activities.

An introduction to the aims of the workshop and to the PACITA project was delivered by Prof Frederic Adam (UCC) who noted the large attendance and warmly welcomed the panel of experts from European Technology Assessment Institutions and the attendees from Irish policy-related entities (including the Department of Health and Children, the Environmental Protection Agency, the Health Research Board, Teagasc, and the Advisory Council for Science, Technology, and Innovation), various academic institutions, and civic initiatives.

The experts delivered presentations and responded to questions on the following topics: (1) *How Different European Countries are Managing the Interface between Science, Society, and Politics*; (2) *How to Engage Politicians, Scientists, and Citizens to Drive More Effective Policy Making*; and (3) *How to Push the Boundaries of Foresight, Prioritization, and Measurement*. Each presentation was followed by an energetic round table discussion about the situation in Ireland. The following is a summary of the main themes emerging from these discussions.

### *Theme 1: 'Lite Touch' Regulation of the Irish STI System*

Science impacts all aspects of society (i.e. political, economic, and cultural) and therefore science and society are inherently connected. These impacts can be positive but also negative and we need to ensure the credibility and integrity of the Irish science, technology, and innovation (STI) system. Public support and trust of science is not unlimited, but is conditional. Steps to promote research integrity and discourage misconduct within the scientific community are, therefore, crucial to the wellbeing of the system. Failure to do so could have serious negative impacts through threatening the to-date investment in the Irish STI System, undermining the reputation of research in Ireland, as well as producing impacts that would be of questionable value.

'Ethics' appears to be a word that many (including politicians and policy makers) are uncomfortable with and those engaged in promoting the need for ethics are not always finding a ready audience for their concerns and their ideas. There are real fears of the reputational and financial damage that could be caused by a 'rogue scientist' operating in Ireland. 'Bad science' is taking place in Europe and it would be naïve to believe it could not be or is not an issue in Ireland.

The government and the various institutions that administer the Irish STI system have a responsibility to ensure that research is governed in a proper fashion. 'Lite touch regulation' of science will not work as it has not for the financial sector. But there is a widespread view that while significant scientific funding is

continuing here in Ireland, similar investments in the research governance structures may be falling short. Instead individual research institutions are being relied upon to police themselves. Unlike many other European countries, Ireland lacks strong regulatory and governance structures to formally promote integrity and tackle misconduct.

### *Theme 2: Ethics and Positive Economic Impact are Complementary*

Lack of regulatory and governance structures are having a negative economic impact and are damaging our national aim to be at the forefront of European and global science. There is some anecdotal evidence that the lack of strong regulatory and governance structures is restricting the Irish ability to attract certain research investments – why would a renowned researcher, a research institution, or a commercial organisation engage in research in Ireland when they are unsure of the grounds on which their investment is made and the grounds on which the research is performed. This uncertainty is almost certainly having repercussions for how Ireland is being viewed externally as a hub for research.

A case in point is the legal uncertainty regarding embryonic stem cell research and the situation whereby Ireland does not have well defined legislation covering the area. Closing the Irish Council for Bioethics in 2010 is viewed as a retrograde step in that it was well positioned to assist policy-makers in mapping out the way forward for dealing with such difficult issues.

### *Theme 3: Immaturity of the Irish STI System*

The Irish STI system should be understood in the context of its relatively recent emergence. Many elements of the system have emerged in the past 20 years and often through 'subterfuge' – the elements were justified under the umbrella of supporting jobs creation. Subterfuge was necessary as it was perceived to be easier to request funding for 'job creation' rather than 'science' per se. Hence funding was sought for science by promoting it as an instrument for job creation rather than being of value to broader society.

This may well explain why to-date Ireland has almost exclusively focused on institutionalizing the relationship between *science and economy* while largely ignoring the relationship between *science and society*. The result is that in comparison to best international standards, Ireland has an impoverished engagement model whereby there are little formal structures for promoting open and transparent engagement between policy makers and various stakeholders (including scientists and citizens) on issues of science and technology. A further indication of the lack of maturity of the Irish STI system are the many decisions involving science and technology that continue to be justified in terms of economic impacts while largely ignoring important societal impacts.

### *Theme 4: Increased Participation and the Value of Societal Impact*

While it could be argued that the Irish policy-making approach on issues of science and technology is largely *analytical*, it would be difficult to view it as being wholly *democratic* as many stakeholder groups are not involved in decisions affecting them. There is a growing need to mature the Irish STI system so that it also focuses increasing attention on societal impact. But many existing entities in the system are focused almost exclusively on economic concerns and appear ill- equipped to make this move. In addition, there is an inability or reluctance to place a value on *societal impact*. Any attempts to do so are overridden by the default concern for *economic impact*.

This can result in a democratic deficit whereby many Irish institutions are falling short in fulfilling the principles of parliamentary democracy. A symptom being the occasions when people feel they are not

included in decisions that impact them and their heightened feelings of frustration sometimes manifest in more radical behaviour. Mistrust can also be an issue and is sometimes borne out of suspicions that some lobby groups are getting their voices heard and have undue influence whereas others are being ignored. In such cases there is a need to create more open, transparent, and fair methods of participation on questions of science and technology.

#### *Theme 5: Next Steps and the Need for Impartial Advice*

There is evidence that more participation leads to more democratic and better decision making. Impartial advice of a scientific nature must be provided to policy makers and the concerns of various stakeholder groups, including citizens, must also be taken into account when making decisions. There are concerns as to what might happen if we do not engage with citizens on questions such as fracking – little is to be gained by leaving local and national dialogue to more extreme or less informed views and then struggling to get acceptance among stakeholders for central policy. There is an onus on the state and its institutions to engage meaningfully in dialogue with stakeholder groups. This role would appear to be best filled by a trusted and impartial third party entity – separate from those entities charged with implementing policy.

Such an entity should provide evidence based advice to both policy makers and other stakeholders, including citizens. It should provide impartial advice based on international sources of knowledge, Irish sources of knowledge, as well as various stakeholder groups interested in the topic under consideration. It could utilise approaches such as citizen juries and citizen assemblies if and when required. It should take up the offer of our European colleagues to become part of a wider technology assessment community in order to leverage the capabilities, knowledge, outputs, etc. available from these networks. The entity could strive to be reasonably cost neutral in terms of additional budget requirements, while saving on current expenditure on the services of international consultancies (e.g. Technopolis) that provide information to Irish institutions. The entity should leverage the intention of the PACITA consortium to run a public participation project in Ireland to deal with the topic of heath care for the elderly.

***Second National Workshop, 18.09.2012, Dublin***

***Agenda***

| | |
|---|---|
| 9:45AM - 10:15AM | **Workshop Registration and Light Refreshments** |
| 10:15AM - 10:45AM | ***Introductions, Welcoming Remarks, and Overview of Agenda***<br><br>Presenter: Prof Frederic Adam, PACITA Principal Investigator, UCC |
| 10:45AM - 11:15AM | Presentation: ***How Different European Countries are Managing the Interface between Science, Society, and Politics? The core elements of Technology Assessment found in other European countries;*** Presenter: Tore Tennoe, Norwegian Board of Technology |
| 11:15AM - 12:15AM | Round Table Debate: ***The Elements of Technology Assessment Required for the Irish Context*** |
| 12:15PM - 1:15PM | Lunch Break |
| 1:15PM - 1:45PM | Presentation: ***External Expert Views of Where Ireland is in its Approach to Technology Assessment;*** Presenter: Tore Tennoe, Norwegian Board of Technology |
| 1:45PM - 2:45PM | Round Table Debate: ***Steps Required for Moving Forward the Irish Technology Assessment Agenda*** |
| 2.45PM - 3:15PM | Break with Light Refreshments |
| 3:15PM - 3:45PM | Presentation: ***The European Technology Assessment Community and steps towards cross-country Technology Assessment;*** Presenter: Tore Tennoe, Norwegian Board of Technology |
| 3:45PM - 4:30PM | Round Table Debate: ***Bringing Ireland into the European Technology Assessment Community*** |
| 4:30PM - 5:00PM | **Closing Remarks and Future Actions;** Presenter: Prof Frederic Adam, PACITA Principal Investigator, UCC |

***Second National Workshop, 18.09.2012, Dublin***

***List of Participants***

| | |
|---|---|
| 1) Aleksandra Djordjevic | City of Science 2012 |
| 2) Bei Gao | Innovation Research Uni, UCD |
| 3) Brenda McNally | Dublin City University |
| 4) Brian Trench | Dublin City University |
| 5) Christina Mary Ruddle | Innovation Research Unit, UCD |
| 6) Colman McMahon | Innovation Research Unit, UCD |
| 7) Damien Owens | Engineers Ireland |
| 8) Dan Boyle | Green Foundation Ireland |
| 9) Denis Leamy | Pobal |
| 10) Elizabeth Harvey | Forfas |
| 11) Frederic Adam | University College Cork |
| 12) Gemma Moore | School of Sociology, UCD |
| 13) George Kiely | Enterprise Ireland |
| 14) Graham Love | Science Foundation Ireland |
| 15) Jane Suiter | We The Citizens |
| 16) Jon Fixdal | Norwegian Board of Technology |
| 17) Marie Boran | Digital Enterprise Research Institute, NUI Galway |
| 18) Martin Cronin | InterTradeIreland |
| 19) Padraig Murphy | Dublin City University |
| 20) Paidi O'Reilly | University College Cork |
| 21) Rebecca Farrell | Royal Irish Academy |
| 22) Tim Jacquemard | Institute of Ethics, DCU |
| 23) Tom McCarthy | Advisory Council for Science, Technology and Innovation |
| 24) Tore Tennoe | Norwegian Board of Technology |
| 25) Trevor Purtill | Aqua TT |
| 26) Vincent McCarthy | City of Science 2012 |
| 27) Ellen Byrne | City of Science 2012 |

*Apologies*

| | |
|---|---|
| 28) Caitríona Geraghty | Engineers Ireland |

| | |
|---|---|
| 29) John Walsh | Irish Research Staff Association |
| 30) Petra Ahrweiler | Innovation Research Unit, UCD |

***Second National Workshop, 18.09.2012, Dublin***

***Minutes by Paidi O'Reilly, Frederic Adam***

### *Background*

The event held on the 18th Sept, 2012 in the Davenport Hotel was the second Irish national workshop dealing specifically with technology assessment. For the purposes of the event technology assessment (TA) was defined as the *analytic and democratic practice which aims at broadening the knowledge base of policy decisions by comprehensively analysing the socio-economic preconditions as well as the possible social, economic and environmental impacts in the implementation of science and new technology*. The workshop was supported by the PACITA project, which is a pan-European project funded by the EU Commission that aims to strengthen the institutional foundation of European technology assessment by helping countries establish and improve their TA activities.

An introduction to the aims of the workshop and to the PACITA project was delivered by Prof Frederic Adam (UCC). Prof Adam noted the interest in the event as evidenced by the large attendance made up of many that had also participated in the first workshop as well as new attendees. He warmly welcomed the panel of experts from the Norwegian Board of Technology and the attendees from Irish policy-related entities, political parties, academic institutions, professional associations, and civic initiatives.

The experts delivered presentations and responded to questions on the following topics: (1) *The Core Elements in How Different European Countries are Managing the Interface between Science, Society, and Politics*; (2) *External Expert Views of Where Ireland is in its Approach to Technology Assessment*; and (3) *The European Technology Assessment Community and Steps towards Cross-Country Technology Assessment*. Each presentation was followed by an energetic round table discussion about the situation in Ireland. The following is a summary of the main themes emerging from these discussions.

### *Themes*

One only needs to look at hot issues in this country, such as genetic modification, hydraulic fracking, and human embryo research, to realize that science and technology is the proverbial double-edged sword – assisting society in finding solutions to complex problems, but also confronting society with serious questions and dilemmas. When addressing such issues, there is evidence that politicians are not well informed and that citizens are feeling increasingly distant from the decision making. There is no single entity to provide unbiased independent advice on these issues to either politicians, policy-makers, or the public. Ireland has a weak parliament with little powers to oversee Government policy. TDs[200] trying to access knowledge often have no alternative but to use *ad hoc* networks of contacts – networks that are often of unknown quality and independence. Parliamentary Technology Assessment (PTA) seeks to address this weakness.

While some existing state entities may be performing '*TA-like*' activities they are not doing PTA in a true sense. In any case, these entities are not always perceived to be open, transparent, or indeed independent. An added difficulty is that the entities are often charged with implementing policy and it is difficult to see how they can also be independent when assessing policy. The entities are not necessarily trusted by members of the public or indeed by politicians. Instead there is often a '*dominant logic*' in the Civil Service that filters

[200] Irish parliamentarians

out some policy options. In the past the OECD has raised questions about a lack of an evidence based policy making in Ireland.

PTA in Ireland is unlikely to be an '*easy sell*'. The Irish political culture is largely focused on local concerns and clientelism and may not readily embrace PTA. However, the case for TA should be built around ensuring TDs have ready access to comprehensive insights on both the opportunities and consequences of technology adoption and non-adoption. PTA is built on open, transparent, and honest dialogue between stakeholder groups, ensuring that the advice emerging is both informed and legitimate. PTA is about rebuilding trust - trust between citizens and institutions, politicians and institutions, but also citizens and politicians. The embracing of PTA in Ireland would assist in addressing a democratic deficit while concurrently moving policy making towards a truly evidence-based approach that examines both the economic, ethical, and societal aspects of policy options. It would re-connect the Dáil[201] with increasingly disengaged voters, whereby TDs are informed of citizen views in a timely manner. The result would be a re-energised Dáil possessing increased capabilities for directing the role of science and technology in Irish society. It would be about *'turning on the radar*'. Such '*strategic intelligence*' is increasingly at the disposal of parliamentarians across the European landscape – its absence in Ireland places the country '*behind the curve*' and at a considerable disadvantage. It should also be pointed out that PTA is not synonymous with academic research. While academic research is often post-event, policy makers often need to be in '*front of the curve*' and PTA, therefore, needs to foresee events.

PTA, therefore, feeds into the political reform agenda, empowering the Dáil and TDs, while also seeking to increase social inclusion and cohesion. Adopting such an approach would be relatively cost neutral whereby certain activities currently undertaken in a disparate and distributed fashion would be centralized in order that we achieve the benefits of PTA while also garnering the resulting savings suggested in a recent paper by Robert Watt (Secretary General of the Department of Public Expenditure and Reform). It would leverage existing expertise in the Civil Service in addition to the good will of Irish scientists, researchers, industrialists, etc. An internship and/or secondment programme would be utilized in order to supplement available resources while building a capacity for PTA that would subsequently disperse among the Civil Service and beyond. It would draw on the support of our European colleagues in order to access the undoubted expertise and knowledge base of the European PTA community - some of the problems encountered by one country are likely to have been addressed previously by others. Within this community Ireland should seek to become a leader in one or more areas of science and technology, thereby building a leading edge reputation, which could be exploited by agencies such as the Industrial Development Authority (IDA) and Enterprise Ireland (EI).

While housing a PTA function in a standalone and independent entity would appear to be the optimum approach, owing to the current economic and political situation, it would appear that if a PTA function is to be established in Ireland it would need to be located in an existing entity. One proposal is that the PTA function could be provided by either the *Advisory Council for Science, Technology, and Innovation* (ACSTI) or the *Office of the Chief Scientific Adviser* (CSA). The approach would supplement the existing secretariat resources assigned to either entity with the pro bono work of scientists, researchers, industrialists, etc. Some of the existing TA-like activities performed by state institutions and external consultancies should be connected into this new function. This would support the Government's plan to streamline existing institutions while saving costs by reducing redundant activities and fees paid to consultancies. This would also ensure that there is increased separation between policy advisory and policy implementation roles – thereby sidestepping accusations of potential conflicts of interest when both roles are combined in single

[201] Irish Parliament

entities. The entity should have an independent board, but this does not prevent it from being 'embedded' in the policy making process.

The focus would not be on employing internal expertise but instead on reaching out to carefully selected external expertise to deliver quality outputs. There appears to be goodwill on the part of academics, researchers, industrialists, etc. to contribute to the efforts of the function. An intern programme could be funded through external agencies. In addition, the function should utilise the undoubted expertise available through the *European Parliamentary Technology Assessment Network* (http://www.eptanetwork.org/) and through initiatives such as the *Pacita Project* (www.pacitaproject.eu/) – both of which have expressed a desire to assist Ireland in establishing such a function.

In this way PTA in Ireland could utilize a small (and perhaps pre-existing) secretariat foot print while leveraging expertise and knowledge provided on a pro-bono basis in order to maximize economic and societal impact. While such an approach does not require a large financial investment it does require political support in order to bring about political reform and in so doing build a political legacy. Ireland (by European standards) is reasonably well positioned to take advantage of and to implement a PTA function. Ireland has existing STI structures, a desire in tackle a democratic deficit, headquarters of leading global companies, is integrated into the EU, and is English speaking. But the initiative requires a strong indication of support from the Irish Government . The initiative needs champions in Government and in Parliament.

### *5.6.2 Interviewed Experts*

| Category | Organisation | Expert | Expert´s position | Date of interview |
|---|---|---|---|---|
| Science, Media | National Academy for the Enhancement of Teaching and Learning | Dr. Catherine O'Mahony | Science journalist, Academic | 14/03/2012 |
| Parliament | The Green Party,<br>The Green Foundation | Mr Dan Boyle | Politician | 09/08/2012 |
| Science, CSO | Claiming Our Future,<br>University College Cork | Dr. Feilim O'hAdhmaill | Community/ Voluntary Worker,<br>Academic | 25/04/2012 |
| Science, Media, CSO | We The Citizens,<br>Dublin City University | Dr. Jane Suiter | Academic | 29/02/2012 |
| Government Authority | Various | Mr Martin Cronin | Chief Executive, Board Member | Various Dates in Summer 2012 |
| Science, CSO | University College Cork | Dr. Seamus O'Tuama | Community/ Voluntary Worker,<br>Academic | 28/03/2012 |
| Government Authority | Advisory Council for Science, Technology, and Innovation,<br>Various | Dr. Tom McCarthy | Chairman | 18/02/2012 |

# Chapter 6 Explorative Country Study: Lithuania

Edgaras Leichteris, Giedrė Stumbrytė (Knowledge Economy Forum)

## 6.1 Description of governmental system and general R&D structure

### *6.1.1 General information about the R&D system*

According to the Innovation Union Scoreboard (2011) Lithuania is one of the modest innovators with a below average performance. Country's relative strengths are in Human resources and Finance and support. Relative weaknesses are in open, excellent and attractive research systems, Linkages & entrepreneurship, Intellectual assets, Innovators and Economic effects.

R&D related activities in Lithuania are concentrated in the largest cities (by number of inhabitants): Vilnius (548 835 inhabitants), Kaunas (348 624), Klaipėda (182 752), Šiauliai (125 453), Panevėžys (111 959).

The Lithuanian research system recently underwent big changes, it was the outcome of the many reforms in 2008-2010, part of which are already implemented and part are at risk of being unfinished because of elections in October 2012. It was the biggest reform since regaining the independence in 1991. The majority of governmental research institutes merged with main universities, public funding for research has increased, competitive funding schemes were introduced and the Lithuanian Research Council became the administering body for research grants, the functions of many policy implementing bodies were reviewed and fine-tuned, management and legal status of most universities has changed.

The reform on the one hand gave more freedom to universities in solving everyday issues, on the other hand it established new elements of public accountability and control: new principles in forming of the university boards, electing rectors, strengthening links with social partners and public in general.

Interesting part of the reform is that it was prepared when the social democrats were in charge of the ministry of Science and Education (2006-2009), and was implemented during the governance of liberals (2009-2012). It created strange public debate who shall be praised for successfully implemented measures and who shall be blamed for the mistakes. The debate was connected more to the financing mechanisms of high education studies, but influenced other areas as well, as the financing of studies was the main cornerstone of the whole ongoing reform. The more important was the issue of concentrating resources, reforming institutes and universities into big centers of excellence, improving the management of those institutions and it was raised by the social democrats. Several studies were performed to support such reform. The modernization of management in the universities and introduction of university boards has also started with the working groups under the supervision of the former ministers of Science and Education. The key points of prepared reform was to concentrate resources, give more freedom to the rector to initiate reforms in the universities by introducing university boards and give more freedom in managing property and intellectual property afterwards. When new Government was formed in 2009 and liberals have taken the post of minister of Science and Education, some parts of the prepared work plan were implemented with a high political will and implementation power: changes in the legal status and governance of universities, more rights to engage in business activities: purchase and sell property, set up companies, get loans. But what was new to the previous plan, - changes in financing of HE: “student basket” was introduced and included teachers’ salaries, costs of study materials and scholarships. Also loan system was introduced. "Student basket" and "loan system" had created a lot of controversies in public discussions: on the one hand it shall help to improve quality of the studies, and student becomes "client". On the other hand it pushes universities to hunt for the

students, as more "baskets" means more money to other needs as well. It also proposed the switch from "free education for everybody" to "free education to those with high marks". After the elections in October, 2012, the control of the ongoing reform will be regained by the coalition formed from social democrats and the proposals to abolish the "basket model" and to return to the old system of financing are already heard. Another controversial issue is connected with the integration of small research institutes into the universities by creation of centers of excellence in several fields. Some small, dynamic institutes with high potential, but low resources to develop on the one hand gained more general support, more branding possibilities, but are coping with huge bureaucracy and inflexibility of big university systems.

Nevertheless the significant amount of funding (10 % of EU Structural Funds of 2007-2013) was invested into research (mainly research infrastructure) and the concept of valleys[202] as business cooperation centers was introduced and implemented, together with the supporting national complex programmes, joint research programmes and other instruments. Most of those instruments are influenced more by the Ministry of Science and Education.

At the same time a broad-based Lithuanian Innovation Strategy 2010-2020 was approved and a Science, Technology and Innovation Agency (MITA) was established by the two ministries (Ministry of Science and Education and Ministry of Economy). That process was driven more by Ministry of Economy.

After the reforms, the backbone of the Lithuanian research governance system is formed by 14 universities, 5 big technological centers, 2 competing ministries, 1 strengthened implementation agency for monitoring and analysis (MOSTA), 3 funds distributing agencies for R&D and innovation (LBSA, MITA, LMT), formation of better image of science and technology in the society (LMA) and stronger participation of social partners (Knowledge Economy Forum, Young Scientists Society, Lithuanian Scientific Society). The role of those actors is explained in the next section of the report on the governance system.

After the financial crisis in 2009 nearly all national funding programmes for research were transferred into SF 2007-2013 system and EU structural funds now is the main source of finance for research and innovation in Lithuania. National funding is mainly used as cofinancing source for EU projects. It has reshaped and financing priorities - at the moment financing is given only to those priorities, which are in line with EU structural funds aid rules.

[202] Introduction of Valleys helped to identify the main potential excellence areas in Lithuania: life and materials sciences, laser, light and nanotechnologies, semiconductor physics, electronics and civil engineering in Sunrise Valley (Vilnius), biotechnologies, biopharmacy, molecular medicine and innovative medical technologies, ecosystems, safe environment research and computer science in Visoriai Valley (Vilnius); chemistry and biopharmacy, mechatronics, energy and environmental engineering, information and telecommunication technologies in Santaka Valley (Kaunas); argobiotechnologies and bioenergetics, food processing technologies in Nemunas Valley (Kaunas) and marine studies and marine industries in Marine Valley (Klaipėda). Based on those research potential areas, and as a response to the European Strategy Forum on Research Infrastructures, the Lithuanian road map for research infrastructures of Lithuania was prepared in 2011.

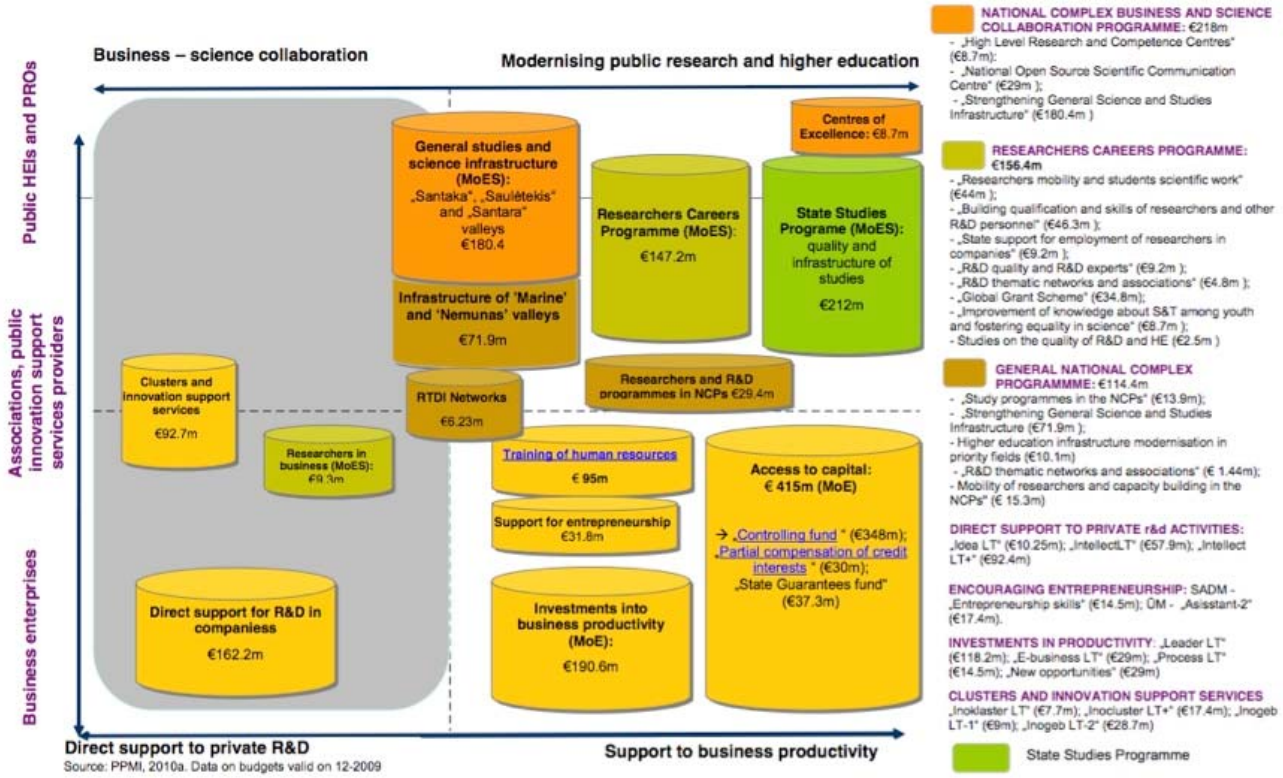


Figure 7: EU SF 2007-2013 support for RTDI in Lithuania (PPMI, 2010).

In the figure below the general overview of financing schemes is presented, reflecting support to private R&D, public R&D, business productivity and modernization of public research and higher education.

Judging from the data available, the largest share of RTDI funding (more than €600m, or about 45% of total policy budget available for 2008-2013) is currently devoted to promoting and sustaining the growth of innovative enterprises. Venture capital funds comprise the highest share (about €415m) of funds in this category. However, it is disputable what part of the financial engineering funds is attributed to the funding of innovative enterprises, as these funds are open to all types of enterprises. The financial engineering funds as well as support to organizational innovations received highest political attention during the financial and economic crisis.

Another 43% of the total public RTDI funding is to be allocated to research and technologies. More than half of it will be allocated to strengthening the public R&D infrastructure in the five integrated science, business and studies 'valleys'. The take up of these funds has been relatively low so far – less than 2% of the science 'valleys' funds were allocated in 2010.

The remaining 12% of the RTDI funding are planned for the investments in human resources (€157m for 2007-2013 period; about €12.1m of which allocated in 2010). In order to ensure the long-term accumulation of human resources for R&D, for the programming period of 2007-2013, a national 'Researchers Careers' programme' (RCP) schedules a variety of actions. For example, such actions like the attraction of the highly-skilled researchers, funding short-term visits of the researchers from abroad, the researcher mobility between science and industry, etc.

Clearly, governance and horizontal RTDI policies, as well as markets and innovation culture, are currently beyond the RTDI policy attention in Lithuania. On the other hand, there are certain non-financial measures

in these categories. For example, in December 2009, the Minister of Education and Science approved a set of Intellectual Property Management Recommendations (guidelines) for the HEIs and PROs. In these Recommendations, the organizations are advised to create management strategies for intelectual property in a way that creates more incentives for knowledge commercialization.

About 20-25% of the total planned RTDI funding is thematically or sectorally focused:

- About €300m will be allocated to the integrated science, studies and business 'valleys' that were selected in the priority research fields;
- Twelve national complex research programmes (NCPs) were approved in: biotechnology and biopharmaceuticals; lasers, new materials, electronics, nanotechnologies and applied physical sciences; sustainable chemistry; ICT; medical sciences; sustainable environment; mechatronics; civil engineering and transport; cultural and creative industries; marine sector; agriculture, forestry and food industry. Thirty four research projects under the NCPs will be during 2010- 2013 with a total budget of €34m;
- The State will invest €5.7m in each of the national research programmes before 2013. The programmes were approved in these thematic R&D fields: future energy; chronic non-infection diseases; Lithuania's eco-system: climate change and human factor; safe and healthy food; State and the nation: heritage and identity.

### 6.1.2 *Description of the national system of R&D governance and the role of relevant actors*

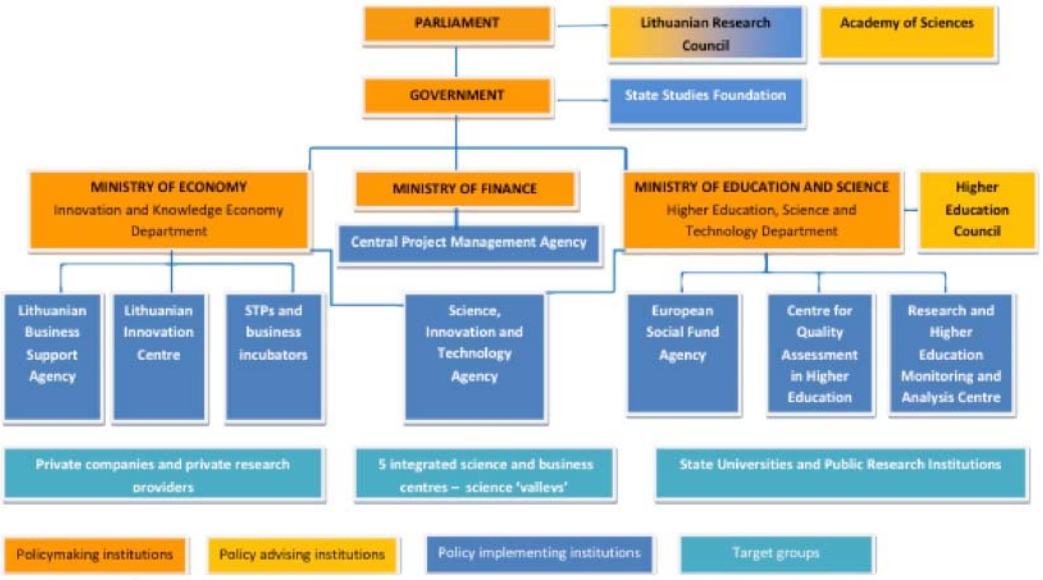


Figure 8: Overview of Lithuania's research and innovation system governance structure (Erawatch, 2011)

In Figure No. 8 we have presented the overview of the institutions involved into R&D governance and we can see four different roles those institution can perform: a) policy making; b) policy advising c) policy implementing d) being just a target group

### *Policymaking institutions*

**The Parliament of the Republic of Lithuania (Seimas)** is the policy instigating body which approves the Government's programme and defines national R&D policy framework and its main objectives. The legislative process and involvement of possible actors is explained in the second part of the report (Democratic structures).

**The Government** is the executive body which prepares and implements research policies, but the science and innovation system governance at the moment is based on the coordination of actions between the two Ministries - The Ministry of Education and Science and the Ministry of Economy. Earlier such coordination was performed by the specific Science, technology and innovation Committee within the Government itself, which was abolished in 2010, but there are proposals to rebuild it again, especially in the context of management "valleys programmes" as the coordination between equal ministries sometimes become very difficult, if there are connectional disagreements. The function of development and implementation of R&D policies (including knowledge generation and human resource development) lies within the Ministry of Education and Science, while the innovation policy is the prerogative of the Ministry of Economy. Intervention areas define the separation of functions. ***The Ministry of Economy*** aims at boosting the economy competitiveness, at facilitating the development of higher value-added activities, and at increasing productivity in business. The key policy targets are as follows: the development of R&D processes in the business sector, creation and support of new technology-based businesses, development of science and business cooperation platforms and innovative clusters, and intellectual property development in industry. ***The Ministry of Education and Science*** deals with research excellence in the public science sector and holds the responsibility for the development of highly-skilled human resource for R&D and innovation. ***The Ministry of Finance*** deals with financing issues, manages the overall system of EU structural funds, which is the main and sometimes the only source of financing for R&D and innovation at the moment. The Ministry of Finance sometimes acts as the mediator between the Ministry of Education and Science and the Ministry of Economy when there are conflicting priorities, interest. The ministry of Finance also makes a push on horizontal approaches, complex programmes and social partnership issues.

### *Policy advising institutions*

***The Lithuanian Academy of Sciences*** is an autonomous state-subsidized research performing institution, which brings together distinguished Lithuanian scientists and serves at the same time as an independent advisory body to the Government on scientific and educational advancement. ***The Lithuanian Research Council*** (to the Ministry of Education and Science) is the main scientific adviser to the Parliament and the Government in research and higher education policy issues, and remains one of the major Lithuanian science and technology policy instigators. The Research Council is an institution, which represents the interests of the science community and the state. Still, the main responsibility for corporate R&D lies within the Lithuanian Ministry of Economy, as a part of Innovation and Competitiveness Programme.

As several interviewed experts noted - neither of those institutions are strong in advisory role anymore, although each of them has some potential to develop such advise. Lithuanian Research Council now is concentrated on fundamental research funding schemes, and Lithuanian Science Academy is more concentrated on science popularization in the society issues. It was also noted that such situation happened because of the low demand for policy advise in the Parliament, but both institutions provide experts on specific issues and has capacity to do it (if it is necessary somewhere in the process by policymaking institutions). The demand for policy advise is higher in the Ministry of Science and Education. Another good point that the Lithuanian Research Council and Lithuanian Science Academy often cooperate with each other in the provision of experts.

***Policy implementing institutions***

***Research and Higher Education Monitoring and Analysis Centre*** (MOSTA) is an analytic and advisory body on the main decisions to the Ministry of Science and Education, as well as related to the R&D policy development. In order to provide valid recommendations, the Centre attracts external experts from Lithuania and abroad. Some of the interviewed experts consider MOSTA's ability to involve experts from different fields into debates about science, technology and policy as a core competence of that organization. But the strong dependence of that institution from the Ministry of Science and Education does not allow to develop it further. There are many cases when initial projects were narrowed down to the issues which are important only to the Ministry of Science and Education. On the other hand, MOSTA usually tries to build strong partnerships with other institutions (Research Council, Science Academy, Knowledge Economy Forum, Confederation of Industrialists, MITA, universities, private institutes and consultancies), but the main challenge for them remains how to build enough trust when in addition to debate promotion function they are responsible for evaluation and monitoring of R&D and education system and when reports prepared by MOSTA might end up in finance cuts or management reforms in evaluated institutions.

***Lithuanian State Science and Studies Foundation*** earlier was responsible for competitive research programmes, but that function was taken over by the Lithuanian Research Council in 2010. At the moment Foundation administers financial support for students. It might be relevant to PTA (TA) only in a way that earlier they had capacity of evaluating technological projects and can regain that capacity if needed.

In order to facilitate the participation of Lithuanian science institutions in ERA initiatives, a specific agency was set up. ***The Agency for Science, Innovation and Technology (MITA)*** is responsible for the administration and coordination of EU Framework Programmes, EURATOM, Security Research Programme, EUREKA, COST, as well as other programmes and activities related to international cooperation in R&D. The agency also participates in shaping the R&D and innovation policy and plays an active role in submitting proposals to the Lithuanian legislature in order to facilitate and strengthen the participation of Lithuania in international R&D programmes. Still it is to early to talk about their possible role in the setting PTA (TA) or initiating of public debates. That institution still is looking for their own niche in the whole R&D and innovation governance system. The highest probability at the moment is that they will take over financing part, especially in the applied research area and will act as general promoters of innovation in business, - the functions similar to those performed by Research Council and Science Academia, but with more focus on business sector and economy in general.

***Lithuanian Innovation Center (LIC)*** is a non-profit organization, providing innovation support services to enterprises, research institutions, industry associations and business support organizations. They have some expertise and capacity to provide policy advise and to make technological audits in companies, but their focus area is too narrow for the PTA (TA) function.

***Other institutions*** (Lithuanian Centre for Quality Assessment in Higher Education,

Central Project Management Agency (CPMA), The Support Foundation European Social Fund Agency (ESF agency), Lithuanian Business Support Agency (LBSA) has little to do with PTA. Lithuanian Centre for Quality Assessment in Higher Education is responsible for quality control of study programmes and other institutions are administrating various funding schemes, but has no advisory role and are not involved into public debates.

***Science and technology parks, incubators and "valleys"*** - are important as a place where during the implementation many real life problems are identified which are connected either with technologies or with R&D and innovation policies and those problems usually are channeled through various civil society

organizations into policy level or "bottom up" debates are initiated through the conferences/round tables and forums.

### *Target groups*

**Scientific community** - there are several organizations representing Lithuanian scientific community, like Lithuanian Universities Rectors' Conference, Lithuanian Catholic Academy of Science, The Board of Directors of Lithuanian Science Institutes, The Conference of Chairmen of Senates (Councils), Lithuanian Scientific Society, Lithuanian Society of Young Researchers.

During the interviews with experts they identified none of those organizations as very relevant to the PTA or TA function. As most influential organization was mentioned Lithuanian Universities Rectors' Conference (but in the negative context, as main opposing force against the reform and more concentrated on high education than research issues). As the most active (although in narrow field) was identified **Lithuanian Society of Young Researchers**. And as the most relevant according to formal functions - **Lithuanian Scientific Society** (although experts were skeptical about their ability to perform PTA function or to take active participation in debates).

**Business community and NGO's -** the tradition of systematic business networks for innovation is not very developed in Lithuania. However, the Private Sector increasingly organizes itself in formal structures such as The Confederation of Lithuanian Industrialists (unites 41 branches and 8 regional associations, over 2700 various enterprises, all which are starting to form their own research groups) and business associations such as Infobalt (association of IT companies), Association of Lithuanian Chambers of Commerce, Industry and Crafts (a voluntary union of Chambers of Commerce, Industry and Crafts), Lithuanian Business Confederation (ICC Lithuania), Association Knowledge Economy Forum (specific association trying to keep balance between scientists, business people and NGO's, under the "umbrella" of knowledge economy issues). Through these formal structures, the Private Sector is represented in the public R&D structures and institutions (e.g. Science Council, Business Development Council, etc.).

During the interviews with experts they have identified only the **Knowledge Economy Forum** as an organization which might be relevant to the PTA or TA function, because of it's strong aim to be independent and ability to organize public debates on technological and policy issues, at the same time involving very different stakeholders. But experts expressed skepticism that Knowledge Economy Forum will be able to become totally independent from the interests of its members - mainly business companies of high-technology sectors, main universities and youth/students organizations. Experts agreed that it can be a good facilitator for the establishment of PTA or TA functions because of it's strong focus on building partnerships and well connected network of experts. And it was seen more like a gatekeeper which is able to reach other business associations and facilitate debates (in particular with Confederation of Lithuanian Industrialists, Infobalt, ICC Lithuania and others).

After the interviews and discussions with various stakeholders in the Workshop No. 1 and No. 2, the list of institutions in the scheme was narrowed down to the potential candidates for the establishment of PTA function in Lithuania: Office of the Parliament (Parliamentary Research Department), The Lithuanian Academy of Sciences, The Lithuanian Research Council, Research and Higher Education Monitoring and Analysis Centre, The Agency for Science, Innovation and Technology, representatives of target groups: Lithuanian Scientific Society, Lithuanian Society of Young Researchers, Association Knowledge Economy Forum. Candidates were selected based on the following criteria: a) shall be mentioned in the interview as a possible important stakeholder b) shall have some interest in performing the PTA function themself or are interested in the results of the PTA c) shall represent different layers of the governance system (policymaking, policy advising, policy implementing, target groups).

## 6.2 Barriers and opportunities for building up a national TA landscape

### *6.2.1 Democratic structures in Science and technology*

Formally there are no serious barriers to set up national TA and to use existing democratic framework for the decision-making. Legislative process allows to integrate expert's opinions, involvement of public is compulsory during the preparation and approval of legal acts.

The main work in the Lithuanian Seimas (parliament) is organized through various committees. The draft legal act is submitted to the proposed main committee, to the additional interested committees and to the general public and interest groups. During the first meeting the main committee has to decide on the need of additional expertise for the question and on the date of the first hearing. Very often the media is informed about the hearing. During the first preparatory meeting experts are invited, they submit their views and interest groups submit their opinions. Our interviewed experts agreed, that the formal system of decision-making in the Seimas is open and transparent. Although submission of information to the general public and interest groups is not proactive, those who are really interested can always find the information about main meetings/hearings and decisions on the web page of the Parliament. But experts noted that in most cases the society and interest groups are not active and do not use their rights to get the information and submit an opinion. As one of the interviewed persons said: "Most representatives of civil society organisations or interest groups come to those hearings only to show their negative emotions, but are not prepared neither to the constructive debate, nor to the submission of articulated proposals. Thus it becomes common practice in Seimas not to pay attention to the expressed opinions of those interest groups. On the other hand there are some strong lobby groups who came well prepared in advance and with some preliminary personal contacts with members of the committees and in such cases the probability of successful outcome is much higher, especially if there is some public opinion expressed in the media as well. But in such cases usually Seimas makes quick decisions, which represent only the narrow interest of some interest groups and we are changing the laws again after a while. That's why in Lithuania the laws change so often".

Science and technology issues are very rare on the parliamentary agenda in Lithuania. In most cases if such issues are on the agenda, experts from Lithuanian Research Council or Lithuanian Science Academy are invited. Those two institutions have formal links with the Parliament. When education questions are debated, usually such interest groups as Conference of the rectors, representation of students, youth organizations are invited. Some of the interviewed former and present parliamentarians expressed opinion, that it is good that science and technology questions are discussed more at the level of Government and ministries and not in the Parliament, because the capability of understanding and discussing complex technological questions in societal context is very low, and the probability of not qualified decisions in that area will be higher in the Parliament than in the Government. As one parliamentarian noted: “It is very difficult to talk about science based decisions in the Parliament, when we still have a lot of parliamentarians who use tabloid newspapers as the main source of preparatory material rather than some high quality policy brief or report”.

But there are some opportunities to develop PTA in Seimas as well. We have identified two kinds of PTA like activities in the Seimas:

1. "ad-hoc" working groups, which can be developed into permanent Parliamentarian Committees as it is the case with OPECST in France, Committee for the Future in Finland, the Greek Permanent Committee of TA, and VAST in Italy

2. Office of the Seimas (Parliamentary Research Department), which can be developed into Parliamentary Office or Parliamentary Unit model as it is the case with POST in the United

Kingdom, PER in Sweden, CAPCIT in Catalonia, TAB in Germany, STOA at the European Parliament

After analysis of 51 "ad-hoc" working groups, established from 2008 till 2012, we have found only 3 working groups, whose topic can be considered as PTA related:

1. On the establishment of Office of Academic ethics and procedures in the Seimas (has worked for 5 months in 2009)

2. On the preparation of Law on alternative energy resources (has worked for 1 month in 2010)

3. On the analysis of the ruling by Constitutional Court of Lithuania on some issues connected with new Law on Higher education and research (mainly financing and management issues). The group worked for 3 months in 2012.

In the Office of the Seimas all analytical and information work is performed by Parliamentary Research Department (around 30 people). It has General Information Unit, Bibliographic Information Unit, Economic and Social Information Unit, Legal and Political Information Unit. On average they get from 600-700 requests for analytical information per year, and from the 1993 till 2011 they have accumulated 2097 analytical and informational responses to the analysis needs of parliamentarians.

After analysis of 40 most important and most sophisticated analytical works, performed from 2008 till 2012, we have found only 5 works, which can be considered as PTA related:

1. Overview of global responses to the climate change problems (2008)

2. Analysis on the several issues connected with energy security and common energy market (2009)

3. Integration of the energy markets (2009)

4. The procedures for the use of secret surveillance of telecommunications in the EU (2010)

5. Burning of waste in EU: several aspects (2010)

Most analysis are based on information gathering on regulatory issues and is not an "assessment" as such. But the strategy and vision of Parliamentary Research Department is connected with constant improving of quality of analytical reports and trying to make more sophisticated reports.

Despite of the fact that science and technology issues are rare on the agenda, sometimes they are discussed. In those cases the second hearing in the Parliament is very important. In second hearing officials from the Government, President's Office and Parliament members submit their proposals and opinions. Often people from the Ministries and governmental agencies such as MOSTA or MITA are invited, especially if implementation questions are concerned. If they are not invited - usually they still are participating, because of their proactive approach and open procedures.

After the second hearing the project is discussed in plenary Parliamentary hearings, where the debates are summarized and proposals are made. Usually the main opinion is expressed by the chairman of the main committee responsible for the legal act. For science and technology issues it is either the Committee of Education, Science and Culture or Information society development committee.

### *6.2.2 Public debate on science and technology*

After the legal acts are approved by the Parliament, further work is delegated to the Government and the Ministries. And that's where the main debates are held and more experts from various fields are involved (universities, NGO's, business companies, research institutes, etc).

The discussion on the further development of Lithuanian R&D and innovation system at the moment is headed in such directions:

1. The public interest in the technologies is low, but the priority sectors will develop, one might expect more and more concerns in the society about the use of such technologies. We have already some "voices" lobbying for the most suitable environment in Lithuania to allow stem cells research and development or to allow Google cars on the roads. Such position is promoted by several business companies and young entrepreneurs working in the field. Media coverage is weak, mainly in technological media. There are several projects financed with EU structural funds money for the stem cells research. And for the first time in Lithuania the European initiative to collect signatures against "financing of stem cells research with European money" was registered in August, 2012. But some questioned experts do not believe that this initiative will collect the promised 20 thousands signatures in Lithuania. With the development of local knowledge base for such technologies and startup companies in this area, and with flexibility of small country in adopting the laws, we can create controversies where the need for the PTA might arise.

2. Institutional system capable of promoting R&D and innovation in priority areas is mainly in place - the debates in working groups now concentrate on how to create the eco-system surrounding it and reach the overall efficiency and effectiveness of the institutions, form the monitoring systems, establish clear performance and impact indicators.

3. The reform of the R&D and innovation system and investments into that area for the period of 2007-2013 were characterized by some management mistakes and "missed spots", so the main question is how to fill the forming gaps between the renewed infrastructure and lack of local knowledge, qualifications, human resources and skills. How to use that to develop the infrastructure to it's full potential and set up the priorities for R&D and innovation.

4. As the business and social partners were only formally involved in the process of building the whole system, how to build better public debates and facilitate more interactions between them, research institutions and public administering bodies

5. As the brain drain became even bigger problem because of financial crisis - how to attract high quality potential from other countries (mainly targeting Lithuanian emigrants)

6. As the budget crisis remains a constrain, EU Structural Funds 2014-2020 will be very important for the development of Lithuanian R&D and innovation system. Therefore ability to set up the priorities for funding - will be critical in the nearest future.

Neither of those questions is discussed in the broad public context. The most widely debated issue was "atomic energy and building of new atomic power plant", which is described as a separate case study in the report.

Most other public debates are not technological ones and oriented more to the policy implementation and financing issues, even in the context of the foresight activities. The examples are below:

- "10 % of Structural funds for science and education" - debate started in 2005 and united all NGO's in the sector into the fight for European money for science and education. It helped to switch a little bit the former priorities from investing into the roads and environmental sector to the promotion of science, technology and innovation based companies.

- "Learning Lithuania 2030 foresight" - was initiated and organized in 2010-2011 by Mosta, and involved around 200 experts from various fields directly and around 2000 indirectly through the electronic questionnaires. Academia was highly involved in the discussions and it can be considered the main achievement of that study. The Government expected very concrete measures with performance indicators as the outcome of the foresight and was disappointed by the visionary and philosophical nature of the document. The discussions has stopped with the preparation of report and there is a risk, that accumulated trust in the process at least in the academic society and support by some of the politicians can diminish in the nearest future if further actions will not be taken.

- "Building of science and business cooperation Valleys" - it was an initiative, which came both from Government and academic/business community, mainly represented by Knowledge Economy Forum and two main universities of Lithuania (Vilnius University and Kaunas University of Technology). The idea was to facilitate "bottom up" discussions on the strengths of Lithuanian research system and to find areas where the spillover effect to the business sector might be achieved. The creation of these programmes started by using "bottom-up" discussions, involved academia, business companies and NGO's, but it did not have strong methodological support how to create such debates and finished as the submission of "shopping lists for infrastructure" from Universities to the Government, with experts from business, academia and NGO's loosing interest in the initiatives on the way. Nevertheless it enabled the consolidation of human and physical resources of related academic and research institutions and was later supported by national complex programmes and joint research programmes, partly addressing the gaps made during the creation process. On the other hand such "fixes" created even more complex and difficult to manage systems.

Some interviewed experts have recalled other debates on technological issues like "Movement against genetically modified food and the use of "E" additives in the food", "The use of mobile telephone antennas on the roofs of the schools", "Possibilities of implementing e-voting system in Lithuania", "Protest against APTA initiative". But neither of those discussions attracted critical mass of interests from the society, structured debates and coordinated long term actions, although each debate is has some good points worth to mention: GMO theme and food safety topics were liked by media, APTA related protests have showed some coordinated civil actions and the use of internet technologies to find "like minded" people. Mobile telephone antennas case has showed some fairs of new technologies in the society and that in most cases it can be solved through economical measures or through the constructive debates. E-voting topic gained some structure over recent years, was supported by some demonstrational projects initiated by civil society organisations (like http://www.ivote.lt) and can be a good starting point to apply TA or PTA methods to push the public debate further into the Parliament, especially that after the elections in October, 2012 when some manipulations with vote buying were reported to the public, the discussion on pluses and minuses of e-voting system has renewed.

In general all experts were very sceptical on the possibilities to initiate good public debate on science and technology issues in the Lithuania and some even advised to stay away of the general society as far as possible and to concentrate only into the debates with experts and interest groups.

### *6.2.3 Policy advice*

Most debates on science and technology within the Government are organized with the domain of Ministry of Economy and Ministry of Education and Science. During last 4 years cooperation between the Ministry of

Economy and Ministry of Education and Science improved significantly. Two main reasons for that: common innovation strategy for which both ministries are responsible and the creation of Science, technology and Innovation agency as a main instrument for implementation of that strategy.

The Innovation strategy was approved by the order of the Government and was prepared by the joint group of representatives from Ministry of Economy, Ministry of Science and Education, representatives from Knowledge Economy Forum and business companies.

The key players helping ministries to prepare decissions on science and technology issues and showing active interest in the debates are: a) Research and Higher Education Monitoring and Analysis Centre (MOSTA) b) Agency for Science, Innovation and Technology (MITA) c) Lithuanian Research Council ) d) Lithuanian Science Academy e) Knowledge Economy Forum f) Confederation of industrialists g) some sectoral business associations like Infobalt (for ICT sector), association of Laser and light technology companies, and others h) active experts from the universities and private research/consultancy groups.

When we take the role performed by MOSTA and MITA - those organizations are similar in a way, that Ministries try to strengthen them and to make analytical centers which might help Ministries to base their decisions on science, technology and innovation policies. MOSTA is controled by Ministry of Education and Science, MITA is formally controled by both ministries, but is more influenced by the Ministry of Economy. Both MOSTA and MITA try to cooperate with each other, invite representatives of another agency into various working groups, but that cooperation is still weak at the moment. MOSTA creates it's own expert and cooperation network based on links with academia (including Science Academy, Research Council, universities) and MITA concentrates on higher involvement of business associations. MOSTA's key strengths are availability of data and analytical skills and already established expert teams. MITA's key strength is availability of financing leverage instrument: through the various financing programmes for science and technology they administer, they have bigger influence on the implementation of science and technology policies. In most cases those agencies do not provide their own advice - they finance various studies and expert working groups, do the job of the secretariat for them, and disseminate the results.

When we take the role perfomed by the Lithuanian Research Council and Lithuanian Science Academy - those organizations are similar in a way, that formally they are providing policy advice to the Ministries and to the Parliament. The practical implementation of the functions of Lithuanian Science Academy is concentrated on promotion of education and science (topical conferences, meetings, seminars, discussions), encouraging talented scientists and scientific research (prizes, awards, facilitating international cooperation). Its expert and advisory function is considered very important and challenging by the President of Lithuanian Academy of Science Prof. Valdemaras Razumas, but is considered weak by other interviewed experts who see Lithuanian Academy of Science more as a club of scientists, and that "club" recently is involved more in science popularisation projects than in policy advice. It was said that at policy advice level (at least five years ago) Lithuanian Research Council was more visible with their advisory function than Science Academy, but at the moment both institutions are passive. During the interview, the President explained, that provision of policy advice to the Parliament and to the Government is one of their key priorities, they recently have changed the Statute to strengthen that function and started providing policy advice, which is very similar to the PTA activities. Other experts were more sceptical about the capacity of Science Academy to deliver PTA and good quality policy advice, but admited that other candidates for such function in Lithuania have weaknessess as well. It is difficult to say at the moment what the real capacity of Lithuanian Science Academy is. Most of the projects performed by the Academy of Science are connected with popularization and dissemination activities. The Lithuanian Science Academy is publishing 12 peer-reviewed scientific journals. Recently they have published the book "Concern", which was written by famous Lithuanian scientists from socio-humanitarian field as a response to the ongoing foresight activity Lithuania 2030. They

are raising a lot of questions about the strategic governance of Lithuania, social and humanitarian concerns and advocating the necessity of science based decission making.

The practical implementation of the functions of Lithuanian Research Council is concentrated on the implementation of competition based R&D financing model and administration of various grant schemes. Interviews have showed that after the reform of Research Council it is seen mostly as financing agency and not advising agency. Some interviewers admitted that Research Council was actively involved in policy formation 5 years ago and they might have capacity to that again. From yearly reports it is clear that advisory role is performed to some extent, but most of the questions are connected with the implementation of R&D policies, rather than impact on controversial science and society issues.

There is some ongoing fight of interests going on between MITA and Lithuanian Research Council. Both institutions seek to administer funds for research, technology and innovation. At the moment the agreement on the future separation of responsibilities and influence is such: Lithuanian Research Council shall take over all the funding for the fundamental research and MITA will have to concentrate on the applied research, especially in business companies. MITA will play the key role in set up of innovation support network.

In the workshops everybody agreed that at least Lithuanian Research Council and Lithuanian Science Academy are very useful in the whole process of establishing PTA in Lithuania, as they have access to the pool of experts.

**Science and academia** are involved in the policy advice mainly through one of the two channels: either are invited by such institutions like Mosta, based on their knowledge or skills in the particular domain, or a delegated by Lithuanian Research Council or Lithuanian Science Academy, who have their own internal working groups, division of labor and responsibilities. Lithuanian Scientific Society (LSS), which consists of 24 scientific organizations and 5 smaller LSS groups, was not considered by experts an influential organization. Although they do some work which can be attributable to the building of PTA favorable environment. LSS organizes various symposia and conferences, arranges for cooperation with scientists in other countries and their societies. One of the key links for the LSS and all scientists is "Mokslo Lietuva" ('Lithuanian Scientific'), a fortnightly paper that covers the most important aspects of life of the Lithuanian scientific circles, helping to create a cooperative atmosphere for the entire academic community. As a more active (although with narrow focus) participant was mentioned Lithuanian Society of Young Researchers (LSYR) - a dynamic knowledge-based autonomous non-political and non-profit nation-wide organization, open to young researchers, scientists, and students from various science and research fields. Currently, it has 183 members from different research fields and institutions all over Lithuania. Practical activities: summer schools for pupils interested in research or for young scientists, annual science festival "Catch a New Sight", analysis of science communication demands, "The Best PhD thesis competition".

Knowledge economy forum, one of the organisations identified as representing both communities: **scientific community and business community**, brings together politicians and representatives from universities, the NGO sector, and qualified business people in knowledge intensive industries. The members of the Association are legal entities – universities, scientific research institutions, students' organizations, business organizations and active, progressively thinking experts – heads of successfully operating undertakings of the country, scientists and politicians. Practical activities: discussion forums and round table discussions on the issues of technology, innovation, cooperation; analysis of Lithuanian science and innovation system, science and technology parks system; birth enabler for such activities and concepts as "valleys", foresights and promotion for knowledge based decision making. Main social partner in formulating and implementing long term vision for Lithuania, research policy, innovation policy, structural funds system. Knowledge Economy Forum has experience on preparation of studies (around 10 research based studies: ICT Technological Audit, analysis of Science and Technology parks in Lithuania, study on science

internationalization, study on E-government using foresight methodology, study on innovation in business, etc). Forum has experience in using expert panels, round table discussions, Delphi methods, foresight methodology, envisioning workshops.

**Business community** on issues connected with science and technology usually is represented in the debates by above mentioned Knowledge Economy Forum, the Lithuanian Confederation of Industrialists (uniting 39 sectoral and 9 regional business associations), Infobalt (uniting around 130 business companies in ICT industry), Laser and Light science and technology association. Depending on the issue and context, sometimes other organisations are invited as well. Business community views are sometimes represented in the working groups by governmental (or semi-governmental) agencies working tightly with business (such as Enterprise Lithuania, Invest to Lithuania, Lithuanian Innovation Center, science and technology parks).

**The hottest recent debate on science and technology policy** where most of above mentioned institutions were involved or will be involved in the nearest future is on setting up the priorities for funding of R&D and innovation system.

The debate has started just before the elections to the Parliament (held on the 14th of October), when in the end of September the experts group was set up to formulate the **priorities for funding of R&D and innovation system**. Further text summarizes the outcomes of expert group's work. It is based on a background report, 'Lithuanian R&D, studies and innovation status analysis 2012', prepared by MOSTA (hereinafter called Background Report), draft expert report to the Ministry of Education and Science & MOSTA 'A contribution to priority setting for future research, studies and innovation in Lithuania in the context of Smart Specialisation' (2012/10/19) (hereinafter called Expert's Report) and EraWatch report of 2012 (herinafter called Erawatch report).

For the last decade the priorities of business and science collaboration in Lithuania concentrated in high-tech fields such as lasers, biotechnologies, mechatronics and nanotechnologies, in which Lithuanian industrial potential is low but researchers have international recognition. The adoption of the Lithuanian Innovation Strategy of 2010-2020 has expanded business and science collaboration priority areas and the financing was programmed by additionally incorporating the larger fields of the Lithuanian economy sectors. The most active in the programmes and the receivers of the biggest part of the support are the business enterprises in biotechnology, information and communication technology, energy, lasers and hospitality sectors.

Current public investments go into four R&D fields that receive the highest amount of funding and have been repeatedly prioritised by strategic documents between 2002-2012:

- Biotechnologies, bio pharmacy and medicine (at least 359.77 million LTL);
- Nano, laser, electrical and optical technologies (at least 304.29 million LTL);
- Food and agriculture (at least 175.85 million LTL);
- ICT (at least 147.11 million LTL).

Current public investments for the development of study programmes and funded study places at postgraduate level go into four groups of study fields:

- Business and management;
- Informatics and Informatics engineering;
- Civil engineering;
- Medicine and public health;

The debate and prepared report has initiated again the fight for the money between different sectors, especially from the side of traditional industries. The report concluded that two broad fields have the strongest potential to contribute to knowledge creation and, potentially, R&D based growth, namely medical sciences and physics. That has initiated a strong disagreement by the Confederation of industrialists. Arguments in the report that three scientific fields are in decline: agricultural sciences, environment/ecology, and plant and animal science created even more opposition from the representatives of those sectors. Paradoxically these fields are potentially the most important both for the Lithuanian economy and for responding to 'societal challenges' such as resource efficiency and climate change. Innovation potential which might be exploited was identified in food and beverages and ICT sectors. Some of the largest sectors in the Lithuanian economy with critical mass of employment, exports and added value – for instance, transport and logistics, construction and engineering, electricity, gas, steam and air conditioning supply, wood and furniture, and the chemicals industry – are likely to face threats to competitiveness in the long term if they do not invest in innovation. The sector of chemicals and chemical products is relatively more innovative than the other sectors in this group. In contrast, the sector of wood and furniture seems to be losing competitiveness. Some emerging niche economy sectors were identified as well, like pharmaceuticals (including biotechnologies) and fabricated metal products and machinery; a small cluster of creative and cultural industries.

As the debate has touched so many interest groups, it will be interesting to observe how it will develop further and will science, technology and innovation policy in the future will be based on some additional research in the area, which stakeholder groups will participate in further debates and with what arguments. As most priority areas are connected with some key enabling and exponential technologies, there is a good opportunity to introduce at least some elements of technology assessment to clear up it's economical and societal impacts and help decision makers to make well grounded decisions.

### *6.2.4 Summarry of barriers and opportunities*

After careful consideration of interviews, main candidates for the PTA function and the results of the workshops the following barriers and opportunities were identified:

A. Main barriers:

1. Growth of Lithuania's economy slowed down after the financial crisis in 2009, the unemployment rate is 15,6 %, the share of high technologies is low - around 4 %. That leads to the weak focus on technological issues.
2. The general quality of high education and research is average, but Lithuania is still modest innovator with below average performance.

3. There is no clearly expressed need for P(TA) from the side of politicians. From the side of candidates able to perform the PTA function - there are doubts about the possibility to build independent and trustful institution, capable of making objective and unbiased reports. Motives to build up such institution might be financial (possibility to get access to public money for establishment of such function). There is risk of politicized process which is very likeable in the Lithuanian context: when such institution is set up by some political power, the executive director is appointed not by competitive procedure and qualifications, but based on the political will, huge amount of money is given for the creation of the system (including IT and common infrastructure, trainings, etc.), but it is rarely used after the new elections, because of lack of trust.

4. Low participation by the society - most interviewed experts were rather skeptical about any inclusion of the society and worried that it will be challenge to introduce PTA even to the specific communities of experts.

5. Neither institution from analyzed candidates has enough capacities and accumulated trust to perform PTA function alone, although some argue that there are institutions who are doing PTA already for more than 30 years (like Lithuanian Academy of Sciences or main universities). Lithuanian candidates for the PTA function have difficulties focusing on mission as well. Creation of new institutions at the moment is extremely unpopular, new functions are delegated each year to the existing structures, capable to perform above average level, leaving those below average to stagnate (because it is extremely difficult to close down the structures due to political and legal obstacles). Top performers are overstressed, overworked and overdelegated by various functions, sometimes contradicting with each other and as we see from other countries - PTA function needs some focus and dedication.

6. In general the cooperation in the R&D sector is at very low level. Expert involvement and the involvement of some Civil Society Organizations, representing scientific or business communities is average, but the general interest of public is nearly to none. In cases where some activity is going on, the questions raised and arguments used are connected mostly with management or administration (bureaucracy and financing) issues, some with legal or economical aspects, but very little connected with societal or especially ethical aspects.

B. Main opportunities:

1. There is a gradual but consistent shift towards a knowledge-based economy: "breakthrough" sectors are identified, their development is supported by Governmental investments into the area and some of those sectors have already small but solid base for further development.

2. The number of students in the universities is high. Lithuanian system of high education and research underwent big changes recently and there are expectations of better quality and rise of excellence centers.

3. The significant amount of Structural Funds 2007-2013 were invested into research infrastructure (around 10 percent).

4. At least till the 2020 money is not the main concern for PTA. With the European Structural funds and constant push from the European Commission to use those money for the creation of "soft infrastructure", better policy making, better participation and dialog with the society, establishment of PTA might be one of the big pilot projects during the year 2014-2020 and act as a "proof of

concept" like it was made with the TA-SWISS. Structural Funds 2014-2020 can be used to address the problems, initiate structural reforms and disseminate knowledge about technologies and PTA.

5. Some people identify the need for PTA as "unrecognized need" and there is some support to initiate pilot project in order to see the feasibility and effectiveness of such measure/function. There is a highly expressed interest at least in discussions with some actors (Science Academy, Mosta, KEF) to participate in the development of PTA system, what gives us some "bottom up" support for the creation of the political stage.

6. There are capacities in several institutions (Lithuanian Science Academy, Higher Education Monitoring and Analysis Centre, Knowledge Economy Forum, private consultancy companies and private research institutes) who can undertake at least part of the functions attributable to PTA institutions in other countries. Most institutions analyzed are relevant to S&T policy making and to the Science popularization.

7. There are some informal and formal networks between main stakeholders which can be further developed and strengthened. There is possibility to have high level of cooperation between partners. Despite of the common opinion that Lithuanian institutions do not cooperate with each other, the analysis shows that at least formal cooperation exists between many actors and it is supported by various common real life projects. In most cases it is impact of financing schemes where cooperation is promoted, but over long period of time it created some strong cooperation links. Very high level of cooperation exists between Science Academy and Research Council, between Mosta and KEF, MITA and KEF, Mosta and Science Academy, etc. The biggest problem is that until now the Parliament was not involved into those cooperation networks and this shall be the aim of the whole model. High interest is shown by municipalities (especially towards the Danish model). Municipalities become more independent over time and there are plans to extend the decentralization of governance system, including budgets for 2014-2020, TA like activities become important in planning urban development, regional technological centers, etc.

8. Wider use of participatory methods, especially connected with foresight activities (Lithuania 2030, Learning Lithuania 2030) where the current methodological structure can be used as a basis and might be extended to include the debates on more technological issues.

## 6.3 Policy options and recommendations

Based on our presumption that depending on the way PTA is institutionalized it can influence different interfaces. In the table below we are providing the summary of our findings of the institutional analysis and their influence on various interfaces.

| *Institution* | **Parliament and Science interface** | **Parliament and Government interface** | **Parliament and Society interface** | **Comments** |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| ***Office of Seimas*** | - | +/- | - | Serves Seimas internal needs, but is an additional source of information to the data provided by Government |
| ***Lithuanian Academy of Sciences*** | + | - | - | |
| ***Lithuanian Research Council*** | +/- | +/- | - | After the reform Research Council started working more with Government, rather than with Seimas and their real connection weakened |
| ***MITA*** | - | - | - | |
| ***MOSTA*** | +/- | - | +- | Weak connection to Parliament established by their own proactive approach |
| ***KEF*** | +/- | +/- | +/- | Weak and fragmented connection to parliament, established by own proactive approach |
| ***LSYR*** | +/- | - | - | Weak and fragmented connection to parliament, established by own proactive approach |
| ***LSS*** | - | - | - | |

Table 3: Summary of findings of institutional analysis (created by authors)

As we see, the most developed interface in Lithuania is between Seimas (parliament) and Scientific community. Although weak, but it is established at the level of Parliamentary institutions, policy implementing agencies and even civil society organizations. The interface between Parliament and Government is not supported by analyzed institutional system - the links are weak. On the other hand, during the interviews we have got impression that there is a high level of cooperation between the Parliament and Government, the relationships are stable, Parliament uses the information provided by Government. Probably, such situation is because of big majority in the Parliament who has formed the Government If the

competition between the Parliament and Government strengthens after the new elections, the situation might change and the need for the more independent institutions might arise. The interface between Parliament and Society is very weak with Knowledge Economy Forum (KEF) and partly MOSTA taking the initiative and participating in the Parliamentarian committee meetings, initiating discussions. This interface can be easily addressed by Lithuanian Science Academy as well - currently they have resources to facilitate science popularization issues in the society and politicians might be just one more narrowed target group for their communication.

Giving the overall assessment of the opportunity structures for TA infrastructure we will use the functional matrix used to compare cross-boarder TA structures across Europe and will make conclusions and recommendations based on two main aspects: a) legal status b) possibility to accumulate trust.

In the table below we present our main conclusions after the analysis of different institutional cases on the existence or lack of particular function in the institution analyzed.

| | ***Institution*** | **Perform interdisciplinary impact analyses of S & T** | **Be relevant for S&T policy making** | **Stimulate societal debate on S&T** | **Watch trends in S&T** | **Cooperate in the field of S&T** | **Contribute to humane and sustainable S&T** |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| ***Parlamentary*** | ***Office of Seimas*** | - | + | - | - | - | - |
| | ***Lithuania Academy of Sciences*** | + | + | + | + | + | +/- |
| | ***Lithuania Research Council*** | ? | + | - | ? | + | +/- |
| ***Governmental*** | ***MITA*** | +/- | + | +/- | - | + | - |
| | ***MOSTA*** | +/- | + | +/- | +/- | + | +/- |
| ***NGO*** | ***KEF*** | +/- | + | + | + | + | - |
| | ***LSYR*** | - | + | + | - | + | - |
| | ***LSS*** | - | - | + | - | - | - |

Table 4: Overview of existing PTA related functions in different institutions (created by authors)

Analysis has shown that we have two main institutions which can be candidates for the establishment of P(TA) institution in Lithuania, based on the formal existence of particular functions and representing different levels of involvement with the Parliament - Lithuanian Academy of Science (with legal basis in place for performing such function) and MOSTA (with more focused approach towards the accumulation of trust, involvement of scientific community and society in general). The third candidate representing NGO level - Knowledge Economy Forum, with strong barriers for establishment of legal links with Parliament (in the context of Lithuanian culture and tradition), but with some level of accumulated trust and independence from the governmental structures and wide experience in applying public debate methods.

The experience of other countries show us that institutionalization of PTA is a long process which usually has an opposition. In our view neither of those candidates will be able to overcome such opposition alone. It will be even more difficult to set up political stage where debates about technologies and their impact on society can take place and to engage the society or at least scientific community. Especially when the debate culture in Lithuania is very low and our best identified case on Atomic energy shows that the involvement of all above mentioned institutions in this debate was nearly to none, giving opportunities to other actors.

We can see **five main challenges** for institutionalizing the PTA in Lithuania:

1. **unrecognized need by politicians** - the quality of decision making process and the use of scientific based evidence is low. Different interviewed politicians do not see the obvious value of PTA function. They feel that such think might be necessary and good for their everyday work, but would like to see how the real product will look like. As one of the politicians said: "What you say about PTA is interesting, but I want to see how the final product will look like, I want to touch it, to read it and try to base some decision on it. Only then I will be able to tell you if I need PTA function in Lithuania or not".

2. **low participation by the society** - most interviewed experts were rather skeptical about any inclusion of the society and worried that it will be challenge to introduce PTA even to the specific communities of experts.

3. **politicized process of creation of similar institutions** - during the interviews it was reflected as the skepticism that we will be able to create independent institution set up by Parliament or Government, and the huge risk of making it "as always" - the scenario everybody is against, but which is very likeable in the Lithuanian context: when such institution is set up by some political power, the executive director is appointed not by competitive procedure and qualifications, but based on the political will, huge amount of money is given for the creation of the system (including IT and common infrastructure, trainings, etc.), but it is rarely used after the new elections, because of lack of trust.

4. **difficulties focusing on mission from the current actors** - as creation of new institutions at the moment is extremely unpopular, new functions are delegated each year to the existing structures, capable to perform above average level, leaving those below average to stagnate (because it is extremely difficult to close down the structures due to political and legal obstacles). Top performers are overstressed, overworked and overdelegated by various functions, sometimes contradicting with each other and as we see from other countries - PTA function needs some focus and dedication.

5. **general low level of trust** - between the institutions themself, between Parliament and other actors, between members of society. Neither institution has enough trust and power to get the broad

mandate for performing the PTA functions, although part of them expressed interest and eagerness to take it over.

There are **five main opportunities** for institutionalizing the PTA

1. most institutions analyzed are **relevant to S&T policy** making and to the **Science popularization**. Although it is not considered as the TA function, many of the institutions do similar projects as are made by PTA institutions.

2. possibility to have **high level of cooperation** between partners. Despite of the common opinion that Lithuanian institutions do not cooperate with each other, the analysis shows that at least formal cooperation exists between many actors and it is supported by various common real life projects. In most cases it is impact of financing schemes where cooperation is promoted, but over long period of time it created some strong cooperation links. Very high level of cooperation exists between Science Academy and Research Council, between Mosta and KEF, MITA and KEF, Mosta and Science Academy, and some others. The biggest problem is that until now the Parliament was not involved into those cooperation networks and this shall be the aim of the whole model. High interest is shown by municipalities (especially towards the Danish model). Municipalities become more independent over time and there are plans to extend the decentralization of governance system, including budgets for 2014-2020, TA like activities become important in planning urban development, regional technological centers, etc.

3. at least till the 2020 **money is not the main concern for PTA**. With the European Structural funds and constant push from the European Commission to use those money for the creation of "soft infrastructure", better policy making, better participation and dialog with the society, establishment of PTA might be one of the big pilot projects during the year 2014-2020 and act as a "proof of concept" like it was made with the TA-SWISS.

4. there is a highly **expressed interest** at least in discussions with some actors (Science Academy, Mosta, KEF) to participate in the development of PTA system, what gives us some "bottom up" support for the creation of the political stage.

5. Wider use of **participatory methods**, especially connected with foresight activities (Lithuania 2030, Learning Lithuania 2030) where the current methodological structure can be used as a basis and might be extended to include the debates on more technological issues.

Below we provide model based on individual strengths and core competences of all the institutions, paying particular attention in establishment of "gate keepers" at various levels, putting efforts to create political stage, debate culture, and provide examples of real life products which were eagerly wanted by the politicians during the interviews.

We based our model on European example of cross-boarder TA, where "participants favored establishment of smaller, independent networks of "TA working groups... institutionally linked, in a suitable form, with the political decision-making system."(Vig and Paschen, 2000, p. 14). Seems that after the interviews it's the way with least opposition.

We have used the three models of parliamentary TA most popular in Europe, but adopted it to better reflect Lithuanian context. Instead of Parliamentary Committee (during the interviews it seemed least feasible) we have added additional Governmental Agency layer. We divided independent institutions into two categories: a) Parliamentary institutions b) NGO's.

As main recommendation for Lithuania, network model with the establishment of so called "gatekeepers" is proposed. Each gatekeeper represents different layer of R&D and innovation policy system, has particular set of individual strengths and core competences and is able to reach wider networks of interested groups.

| Model | Gatekeeper | Partnering institutions |
|---|---|---|
| Parliamentary Office | Parliamentary Research Department | Lithuanian Science Academy,<br>MOSTA,<br>KEF |
| Parliamentary Institution | Lithuanian Science Academy | Research Council, LSYR, LSS, etc. |
| Governmental agency | MOSTA | MITA, Energy Institute, Universities |
| NGO's | KEF | Lithuanian Innovation Center, Lithuanian Free Market Institute, Public Policy and Management institute, private consultancy companies and industry experts. |

Table 5: Proposed Gatekeepers and their main partnering institutions (created by authors)

The aim of the network and further steps of implementation shall be to put efforts and create political stage, promote debate culture and provide examples of real life products.

## 6.4 Case study – Public debates on Building Nuclear Power Plant in Lithuania

Ignalina's Nuclear Power Plant (IAE), based in a small city of Visaginas in Lithuania has a long history rooted into overall energy strategy of former Soviet Union. It was started to build in 1972. IAE had to be the biggest atomic power plant in the world and had to show the prosperity of Soviet economy and science. The 1st block was build in 1984, 2nd in 1986, 3rd block was started to build, but never finished.

Accident in the Chernobyl atomic power plant in 1986 had initiated the public debate about security of Lithuanian atomic power plant, because it had been using the same "unsafe" reactor type as in Chernobyl. The public debate was supported by general democratic processes which have started with Perestroika. For example Civil society organization "Žemyna" organized the first official plebiscite against building of 3rd block in IAE, and more than 700 000 signatures were collected (in a country with around 3 mln. inhabitants).

In 1987-1988 a lot of "green clubs" were created and they became an umbrella not only for discussions about ecology and atomic energy, but for Lithuanian intellectual movement "Sąjūdis". Sąjūdis was burn out of those clubs and general discussions about the Lithuanian independence, democracy has spread. Later they became the epicenter of "singing revolution" with such results as collapse of Soviet Union, acknowledgement of Lithuanian independence, building up of new national democratic structures.

Green movements formed one of the main pillars of the whole "revolution" and arguments against Atomic power plant were widely used in the public debate and speeches of politicians (Ignalina's atomic power plant is unsafe because uses Chernobyl type reactor; the power plant was build by "enemy" - Soviet Union in the most beautiful district of Lithuania and it was build without the consent of Lithuanian people). For most of the people at that time to close IAE 3rd block was the same as to win the battle against soviet regime.

The arguments against the power plant and wish to make decisions based on the will of Lithuanian people had initiated some publicly well seen actions. For example - "Bicyclists' tour" across the Lithuania with aim to disseminate ideas about ecology or "Living ring" initiative - when 150 000 people joined their hands and surrounded atomic power plant as the protest against building the 3rd reactor (despite of the fact that the demonstration was forbidden by Government).

In 1990 most of the candidates supported by Lithuanian intellectual movement "Sąjūdis" were elected into Seimas (parliament) and act of the Re-establishment of the State of Lithuania was signed. With regaining of independence the ecological nationalism which was at the core of most of the movements slowly diminished and even the strongest "green" organizations expressed only moderate views on new laws and policies. Some of them started lobbying Government and Parliament in narrow fields, some turned into NGO's promoting ecology in the society, but with limited advocacy role in the political field. Analysis of internet pages of such organizations have showed that there are two streams of problems in concern at the moment:

a) the degradation of living environment (genetically modified food and crops, decline of cultural heritage, decline of biological diversity, energy problems)

b) pollution of environment (quality of drinking water, pollution in the Baltic sea, noise reduction, pollution of soil, recycling, radioactive materials, chemical elements).

With the economic blockade initiated by Soviet Union (soon after Lithuania declared about it's independence), the arguments about unsafety of Atomic power plant declined, and the influence of green movements has lowered even more, as the economical concerns has taken their place. Even today some experts use arguments, that atomic power plant became the guarantee for energy independence and helped to survive economic blockade, because one of the main resources which were blocked was Russian gas. While others argue that economic blockade and atomic power plant are not connected. They think that heating and not energy was a problem.

Next step in the debates on atomic energy is connected to the process of joining the European Union and Lithuanian-EU negotiations. In negotiations EU asked to close down IAE due to unsafe "Chernobyl type" reactor. Lithuanian society was very passive on the issue. In general one can say that it was silent approval of decision that "Lithuania does not need unsafe Chernobyl type reactors", but it does not show the position for or against the atomic energy in Lithuania. When in 2003 Lithuania had referendum on joining the European Union, the expressed positive opinion is now interpreted by green movements as position to close the atomic power plant as well. Opponents argue that the question was being the part of European Community and not about the atomic energy.

Meanwhile when we look at the processes in Seimas, at least from 2005 till now there is a very clear support for the development of atomic energy system in Lithuania. Some experts state that it has started much earlier, but definitely we have clear decisions, made by very different political coalitions during the period (2005-2008 led by socialdemocrats, 2009-2012 led by conservatives). The decisions include: resolution of 2005 on atomic energy, communication to Latvia and Estonia in 2006, Law on atomic power plant in 2007, national strategy on energetical independce in 2012, etc. Those documents were taken with very little opposition, although Seimas (parliament) as democratic structure is open to proposals (the system was the same of submitting comments and proposals was nearly the same all that time). Even more - before the closure of IAE the referendum was initiated and although it was not successful due to the low rate of votes, 91 percent of people who voted expressed opinion that they agree on extension of work of IAE. That result is interpreted differently: green movements say that people did not give their vote for atomic energy (i.e. "the permission is not given"), Government had interpreted it as clearly expressed opinion of active voters for continuation of "nuclear" strategy. Neither opinion has got attention and support from general public and we can see the indifference and passive approach in this case.

Fukushima's nuclear disaster in 2011 again initiated debates worldwide about the safety of nuclear energy and those debates reached Lithuania as well in the form of public protests and discussions on the building of new atomic power plant. It is interesting that until these debates, there were not many disagreements whether to build atomic power plant or not. All disagreements were about who will be responsible for building of power plant: coalition by social democrats negotiated with consortium made by one of the strongest Lithuanian group of companies (whose business is focused primarily on retail), coalition by conservatives neglected all previous agreements with that group and started negotiations with Japanese company Hitachi. In the view of general public expressed in mass media it was seen as possible source of corruption from both sides, with possibility of act of corruption from Japanese company slightly lower. After the Fukushima's disaster new arguments were used connected with safety of atomic energy in general and it lead to the reborn of some green movements. The same people who collected more than 700 000 signatures in 1986, initiated the referendum against building of atomic power plant in 2012, but were not able to collect the necessary amount of signatures (46 000 signatures were collected). They claim that the procedure in Lithuania for collecting signatures is too strict (as personal data is needed in each case). On the other hand former initiative to extend the life of atomic power plant in 2008 collected only 19 000 of signatures, but nevertheless Seimas made the decision to organize referendum with an advisory role. The similar decision (to have referendum with advisory function only) was taken towards the referendum of 2012 against building of atomic power plant, but with different text "I agree with building of new atomic power plant in Ignalina". Referendum was held on October 14, 2012. Around 62 % voted against atomic power plant. That created very difficult situation as most politicians expected that referendum will not be able to attract necessary amount of voters and there will be no obligation to listen to the public opinion. But it did. Especially this dilemma touched social democrats, who initiated building of atomic energy plant more than decade ago, but after the process was taken over by the block of conservatives and liberals, publicly criticized the project and in some cases even the idea. Now, when they have gained a majority of votes in the first round of elections, when their coalition partners Lithuanian Working party are interested in building the power plant and when people

voted against power plant – social democrats will have to make very difficult choices if they will form the new Government. And it is clearly seen in media: when the leader of social democrats party was asked what he thinks about the results of the referendum (just after the first round of elections) – he expressed opinion, that the atomic power plant will be build, but later has changed his opinion in the official communication letter from the party. The situation is not better for the conservative and liberal block. Although they were consistent in their opinion, but public vote against power plant puts some obligations for consideration as well.

The whole complexity of debates which led to the referendum can be expressed by the opinion of one of the most influential experts in the energy sector, interviewed during the PACITA project: "During debates I was constantly called up by the leaders of the political parties, ministers and vice ministers. But not in order to hear my opinion, but asking to approve some arguments used in their position. I declined proposals to talk from both sides, because, frankly – I do not have access to all the information and facts to see the whole picture. Most decisions are political and not scientifically based. And if decision to vote for or against atomic power plant is difficult to me, I imagine how it is difficult to ordinary people".

Next we are presenting the most commonly used arguments in the debates expressing the position "for" and "against".

1. ENERGETIC INDEPENDENCE

Arguments have roots in the Soviet system of energy supply and Lithuanian wish to join Nordic and European networks.

Those who say "Yes" to the atomic power plant argue, that:

- Lithuania is not independent from Russia in the energy sector
- All alternatives (including alternative energy sources, coming from wind, sun, biofuel, etc.) ARE discussed, analyzed and choices are made based on the analysis that Lithuania will not be able to get constant supply of energy from those sources, but those alternatives have to be developed further as addition to the atomic energy
- Lithuania has to have some "main energy source" which they call "basis". Only then other countries will be interested accepting the Lithuania into their energy networks

Those who say "No to the atomic power plant argue, that:

- "Energetic independence" is a political buzzword, which means nothing
- Full integration into European networks is not very far away, we have already did a lot
- Real energetic independence will come only from diversification of sources
- Atomic power plant instead of making us free of influence from Russia will put us even into more dependent position (control of uranium, part of Russian "atomic ring")

2. SECURITY AND SAFETY

Arguments have roots in the safety of technology itself.

Those who say "Yes" to the atomic power plant argue, that:

- Atomic energy is the “cleanest” one (and very often you can hear references to Nordic countries such as Finland)

- The particular reactor from Hitachi is reliable, had been successfully used in other plants already and widely tested (and in such cases like safety it is not always very good to buy the most recent one)

- Technologies develop very fast and become safer over years. And it is a matter of believing into the technologies and we have only to foresee the measures how to make it safe and avoid Fukushima (environmental conditions in Lithuania are better than in Japan: no earthquakes, tsunamis, etc., we need to control only “human factor” and we have competence for that)

- Lithuanian neighbors in Kaliningrad and Belarus are planning to build plants near Lithuanian boarder with much bigger safety issues. Even if we will not be able to stop them, at least we will have competence inside Lithuania to monitor them.

Those who say “No to the atomic power plant argue, that:

- Other countries are abandoning the atomic energy (references are made to Germany, Austria, Japan)

- The reactor planned is of old design and might have safety issues. and Lithuania is buying too powerful reactor which does not correspond to current and future needs (has overpower) and probably because nobody in the world wants to buy this type of reactor from Hitachi.

- Nothing has radically changed in the atomic energy technologies over last 50 years, so the technology is still unsafe and Fukushima is a good example.

3. ECONOMICAL REASONS

Arguments have roots in the economical development, ability to join European Energy Exchange to sell overload of energy on the market. It is the most discussed argument in the media, with lots of speculations from both sides with numbers, diagrams, tables, reports. It is widely discussed in social media, blogs, and debates on the TV. Even advertising campaigns were held in order to persuade people saying “Yes” to the atomic power plant. And some experts say that it had a negative effect: people became angry seeing famous people in such advertisements, but with weak and ungrounded arguments. On the other hand it urged some famous rock starts to start the campaign against and to use such arguments like “Not the economy matters most in this case, but our children and their future” (safety concern).

Those who say “Yes” to the atomic power plant argue, that:

- Investments will generate revenues, because everybody is investing and a lot of serious calculations are made not only in Lithuania, but in Latvia, Estonia and Japan on this project.

- Atomic energy will be cheaper. Now the low prices are subsidized by Russians because they do not want the plant in Lithuania, but when they will reach their aim, the prices will go higher and we will be buying expensive energy from Kaliningrad of Belarus. On the other hand – development of alternative energy sources will reach it’s maximum (there is not so many places suitable for that) and this kind of energy will become more expensive as well.

- We have competence and we have the place for that (recently closed down power plant)

- Our other plants need serious renovation and we get big loses while trying to save energy in reservoirs

- Those countries who manufacture and control energy produce have competitive advantage.

Those who say “No to the atomic power plant argue, that:

- Investments are doubtful, Government provides provides speculative data, there are many contradictions and even analytics can't understand the data.

- Lithuania does not need so much energy and with development of eco and energy friendly future technologies that need will decline even more

- The future market for energy is unclear, the best for Lithuania is to wait and see how it will develop, maybe for Lithuania the best decision will be to buy energy and not to own it’s own power plant

- Nobody counts that after 10-20 years the alternative sources of energy will be cheaper and more effective.

- Nobody counts that we might lessen the consumption, instead of trying to create oversupply of energy

- We will not be able to influence decisions to build power plants in Kaliningrad and Belarus and we will have huge oversupply of energy in the whole region.

4. PUBLIC CONSULTATIONS

Arguments have roots in the public participation in the decision making and the proactive approach which might be used in such cases (on very important issues)

Those who say “Yes” to the atomic power plant argue, that:

- Society elected it’s representing body – Parliament (Seimas) and thus gave it’s vote to that institution. Seimas was constant in it’s actions and decisions for more than 10 years promoting atomic energy.

- Lithuanian society is more tolerant to the atomic energy than other countries: there are concerns of course like with any technology, but in general the situation is one of the best in the region

- We had a lot of place for the debates, decisions were taken in the democratic and open way, nobody has argued a lot, there was not before upcoming elections a lot of resistance for such decisions and only before the election some people have tried to get political momentum based on that topic.

Those who say “No to the atomic power plant argue, that:

- Society was cheated into the decisions and nobody actually explained the consequences, there were no proactive measures aiming at getting public opinion.

- All the decisions are taken in the strange way – first comes the decision, later – formal public consultations are held

- Society has expressed already it’s opinion on the atomic energy twenty years ago and did not change it’s opinion neither during the negotiations with European Union on the closure of the former plant, neither in the referendum on the extension of it’s existence. So all the decisions are based on “wishful thinking”.

5. OTHER CONCERNS

Other concerns lay down in the overall culture of decision making and project implementation in the Lithuania.

Those who say “Yes” to the atomic power plant argue, that:

- The systemic risks are minimized, because Hitachi is a reputable Japanese company, because Japan is one of the most experienced developers of atomic technologies and because Lithuania is not building the plant on it’s own – other countries are involved, with a lot of control and expertise

- Research is being made and feasibility study for the particular project will be developed. There are some gaps in the information but they will be filled in during the preparation process. Lithuania is one of the most open countries in the world for disseminating the information about what is going on with the building of atomic energy plant. Even across the countries. The information is provided, but people lack the qualifications to understand or to find it.

- Atomic energy in Lithuania has bright future, especially looking from economical perspective

Those who say “No to the atomic power plant argue, that:

- Lithuania for the last twenty years was not able to implement any major project without some kind of corruption scandal or problems with the effective implementation

- Studies are not available, dissemination of knowledge is low, it is very difficult to understand those complex processes, especially when there is lack of information.

- Political system is not stable

- The risk is too big in case of accidents or failures

6. INFORMATIONAL “NOISE”

And, finally, there is a lot of informational noise in the debates around the issues of “corruption” and “influence of Russians”. During the interviews when we have started asking questions about atomic energy case, the first systematic reaction from different stakeholders was trying to understand which side we represent and who have paid us money (Russians or Japanese) and for what position. We tried to filter out those arguments based on such "conspiracy theories", have called them “informational noise”, but because of very wide use in the media and public political debates – they still might have made influence on the arguments presented above.

### *6.4.1 Conclusion*

The case has showed the inability of Lithuanian decision making system to involve civil society in early stages of making political and economical decisions, where the technologies play important role. It has showed how the status quo (mainly untouched for more than 10 years) can change in several months when real life projects are started, agreements with potential builders of plants are made and the society starts reacting, asking questions and demanding answers. When the politicians do not have clear and well prepared answers/positions, when there is no time to initiate additional studies and when simple marketing tricks ("pay less", "everything is good") are used in the process, the society feels rejected and votes against

technologies. Although to a less extend, but the same problems are reflected in other debates as well (e-governance, e-voting, waste management, mobile telephone antennas, etc.) and it shows that the problem is systematic: the society in most cases is passive and uncertain, the Government does not put extra effort to initiate dialog and makes decisions on their own, the scientists are not involved professionally (usually they discuss it only in their own narrow networks).

Even now, when voting against atomic power plant is over, the decisions are still to be made (results of the referendum are not obligatory to the decision makers), the alternatives to the atomic energy still have to be found (especially when big part of the scientists say that we will not be able to produce the necessary amount of energy from alternative energy sources), and a good debate is still needed.

The debate has to start as a proactive response to the referendum results by newly elected Government, the previous discussions have to be documented and need to be considered as the starting point for further decisions. And (if needed) the additional research has to be made. The biggest risk is that Lithuania might be stuck in the "informational noise" described above for a long time unable to take any decision for action.

## 6.5 References


European Commission (2012): Innovation Union Scoreboard 2011, Enterprise & Industry. Magazine, European Commission (EC), *doi:10.2769/32530 Available at: http://ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf*

ERAWATCH (2012): Annual country report. Lithuania. Available at: http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/galleries/generic_files/file_0213.pdf

High technology development programme for 2011-2013. Short description available at: http://www.ukmin.lt/web/en/innovations/programmes_and_strategies

Industrial biotechnology development programme for Lithuania for 2011-2013. Short description available at: http://www.ukmin.lt/web/en/innovations/programmes_and_strategies

Learning Lithuania 2030 strategic vision. Available at: http://www.moksliojilietuva.lt/en/

Lithuanian Innovation Strategy for the year 2010–2020. Short description available at: http://www.ukmin.lt/web/en/innovations/programmes_and_strategies

Lithuanian Strategy for the Use of the EU“s Structural Assistance 2007-2013. Available at: http://www.esparama.lt/2007-2013/en/5

Lithuania 2030 strategic vision. Available at: http://www.lietuva2030.lt

MOSTA (2012): Background report, Lithuanian R&D, studies and innovation status analysis 2012.

MOSTA (2012): Report of an expert group to the Ministry of Education and Science and Ministry of Economy of the Republic of Lithuania. A contribution to priority setting for future research, studies and innovation in Lithuania.

National programme on development of research, technologies and innovations in the space sector for 2010-2015. Short description available at: http://www.ukmin.lt/web/en/innovations/programmes_and_strategies

National Reform Programme: Lithuania, April 2011. Available at: http://ec.europa.eu/europe2020/pdf/nrp/nrp_lithuania_en.pdf

PPMI (2010): Study on the innovation policy and innovation governance in Lithuania. Knowledge Economy Forum, Vilnius.

Vig, Norman J., Paschen, H. (Eds.) (1999): Parliaments and Technology: The Development of Technology Assessment in Europe. State Univ of New York, New York.

## 6.6 Appendix

### *6.6.1 National Workshops*

***First National Workshop, 25.05.2012, Vilnius***

***Agenda***

| | |
|---|---|
| **8.45 – 09.00** | **Registration** |
| **09.00 – 09.30** | **Introduction to Technology Assessment and Parliamentary Technology Assessment concepts and systems in Europe**<br>Dr. Leonhard Hennen<br>Karlsruhe Institute of Technology (KIT)<br>Institute for Technology Assessment and Systems Analysis (ITAS) |
| **09.30 – 10.00** | **Example on the use of TA for solving complex policy issues: transition of the German Energy System**<br>Jens Schippl<br>Karlsruhe Institute of Technology (KIT)<br>Institute for Technology Assessment and Systems Analysis (ITAS)se (ITAS) |
| **10.00 – 10.20** | **Comments by selected discussants** |
| **10.20 – 10.40** | **Overview of Technology Assessment like activities in Lithuania**<br>Dr. Edgaras Leichteris<br>Knowledge Economy Forum |
| **10.40 – 11.00** | **Coffee break** |
| **11.00 – 13.00** | **Open discussion: identification of gaps and challenges**<br>a) Strengths and weaknesses of S&T governance structures<br>b) Is there a need for a TA Institution in Lithuania?<br>c) Main challenges for establishing a TA Institution in Lithuania: possible actors and scenarios<br>Moderators: Dr. Edgaras Leichteris and Dr. Leonhard Hennen |
| **13.00 – 14.00** | **Snacks and informal networking** |

***First National Workshop, 25.05.2012, Vilnius***

***List of Participants***

| | |
|---|---|
| 1) Augustinaitis Arūnas | University of Kazimieras Simonavičius |
| 2) Balkevičius Petras | EKSMA company |
| 3) Bumelis Vidimantas | MOSTA |
| 4) Čenys Antanas | Vilnius Gediminas Technical University |
| 5) Eriksonas Linas | Europarama company |
| 6) Furman Erika | Association of Publishers, Confederation of the Industrialists |
| 7) Hennen Leonhard | Karsruhe Institute of Technology |
| 6) Leichteris Edgaras | KEF |
| 8) Naudžius Kęstutis | Vilnius Science and technology park |
| 9) Jonauskis Mantas | ProBaltic Consulting company |
| 10) Kalytis Romualdas | Ministry of Economy |
| 11) Petrauskienė Jurgita | MOSTA |
| 12) Putinaitė Nerija | Viceminister of Science and Education |
| 13) Razumas Valdemaras | Lithuania Science Academy |
| 14) Schippl Jens | Karlsruhe Institute of Technology |
| 15) Strakšys Artūras | Ministry of Science and Education |
| 16) Ušpuras Eugenijus | Lithuanian institute of Energy |
| 17) Vaitkus Rimantas | Vilnius University |
| 18) Valančiauskas Ričardas | MITA |
| 19) Zabieta Žygimantas | European Leadership Institute |
| 20) Žakaitienė Roma | Lithuanian association of municipalities |
| 21) Žalys Albertas | Ministry of Science and Education |
| 22) Šetkus Kęstutis | MITA |
| 23) Stumbrytė Giedrė | KEF |

***First National Workshop, 25.05.2012, Vilnius***

***Minutes by Edgaras Leichteris***

Moderator Edgaras Leichteris from Knowledge Economy Forum introduced the aims of the PACITA project, partners, main work packages and planned future events.

Introduction to Technology Assessment and Parliamentary Technology Assessment concepts and systems in Europe

Dr. Leonhard Hennen from Karlsruhe Institute of Technology (KIT) and Institute for Technology Assessment and Systems Analysis (ITAS) has introduced the concept of (P)TA, historical evolution, different (P)TA models in European countries, presented an overview of German system and main challenges awaiting countries, which try to implement P(TA) system.

Example on the use of TA for solving complex policy issues: transition of the German Energy System

Jens Schippl Karlsruhe from the Institute of Technology (KIT) and Institute for Technology Assessment and Systems Analysis (ITAS) has presented the case study of the German Energy System and how TA was used to solve complex policy issues.

Comments by selected discussants from the audience

Comments were provided reflecting different angles (policy formation, science, social partnership, implementation).

Overview of Technology Assessment like activities in Lithuania

Dr. Edgaras Leichteris from the Knowledge Economy Forum presented interim results of analysis on Lithuanian system.

Open discussion: identification of gaps and challenges

a) Strengths and weaknesses of S&T governance structures b) Is there a need for a TA Institution in Lithuania? c) Main challenges for establishing a TA Institution in Lithuania: possible actors and scenarios

Moderators: Dr. Edgaras Leichteris and Dr. Leonhard Hennen

Conclusions from open discussion

The discussion was based on the Lithuanian TA country study. It reflected main problems in understanding the concept of TA, strengths and weaknesses of Lithuanian science and technology system. Some were skeptical, but many stakeholders have expressed the positive view towards the TA system in Lithuania, some has showed interest in being the TA institution, but in general there was agreement that it has to be slow process, because Lithuania has too many defragmented institutions, no philosophy of technology and ethics and unrecognized need by politicians. The discussants saw the possibilities starting with informal network of institutions and partnerships, focusing at first on some pilot project activities. The demand of practical examples and trainings on the TA concept with the use of simulation of the whole TA process was also expressed.

The Second Lithuanian National Workshop to be held in September, 2012.

***Second National Workshop, 18.09.2012, Vilnius***

***Agenda***

| | |
|---|---|
| **9.45 – 10.00** | Registration, coffee |
| **10.00 – 10.30** | **Parliamentary Technology Assessment and overview of expanding the concept across Europe**<br>Dr. Leonhard Hennen<br>Karlsruhe Institute of Technology (KIT)<br>Institut für Technikfolgenabschätzung und Systemanalyse (ITAS) |
| **10.30 – 11.00** | **Scenarios for establishment of Parliamentary Technology Assessment institution(s) in Lithuania**<br>Dr. Edgaras Leichteris<br>Knowledge Economy Forum |
| **11.00 – 12.00** | **Comments by selected discutants and open discussion** |
| **12.00 – 13.00** | **Lunch break** |
| **13.00 – 13.30** | **Presentation of Lithuanian case study "Public debates on building up of Ignalina's atomic power plant"**<br>Dr. Edgaras Leichteris<br>Knowledge Economy Forum |
| **13.30 – 15.00** | **Comments by selected discutants and open discussion** |
| **15.00 – 16.00** | **Snacks and informal networking** |

***Second National Workshop, 18.09.2012, Vilnius***

***List of Participants***

| | |
|---|---|
| 1) Auštrevičius Petras | Seimas of the Republic of Lithuania |
| 2) Balsys Linas | Green Policy Institute |
| 3) Eglė Butkevičienė | Kaunas University of Technology |
| 4) Dainė Denisovienė | Ministry of Science and Education |
| 5) Hennen Leonhard | Karsruhe Institute of Technology |
| 6) Leichteris Edgaras | KEF |
| 7) Naudžius Kęstutis | Vilnius Science and technology park |
| 8) Petrauskienė Jurgita | MOSTA |
| 9) Raulušonis Benediktas | Lithuanian Energy Consultants Association |
| 10) Razumas Valdemaras | Lithuania Science Academy |
| 11) Rimkevičius Sigitas | Lithuanian Energy Institute |
| 12) Savickas Lukas | Visionary Analytics |
| 13) Vaicekauskaitė Renata | KEF |
| 14) Vaitkus Rimantas | Visaginas Nuclear Power Plant |
| 15) Valančiauskas Ričardas | MITA |
| 16) Vizbarkienė Jūratė | Ministry of Science and Education |
| 17) Zaicevas Paulius | Photovoltic Technology and Business Association |
| 18) Niaura Algirdas | Vilnius University |
| 19) Steponavičiūtė Ieva | Center of Energy Security |
| 20) Buinickaitė Irena | Office of the Parliament |
| 21) Misevičienė Grytė | NDJ |
| 22) Stumbrytė Giedrė | KEF |

***Second National Workshop, 18.09.2012, Vilnius***

***Minutes by Edgaras Leichteris***

Moderator Edgaras Leichteris from Knowledge Economy Forum introduced the aims of the PACITA project, partners, main work packages and the results of the previous workshop.

Dr. Leonhard Hennen from Karlsruhe Institute of Technology (KIT) and Institute for Technology Assessment and Systems Analysis (ITAS) has introduced the concept of (P)TA, different (P)TA models in old European countries and preliminary findings of the case studies performed in "non-PTA" countries.

Dr. Edgaras Leichteris from the Knowledge Economy Forum presented results of analysis on Lithuanian system, evaluation of potential stakeholders and introduced the proposed "gatekeepers" model as the main recommendation for the future development of PTA in Lithuania. President of Lithuanian Science Academy Valdemaras Razumas and Director of MOSTA Jurgita Petrauskiene reflected with prepared comments on the study and both presentations.

Open discussion was held providing general support for "gatekeepers" model and identifying main risks of future development of PTA in Lithuania (lack of support by politicians, difficulties in possible coordinated actions, etc.).

After the short break Dr. Edgaras Leichteris from the Knowledge Economy Forum presented results of case study "Public debates on Building Nuclear Power Plant in Lithuania". Presentation was commented from different angles by different stakeholders: Member of Parliament, initiator of referendum against nuclear power plant, the manager of the new nuclear power plant project and independent scientist.

Then open discussion was held. Conclusions from open discussion

The discussion on atomic energy case has showed a lot of "for" and "against" arguments, which helped to fine-tune the case study report, but in general both sides agreed that arguments in the case study were reflected objectively and might be a good start for future debates on atomic energy topic.

### *6.6.2 Interviewed Experts*

| Category | Organisation | Expert | Expert´s position | Date of interview |
|---|---|---|---|---|
| Government | MOSTA | Jurgita Petrauskienė | Director | 28 March 2012 |
| Industry | EUROPARAMA | Linas Eriksonas | Consultant | 28 March 2012 |
| Parliament | Union of liberals and center | Gintautas Babravičius | Politician | 28 March 2012 |
| Science | Lithuanian Science Academy | Valdemaras Razumas | President | 29 March 2012 |
| Government | MITA | Kęstutis Šetkus | Head of Department | 29 March 2012 |
| Parliament | Parliament | Petras Auštrevičius | Member of Parliament | 29 March 2012 |
| Industry | Vilnius science and technology park | Kęstutis Naudžius | Director | 30 March 2012 |
| Science | Lithuanian Institute of Energy | Eugenijus Uškpuras | Director | 14 May 2012 |
| CSO | KEF | Haroldas Brožaitis | Chairman | 23 May 2012. |
| Parliament | Seimas (Parliament) | Mantas Adomėnas | Member of Parliament | 23 May 2012 |
| Science | University of Kazimieras Simonavicius | Arūnas Augustinaitis | Rector | 24 May 2012 |
| Science | Vilnius University | Rimantas Vaitkus | Vice-rector | 24 May 2012 |

# Chapter 7 Explorative Country Study: Portugal[203]

Mara Almeida (Institute of Chemical and Biological Technology (ITQB), Universidade Nova de Lisboa)

## 7.1 Description of governmental system and general R&D structure

### *7.1.1 General description of R&D structures, foci and performance*

Over the last decade, the research policy in Portugal has had three main priorities: (1) stimulate the research system to elevate it to the levels of scientific excellence of leading international groups; (2) stimulate the internationalization of the national research community; and (3) set up appropriate machinery to support the research system. In this context, academic research has been a central issue, while strategic and applied research has been given less emphasis.

Recent data indicates that, by 2010, research and development (R&D) in Portugal was mainly conducted within a network of scientific institutions directly dependent on the ministry in charge of science and education, that included research centres (510) and associate laboratories (25) (Science, Technology and Tertiary Education in Portugal, 2011, Minister of Science, Technology and Higher Education, Portugal). R&D is also been carried out through state-managed autonomous research institutions (dependent on a number of other ministries), non-profit private institutions and private companies. Since 2008, funding has been relatively stable, with direct funding from the Government accompanied by similar levels of funding by the private sector. Gross national investment (both public and private) has been of the order of 1.6-1.7% of the GDP (about 2.7 billion euros per year). Further funding has been provided by the European Union (EU) (of the order of 0.4-0.6 billion euros per year) (Science, Technology and Tertiary Education in Portugal, 2011, Minister of Science, Technology and Higher Education, Portugal).

One of the aspects that characterises the Portuguese research system is its centralisation, both in terms of funding and policy design. For many decades, government was by far the main source of financing. The situation has changed over the last decade with arise of significant investments by the private sector. This change, however, did not result in an increased participation of the private sector and other stakeholders in the process of design and implementation of relevant policies. The legal framework foresees the existence of formal structures for stakeholder involvement and participation, but in practice these structures have been operating only occasionally.

### *7.1.2 R&D governance: relevant actors*

In Portugal, governance of the research system is provided at three levels: political (policy-making), operational (financing and implementation) and research performers. The Government and related ministries are central actors in the design of the national policies for R&D. In particular, in the current Government, the Ministry of Education and Science (MEC) and the Ministry of Economy and Employment (MEE) are the most relevant ministries for S&T and innovation policy-making. The implementation of policies is then carried out through state agencies, which distribute available funding to a variety of 'research performers'. An organogram presented in the European Research Area (ERA)-watch 2010 report illustrates how the research system is organised in Portugal (Figure 9). The diagram makes reference to the structure present in

[203] This report is based on published documents, web-sites and interviews with relevant stakeholders in Portugal. Stakeholders representing different sectors of society (academia, media, civil society, etc.) were considered in assembling the information (please see 7.5.2.)

the previous government[204] but is sufficiently similar to the one currently in place to be useful as a basis for discussion. Overall, the governance structure reflects a substantial centralisation of the Portuguese R&D system.

***Governance: Government and Parliament (policy-making)***

The MEC (and formerly the MCTES) is responsible for designing and implementing research policy, as well as for the development of international cooperation and national R&D statistics. The Secretary of State for Science for the Ministry of Education and Science (MEC) has the responsibility to develop the designed research policy. The responsibilities of the MEC also include policies regarding the Information Society programme developed by the previous ministry and the responsibility for coordinating and providing incentive to the R&D carried out in public laboratories (shared with other ministries). The MEC has formal internal advisory bodies: the Coordinating Council of Higher Education (CCES), the National Education Council (CNE) and the Schools Council (CE). The advisory bodies for S&T within the MEC include the National Council of Science and Technology (CNST) and the Academy of Sciences of Lisbon. External advisory bodies also exist, including the Council of Deans of Public Universities (CRUP) and the Council of Deans of Public Polytechnical Institutes. Beside the internal and external advisory bodies, the broad political orientations of the MEC are also defined in consultation with universities and public research organizations.

[204] The government that took office in mid-2011 conducted some structural changes in the organisation of former ministries involved in relevant policy-making. More specifically, the Ministry of Education and Science (MEC) has replaced the two former ministries for Science, Technology and Higher Education (MCTES) and the one for Education, while the Ministry of Economy and Employment (MEE) has replaced the Ministry of Economy and Innovation (MEcI). Additionally, there has been the closure of the Agency for the information society (UMIC) and some adjustments regarding the advisory bodies for the MEC. The Planning, International, Relations and Statistics Office (GPEARI) is now being replaced by the General Directorate of Statistics of Education and Science (DGEEC).

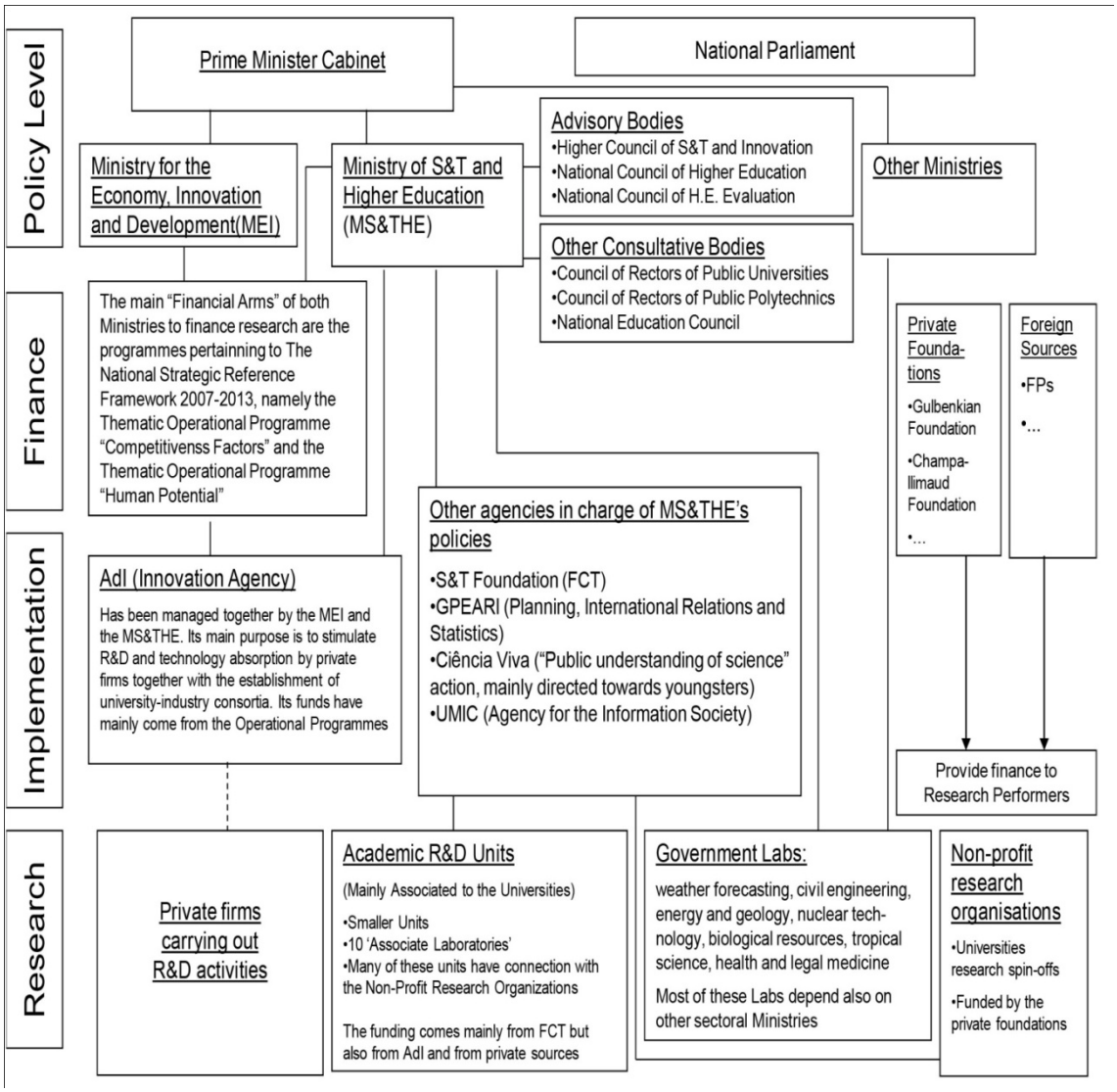


Figure 9: Overview of the Portuguese research system governance structure up to 2010. Source: ERA-watch Country Report 2010: Portugal

The MEE is in charge of promoting research and innovation in private companies. This includes promoting sustainable employment, competitiveness, internationalisation and regional development. Several public agencies also exist to support its mission, including the Innovation Agency (AdI). The current Ministry of Agriculture, Sea, Environment and Spatial Planning (resulting from the merge of the Ministry of Agriculture, Rural Development and Fisheries with the Ministry for Environment) and its depending agencies have responsibilities for specific research issues, mainly addressed through the work of public laboratories.

Aside of Government ministries, the Portuguese Parliament, 'Assembleia da República', is organised in standing committees specialized in a particular matter, some with permanent jurisdiction, others created *ad hoc* for a limited period of time to fulfil a particular function. Some of these committees have a role in the development of policies related to science and technology. As an example, the Standing Committee for Education, Science and Culture legislates, oversees and monitors the development of policies in the all areas of education (from early childhood to higher education) and science (including scientific research, technological development and innovation). Additionally, the Standing Committee for Economy and Public Work exercises its competences and political control by overseeing several other policy areas, including technological development, technology transfer, business, geological resources and energy.

***Governance: State agencies (finance and implementation)***

Funding of the research system is mainly conducted under the authority of the MEC, in particular through its **Science and Technology Foundation (FCT)**. The FCT acts in a similar manner to a national research council, providing the basic funding of academic research units, as well as financing training of advanced human resources and research projects. It provides funds across all disciplinary areas including initiatives which are related with the European Research Area (ERA) policies. The FCT executes policies but it can also advise and make recommendations when requested. The FCT, however, is under the directives of the MEC and, therefore, its autonomy in defining strategic research priorities is limited.

Other important agencies under the same ministry include the **General Directorate of Statistics of Education and Science (DGEEC**)**,** in charge of producing statistical information to enable monitoring the R&D system, and the **Innovation Agency (AdI)**, a state-owned agency funded by the MEE and MEC, whose responsibility is shared by both ministries. The AdI is in charge of the management of most public programmes supporting research, development, technology transfer and the creation of new technology based enterprises. Among other things, AdI is responsible for managing SIFIDE, the programme of fiscal credits to business R&D. In general, AdI is perceived as not having a relevant role and being very limited in its action.

Also relevant to S&T is **Live Science** (Ciência Viva), a national unit in charge of implementing programmes to increase public awareness of science and technology. In the last recent years, Live Science has had a very important role in promoting science in the society, including activities specifically aimed at engaging young people in S&T.

There are also a number of agencies and institutes that follow the directives of the Ministry of Agriculture, Sea, Environment and Spatial Planning, which are not indicated in the organogram but have relevant functions. These include the **Portuguese Environment Agency (APA)**, responsible for proposing, developing and monitoring the implementation of environmental policies (particularly in the context of integrating the environment into sectorial policies) as well being the national authority for Environmental Impact Assessment and Strategic Environmental Assessment. In the field of climate change APA is the Competent Authority for the EU ETS (European Trade Licensing Issue), with responsibilities for national coordination and system administration of the National Registry of Emission Allowances.

Also relevant is the **Institute for Nature Conservation and Biodiversity (ICNB)**, the governmental body responsible for nature conservation and biodiversity policies as well as the management of Protected Areas. The **National Institute for Biological Resources (INRB)** has the mission to pursue research in the domain of biological resources. As such, its policies aim at protecting and adding value to such resources and to back-up policies internally and towards the EU.

***Research performers: academic and state-managed institutions***

Most of the Portuguese scientific research is performed in units of R&D financed and evaluated by FCT. The largest R&D units by number of peer-reviewed publications and research grants include, among others: the Institute of Molecular Pathology and Immunology (IPATIMUP), the Institute for Cellular and Molecular Biology (IBMC) and the Abel Salazar Biomedical Sciences Institute, at the University of Porto; the Institute for Molecular Medicine (IMM) at the University of Lisbon; or the Centre for Neuroscience and Cell Biology at the University of Coimbra. Globally, there are over 380 units distributed across 14 public universities.

Aside of research units directly financed by the FCT, state-managed autonomous research institutions also exist. They include the National Laboratory of Engineering and Geology (LNEG), the National Institute for

the Biological Resources (INRB), the National Institute for Health Dr Ricardo Jorge (INSA), the National Laboratory for Civil Engineering (LNEC) and the Laboratory of Instrumentation and Experimental Particles Physics (LIP), whose activities span from life sciences and medicine to physics and engineering. The International Iberian Nanotechnology Laboratory (INL) is an international research organization in the field of nanoscience and nanotechnology based in Portugal. Several other scientific fields are covered by specialized organizations, recognised for their role as technology business incubators. These include the Institute Pedro Nunes and Taguspark (S&T park).

In general, private Universities have a smaller research output. However, there are a number of research units accredited by the Ministry and the FCT (for example the Facial Emotion Expression Lab at the University Fernando Pessoa). An increasingly large number of Portuguese polytechnic institutions (state-run) have also been established which have expanded their own research facilities. However, their limited research activities are very small when compared to the state-run universities.

#### *Research Performer: Non-profit Private Institutions and Companies*

A number of non-profit private research institutions have been set up in Portugal. Relevant examples can be found in the field of Information and Communication Technology (ICT), such as the Institute for Systems and Computer Engineering (INESC), set up with a focus on the relation between university and industry, and the Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions (Fraunhofer AICOS) aimed at creating scientific knowledge capable of generating added value for its partners, at exploring technological innovations oriented towards economic growth, social well-being, and at improving the quality of life of its end-users.

Other large, non-profit private institutions carrying out R&D in Portugal can be found in the field of biomedical research and include the Institute Gulbenkian of Science (IGC), from the Gulbenkian Foundation, and the Champalimaud Foundation, opened in Lisbon in 2010.

Other examples include the Luso-American Foundation for Development (FLAD), the Orient Foundation (FO) and the Bial Foundation, named after a Portuguese pharmaceutical company.

There is a relatively small group of profit-driven private companies in Portugal which have large R&D units. According to a list of the 100 enterprises with the largest R&D expenditures in Portugal in 2009 (GPEARI, 2011), the business with the highest (intramural) expenditure was the Grupo Portugal Telecom (201million euros), providing services in the ICT sector, followed by Energia de Portugal (59 million euros), working in services for energy and environment. With an R&D investment of 43 million euros, Bial, the biggest Portuguese pharmaceutical company in the country, was in 6$^{th}$ place. These companies, with a strong presence in the international market, tend to carry out R&D in close partnership with several institutions and research centres present in the country.

#### *Other important stakeholders: Associations, Foundations and Public Interest Groups*

In Portugal there are institutions that could be considered as relevant stakeholders as they represent key interests and priorities present in the Portuguese society. These stakeholders range from industry, academia, civil society organizations and foundations. They are sometimes invited to meetings with specific ministries to discuss matters regarding specific policies which are in debate or then to participate in hearings organised by the Parliamentary committees. These are some of the stakeholders participating in discussions regarding S&T and innovation.

*Industry*

Several associations can be considered having a key role in the scope of business development and progress, new skills and supporting innovation. For example, COTEC Portugal, Business Association for Innovation, is a business association for innovation and their associates include a significant number of the largest companies in Portugal. Therefore it is emerging as a central intermediary between the public and the private sector in research and innovation issues. The involvement of COTEC, besides consultation, can derive also from its own initiatives to instigate new policies and measures, or raise concerns in specific areas to stimulate action by policy makers. Similarly, the Portuguese Association for Business, Chamber of Commerce and Industry (AIP-CCI), the Association for Business of Portugal, Chamber of Commerce and Industry (AEP) are also committed to provide support and to contribute to the economic, technical, technological progress of its members. The National Association for Young Entrepeneurs (ANJ) has the goal to support and help developing the professional activities of young Portuguese entrepreneurs by providing training and information. These associations are sometimes involved in discussions with the government in questions regarding economical and innovation issues.

*Academia*

The Council of *Rectors* of Portuguese Universities (CRUP) has a relevant role in the coordination and development of the public higher education. Specially, it collaborate in the formulation of national policies for education, science and culture, give opinion on draft legislation that is directly related to public higher education and pronounce on matters of public higher education budget.

*Civil Society Organisations*

The Association of grant-holding researchers (ABIC) represent the researchers at the early stage of their career (as doctoral students, post-doctoral fellows and grant-holders). The National Association of Science and Technology Researchers (ANICT) aims to represent the interests of all full-time doctoral researchers. Both associations are active in provide a voice and offer support to researchers working in Portugal and to act as an effective partner to facilitate dialogue between the researchers and the government, mainly the MEC, as well as with other organisations that influence science policy. However, their influence is still limited regarding policies for science and researcher interests. In matters of environment, Quercus- National Association for Natural Conservation is the biggest environmental association in the country. It is constituted by citizens with common interests in nature conservation, natural resources, and protection of the environment. Quercus is involved in the organisation of several campaigns and initiatives concerning environmental policies placing a significant pressure in these matters. The PONG-Pescas, represents a platform of NGOs for fishery and it has being having an active participation regarding policies concerning sustainable development.

*Foundations*

The Foundation Francisco Manuel dos Santos was established with the mission of creating a more free and informed society. One of the Foundation principles is that it considers the progress of societies as dependent on citizen participation and public debate in issues affecting their interests. The Foundation acknowledges that participation and debate are dependent on knowledge-based information. To achieve its mission, it has created the PORDATA[205] Contemporary Portugal Database. The initiative has involved the collection, organisation and dissemination of information about Portugal and the Portuguese which has now being extended to Europe. All information is freely accessible on their website.

[205] The PORDATA project has won the World Summit Award (WSA) 2011, a global activity that selects and promotes the world´s best e-content and most innovative ICT (information and communication technologies) applications.

*Associations*

There are several associations including patient associations and the Portuguese Association of Fertility which have a relative influence on policy-making for their interests to be taken into account.

### *7.1.3 Level of funding, funding schemes and programmes*

Due to the clear implementation of national policies designed to increase the potential of the country, the R&D system in Portugal has developed considerably in the last years (Gonçalves, 2011). In the period 2005-2007 Portugal was the EU Member State with the highest growth rate of investment in R&D as a percentage of the GDP - a 46% growth (Science and Innovation country notes, 2010, OECD). In that period, in absolute terms, however, Portugal investment in R&D was equal to 1.2% of the GDP, representing the 15th largest allocation of funds as a percentage of the GDP for R&D among the 27 EU member states at that time. In recent years (2008-9), the investment in R&D grew further, reaching a value of 1.66% of the GDP (ERA-watch Country Report 2010: Portugal). According to the survey for the Scientific and Technological National Potential (IPCTN), R&D in Portugal in 2010 was of 2,747 million euros (representing 1.59% of GDP) indicating a slight decrease (but overall comparable) spending in R&D) a trend also observed in other countries in Europe (General Directorate of Statistics of Education and Science (DGEEC)-IPCTN, 2010).

These figures include investment from both the state and private sector, which since 2007 contributed in comparable amount to the overall expenditure (of the order of 1.3-1.4 billion euros each) (Science, Technology and Tertiary Education in Portugal, 2011, Minister of Science, Technology and Higher Education, Portugal). Using the 2010 figures as an example, a closer look at the breakdown of state-managed funds indicates that, of the total 1.3 billion nominally allocated to R&D, about 0.4 billion euros were allocated through the FCT to R&D units under the directives of the Ministry of Science, Technology and Higher Education (the predecessor of the MEC), about 0.7 billion euros were allocated to the budget for education (also under the MEC), and about 0.2 billion euros were allocated to R&D units (state-managed autonomous institutions) under the directives of other ministries. Additional EU funds (about 0.1 billion euros) were allocated to R&D units under the directive of the MEC. The funding devoted from the state to innovation (under the directives of the MEcI) were significantly lower, with a figure of about 0.3 billion euros (EU funds).

Aside of State-driven funds, a number of both national and multinational high-tech and industrial companies present in Portugal contribute to funding R&D. The number of companies with R&D activity in Portugal is currently close to 2000 (DGEEC-IPCTN, 2010) and, in recent years, they have become major investors in R&D in the country, with levels of investment comparable with than that provided by the state. In particular, according to the OECD, the national funding of gross expenditure on R&D (GERD) has changed significantly, with industry's share increasing from 27% in 2000 to 47% in 2007, while the government's share fell from 65% to 45% (Science and Innovation country notes, 2010, OECD). The IPCTN report also indicates that the business sector has maintained a significant expenditure in the last years, (a position held since 2005), although a decline of around 5% was observed in 2010. However, the investment of the private sector in R&D is still relatively low compared to the European average (DGEEC-IPCTN, 2010). There have been several initiatives to engage private sector with the public sector which have been successful however there are still several problems to solve.

Structural EU funding have further contributed to investment in R&D, with levels of investment of the order of several 100s million euros per year (e.g. about 460 million euros in 2010) (Science, Technology and Tertiary Education in Portugal, 2011, Minister of Science, Technology and Higher Education, Portugal). Funding has benefitted from Operational Programmes, established with the European Commission to build a

platform to develop Portugal's Science and Technology (S&T) capabilities. In the last decades, EU funds in supporting R&D in Portugal have been directed to strategically important areas through specific operational programmes. Between 2000-2006 and 2007-2013, first the Operational Programme for Science and Innovation (POCI 2010) and later on the Human Potential Operational Programme, contributed significantly to increase the funding available to drive R&D in the country. In particular, through the latest operational programme, the National Strategic Reference Framework has been established, under whose auspices three types of measures have been developed to enhance the countries capabilities: PhD and Post-Doc grants to carry out research across a spectrum of relevant fields; promotion of employment of scientists and engineers through specific incentives for their integration in private firms and research entities; measures to support the involvement of graduate students in R&D activities and enhance their international mobility.

During the previous Government, a Technological Plan was also created to support the overall development and implementation of initiatives aimed at increasing the level of maturity of science and technology in the country, including initiatives aimed at increasing average educational levels, and promoting lifelong learning, at overcoming scientific and technological backwardness, and at recognising that companies are key actors in the innovation process. The Technology Plan has been abandoned in 2009. It is not clear how much the implementation of the Technology Plan was successful in developing solid structures of R&D and innovation in the country. Progress has been made but this remains an area where additional improvements can be achieved.

## 7.2 Barriers and opportunities for building up a national TA-landscape

So far, the approach to policy-making adopted by Portugal in relationship to S&T has been of a policy-for-science and not science-for-policy, with relatively little interaction with key stakeholders.[206] The centralisation of the policy-making and policy-implementation into specific ministries (mainly the MEC) generates a governance structure with relatively poor accountabilities to stakeholders. The relatively limited interaction among different ministries results in science policy being potentially inward-looking rather than aimed at supporting the overall advance of the society, both in terms of innovation and relative to broader issues. Normally, top-level coordination between different ministries, even when required, has been weak. Aside of Government ministries, Parliament has very little impact on both the design and implementation of relevant S&T policy, with relative political debate occurring in a non-permanent (non-systematic) manner.

The interaction of policy-makers with stakeholders occurs on a relatively formal and *ad hoc* basis, resulting in a relatively stiff and not fully effective interaction. There have been very little initiatives from relevant ministries (the MEC and formerly the MCTES) to promote wider public debate in S&T matters, including important, controversial issues in which some involvement of key stakeholders would be expected or any experiment with participatory procedures. It is clear that public dialogue should be firmly embedded into policy-making processes however it does not seem to be the case in Portugal.

### *7.2.1 Democratic structures in S&T in Portugal*

#### *R&D system: Government*

Some countries have a relatively centralised decision-making system in matters concerning S&T and innovation, and Portugal is one of the examples. In principle, if effective coordination with relevant stakeholders takes place strategic coordination, accountability and transparency can be maintained. However,

[206] Technology Assessment (TA) is broadly defined as "a scientific, interactive and communicative process, which aims to contribute to the formation of public and political opinion on societal aspects of science and technology" Bütschi, D. et al. (2004).

if insufficient interaction with stakeholders occurs, this type of approach can lead to science been detached from societal issues perceived as important by stakeholders and/or be ineffective in ensuring that scientific and technological advances are transmitted to potential beneficiaries (e.g. businesses).

At a policy level, the governance for S&T is mainly provided by the ministry in charge of science (currently the MEC). A separate ministry (the MEE) has direct responsibility mainly for innovation policy. This separation is replicated at the operational level. The financing of science and the implementation of science policy are generally provided by the FCT (dependent on the MEC) and hence focused on academic research. The agency responsible for innovation (AdI) (dependent on the MEE) has a very limited role in matters related to science policy, despite the fact that the amount of R&D carried out by Portuguese companies has grown significantly (and recently exceeded), that generated in the public sector. As a result of this separation, Portuguese companies are not connected efficiently to the rest of the research system and establish very little partnerships with publicly-funded research performers (e.g. universities) in a manner that would benefit the economic and technological development of the country.

Considering the situation described above, the Portuguese system has been described as having a dual policy, in the sense that separation between science policy and innovation policy exists. In other words, there is a relatively substantial separation between knowledge and information produced by research performers and the potential benefits that could be produced in business and the broader society. Studies of innovation show that a good model for a country that is very innovative is a model in which interactions are systemic and where intense networking and collaboration between public and private entities take place (Hou and Gee, 1993; Edquist, 1997; Galli and Teubal, 1997). Specifically, in technologically advanced countries in Europe and in the USA, the research system and its governance are more complex (wider networks and more participative modes of interaction of stakeholders) and therefore ensure a wider and more effective participation to relevant policy-making and a greater impact of the knowledge produced by science on the society (Edler *et al.*, 2003, Flanagan *et al.*, 2011). In such countries, innovation is not a mean by itself but rather a way to gain or maintain competitiveness despite the challenges introduced by globalisation. It is crucial for the innovation systems that the actors interact closely, but in Portugal they connect to an insufficient extent. However, some initiatives such as set-up of technology polls and clusters have started to change the dynamic of collaboration.

In the recent past, there have been some attempts by different governments to make the Portuguese system less centralised and more open to the interaction with relevant stakeholders. There were attempts to mimic what happens in some countries in Europe, for examples concentrating on a deputy minister of the Presidency of the Council of Ministers all science and innovation policy (or at least that relevant to a number of areas such as environment, sustainability, etc.) to enable a more 'horizontal' (cross-cutting) approach through the responsibilities of the different ministries. These attempts, however, did not seem to have led to a permanent structure of this type.

An important consideration is that the existence of operational programmes under the European Community Support Frameworks provided ministries, and particularly the ministry responsible for research, a significant independence to manage funding to address scientific and technological issues. Aside of producing significant advances, this has the potential to lead to the ministry recipient of such funds to act without discussing strategic priorities with other ministries and stakeholders.

#### *R&D system: Parliament*

According to some analysts, the role of Parliament in S&T policy making is very limited and in situations of controversy has had an insufficient intervention (Pereira *et al.*, 2010), since the Parliament does not have the institutional means for any intervention to be more permanent. Even more, according to some of the

interviewees, the Parliament does not have the means to form an opinion based on evidence, since the use of external resources (expert opinion) is episodic rather than systemic: the use of parliamentary hearings without the ability of commissioning detailed studies does not allow for structured opinions to be formed in support of the parliamentary activity. Opinions arising from parliamentary hearings tend to be generally difficult to integrate in the formation of the parties' political opinion.

Currently, a standing commission dealing with "Education, Science and Culture" matters exists, but analysis of the minutes of this commission over the most recent years shows that only recently it has initiated substantive activities directed towards analysing scientific issues. The absence of permanent, systemic structures at the interface between science, parliament and the broader society is an important characteristic of the current Portuguese system. Examples of relatively recent works of the parliamentary committee for Education, Science and Culture are described below.

In 2009, the Standing Committee for Education and Science produced a report entitled "Relatório sobre Ciência" (Report about Science) considering R&D structures in the country and the importance of R&D investment for an economic and social growth. One important aspect of this report was the reference to the importance of developing an office for S&T in the Portuguese Parliament. The report has led to a "Resolução da Assembleia da República nº 60/2009" in which the Parliament will resolve to:

"(1) Build an institutional platform that promotes the meeting of politicians and scientists in order to provide timely and instrumental form, quality information, timely and usable on all controversies and scientific implications that determine or are consequences of public policies, anticipating or evaluating human impacts, social, economic and environmental policies built in Parliament;

(2) Pursue a feasibility study for the possible establishment of a Parliamentary Office of Science and Technology;

(3) Promote efforts to enable the future membership of the "Assembleia da República" to the European Parliamentary Technology Assessment (EPTA) network;

(4) Promote efforts to enable the future membership of the "Assembleia da República" to the Inter-parliamentary Space Conference".

This resolution has only recently been considered in Parliament since previously no action took place. It was only in October 2011 that, according to the proposal of the Chairman of the committee for Education, Science and Culture, the appointment of a rapporteur to reflect on the matters of Parliamentary Technology Assessment (PTA) was approved. The mandate of the rapporteur was to consider and evaluate the operationalization of the resolution, to gather information regarding the ETPA network, to provide a map of the different models of PTA in Europe and to submit a proposal for approval by the committee. Recently (2012), the rapporteur has prepared a report proposing a model for a PTA unit to be established within the Portuguese Parliament. This report seems to have being approved by the committee and is now under consideration by the President of the Portuguese Parliament.

In 2010, a report regarding issues such as research financing, careers and opportunities, research evaluation, research in polytechnical institutes, etc. was commissioned by the committee for Education, Science and Culture to different experts. This report, named "A Ciência em Portugal" (Science in Portugal), was subject to comments by the different Parliamentary groups and the final report was discussed in a session open to the public.

***Technology Assessment in Portugal: existing structures***

In Portugal, there are some bodies for policy consulting in the field of S&T that could be considered as carrying out some kind of Technology Assessment (TA) activities. These structures have mainly an advisory role, executed by producing reports or opinions which can be then requested by the Government or Parliament. The role of theses structure, together with examples of their interaction with the Government and Parliament, is described in the following paragraphs to illustrate the current level of interaction between policy-makers and relevant stakeholders in Portugal. Aside of bodies whose main purpose is to provide relevant advice, universities and consultancy firms may carry out specifies studies when requested by the Government.

One of the main advisory bodies for S&T matters is the **National Council of Science and Technology (CNCT)**, recently created as part of the organic structure of the MEC. The CNCT is a consulting body for "cross-cutting science and technology matters". Its members are expected to advise the Government on matters related to science and technology in order to contribute for the definition of national policies and strategies. The composition of the council is already known however is still not clear how it will be operating. The CNCT is composed by academics and experts in S&T.

The **Academy of Sciences of Lisbon** has a vast mission including to assist the government as an advisory body on scientific and linguistics issues of national interest. However, it seems that the Academy role is not as visible and their initiatives are not widely promoted. It is not seen as a key stakeholder for supporting policy-making despite its position.

The **National Council of Ethics for Life Sciences (CNECV)** is an independent body created in 1990 for the purpose of "analysing systematically the moral problems which arise out of scientific progress in the fields of biology, medicine or general health care". It acts as a consultative body working alongside the Portuguese Parliament. Diverse entities are entitled to request opinions from the CNECV - the President of the Republic, Parliament, members of Government, entities entitled to member status, public or private centres practising techniques connected in some way to the fields of biology, medicine or health care - and the Council may issue pronouncements on diverse themes. The Council has been involved in issuing opinions on current ethical themes as the one produced on "Medically assisted procreation and surrogate pregnancy", requested by the Portuguese Parliament as it has been an issue recently in debate. Specific reference to this council is made in the case study (section 4). It is composed by individuals qualified in the ethical issues raised by life sciences and includes two individuals from law, sociology or philosophy.

The **National Council for the medically assisted procreation (CNPMA)** is composed of nine individuals of recognized merit to provide a higher expertise regarding ethical, scientific, social and legal questions for the medically assisted procreation (PMA). Five of these individuals are elected by the Parliament and the four remaining are chosen by the members of the Government responsible for health and science issues. The CNPMA has been established with the mission of addressing the ethical, social and legal questions generated by medically assisted procreation. The CNPMA is a national council under the umbrella of the Portuguese Parliament providing recommendations regarding issues for the PMA to the Government. Specific reference to this council is made in the case study (section 4).

Besides being supported by the National Council of Ethics for Life Sciences, the research ethics for medical research are also matter of the **Centres of Reflection**. The Centres of Reflection considers bioethical issues reflecting national health policies and produce guidance on these issues for other bodies to consult. Another level of review in ethical matters is provided by the Ethics Committee for Clinical Research (CEIC),

answering to the Minister of Health. The CEIC is responsible for receiving applications for ethical review and for monitoring the work of Health Ethics Committees[207].

The **Economics and Social Council (CES)** of Portugal "is an auxiliary constitutional body set up to advice the government and provide a forum for consultation on economic and social policies." The aim of the CES is to promote the involvement of economic and social operators in the government's decision-making process on socio-economic issues; it provides a forum for dialogue between social partners and other civil society organisations. As part of their work, the CES prepares opinions on draft legislation and economic policy programmes when requested by the government or on its own initiative. Moreover, through its Standing Commission for Social Consultation, the CES promotes social dialogue and negotiations between the government and the social partners. Examples of the work produced by CES are their "initiative opinions" on the "The future of the euro zone", 2010; or "People with disabilities: mobility, education and work", 2008.

The **National Council of Environment and Sustainable Development (CNADS)** was established by the different country states including Portugal as a consequence of Principle 10 of the Rio Declaration, which points out that "Environmental issues are best handled with participation of all concerned citizens, at the relevant level". CNADS is an independent body working alongside the Minister of Environment whose mission is to advise the members of the Portuguese Government, public entities and NGOs on all matters associated with the environment and sustainable development. The CNADS provides also a forum for the design and implementation of environmental and sustainable development policies. It has produced documents in themes such as energy, climate change, farming, and health, for example: "Advice on genetically modified organisms", 2005; "A reflection on Energy and sustainability", 2007; a "CNADS statement on the challenge of climate change", 2007. This year has produced an opinion on "Climate Change, Energy and Food Security in the Framework of Sustainable Development".It is difficult to evaluate the impact or in which manner the work developed by CNADS has been taken by Parliament or society in general. The reports produced by CNADS are freely accessible on their website but is not clear how they are being promoted in the society or if they create any debate.

These structures are not perceived as sufficient to ensure proper TA (rather, they are very much seen as forums and think tanks). One specific weakness of these structures is that they show a limited influence, since they do not communicate their ideas to stakeholders and the media to promote a wider debate. In the national workshop held also to support the preparation of this document, this was considered an important barrier since, if these forums had to work in a perspective of supporting the political decision-making, surely they would need to have a greater power of communication and a much bigger influence over a wider audience.

Besides advisory bodies, institutional structures fully dedicated to TA functions do not exist. For suitable TA structures to be formed, it seems important to develop a consistent and systematic integration process with the participation of the different stakeholders. However, in Portugal, the culture of working in partnership to reach a common goal is traditionally not always present and it is difficult to negotiate competences and accountabilities between different other actors. Nevertheless, things are changing and more than ever there is the need and determination to develop a more robust approach.

### *7.2.2 Public Debate and engagement on S&T issues*

In 2001, Portugal was described as a country with a low knowledge levels in the *Eurobarometer 55.2* (Miller *et al*., 2002), a survey carried out by the EU. In this survey Portuguese citizens scored the worst in science-

[207] The Health Ethics Committees were created to review biomedical research. For example, the CEIC can appoint a Health Ethic Committee to review a clinical trial and report back in order for CEIC to be able to carry out its mandate.

related questions in the EU. In addition, Portugal was shown to be one of the countries in Europe with the less interest in S&T related issues. Less than 23 per cent of Portuguese people were reported to go to museums, libraries or art galleries in a period of one year (Research-EU, 2001). Other studies have found that more than two thirds of the Portuguese have a distant relationship with science, illustrating a limited interest in acquiring scientific information. In 2010, the *Eurobarometer 340* survey on science and technology still shows a similar trend as 35% of respondents in Portugal are not interested at all in scientific discoveries and technological development. However, 57% of the correspondents feel poorly informed regarding these issues.

In comparison with other European countries, in Portugal there is no major tradition of promoting science communication. However, in the last years, there has been an increased presence of science in the public sphere, as some policy-makers have insisted that the success of scientific entrepreneurship depends on science articulation with the public domain.

In this context, there has been public funding to support the presence of science in the public space, including programs on the radio, on television, etc. Specifically, an important national agency sponsoring the diffusion of science and technology in the country has been established (Ciência Viva, 'Live Science'). Live Science has done a considerable effort in the past years to raise science and technology awareness in the general public, including activities to encourage the interaction between the scientific community and the society. However, aside of raising general awareness of S&T, there are no major systematic initiatives to stimulate debate of ideas and public participation in S&T questions/problems relevant to modern societies.

Nowadays, a growing number of scientific institutions independently encourage public awareness through their own campaigns, aimed at establishing strong links between the educational system and their community, and having their own, local, 'science weeks'. Currently, most large scientific institutions have an office for science communication involved in organising this type of activities. The formal education, the media, science-related centres (e.g. museums), national agencies have all an important role to play in disseminating S&T and raising their profile in Portugal. However, it is becoming increasingly clearer that the scientific community itself has also a role to play in making S&T meaningful to communities, by keeping the society informed of their work and of its implications. In order to do that, the scientific community has to develop an integrated view of the complex issues facing society and keep their work relevant and up to date. It is essential that the number of individuals thinking about these issues technically, economical and at a social level increases. It would be also important for the S&T debate to take into account the interests of stakeholders, including the general public. A two way dialogue between the scientific community and lay audiences would benefit the economy as well as the level of democratic engagement of the Portuguese, with important consequences on the future of its S&T.

#### *Examples of topics recently debated*

There are two publications on Science, Technology and Governance in Europe (STAGE publications, João Arriscado Nunes e Marisa Matias, discussion papers 21 and 22, 2004) that have discussed in detail these matters and the interaction of the different stakeholders in relationship to these topics. These reports are relatively old but provide good examples to illustrate how science and technology hot topics have been debated in the past years in Portugal.

According to these sources, the most controversial S&T issues that led to public debates during that period (1990s-2004) were related to environmental policies (especially waste management), genetics and biotechnology. Other specific issues that were debated include cases of conflict between national heritage and technological development (in particular the finding of paleolithical engravings in an area-'Foz Coa'-

where a big dam was planned, cases related to public health (in particular the case of the BSE-the 'mad cow' disease) and cases related to controversial military practices (the use depleted uranium in ammunition).

Both publications reflect on the fact that, despite significant differences in the nature of the issues in question, these cases showed a tendency to exclude lay citizens from the debate, rather accepting them as legitimate participants in public controversies involving S&T. These sources also noted a trend towards narrowing the spaces and mechanisms of participation of stakeholders and the dismissal of the views of those stakeholders dissenting from the official views. They also emphasised a lack of engagement or at least visibility of the relevant ministry at the time (MCTES) in the debate. All these issues have undermined the confidence of stakeholders in their ability to influence the debate.

The main driving forces behind any escalation of important S&T matters to the public arena have been environmental organisations or, organised groups of scientists, and local-level citizen movements (sometimes accompanied by MPs and local political leaders), often resulting in public protests. In these instances, debate has generally received good coverage by the media, in both national and local political debate. In some cases, the media, especially the TV, have organised specific programmes dedicated to discuss S&T matters, inviting subject experts. The national press also provided substantial coverage for issues having a strong public support, such as in the case of the waste management.

Despite clear examples of public engagement on specific topics, according to many interviewees there is a need to improve the debate on issues of S&T regarding, for example, food security, water and energy. It is also prevailing opinion that is essential to have a public debate that can formulate opinions and positions which can realistically lead to the development of policies.

### *7.2.3 Policy advice*

The predominant view by a spectrum of the Portuguese society is that politicians prefer to have information that can justify their positions and not information that assist them to consider the best options. This reflects the general lack of trust of many citizens in the institutions as much as the lack of desire of politicians to look for sound advice. Among other factors, the lack of public trust is likely to be a result of the lack of transparency of decision-making processes and their underpinning information, as well as of a general lack of engagement of large fractions of the society in policy-making. Public trust is often significantly increased if transparency and engagement are also increased.

There are a number of public bodies purposely-established to provide advice to policy-makers in respect to issues relevant to S&T. There are also numerous institutions (including universities) potentially able to provide relevant advice. However, most of the communication between potential knowledge providers and policy-makers does not occur in a systematic way, but rather depending on the decisions of policy-makers to ask advice. Aside from a formal advisory body currently present within the Government (the National Council of Science and Technology, CNCT), and other previously-mentioned national councils, communication channels between policy-makers and other potential knowledge providers are less clearly defined.

Members of the scientific community, experts or members of civic associations are often invited by the different Parliamentary Commissions to provide their expertise relative to specific topics. Other stakeholders are also invited to provide their opinions or views. There are specific activities in the Parliament (for example 'Café Ciência', organised by the national agency Live Science) in which members of the Parliament, scientists and other stakeholders are invited to attend and discuss specific topics. The Government also tends to consult with relevant actors in the initiation stage of new decision processes (e.g. public organisations).

Members of the Parliament are also often invited to workshops and seminars to give their view on a specific matter or engage them on an issue in debate. Some of these activities are organised by national foundations, universities and other public institutes. In this context, however, communication channels seem fragile and dependent of the continuous will of interacting between specific stakeholders.

### *7.2.4 Science/Academia*

In Portugal, the institutions most active in TA are academic. There are at least two institutes for social studies that include activities relevant to S&T in the country: the Centre for Social Studies (CES) from the University of Coimbra, and the Research Centre for Enterprise and Work Innovation (IET) from the University Nova de Lisboa. Both institutes have doctoral programs related to TA. At the University Nova de Lisboa, the Faculty of Science and Technology has a PhD Program on Technology Assessment that started in 2009-2010, aiming specifically at training researchers and professionals in TA in Portugal. In Coimbra the PhD Programme focuses on Governance, Knowledge and Innovation (with some emphasis on Social Impacts of Science and Technology) and is jointly organized with the Faculty of Economics. A master's program with components relevant to TA (the Master of Economics of Management in Science and Technology) also exist at the Technical University of Lisbon (ISEG).

The academic institutions active in TA have in their master and PhD programmes components that have to do with evaluation of science and technology or with technology evolution. Research in other fields such as Foresight and Environmental Assessment is limited[208]. There are several groups working in the field of Science Communication, most of the times part of the communication department of the research institutes. One of these groups ('Comunicar-Ciência', a team formed by a combination of scientists and science journalists) is dedicated to training Portuguese scientists to communicate with the media and the public and to promote dialogue between scientists and journalists. Most of the times the work developed have a pedagogic aspect and does not involve the public in the evaluation of S&T issues.

Established as the Portuguese branch of an international organisation based in Switzerland, the International Risk Governance Council (IRGC) of Portugal is an independent organisation whose work includes developing concepts of risk governance, foreseeing major risks, and delivering risk governance policy recommendations for key decision makers. Established as a research consortium initially engaging with a group of Associate Laboratories and the two main Portuguese engineering schools[209], IRCG Portugal is now planning to evolve towards a larger collaborative platform involving a number of other research units, Associate Laboratories, corporations and non-governmental organizations. IRGC Portugal intends to be a research platform integrating competencies and articulating stakeholders towards an improved understanding of emerging risks relevant to Portugal. It intend to do so by fostering the design and implementation of knowledge-based policies and by operating as a think-tank, aiming to anticipate major risk issues and providing policy recommendations for decision makers, in particular those related to science and technology in Europe and throughout Portuguese speaking countries.

Aside of academic institutions doing TA-relevant work, in Portugal there are platforms which help stakeholders to connect and collaborate. An example is "GrEAT-Avaliação de Tecnologia" (Study Group on Technology Assessment), founded in 2010. This Study Group was born from the joint collaborative activities of a PhD Program in Technology Assessment that started in 2009 in the Faculty of Science and Technology at the Universidade Nova de Lisboa and the Institute for Technology Assessment and Systems Analysis of

[208] There are a Post-Graduation in "Foresight, Strategy and Innovation" and an "Advanced Seminar on Scenario Planning and Strategic Agility" at the ISEG. In the PhD Program on Technology Assessment at the University of Coimbra (FCT-UNL) research work in this area is also being developed. Some work in environmental impact assessment is also being developed in the Institute of Social Sciences of the University of Lisbon.

[209] The Instituto Superior Técnico, IST-UTL, in Lisbon, and Faculdade de Engenharia da Universidade do Porto, FEUP, in Porto.

the Karlsruhe Institute of Technology (ITAS). The platform aims to promote the reflection on the concept of Technology Assessment and combine the interests in the subject.

A platform designated 'Biosence' has also been recently developed. Bioscience is a platform aiming at incentivising the involvement and cooperation between scientific institutions and society. It is directed at universities, research centres, students, organizations, citizens and communities. The objective of this initiative is to develop collaborative research-action projects intersecting social sciences, life sciences, health and environment, aiming to produce the knowledge contributing to solve problems identified by society. The themes and range of the projects currently being developed are very diverse in nature (information is openly available on their website). The projects involve societal groups such as association of patients, small communities, schools and members of the scientific community. The aim of this platform is to create dialogue between society or representatives of specific groups of society and the scientific community to deal with a question or problem on which society would like to act but does not possess the tools to intervene on. One of the projects, designated "Trios-individual networks linking the scientific community, policy making and media", seem of interest to TA activities, since it aims promoting opportunities of dialogue and interaction between the scientific community, the political community and the media, by empowering individuals to facilitate/mediate such interaction, and by creating networks of individuals interested in having S&T in the public policy agenda.

## 7.3 Policy options and national recommendations

### *7.3.1 Analysis of the current situation*

One of the central conclusion of this report is that, in Portugal, policy-making processes related to S&T are not sufficiently informed by relevant sources of knowledge and do not sufficiently take into account the input of key stakeholders, their interests and priorities. The key question in this regard is to how this shortfall in the policy-making processes can be solved.

There are a number of factors indicating that there are opportunities for establishing effective TA structures in Portugal. In particular, there is an established scientific community with expertise in different fields relevant to S&T, whose advice and consulting capabilities could be drawn upon. There are also structures in the Portuguese Parliament and within the overall organisation of the State with which a constructive dialogue can be established. However, the existing expertise is not well organised and systematic communication links between policy makers and potential suppliers of information and knowledge are not always well established. Therefore, it becomes imperative to improve the communication channels between them.

As a first step to enhance the development of TA structures, it seems important to develop a map of the knowledge and expertise existent in the country to draw up from and be able to establish partnerships for different topics. This would also allow the development of a sufficiently large community with expertise in a variety of relevant themes. This community could work in articulation with a TA structure in elaborating technically competent and well informed positions that could be considered by the Parliament. The work done by the national councils should also be considered to create an effective dialogue. In this process, it is important to consider the framework of the existent structures and their current fields of action (e.g. like agriculture, economy, etc.).

As discussed in the second national workshop held in Lisbon in September 2012, a key consideration in establish a dedicated TA structure in Portugal is that it is crucial to have a landscape vision of relevant existing structures, to ensure that any newly established function is complementary to and well-coordinated with already available functions. The view emerging from such workshop was that, for an effective TA structure to be established, it is important to identify what structure (e.g. Parliament) is going to support and

clearly define its specific function, explaining how it differs from other existing structures and what added value it brings to them. Such TA structure would need to operate as a partner of the existing structures and be able to cope with their natural evolution.

One of the main barriers in the development of effective TA in Portugal is the influence of culture. The past tendency to an authoritarian mode of exercising power, with little interaction of rulers and policy makers with the civil society (including the scientific and technical community) has led, in a lot of the cases, to a mentality of acceptance of the rules without the need of contributing to the political debate. The already mentioned lack of trust also results in the Portuguese being hesitant in developing collaborations and partnerships.

It is important to recognise that this situation is exacerbated by the fact that even relatively recent Governments and, maybe to a lesser extent the Parliament, often failed to respond constructively to public and civic mobilization. Despite the actions of stakeholders (like advisory structures previously mentioned, civil society organizations, for example, environmental Non-Governmental Organization (NGO)) in developing initiatives (including reports) aimed at improving public engagement or other TA-relevant aspects, there been rarely any consequences or impact on policy-making. The structures of State are entangled in a bureaucratic compliance which makes it very difficult to accept participation of the civil society. In addition, there is a lack of critical mass and a relatively weak accountability to stakeholders for decisions with social, economic and environmental impact. Most of the interviewees have suggested that, when exist, relevant information is often used by politicians in a subjective manner rather than to help a balanced assessment of different options. They suggested that policy makers of S&T have sometimes been using information produced by existing TA-like structures as a justification for their own ideas rather than as a way to promote debate. Differently to what happens in other European countries, there is no “tradition” to request advice, information or to consult with the different stakeholders. In summary, policy-advice or TA exercise in several of the relevant issues in debate is not part of the political process in Portugal, indicating this could be the biggest barrier for the institutionalization of TA.

Not all responsibilities, however, lie with policy-makers. It is important to recognise that distance between scientists and policy-makers has been developed on both sides, since very often academic actors display a hesitant attitude in engaging with the outside world to ensure that their work is sufficiently focused on matters which are important to stakeholders.

Independently of the model with which it could be developed, the establishment of a structure or unit for TA that would work specifically for the Parliament was considered by all the interviewers as to be essential for the development of the country on a political, social and economic level. Therefore, it is crucial establishing a platform of Technology Assessment for the Parliament and give it appropriate profile on the agenda of academia, business, civil societies and media to influence the Parliament in giving this issue due consideration.

### *7.3.2 Policy options*

Technology assessment (TA) provides a series of tools able to support policy-making, more specifically "a tool of policy analysis of emerging technologies." TA is an instrument that not only supports parliaments and governments but also other stakeholders in decision-making and in developing strategies around the topics of science, technology and innovation (Deuten *et al.*, 2011). The development of a structure that can provide expert opinion in questions regarding, for example, energy, water supply and food production, etc., thus supporting the promulgation of knowledge-based policies is essential for a country. The question is what type of TA structure could be or should be developed in Portugal?

Some of the possibilities include establishing a unit inside the Parliament, establish an independent institute outside the Parliament or to expand and strengthen the mission of an existing institution to formally make it accountable of a TA function. Another possibility would be for this mission to be taken up by a Foundation with an interest in TA activities. In the national workshop the discussion was not so much centred on the best model for TA to be applied in Portugal, but rather on the analysis of how the policy-making processes are supported with relevant and independent information. Considering the Portuguese situation, establishing a unit inside the Parliament was identified as a good option, since this option would very likely create the strongest lines of communication with the Parliament and be the most effective in breaking the isolation of decision-makers from potential suppliers of information and knowledge. If TA in Portugal was to be established through a dedicated unit for S&T Assessment inside the Parliament, this unit would need to provide a sufficiently independent interface between the Parliament and the scientific community, to be able to produce unbiased scientific and technological analysis and gain the confidence of stakeholders. This Parliamentary Technology Assessment (PTA) structure should provide systematic and organized information confronting the advantages and disadvantages of the various views and options, including an evaluation of the no-action scenario. This unit would also need to be articulated with citizens, enhancing the value of the debate concerning issues of S&T. The creation of such unit should be done in articulation with the different national councils, relevant academic, experts, previous and current members of the Portuguese Parliament, representatives of civil societies and public institutions, taking into due consideration the difficulty in mobilising relevant stakeholders in the present economic and political climate.

### *7.3.3 Next steps*

The next steps that should be taken in order to further develop TA in Portugal are to mobilise the relevant stakeholders in the debate for action. The debate should include a different range of experts, businessmen and members of civil society organisations as well policy-makers. There needs to be an inclusive dialogue, not just restricted to the academic sphere. The success of any initiative aimed at institutionalising an effective system of TA lies on the integration of diverse experiences and views, in a common effort to create the right conditions for change to occur on both a cultural and political level. Efforts should be made to involve policy-makers and stakeholders in activities that encourage the interest and the need for information in policy-making processes.

The Parliaments and Civil Society in Technology Assessment (PACITA) (http://www.pacitaproject.eu/) initiative has the potential to support TA processes in Portugal firstly by providing the opportunity for a clear and open debate on the issue of TA, giving space to a broad range of actors and stakeholders currently not effectively connected to the TA dialogue. PACITA would also provide a good opportunity to access TA practices developed in other countries, as well as concrete examples of how TA methodologies can be applied, which could have an important role to play in future developments. The participation of relevant stakeholders in the National workshops has provided a very good basis for discussion and relevant feedback related to the report. Further dissemination of the report among other stakeholders is likely to further strengthen the basis for interaction, cooperation and discussion among interested parties and eventually lead to a creation of a solid TA platform.

## 7.4 Case Study – Parliamentary Debate on Medically Assisted Procreation

#### *Introduction*

In Portugal, the development of technologies for medically assisted procreation and the consequent need for appropriate regulation have encouraged several parliamentary debates around different legislative proposals. In this section the political debate regarding medically assisted procreation will be discussed analysing the

structures and processes of policy-making that were involved and to illustrate the interaction of the different actors.

In the Portuguese Parliament, the first references to the context of the biomedicine of reproduction dates back to the 1980s. For example, a parliamentary debate related to international developments regarding new techniques of reproduction, with the first case of *in vitro* fertilization (IVF) occurring in the United Kingdom in 1976, took place in Portugal only in 1986. After a relatively long period of impasse[210], the guiding rules for accessing and using medically-assisted procreation techniques were finally defined in 2006, with a large time delay compared to most other European countries, almost 26 years later after the first IVF baby was conceived in the UK. This long period of time was characterised by the absence of specific legislation, lack of information and gradual growth of the number of public and private centres for treatment, with all the intrinsic risks associated with the case.

The Parliamentary initiatives that eventually resulted in the approval of a law regulating medically-assisted procreation, originated in 2005, when four bills presented by different parliamentary groups were brought to the attention of the Portuguese Parliament. The parliamentary work that lead to the approval of the law (Law no. 32/2006, 26 July) was informed by the consultation with both relevant technical experts and the civil society, and stimulated several debates in hearings and conferences.

#### *Content of the law on medically assisted procreation (Law no. 32/2006, 26 July)*

According to the Law no. 32/2006, 26 July, the medically assisted reproduction, also designated medically assisted procreation, is the process whereby different medical techniques are used to assist human reproduction. According to the law, these techniques were to be applied only in infertile couples. PMA techniques considered legally acceptable included intrauterine artificial insemination, *in vitro* fertilization, intra-cytoplasmic sperm microinjection, the transfer of embryos, gametes or zygotes and pre-implantation genetic diagnosis.

Undoubtedly, Law n. º 32/2006, 26 June represented a decisive step forward in the field of assisted reproductive technologies in Portugal. It offered for the first time a coherent and comprehensive framework regulating a matter that for a long time remained not covered by any regulation, allowing unfertile couples the fundamental right to start a family to be attained. Since then, there have been many citizens given the opportunity to become parents benefitting from crucial scientific advances in the field. This year, after almost six years since the approval of the first law regulating medically assisted procreation in Portugal, the Parliament considered essentially making an initial assessment of its validity and efficacy, providing a response to shortcomings identified in its application, and adapting it to the current scientific knowledge.

#### *Proposed alterations to Law no. 32/2006, 26 July*

In 2012, four bills were presented by different parliamentary groups in the Portuguese Parliament, proposing amendment to the Law 32/2006, 26 July regulating medically assisted procreation. The proposed bills were aimed at:

- "providing exceptions to the prohibition on the use of surrogate motherhood" -Bill nº 131/XII (1ª), presented by the parliamentary group of the socialist party (PS)

[210] In 1999, an attempt to approve a law trying to frame the numerous and complex issues of medically-assisted procreation failed due to a Presidential veto.

- "widening the scope of beneficiaries to the techniques of medically assisted procreation and assuming the use of surrogate motherhood" -Bill nº137/XII (1ª), presented by five members of the parliamentary group of the socialist party (PS)

- "regulating the use of techniques of medically assisted procreation"-Bill nº138/XII (1ª), presented by the parliamentary group of the social democrat (PSD)

- "ensuring access of all women to medically assisted procreation and regulating the use of surrogate motherhood"-Bill nº122/XII (1ª), presented by the parliamentary group of the left bloc (BE)

The bills proposed by the parliamentary groups of PS and PSD seek the revision of the legislation regulating medically assisted procreation by proceeding to the exceptional use of surrogate motherhood and by accepting specific amendments to the legal framework. The bills subscribed by five Members of the parliamentary group of PS and of BE, respectively, also allow the use of surrogate motherhood, allowing, however, other changes in the law with regard to the use of PMA (set as a complementary method of procreation) and the scope of its possible beneficiaries.

In order to consider the amendments to the existing law proposed by the bills, following a request by the President of the Portuguese Parliament, two rapporteurs were appointed, one by the Parliamentary committee for Constitutional Affairs, Rights, Freedoms and Guarantees (CACDLG), the other by the Parliamentary committee for Health. The rapporteurs were charged to produce an opinion regarding the bills nº 131/XII (1ª), nº137/XII (1ª) and nº138/XII (1ª) that was then discussed and voted by the respective committee.

The opinions related to bill nº122/XII (1ª) (the first to be presented) were followed by a single technical note (as an attachment prepared by the services of the Portuguese Parliament). This technical note indicates that the bill takes on board the opinion of experts and associations with a stake in relevant issues, particularly with regard to the rights of parenting to ensure women access to PMA techniques and the establishment of parenting without discrimination. However, in the technical note there is no indication of the expert's background, no explicit record of their opinions or of the information provided as input to their analysis. The technical note includes contextual information relative to the situation in other countries as well as a bibliography that references work produced in Portugal and elsewhere. However, it does not include a relevant analysis of the medical, social or economic impact regarding the issue of medically assisted procreation.

The CACDLG and committee for Health were of the opinion that the bills meet the constitutional and regimental requirements to be discussed and voted in plenary. Both committees stated on their opinions a request to be made to the National Council of Ethics for Life Sciences (CNECV), the National Commission for Data Protection (NCDP) and the National Council for the medically assisted procreation (CNPMA) of their views on the matter. On 20 January 2012, two of these bills (Bill nº137/XII and Bill nº122/XII) are rejected by the Parliament. The two other continue to be debated under the Parliamentary committee for Health.

From a TA prospective, it is important to point out that all of the bills have taken into account some of the recommendations contained in a report produced by the National Council for the medically assisted procreation (CNPMA). Additionally, all proposed bills were submitted for consideration to the Superior Council of the Public Ministry, the Bar association, and the Superior Council of Magistracy. It is not clear if further opinions or studies were requested to other institutions, for example to consider specific social or technical issues.

The Bill nº 131/XII (1ª) and Bill nº138/XII (1ª) are now being considered by the Parliamentary committee for Health, which has been conducting hearings with relevant bodies and experts. So far, six experts and seven bodies have been heard, including the Portuguese Association of Fertility, the National Council of Ethics for

Life Sciences (CNECV), the National Council for the medically assisted procreation (CNPMA) and the Portuguese Federation for life. The opinions provided so far mainly expressed a view on the use of surrogate motherhood and what type of regulation should be considered (since the bills in discussion at the moment do not considered extending the use of PMA to other beneficiaries). The hearings are accessible by audio in the Parliament website.

***Studies supporting the parliamentary debate***

It will be important to analyse in the light of this report, the institutional contributions and studies provided to Parliament allowing for a more comprehensive and broad information (social, ethic, scientific, etc.). In March 2012, the National Council of Ethics for Life Sciences (CNECV) (see page 13) produced a report and opinion requested by the Parliamentary Committee for health and the Parliament, respectively, following the presentation in Parliament of the four bills on PMA. Given the rejection of two of the bills in January 2012, the reports focused on the two bills still being debated (131/XII and 138/XII). The CNECV report states that it would have been better if the Council had been provided with an assessment considering the several technical and sociological aspects of the implications of the existing law (in force for almost six years) before expressing a position on the proposed amendments. It would be interesting to reflect on the reason why the CNECV did not consider doing these studies and analyses. The report also highlights the absence of specific or systematic studies including for example an analysis of the impact the law in both couples in which PMA was and was not successful, in children born through medically assisted procreation but also in other actors involved in the process (such as health technicians) and provides a list of specific points that, in their opinion, should be considered by policy-makers (and society in general) when considering medically assisted procreation (for example the “disclosure of efficacy rates of the various centres for medically assisted procreation” and the “need for national multidisciplinary studies to acquire evidence on all aspects of medically assisted procreation and replacement pregnancy”).

The law established in 2006 has been applied and dealt in a regular manner however important issues are starting to rise, as indicated by the CNECV. Their work has pointed that, despite existing regulations have been applied consistently, gaps and difficulties with regard to the destination of surplus and frozen embryos exist. More specifically, in the case of non-donation of gametes the progenitor couples should legally participate in their destination. There is, however, no regulations establishing the criteria and requirements under which the donation of embryos can be carried out in practice.

The proposals rejected in the Parliament included alterations to broaden the access of medically assisted procreation to single women and gay couples. It has been suggested that the main argument against this option lies on the consideration of the biological and complete family as the only context desirable for the birth and growth of a child. The following arguments can then be divided into the ones of religious and ideological nature or arguments of technical nature supposed to defend the rights of children. In any case, it has been considered by some that at the core is the belief of the "ideal family". Therefore, it would have seemed important to have established through social sciences (including history and sociology of the family) and psychological studies (mentioned in forums of discussion), if this argument was supported by any scientific evidence. It is not clear if any of this type of studies has been produced and, if they were, how they were considered in the debate regarding medically assisted procreation.

***Public debate around medically assisted procreation***

To support the analysis of existing TA processes and capabilities in Portugal is also important to understand whether there have been sufficient public engagement and debate regarding an important issue such as

medically assisted procreation. Was there an extensive and informative debate? Was the public involved in opinion polls, survey or any other standard means of stakeholder engagement? If so, it would be interesting to know the results of official surveys indicating the general feeling of the public about the issues and how such issues have been considered in the discussion.

One source of relevant information is the website 'nineteen' publishing important information in matters related to the LGBT (lesbian, gay, bisexual and transsexual) population, which conducted a survey posing the following question: "Was the public debate on medically assisted procreation (PMA) enough?" The survey had the participation of 601 people and the results obtained indicate that 81.2% of the participants thought that the debate on the subject was not enlightening (only for 4.66% had the opposite opinion). It is not clear how the survey was conducted and therefore it is difficult to assess the meaning of these results. However, it may provide an indication of the perception of the general public (or possibly of a fraction of the society) regarding the level of debate which may have occurred.

Other relevant information includes the seminars or conferences organised regarding medically assisted procreation. At least an official seminar, entitled "PMA: Present and Future, emerging issues in scientific, ethical, social and legal contexts", has been organised by the CNPMA. The seminar took place in Foundation Caloust Gulbenkian. However, it is not clear if a sufficiently representative fraction of the civil society was involved in this initiative. Another initiative worth mention is the one organised by the national agency 'Ciência Viva', where young people of secondary schools were invited to discuss emerging issues of medically assisted procreation with the support of members of CNPMA and of a science journalist.

It is not evident if other seminars regarding medically assisted procreation have been organised by stakeholders such as civil society organisations. The number of think-thank and civil associations in Portugal is restricted and therefore their influence to discuss important matters such as medically assisted procreation is limited. There have been several opinion articles in newspapers or in websites of relevant associations indicating the position of some actors. In general, a clear debate about the subject does not seem to be evident (however it has been difficult to find relevant information).

***Acknowledgements***

I am grateful to Professor João Ferrão, Professor João Caraça, Professor Manuel Laranja, Professor José Ferreira Gomes, Professora Maria Eduarda Gonçalves, Professor João Bravo Nico, Dr. Joana Mendonça, Dr. Tiago Santo Pereira, Dr. Catarina Grilo, Dr. Cristiano Padovani and ITAS team for their helpful comments on the Explorative Country Study: Portugal.

## 7.5 References

Arriscado Nunes, J., Matias, M. (2004): Agonistic spaces, contentious politics and the trials of governance: Environmental policies and conflict in Portugal, STAGE discussion paper 21.

Arriscado Nunes, J., Matias, M. (2004): Science, Technology and Governance in Portugal, STAGE discussion paper 22.

Bütschi, D., Carius, R., Decker, M., Gram, S., Grunwald, A., Machleidt, P., Steyaert, S., van Est, R. (2004): The Practice of Technology Assessment; Science, Interaction, and Communication. In: Decker M., Ladikas, M. (Eds.) Bridges between Science, Society and Policy. Technology Assessment - Methods and Impacts. Springer Heidelberg, New York, pp. 13-55.

Deuten, J., Enzing, C., Rijnders-Nagle, M., Til, J., Arnold, E. (2011): Parliament Technology Assessment in Europe, Technopolis Group.

Edler, J., Kuhlmann, S., Smits, R. (2003): New Governance for Innovation, The need for horizontal and systemic policy co-ordination. Paper for the Six Countries Programme, FhG-ISI.

Edquist, C. (Ed.) (1997): Systems of Innovation: Technologies, Institutions and Organisations, (Pinter, London)

Eduarda Gonçalves, M. (2011): Política de Investigação Científica (Policy for Scientific Research), Dicionário Portugal-Europa.

ERA-watch (2010): Country Report Portugal.

Eurobarometer (2001): Europeans, science and technology, 55.2.

Eurobarometer (2010): Science and technology, 340.

Flanagan, K., Uyarra, E., Laranja, M. (2011): Reconceptualising the policy mix for innovation. Research Policy 40, nº. 5, pp. 702-713.

Galli, R., Teubal, M. (1997): Paradigmatic Changes in National Innovation System. In Edquist, C. (Ed.): Systems of Innovation: Technologies, Institutions and Organisations, Pinter, London, pp. 342-370.

General Directorate of Statistics of Education and Science (DGEEC) (2010): IPCTN.

GPEARI (2009): As empresas e instituições hospitalares com mais despesa em actividades de I&D em 2009, Portugal (Companies and hospitals with more spending on R&D activities in 2009, Portugal)

Hou, G.-M., Gee, S. (1993): National Systems Supporting Technical Advance in Industry: The case of Taiwan. In Nelson, R. (Ed.), National Innovation Systems: A Comparative Analysis, Oxford University Press, New York and Oxford, pp. 384-413.

Miller, S. C., Caro, P., Koulaidis, V., De Semir, V., Staveloz, W., Vargas, R. (2002): Report from the Expert group to the European Commission; Benchmarking the Promotion of RTD culture and Public Understanding of Science.

Minister of Science, Technology and Higher Education (2011): Science, Technology and Tertiary Education in Portugal

OECD (2010): Science and Innovation country notes.

Pereira, T., Rodrigues, A., Carvalho, A. e Arriscado Nunes, J. (2010): Parlamento e conhecimento científico: Dupla Delegação? (Parliament and scientific knowledge: Double Delegation?) Livro, A Qualidade da Democracia em Debate, Editora Mundos Sociais, Lisboa

Standing Committee for Education and Science (2009): Relatório sobre ciência (Report about Science)

Standing Committee for Education, Science and Culture (2010): Ciência em Portugal (Science in Portugal)

## 7.6 Appendix

### *7.6.1 National Workshops*

#### *First National Workshop, 23.04.2012, CES, Lisbon*

#### *Agenda*

The **objectives** of the workshop are:

- Ensure a common understanding of the terms Technology Assessment (TA) and scientific policy advice
- Create the basis for setting up a framework for discussion on future developments of TA in Portugal

9.00 Arrival and coffee.

Introductions, Mara Almeida, ITQB and Tiago Santos Pereira (CES, Universidade de Coimbra)

*Talks*

9.20 Introduction to PACITA project, Sergio Bellucci, TA-Swiss Director

9.40 Overview on the concept of TA and the modes of parliamentary TA institutionalisation in Europe: the example of the German case, Leonhard Hennen, ITAS

*Experiences*

statements (10min) on professional background and view on scientific policy advice and TA

10.00 Paulo Pereira (FCT Board member)

Joana Mendonça (DGEEC)

10.30 *Coffee Break*

10.45 José Ferreira Gomes (FC, Universidade do Porto)

Manuel Laranja (ISEG, Universidade de Lisboa)

Francisco Cunha (IST-IN+/IRGC Portugal)

Maria João Maia (IET/CesNova, FCT-UNL), António Moniz Brandão (ITAS-KIT)

Joana Dionísio (PONG-Pesca)

Tiago Santos Pereira (CES, Universidade de Coimbra)

*Discussion*

12.00 Brainstorm and open discussion following specific leading questions

13.30 Lunch

14.30 Any other business

14.45 Closing remarks

***Long-term aims***

This and future initiatives aim at creating a framework for informal discussion with interested experts and stakeholders and at triggering initiatives supporting the development of TA in Portugal. This specific activity will provide a platform for interaction and engagement with participants coming from a wide range of institutions and learn about the different processes and experiences. It will be important to assess the different expertise and interests in the field and analyse the range of factors that need to be considered when analysing the landscape of TA and scientific policy advice in Portugal.

By creating favorable conditions for debate and action, this and future activities will enable Portugal to set up knowledge brokering systems that can incentivise evidence-informed policy making as an intrinsic part of the political process.

***Approach***

- Engage relevant groups of actors, considering knowledge and processes that might influence the development of a possible TA structure in Portugal
- Consider and list wider issues for the feasibility of implementing a TA structure in Portugal

***First National Workshop, 23.04.2012, CES, Lisbon***

***List of Participants***

| | |
|---|---|
| 1) Ana Sanchez | Communication office, ITQB |
| 2) António Brandão Moniz | Guest scientist at ITAS-KIT; Professor, University Nova de Lisboa, FCT |
| 3) Chiara Carrozza | Post doctoral researcher, University of Coimbra, Centre for Social Studies |
| 4) Francisco Villena Cunha | Researcher IST-IN+/IRGC Portugal |
| 5) Joana Mendonça | Deputy Director, General Directorate of Statistics of Education and Science, DGEEC |
| 6) Joana Dionísio | Platform of Portuguese NGOs on Fisheries, PONG-Pesca |
| 7) José Ferreira Gomes | Professor, University of Porto, Faculty of Science |
| 8) Leonard Hennen | Scientist, ITAS-KIT |
| 9) Manuel Laranja | Professor, Technical University of Lisbon, School of Economics and Management, ISEG |
| 10) Maria João Maia | PhD student, IET/CesNova, University Nova de Lisboa, Faculty of Science and Technology |
| 11) Paulo Fonseca | PhD student, University of Coimbra, Centre for Social Studies |
| 12) Paulo Pereira | Vice-President of Foundation for Science and Technology, FCT |
| 13) Sergio Bellucci | Director of TA-Swiss |
| 14) Tiago Santos Pereira | Scientist, University of Coimbra, Centre for Social Studies |

***First National Workshop, 23.04.2012, Lisbon***

***Minutes by Mara Almeida***

***Introduction***

The workshop started with introductions given by Mara Almeida (project manager of PACITA for Portugal), and Tiago Santos (from Centre for Social Studies (CES)), who hosted the event. Introductions were followed by talks given by two of the PACITA partners and short presentations given by different stakeholders in Portugal to illustrate their different experience with S&T Assessment and policy advice. There was a strong debate along the workshop raising issues and discussing questions concerning the processes of policy-making and S&T assessment in Portugal.

***Talks***

Two PACITA partners with a Parliamentary TA institution in their countries ("PTA-partners") where invited to give a presentation.

Sergio Belluci, director of TA-Swiss, described the PACITA project including its aims, mission and planned activities. Leonhard Hennen, from ITAS, described the different TA models and institutions in Europe. As an example he has spoken of TA institutionalization in Germany and the model applied there. A key feature of the German model is that their TA institution (TAB), established to deliver several policy options highlighting different aspects (environmental, economic, etc.) advices the German Bundestag without providing formal recommendations to which the Bundestag is expected to respond. The work of TAB is generally respected and trusted by the Bundestag and other stakeholders.

***Experiences***

This session counted the presence of representatives of two Portuguese governmental agencies, who opened the session providing an overview of the state of R&D funding and of the balance between expenditure from the public and private sector. Their talks were followed by contributions from other relevant Portuguese institutions, including universities and representative of a Portuguese environmental NGO, PONG-Pescas.

The first speaker was Paulo Pereira, Vice-President of FCT (Foundation of Science and Technology) the biggest funding agency for science in Portugal. Issues as the general level of funding, recent budget cuts and the new alignment of FCT as well as the importance of TA in Portugal were discussed.

The first talk was followed by a presentation by Joana Mendonça, deputy director of DGEEC, an agency that produces S&T indicators used, among others, by the Portuguese scientific community and the members of the Government. The presentation highlighted that there is a close collaboration between DGEEC and private companies to understand the levels of expenditure in R&D of private companies and that, given the significant levels of investment generated by the private sector, industry has now a more important role in policy-making related to science and technology.

The workshop continued with a series of statements by the other participants present, that gave their views on the process of S&T policy-making in Portugal and presented the work they been developing. Several issues concerning S&T assessment in the Portuguese Parliament were discussed and important observations emerging from the opinion statements ranged from the need of institutionalising TA in Portugal to the deep

separation between the development and implementation of policies for science and innovation:

- the limited effectiveness of relevant reports produced my MPs (for example in relationship to approach to TA in other countries) in affecting political decision-making, the lack of integration of this type of information and long-term national strategy. It was suggested that the Portuguese Parliament needs a stronger support in S&T issues and that, aside from direct short-term benefits, institutionalising TA processes could also provide a framework able to provide long-term focus to policy-making. The importance of having expertise in the Parliament that understands the relevant issues and delivers the information coming from the experts to support policy-making.

- The deep separation between the development and implementation of policies for science and innovation (the country was described as having a 'dual-policy system'), arising from broader historical difficulties of ensuring good governance and from the lack of accountability of managers of structural funds.

***Second National Workshop, 10.09.2012, ISEG, Lisbon***

***Agenda***

Science and technology (S&T) are essential for the development of a sustainable and knowledgeable society, and to build a modern, dynamic and competitive economy. Therefore, it is essential that S&T issues are associated with well-informed national and international policies based on scientific and technological information. It will be important to have a structure that could provide systematic and organized information.

The aim of the workshop will be to stimulate the debate regarding the possibility of developing a national unit of Parliamentary Technology Assessment (PTA) in the future. The explorative country study report will be an input to the debate considering the institutional structures of policy-making for S&T and the activities of science and technology Assessment developed in Portugal.

| | |
|---|---|
| 9.30 | Introduction to PACITA project-Objectives and Activities in Portugal, Mara Almeida, ITQB, project manager |
| **Session 1** | **Governance of S&T** |
| 9.45 | Luísa Henriques, FCT<br>Mira Godinho, Technical University of Lisbon<br>Paulo Ferrão, IST, Technical University of Lisbon<br><br>Moderator: Manuel Laranja, ISEG, University of Lisbon |
| 11.15 | Coffee-break |
| **Session 2** | **Technology Assessment supporting policy-making** |
| 11.30 | João Ferrão, ISC, University of Lisbon<br>Tiago Santos Pereira, CES, University of Coimbra<br><br>Moderator: Henrique Diz, University of Aveiro |
| **Session 3** | **Debate on establishing a Parliamentary Technology Assessment Unit** |
| 12.30 | Opening of the session: Odete João, member of the Portuguese Parliament<br>Moderators: Manuel Laranja e Mara Almeida |
| 13.30 | Lunch |
| 14.30 | Closing remarks |

***Second National Workshop, 10.09.2012, ISEG, Lisbon***

***List of Participants***

| | |
|---|---|
| 1) Angela Pinto | Pfizer |
| 2) António Alvarenga | Director-Department of Strategies and Economic Analysis at Portuguese Environment Agency |
| 3) Catarina Grilo | Platform of Portuguese NGOs on Fisheries, PONG-Pesca |
| 4) Elsa Pais | Member of Portuguese Parliament |
| 5) Eugénia Gamboa | Office of the Minister of Education and Science) |
| 6) Fernando Gonçalves | Professor, Technical University of Lisbon, School of Economics and Management, ISEG |
| 7) Henrique Diz | Professor, University of Aveiro |
| 8) Joana Dâmaso | Master student of Economics of Management in Science and Technology at the Technical University of Lisbon, ISEG |
| 9) Joana Gonçalves-Sá | Research Fellow, Institute Gulbenkian Science (IGC |
| 10) José Ferrão | Professor, Institute of Social Sciences, University of Lisbon |
| 11) Luísa Henriques | Senior Advisor, Science and Technology Foundation (FCT) |
| 12) Maria João Rosa | Professor, University of Aveiro |
| 13) Manuel Laranja | Professor, Technical University of Lisbon, School of Economics and Management, ISEG |
| 14) Mira Godinho | Professor, Technical University of Lisbon |
| 15) Odete João | Member of Portuguese Parliament |
| 16) Paulo Ferrão | Professor, Instituto Superior Técnico, Technical University of Lisbon |
| 17) Pedro Miguel da Rosa Janeiro | Office of the Minister of Education and Science |
| 18) Peter Villax | Hovione |
| 19) Ricardo Migueis | Framework Programme Promotion Office, Science and Technology Foundation (FCT) |
| 20) Sara Reis | Master student of Economics of Management in Science and Technology at the Technical University of Lisbon, ISEG |
| 21) Tiago Santos Pereira | Scientist, University of Coimbra, Centre for Social Studies |

***Second National Workshop, 10.09.2012, ISEG, Lisbon***

***Minutes by Mara Almeida***

The workshop was organised in three sessions and the explorative country study was an input to the debate. It started with a presentation by Mara Almeida (project manager of PACITA for Portugal), describing the objectives of the project and planned activities in Portugal.

### *1st session*

The session had the participation of Luísa Henriques, Mira Godinho and Paulo Ferrão to discuss **Governance of S&T** in Portugal. The moderator, Manuel Laranja (from School of Economics and Management (ISEG)), who hosted the event, opened the first session of the workshop with the question: what function TA or foresight should have in the design and implementation of governance of S&T? Several points were raised including the centralization of the process of political decision-making regarding issues of S&T in Portugal. The decision-making process displays a certain fragmentation with a relatively reduced inter-ministerial interaction that is not able to face the social and technological challenges of today. There have been several attempts to create inter-ministerial commissions without any success. Therefore, Portugal has never been able to institutionalize the coordination between the different policies. The advisory function has never been consolidated at the governmental level and is practically non-existent. It is now expected with the establishment of the National Councils of S&T and Innovation and Entrepreneurship for this process at the governmental level to be finally institutionalized. The public debate in the Portuguese society regarding scientific and technological issues is reduced with the portugueses discussing now even less S&T matters. It was also mentioned that S&T policy-makers use information provided by the forums, think-tanks and the indicators as a justification for their positions and much less as a way to promote debate considering all the options available.

### *2nd session*

In this session, João Ferrão and Tiago Santos Pereira analysed the issue of **Technology Assessment as a support for policy-making**. Several of the challenges identified by the report were supported and relevant points that need to be considered were highlighted. The processes of decision-making in Portugal were analysed and there is limited information available considering different sources of knowledge which means different interests, priorities and actors. One of the key questions was how to improve the channel of communication between decision-makers and potential suppliers of information and knowledge with their interests and priorities. The scope, mission and function of a possible TA structure were discussed taking into account the already existent structures with TA-like activities in Portugal. It was considered that for this structure to exist it should differentiate itself from the existent ones and introduce an added value. It is important to have a landscape vision of what exists to better understand the relevant structures and define a new one. The advantages and limitations of having a TA structure in the Portuguese Parliament to enrich the political decision were discussed. The role of society in the discussion of S&T issues was also analysed. The importance of considering all the relevant stakeholders beside the experts involved in a specific matter was discussed.

### *3rd session*

The opening of the session **Debate on establishing a Parliamentary Technology Assessment Unit** was led by Odete João (member of the Portuguese Parliament) which has illustrated the involvement of the Portuguese Parliament in issues of S&T and its sensibility towards matters of science. It was made reference to the reports produced by the parliamentary Committees for Education and Science and for Economy and Innovation. The Committee for Education and Science has produced several reports addressing relevant policies for science. These reports included the Report about science (2009), produced by the Member of Parliament (MP) Bravo Nico, Science in Portugal produced by the MP José Ferreira Gomes (2010), and a recent one (2012) by the MP Elza Pais. There has been a resolution originated from the report in 2009 that pointing to the possibility of establishing a Parliamentary office for S&T. Also, in 2011, the Committee for Economy and Innovation has produced two reports, one regarding innovation and the other business clusters. There was also reference to the activities organised in the Parliament as *Café Ciência* (Cafè Science) which occurs every year creating a space of interation between policy-makers and scientists. The Parliamentary hearings were also indicated as an interface with the relevant actors. Research institutions, individual researchers, companies, organizations, civic associations, etc., are called to Parliament to issue their opinion and participate in discussions regarding issues that are on the parliamentary agenda. It was stated that this debate should continue but also that the communication should be increasingly extended to society.

The existence of advisory and information processes in the Portuguese Parliament was considered to be crucial for well-informed decisions to be made. These decisions should also take into account views of all actors involved in matters of S&T. The Parliamentary Office of S&T was considered essential and to be established as a flexible and small structure with a strong credibility. The starting point was considered critical for the success and credibility of the office. It should work with the structures already existent and assembled in the civil society. The office should interact with the best experts in a permament basis allowing MPs to have access to information specific to the matters which are being discussed. The office should also be pro-active in what are the implications of certain fields of science. It should have a dual movement between what is in the immediate impact of what is being addressed in Parliament but also a medium and long term vision of the future.

After the statement of the MP Odete João, most of the debate concentrated on the several points that emerged from the opinion statements of the three sessions streaming mainly to the charateristics of the possible structure of S&T assessment, on defining its mission and objectives. It was agreed to the importance of having such unit however the relevance of properly defining it and considering the national context was discussed.

### *7.6.2 Interviewed Experts*

| Category | Organisation | Expert | Expert´s position | Date of interview |
|---|---|---|---|---|
| Science | University of Porto, Faculty of Science; board member of the National Council for Science and Technology | Alexandre Quintanilha | Vice-President of Foundation for Science and Technology | 23rd April 2012 |
| CSO | Caloust Gulbenkian Foundation-Delegation in France | João Caraça | Director | 30th May 2012 |
| Science | University of Lisbon, Institute of Social Sciences; Secretary of State for Territorial and Cities Planning in the XVII Constitutional Government (2005-2009) | João Ferrão | Professor | 24th April 2012 |
| Science | University of Porto, Faculty of Science; member of the Portuguese Parliament in the XI Parliamentary term (2009-2011) including vice-Chairman of the Parliamentary Committee for Education, Science and Culture | José Ferreira Gomes | Professor | 2nd May 2012 |
| CSO | Science Service, Calouste Gulbenkian Foundation | Francisca Moura | Deputy Director | 20th April 2012 |
| Other | Economy and Innovation at Lisbon City Council | Paulo Soeiro de Carvalho | General Director | 23rd July 2012 |
| Science | Technical University of Lisbon, School of Economics and Management, ISEG; innovation policy adviser for the Secretary of State for energy and innovation (2009-2011 | Manuel Laranja | Professor | 27th April 2012 |

| | | | | |
|---|---|---|---|---|
| CSO | Platform of Portuguese NGOs on Fisheries, PONG-Pesca | Catarina Grilo | | 31st May 2012 |
| Media | "Expresso" newspaper | João Ramos | Journalist | 13th July 2012 |
| Governmental Authorities | | Paulo Pereira | Vice-President of Foundation for Science and Technology, FCT) | 28th May 2012 |

# Chapter 8 Explorative Region Study: Wallonia, Belgium

Pierre Delvenne, Benedikt Rosskamp, Catherine Fallon (Université de Liège (ULg) – SPIRAL research centre)

## 8.1 Description of governmental system and general R&D structure

### *8.1.1 General system of R&D and relevant actors*

Belgium is a federal State with a high degree of decentralization. It has long been a reference of the model of "consociational" democracy in a socially divided society, which was long structured along the lines of ideological "pillars" (catholic, liberal, socialist) in domains such as education, health services and insurances, labor unions, political parties, press and so forth (Lijphart 1968). Social partners are associated to policymaking through numerous neo-corporatist organizations, particularly for issues related to economic and social policies.

As shown in figure 10, the Belgian federal state is divided into six sub-state entities: three Communities and three Regions, the former being in charge of socio-cultural issues (including education and university) and the latter being in charge of territorial issues (see below).

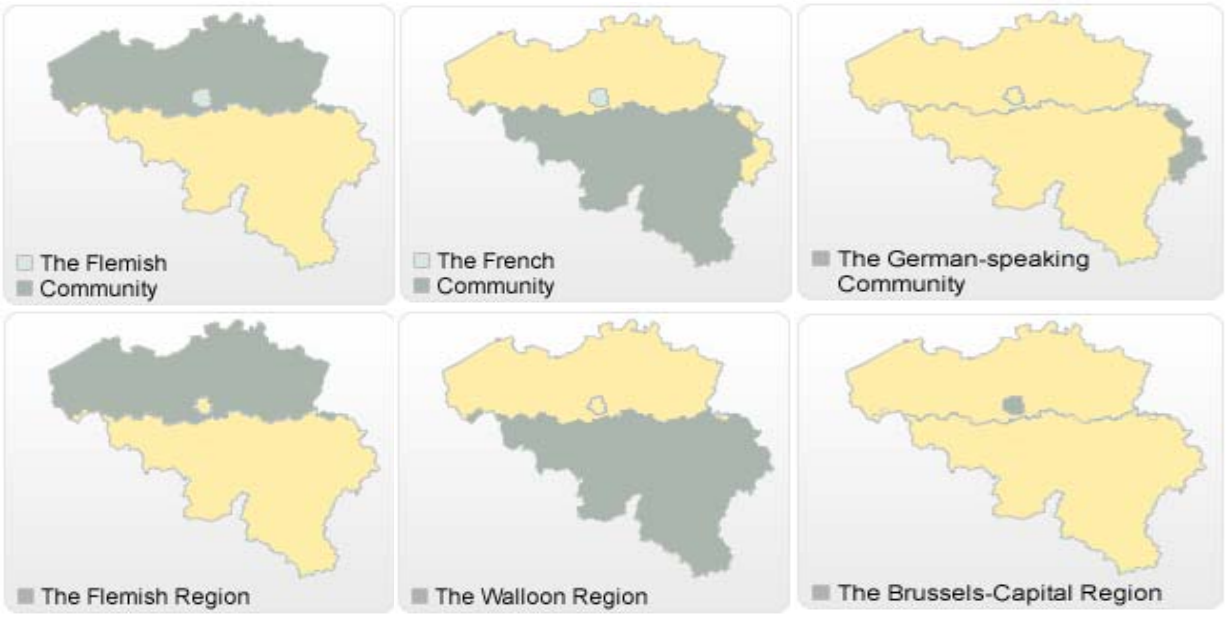


Figure 10: The different sub-state entities in Belgium Source: http://www.belgium.be/en/about_belgium/government/federale_staat/map/

First steps towards the regionalization of research, science, technology and innovation (STI) policies occurred in the 1980s. Federal authorities still organize nuclear and space policies and a residual funding scheme for cooperation between the universities from the different Communities — which gathers less than 20% of total research funds. The federal state still indirectly steers STI policy through connected matters (taxation, etc.) STI policies are today managed mainly by sub-state entities (see figure 11). As a result, two distinct and very different regimes of STI developed in Flanders and in Wallonia. In the Northern part of the

country, the Region of Flanders merged in the Flemish Community, which is the sole authority in charge of STI. In the French-speaking part, the Walloon Region, the Region of Brussels-Capital and the French Community (which covers both territories) did not merge. The sub-state entities (Communities and Regions) all started different STI policy initiatives (Halleux 2009) at their respective level of power. For example, in 2003, Flanders launched the *Innovation Pact*[211]. In 2005, Wallonia launched the *Marshall Plan*[212] (since 2009 it has become the *Marshall Plan 2.Vert)*, while Brussels initiated a *Regional Innovation Plan*. One cannot really say that there is a single STI system in Belgium but rather several regimes based on various industrials networks, different sectorial concentration and specialization as well as a set of different public support schemes and links to the industry.

In this report we will refer to both the Walloon Region (in charge of applied research) and the French-speaking community (in charge of fundamental research and direct university funding), as both entities tend to complement and overpass each other, notably in S&T matters. Wallonia being in charge of the broadest part of competences related to research and science, technology and innovation, we refer to the Region as a non-PTA "country". Most of public funded research in Wallonia is organized in universities. Looking to the patterns of funding, one third of the funds are related to Regional programs, another to the Community programs and the rest to federal, European and international funding.

We suggest continuing our description of the Walloon R&D structure by looking at the relevant fields of research, funding and expenditures. We will start with the Community level followed by the Regional level, and then the remaining competences at the federal level. For an overview of relevant political territories and levels as well as related actors, we refer to figure 11.

[211] Comprising 60 million € dedicated to research.
[212] Representing an additional billion € from which 27% are oriented at research and its valorization.

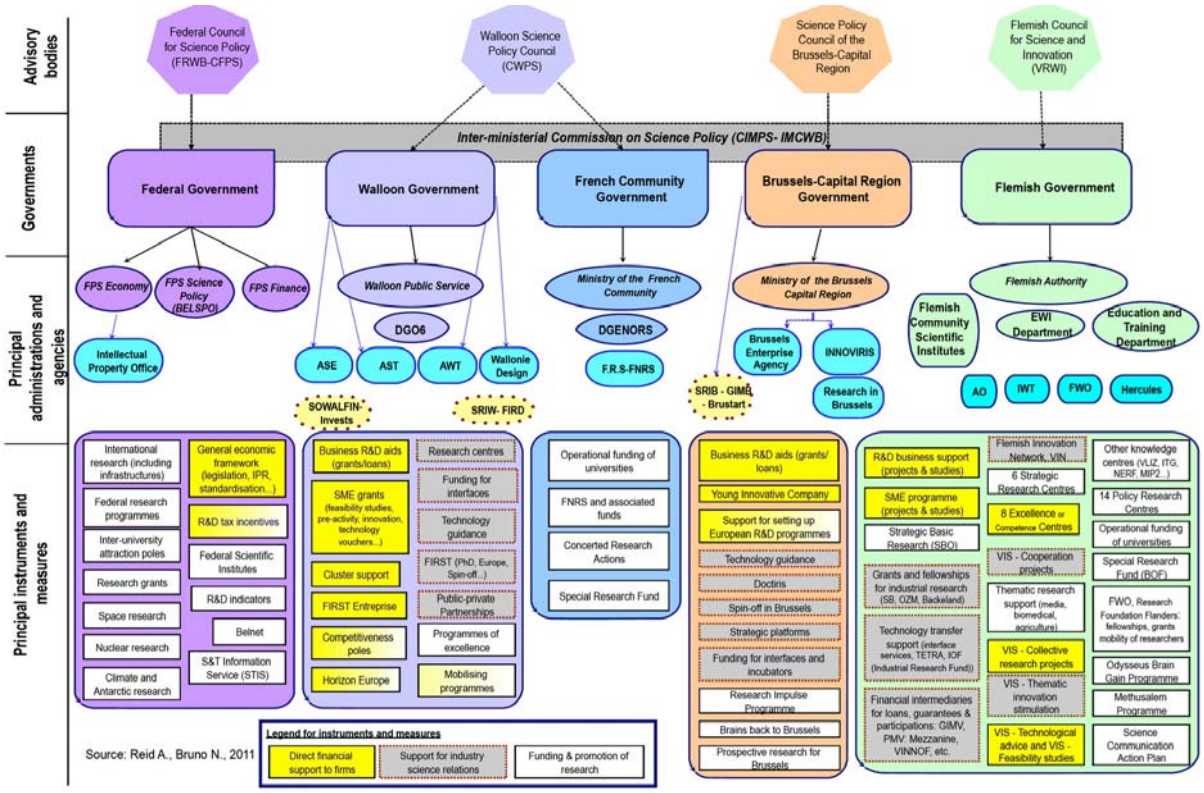


Figure 11: Overview of the Belgian STI structure Source: Reid A, Bruno N., 2011

### *French Community*

The French Community is in charge of financing higher education and fundamental research. It is headed by a small central administration (General Directorate of non-compulsory education and scientific research — DGENORS), with a budget for research of 118,5 million € in 2008 (Fallon, 2011). The main financing tool is the FRS-FNRS (National Fund for Scientific Research), which is a Research Agency devoted to scientific excellence and autonomy, covering all fields of research and financing researchers working in the universities (Belgium — and Wallonia in particular — comprises very little public laboratories and most public research is done universities). 90% of the FRS-FNRS funds come from public source (mainly covered by the French Community, which contributed with 88 millions € in 2008). It finances fundamental research on a bottom-up basis and on an individual level and it does not interfere with the thematic choices, which are entirely left to the consideration of the researcher. Selection by international scientific committees only depends on the quality of scientific research proposal. Definitely, FRS-FNRS is the main actor in Wallonia when it comes to judging the scientific quality of research projects even if they relate to other funding structures. The FRS-FNRS does not provide infrastructures.

The French Community also finances directly the universities under the form of a block grant: 27 million € for Special Research Funds (FSR) and “concerted research actions” (ARC). It is important to point at the fact that the French Community is structurally underfinanced. This situation led the universities to look for other funding schemes, especially those made available by the Walloon Region for industrial and applied research.

### *Walloon Region*

The Walloon Region's research is mainly geared towards economic development, competitiveness, technology and innovation development and promotion, under the authority of the Minister responsible for Research and New Technologies with the support of the administrative organ (SPW-DGO6). The regional research funding follows five objectives: reinforce scientific and technological potential; valorize, transfer and disseminate; promote technological innovation in companies. The Region's annual research budget reached 290 million € in 2009. Additional research funds are also available in support to regional policies, but they are not under the control of the research directorate. Regional grants are awarded to research organizations or enterprises on a competitive basis through regular calls for projects.

After 2000, the regional government chose to reinforce the innovation activities, increasing the funds available and creating numerous new activities and funding schemes, for instance with Public-Private Partnerships (PPP) between industry- university- Region.

- To finance university research, the Region (SPW-DG06) launches thematic calls for projects (50 millions € per year) inspired by the content of the European framework-programs. The authorities insist on the learning effects for universities to step in European projects, inter-university cooperation and the need to have an associated industrial partner. Another budget line (50 millions €), "Excellence Programs", is allocated to large projects directly to universities. All the university research financed through this channel is supposed to be organized in association with an industrial partner.

- The industrial research is financed through an open call for projects (around 60 million € per year). Main beneficiating sectors are the chemical and the pharmaceutical industries.

- The Marshall Plan[213] added a third regional funding scheme with the settlement of the "competitiveness poles" (pôles de compétitivité)[214]. In that framework, between 2006 and 2009 the Region allocated 120 million € for research and 55 million € for education and training programs. The activities are organized at arm's-length from the administration, under the sole responsibility of the industry-university partnerships which organize the strategic plans, the call for projects and the selections. This funding was crucial for universities to further develop collaborative innovation with industry. With this relatively recent funding scheme, the regional authority put a strong pressure to consider Wallonia as a *political* territory, giving innovation a broader and structuring role in the regional economy. It should be underlined that the competitiveness poles break with the social dialogue tradition by bypassing the trade unions, which were so far always regarded as established stakeholders for STI policies (Fallon and Delvenne 2009).

- Collective research centers are initiated by private actors around topical R&D. Funding is either compulsory or coming on a voluntary base from firms engaged in a particular sector.

- A series of calls for proposals for PPP initiatives is open since November 2011, in five thematic priorities: sustainable development, energy, technological research, health and quality ageing (Bruno and Van Til, 2011).

[213] The 'Marshall Plan' aimed at redressing the Walloon economy and bring it back in the average of Europe's most competitive regions by making it more sustainable through affirmative and targeted action in sectors especially promising in terms of economic growth and job creation. Therefore, the innovation model put forward overcomes the old linear approach and favors a more systemic approach pushing hybrid partnerships and the creation of niches gathering industries and university researchers.

[214] Based on a scholarly study, the government identified 5 domains where competitiveness clusters have been created: life sciences, food industry, mechanical engineering, transports-logistics, and the aviation-spatial sector. More recently the "Marshall Plan 2.green" gave birth to a sixth cluster dedicated to environmental technologies. For a detailed analysis of the competitiveness cluster policy, see Fallon C. and Delvenne P. (2009).

- Programs such as the "FIRST initiative" promote the transfer of researchers between academia and industry in order to financially encourage research in enterprises and strengthen the valorization of results. (Bruno and Van Til, 2011)

- In November 2010 the Walloon government launched a new initiative, "Creative Wallonia", which seeks to enhance creativity and innovation. It is aimed at engaging not only companies, SMEs, and public universities but also — this is new — citizens.

The Region also decided to allocate a large part of the European structural Funds for Research, Technological Development and Innovation (RTDI; 2000-2006 and 2007-2013) to R&D infrastructure (mainly health biosciences and biotechnologies, a central axis of Belgian R&D capacity), centers of competence in specific technologies as well as innovation and technology transfers (university "interface" offices trying to foster their linkages with industry) (Rivero Leon et al., 2011).

#### *The Federal State – Competences, Funding and Expenditure*

As mentioned above, the federal state is still competent for some research programs conducted in the framework of international agreements (space and nuclear energy). It finances a limited number of national scientific institutes (e.g. Museum of Fine Arts, Belgian National Institute of Natural Science, National Botanic Gardens, Royal Library, General Archives of the Kingdom, Royal Museums of Art and History, Royal Academy for Arts and Sciences, Polar research,...). Patent policy, taxation and the social status of researchers are federal steering instruments. The last important federal funding measure for university research is the Interuniversity Attraction Poles (PAI, with a budget of 143 million €, where 40% is attributed to French-speaking universities). It stimulates the creation of networks across the two communities of the country. The federal authorities are also in charge of coordinating not the policies but only the statistical information from the regions and communities to handle them to Eurostat.

> "*Despite an increase in public budgets for R&D since 2000, the 1% [of GDP] public funding target remains far out of reach in Belgium (0.54% in 2007) […]. The same comment can be made with regard to the 2% private funding target. The private funding in Belgium represents more than 2/3rds of the GERD funding*"[215].

The last government encouraged *"R&D efforts towards the 3% [of GDP] target through tax incentives (extension of the R&D tax credit scheme (research expenses from universities, public organizations, expenses for patent protection); and continuation in the reduction of charges for public and private researchers)*" (Nelly, 2011). This implies that R&D outsourcing becomes a popular practice in Belgium. This part has constantly been rising from 16% in 1998 to 26,7% in 2007[216].

Belgium has a variety of R&D funding and support programs, which attract international attention but these instruments face a severe lack of coordination, which renders them complex and sometimes concurrent. In addition, a threat relies upon the whole research policy. As stated in Halleux (2009), [some national experts] as well as the OECD pointed out that a total decentralization of research policy would probably weaken the Belgian position in international research, making it more difficult for researchers to reach a critical mass.

[215] http://www.belspo.be/belspo/home/publ/pub_ostc/BRISTI/Bristi_tome2_2010_en.pdf
[216] http://www.belspo.be/belspo/home/publ/pub_ostc/BRISTI/Bristi_tome2_2010_en.pdf

### 8.1.2 Existing R&D structures and performance

#### Structure

#### Universities and Academies

All universities are publicly funded, but only one university is public (Université de Liège); the other universities are foundations, either with a catholic filiation, or a secular liberal one. The first group encompasses Université Catholique de Louvain (UCL), Facultés Notre Dame de la Paix Namur (FUNDP), Facultés Universitaires Catholique de Mons (FUCaM), Facultés Universitaires Saint-Louis Bruxelles (FUSL). The second group is Université de Mons (UMons), and Université Libre de Bruxelles (ULB). There is an ongoing reform to regroup the universities in three large Academies and to organize all university research under a unique agency: the political debate is quite hot between the political partners.

The funding of universities is attributed from a fixed global budget to the individual universities under the form of a block grant, linked to the number of students: this creates the conditions for a strong competition between the universities. Collaborative schemes between universities were uncommon in the past but they are on the increase.

Most universities have fostered the creation of science parks and they encouraged high-tech industries (in particular SMEs) or spin-offs (120 for the French Community with a vast majority in biotechnology) to get established on their campuses. Each university has its own Valorization or Interface Cells designed to connect University and Industry[217].

The two major steering organs for universities are:

Inter-university Council of the French Community – CUIF (Conseil interuniversitaire de la Communauté française), the official meeting platform for academics, students, politicians, employers, trade unionists and public administration. It is mainly in charge of educational issues.

Council of French-speaking Rectors- CReF (Conseil des Recteurs Francophones) is an independent association and considered as the main consulting organ in charge of issues relating to university management, research and teaching. Many actors perceive it as a more powerful institution than the CIUF. This could be due to the presence and visibility of its President and members (Fallon 2009).

The (National) Fund for Scientific Research - FRS–FNRS (Fonds National de la Recherche Scientifique) is a research agency for fundamental research (all fields) since 1928.

Collective Research Centers were initiated in 1948 to support technological development of business enterprises in their respective industrial sectors (Metal, Construction, Textile, Wood, Road research, Cement, Ceramic, Welding, Electricity). They conduct precompetitive research to support whole sectors as well as applied research to meet enterprises' needs and to enhance technological transfers. Until 2002, funding was structural but it now has evolved to a funding by missions and projects. The rationale behind this shift is to let Regions adjust their funding's according to their priorities.

[217] http://recherche-technologie.wallonie.be/fr/menu/ressources/accompagnement/les-cellules-de-valorisation-et-d-interface-des-universites-et-de-l-adisif/index.html

***Non-University Regional Research Centers***

Research centers own relevant infrastructure and equipment to carry out research and technology scouting, and disseminate emerging technologies through the Walloon industrial networks. To mention some of the research centers and their fields of R&D:

IMMUNEHEALTH – Biotechnologies

SIRRIS – Collective centers of the technology industry

MULTITEL – Research center on telecommunications, signal and image treatment

CETIC – Excellence Center in Information and Communication Technology

These centers however do not reach the size of their Flemish counterparts.

*Performance*

As mentioned above, fundamental research supported by FNRS is based on individual projects selection of individual research proposals. There is no thematic interference from other authorities. With regard to research under the Walloon Region, there are some thematic preferences concerning the allocation of funds to research related to the pharmaceutical and chemical research, the more important and competitive domain in the Walloon economy. The competitiveness poles contribute to balance the dominance of the life sciences sector by fostering research in other key domains identified as potentially strategic such as food industry, mechanical engineering, transports-logistics, and the aviation-spatial sector. More recently the "Marshall Plan 2.Vert" gave birth to a sixth cluster dedicated to environmental technologies. These domains have been chosen based on a study on promising sectors for future R&D investments. Indeed the Walloon Region tries to endorse a rationale of strategic specialization in its STI policy, within a larger political strategy towards the recovery from the decline of the old industrial activities, in search for knowledge intensive products and services. This industrial strategy (Plan Marshall and Plan Marshall 2.Vert) also contributes to further Walloon identity building and the emergence of the Region as a political territory.

Performance of Belgian research is positive, as indicated by the increase of participation of the Belgian groups in European projects between FP6 and FP7. The Federal Planning Bureau[218] analyzed the performances of the Walloon innovation system in 2009 and compared it to other European countries with a similar industrial history[219] according to six variables. Here are summarized the main results:

7. The Walloon Region scores excellent in *knowledge production* i.e. the capacity to mobilize resources for research and innovation. Despite a lower level of public funding of R&D, firms can easily mobilize resources for research. The trend goes towards intensification and concentration, because the largest companies (over 100 employees) carry out most research and innovation efforts, especially in the pharmaceutical sector. This might make the Region vulnerable to the strategies of few big companies. More traditional sectors and SMEs, which are the economy's backbone, have more difficulties in R&D efforts.

8. On the *human resources* i.e. education structures and well trained personnel side, the percentage of high-education graduates among active population is rather high but the Region lags behind in

[218] The Federal Planning Bureau (FPB) is a federal public agency that makes studies, assessments and projections on economic, social and environmental policy issues. It assembles data, explores possible evolutions, identifies alternatives, assesses the consequences of policies and formulates propositions. Its expertise is available for the different Parliaments and Governments, social partners and international institutions.

[219] These countries have a similar industrial heritage (RETI regions) and were: Belgium, Germany, Denmark, Spain, France, Luxemburg, The Netherlands, Austria and the United Kingdom.

numbers of graduating scientists and engineers. Furthermore, life-long education is not yet a generalized practice.

9. The *valorization capacity* i.e. the ability to protect research results and assign them economic and social goals is average with a good growth rate. However major differences are observed between excellent industry scores while the service sector tends to have more difficulties to take up innovation, particularly in organizational matters and marketing. This may partly be due to little organizational innovation from the side of public authorities. Also contrary to precompetitive research[220], Wallonia's position is unfavorable when it comes to market oriented research (15% of national participation between 1985-2004). The share of innovation costs not dedicated to research is one of the highest in Europe (CPS, 2011).

10. The *absorption capacity* i.e. the diffusion, integration and utilization of progress, is average. Innovative firms across all sectors are agile in getting public support. Also numerous SMEs develop innovative products and processes with existing technologies. However cooperation is less common. Wallonia's innovation potential is quite scattered across the territory (in comparison to Flanders where only a few but European size research centers exist). Technology and information transfer between universities and firms still need to be improved. All recent STI supportive funds were geared toward an obligation of organizing cooperative research, between companies and with universities (e.g. competitiveness poles)

11. The *entrepreneurship* cannot be internationally compared. However the creation and growth rate of enterprises has improved over the years and caught up with the other Belgian regions (data before the 2008 crisis). Figures of personnel numbers are better in the high technology service sector than in the high technology industry.

12. Innovation *financing* figures are only available for whole Belgium. In this regard Belgium scores below average with the exception of "early stage" venture capital.

In conclusion, the authors express the risk of a growing gap between improved, good scores, and bad scores that might get worse in international comparison. In 2009 total R&D expenses reached 2,2 % of GDP (thanks to a low GDP) and the main contribution has come from the private sector. The main problems lie with the ability to transform innovation and research efforts into economical repercussions.

## 8.2 Barriers and Opportunities for building up a national TA landscape

### *8.2.1 Democratic structures in S&T*

Most democratic structures in S&T policy making are the consultative organs, namely the Science Policy Councils settled at the different levels of power that we pointed out above (Walloon Region, French Community, federal state). They notably bring together employers representatives with labor unions and university representatives.

The Federal Council for Science Policy (CFPS) still exists but its power has notably been reduced over time, along with the successive institutional reforms in Belgium since the late 1980s. Today it is officially in

[220] In a pre-competitive state, research is done by or for enterprises that are in competition or have complementary technological expertise. It consists of basic or applied research and even first developments. However, the results cannot immediately be commercialized and they can be used in different ways according to the enterprises' expertise.

charge of positioning Belgium in the "European Research Area" (in collaboration with the sub-state entities) and it gives the great orientations for the federal science policy whose extension has been dramatically reduced with the different steps of political decentralization of the country.

In 1990, the institutional reform gave birth to the Walloon Council for Science Policy, located within the Walloon Economic and Social Council (CESRW[221]). This Regional body organizes consultations and social dialogue engaging the social partners in Wallonia (representatives of employers and employees) and the Government. Instituted by a Decree of 25 May 1983, the CESRW is often described as the "Social Parliament" of the Walloon Region. CESRW conducts surveys, issues advisory opinions and recommendation on matters related to the economic and social sectors as well as to other regional issues in the fields of environment, urban planning, heritage protection, etc.). The General Assembly of CESRW is composed on one side of 25 members belonging to Walloon Union of Firms (UWE), SMEs, Walloon Agricultural Federation and the Union of Social-Profit Enterprises and, on the other, of 25 representatives of the 3 labor unions. Internal Services of the CESRW enable the Council to duly exercise its activities for conducting surveys, carrying out research and issuing a series of publications. CESRW also runs the secretariat of specific Advisory Committees such as the CPS.

***Walloon Council for Science Policy - CPS (Conseil wallon de la Politique Scientifique)***

After the institutional reform in the late 1980s, the regional Government created in 1990 the scientific policy council (CPS), today considered as a mixed commission inside the CESRW because of its composition. It gives policy and legal advice on any issue related to Walloon science policy. CPS gives its advises both on request or upon its own initiative. It is composed of 29 members: 14 social partners chosen by the CESRW, 6 representatives of universities chosen by CIUF, 2 representatives sent by the General Council of Non university High education organizations, 2 representatives of research centers sent by ACCORD-Wallonia, 4 members designated by the Government and one consultative finance inspector. The CPS's advice always transits trough CESRW and this is a sign of the control of the social partners over these activities. Because it gathers all traditional partners, the Minister in charge of science policy often takes its recommendations into account (Fallon, 2009).

CPS rapidly gave most of its attention to research with technological outcomes (rather than fundamental research or research related to other policy issues such as health and environment) because this research encompasses the most important part for industry and thus for social partners and the CESRW. So far, only the Ministries of Research and New Technologies consulted the CPS on a regular basis. Issues like environment, agriculture or energy are belonging to other Ministries, usually not asking CPS for advice. Their own research organs do not interact much and their consultative organs are not very active compared to CPS.

The French Community has no proper counseling organization and the FNRS strategic body as well as the CReF tend to act as informal consulting bodies in science policy issues related to this political authority. Recently the Walloon CPS began to expand his recommendations to matters relating to French Community's competences (fundamental university research). Ongoing political discussions initiated by the Minister in charge of Research support the project to establish a Science Policy Council Wallonia-Brussels, encompassing both French-speaking political entities. A CPS Wallonia-Brussels, as it is foreseen by law, but not constituted yet, raises a series of problematic institutional questions: how to merge this new organization with the two existing councils (CPS in Wallonia and CPS in the Region of Brussels) and with the FNRS strategic body?

[221] http://www.cesrw.be/index.php?page=EN

***Walloon council of environment for sustainable development (CWEDD[222])***

The CWEDD is an advisory body that gathers different actors of civil society having a background in the environment sector (Walloon Union of firms, agricultural representatives, labor unions, SMEs, environmental protection organism, customer organizations, universities, Union of Cities and Municipalities). It carries out environmental planning and impact studies. Through its advice, the Council helps public authorities (mainly the Government but also municipal councils) to decide in environmental and environment-related matters, under a sustainable development perspective. A major difference compared to the CPS is that the CWEDD can directly submit its recommendations to the authorities, without going through the instances of CESRW (the social partners).

In addition to the traditional counseling organs mentioned before (CESRW and CPS) there is a series of other institutions that perform S&T related studies with a link to policy-making actors.

- Every political party has its own research/advisory body (named "Etopia" for the ecologists, "Institut Emile Vandervelde" for the socialists, "Center Jean Gol" for the liberal-democrats and "Cepess" for the Christian-democrats). As one should expect, these research bodies are very much oriented towards serving the political interests of their respective parties. They produce a significant amount of knowledge, including on S&T issues, but they mainly support decision-making processes by providing knowledge for politicians as well as the design of public policies. Generally speaking, they are not very visible to the general public.

- The trade unions also have their own think tanks that are also doing research. Regarding technology, their focus lies on workers wellbeing and safety and work organization, including the impact of new technologies (more recently also on issues related to environment-health concerns). Traditionally the Christian-democrats have a longer lasting tradition in assessing technological change. In contrast, for a long time the socialists have considered technology as an unconditional symbol of progress.

***Parliamentary committees***

The Committees most likely to be interested in TA and TA-like activities would be: the Committee for energy, housing, public service and scientific research as well as the Committee for economy, foreign trade and new technologies[223]. For an example of pragmatic effects of moving S&T debates to parliament, please refer to the case study below on Electro-magnetic fields.

***Civil Society Organizations (Foundations, associations)***

A majority of foundations are not limited to the same political territories. Some of them might be international with local, national, regional or community based anchorage. However, the ones listed here are considered relevant for S&T:

*King Boudouin Foundation*

- The King Baudouin Foundation supports projects and citizens who are committed to justice, democracy and respect for diversity. The Foundation works on an independent and pluralistic basis.

[222] www.cwedd.be
[223] In the PACITA project, the WP5, 6 and 7 are also likely to engage the Commission of environment, territorial planning and mobility and the commission of health, social action and equal opportunity.

Among other things, it was the coordinator and co-founder of the "Meeting of Minds" project (http://www.meetingmindseurope.org)

*Customer organizations*

- The public body is the Research and Information Center of Customer Organizations - CRIOC (Centre de Recherche et d'Information des Organizations de Consommateurs): CRIOC's missions are to provide technical support to customer organizations and to promote customer protection. It also labels products contributing to sustainable development and it collects diverse information into a documentation center.

- Test-Achats is a private customer organization, funded by its 300.000 members. It pursuits three objectives: disseminating information to protect and empower customers, individual counseling und legal service for members, public relations and lobby campaigns. Test-Achats is a bit more product- and less analysis-oriented that CRIOC.

- Union Wallonne des Entreprises (UWE) is the association of companies working in the Region, and it keeps a very high profile in the innovation field and in the political debate. It is very active at the level of CPS (it supported the writing of the publication of "Evaluation of STI policies in Wallonia"). It also created — with regional funds — a very large database with the list of projects financed with European funds in companies and in universities.

*Lifelong learning organizations*

In order to be eligible for public funding, a lot of NGOs organize a part of their missions according to the requirements of lifelong learning organizations. There are a lot of these NGOs, organized as non-profit organizations, although they often are very small and most of the time they do not have sufficient resources to engage in debates beyond their traditional field of action. Among the ones worth mentioning here:

- Institut Jules Destrée is a small think tank, partly financed by regional funds. It works on topics of social justice, sustainable and economic development as part of a Walloon collective project. Under former Governments it has carried out some participative foresight activities.

- Nature et Progrès (Nature and Progress): the organization started promoting organic agriculture and gardening as well as eco-construction and eco- and sustainable tourism. It presents itself as a defender of biodiversity against GMO's plants.

- Inter-environnement Wallonie: this organization federates 150 local groups of environmental protection. Its aim is to implement the environment in every sectorial policy along with social, economical and cultural dimensions.

- Human Rights League (Ligue des droits de l'Homme) frequently takes position in topics related to ICT, surveillance, and property rights and it give its attention to marginalized groups in society.

- International environmental NGOs are also present in Belgium/Wallonia (Greenpeace, Oxfam, WWF, Friends of the Earth…)

### *8.2.2 Public Debate about S&T / Public engagement in S&T issues*

At first it is important to stress that some debates went through different political institutions and territories and thus were not confined to Wallonia as they do not restrain to a political territory and can pop up either on

a smaller, local scale or at supra-regional levels (as we will also see in the case study in part 4). Some debates are also addressed on a lower level than the Region and sometimes relate to local authorities.

Public Participation in Wallonia is often quite unidirectional, from scientific experts to policymakers and/or society, with a generally low level of societal debate but intense exchanges between experts. The fields raising the most amount of public engagement are often local mobility/territory planning and siting issues (for some issues, e.g. in urban planning, participation is mandatory). However, some broad public participation exercises took place in recent years: the already mentioned "Meeting of Minds"[224] project on brain research or the "G1000"[225] project on political reforms. Limited public initiatives have been organized by the authorities, e.g. the Citizen Conference on radioactive waste management organized at the federal level with the support of the agency in charge of the issue- ONDRAF.

The most recurrent debates (in the medias) are about nuclear power and waste management, sitting conflicts, GMO field trials, ICT developments and downsides and animal experimentation.

Traditional attitudes towards technological development are said to be quite different between the main labor unions – Christian and socialist. While the first has longtime been a little techno-pessimistic and engaged in TA-like activities the latter have considered technology as an unquestioned keystone for social and economical progress.

### *8.2.3 Policy Advice in S&T related issues*

The government already has a series of advising bodies:

In addition to the CPS and CWEDD, two other councils within the economic and social council might touch on TA related matters: The Walloon High council for agriculture, food-industry and food (CSAAA) and the Consultative scientific commission for food-industry products (CCSPA). In addition to that few other structures, there are others that assist policy-making in technology related matters.

#### *Technology guidance*

The Region finances 43 guidance services, each in a specialized technology field. These services provide technology audits for products or processes and technological advice to encourage technological innovation in companies. A technology-scouting mission backs up the guidance in order to be up to date with any S&T progress in Belgium and elsewhere.

#### *Economic Stimulation Agency – ASE (Agence de stimulation économique)*

This agency was created to stimulate entrepreneurship, support new activities and ensure durability of established business enterprises. It stands under the supervision of Minister in charge of the Economy (currently Jean-Claude Marcourt, socialist).

[224] http://www.meetingmindseurope.org/europe_default_site.aspx?SGREF=14

[225] During the difficult political negotiations to form a federal government in 2009 and 2010, a civic initiative came to birth. The main idea is to let lay peoples discuss some of the hot political topics and come up with some political recommendations. This deliberative initiative was labeled "G1000" because 1000 citizens were involved and got largely inspired by Danish consensus conferences. The initiative was quite successful and the organizers are now thinking of follow-up projects on other levels of power or on more particular topics. The organizers gathered some relevant expertise in organizing deliberative events.

### *Technological Stimulation Agency - AST (Agence de stimulation technologique)*[226]

This agency is a publicly funded platform for collaboration, learning and service pursing the objective of raising technological innovation of Walloon enterprises. It is also placed under the supervision of Minister in charge of the Economy (currently Jean-Claude Marcourt, socialist). In order to contribute to a competitive, knowledge-based economy, a special focus is given to those enterprises that are not or little innovating.

Interfaces between universities and enterprises, forming together the LIEU (Liaison Entreprises-Universités) Network. The regional authorities use a part of the European regional funds to support the development of these interfaces with a view of increasing incentives for partnerships between universities and industry.

Research centers through their technological scouting mission. They are represented by a non-profit organization named Accord-Wallonia.

General technology advisors, which gives access to legal and technological council (CeRDT) and European databases on technological offer and demand (CRIW).

Organisms with transversal missions: Intellectual property ($PI^2$), sciences parks (SPOW), accompanying services for European projects (NCP-Wallonie) and quality services (Cequal).

Walloon Agency for Telecommunications – AWT (Agence wallonne des telecommunications). Its mission is mainly to promote and generalize the use of Information and Communication Technology. It has three main mission which are a scouting mission, a counseling mission and a promotion mission. It carries out TA-like activities but solely related to the ICT sector. It is placed under the supervision of Minister in charge of New Technologies (currently Jean-Claude Marcourt, socialist).

### *Walloon Institute for Evaluation, Prospective and Statistics – IWEPS*[227] *(Institut wallon de l'évaluation, de la prospective et de la statistique)*

This public scientific institute supports public decision-making. It provides information, statistics, indicators as well as studies and analysis in economic, social, political and environmental sciences for public authorities, partners of the Walloon Region and citizens. It has also an advising function to the Government by conducting prospective studies and evaluations on its demand. IWEPS is meant to take over the Federal Planning Bureau activities at the regional level but for the time being it is still depending on it to fulfill some of its functions. It has recently started to strengthen its foresight activities and is working to institutionalize them in the Walloon landscape. It is placed under the supervision of the Minister-President of the Walloon Region (currently Rudy Demotte, socialist).

### *Walloon Public Service Scientific Institute - ISSeP (Institut scientifique de service public)*

This public body works under the supervision of the Walloon Government, in particular the Minister in charge of the Environment (currently Philippe Henry, ecologist). Its working axes are the following: characterization of the environment, assessment of environmental and accidental risks and technology scouting and development. It has notably a department of research and assessment of technologies as well as a prospective department but it is very specialized in particular domains such as air quality or soil analyses.

This long list shows that many organizations are active on the small territory of the Walloon Region. A major issue is the too low level of cooperation between them. The Marshall Plan as an industrial strategy

[226] http://ast.wallonie.be/
[227] http://www.iweps.be/

tries to increase partnerships, but fragmentation is still very intense, not only between the federal/Community/Regional bodies but also at the Regional level.

### *8.2.4 Science / Academia*

In 2008, the Royal Academy of Belgium (French-speaking) started a class called "Technology and Society" which is looking into the implications of technologies on society. This class was meant to replace the former committee for the application of science. It stresses the importance of an interdisciplinary approach and aims at delivering independent advice on problems related to research and engineering as well as to strategic choices in order to meet society aspirations, advice and formulate policy recommendations for public authorities with regard to education, research and innovation. Finally it intends to raise public awareness about the importance of science and technology and its impact on society. It also organized a series of courses in the "Collège de Belgique", at the Royal Academy for Arts and Sciences. One subsection of the program is entitled "Science and Technology", and it comprises state of the art achievements but also ethical, environmental, social, historical and cultural considerations and attempts to analyze some techno-scientific controversies such as climate change and GMOs.

Hereafter is a non-exhaustive list of scientific actors engaged in TA-like activities:

Established in 2008 as an ad-hoc academic platform, the **Belgian Science, Technology and Society (BSTS) network**[228] enables STS researchers in Belgium to share with one another their research interests and disciplinary perspectives and to foster collaboration across different fields and locations. The network now extends its hand beyond academia and beyond Belgium to engage an international community consisting of people from research centers, industry, policy making and other professionals with an interest in cross-disciplinary learning and knowledge sharing. TA, that has been relatively confined to the academic world in Wallonia, is expected to be one of the key field of interest in the BSTS network.

**SPIRAL research center, Université de Liège** : SPIRAL is a multidisciplinary research center created in 1995. Its four main research themes are (1) risk and governance, (2) science, technology and society (STS), (3) public administration and policies, and (4) qualitative methodological developments. The STS research unit includes a special emphasis on TA, with several ongoing PhD or post-doc researches on Parliamentary and Participatory Technology Assessment.

**Socio-Economy Environment Development (SEED) research center, Université de Liège** : carries out research in environment, sustainable development, nature conservation, natural resources and agriculture.

**Center for the History of Sciences and Techniques, Université de Liège**: focusing on historical aspects of S&T, including S&T institutions like the FRS-FNRS for example.

**Cellule Interfacultaire de Technology Assessment (CITA), Facultés Universitaires Notre-Dame de la Paix, Namur**: CITA is an interdisciplinary research center specialized in the evaluation of new technologies, in particular of information and communication technologies. It focused on ICT uses, governance, ethics and history.

**The Work & Technology Research Center of the "Fondation Travail-Université"** aims at developing a capacity of research, analysis and intervention on the social aspects of work changes and technological changes. It works out methodological tools for research and lifelong education. The current activities of the Work & Technology Research Center address two research areas: (1) changes in work and the information society; (2) technology and society.

[228] www.bsts.be

**Insitute of Philosophy, Université Catholique de Louvain**: research center focusing on issues related to the epistemologies of life sciences (reductionism, emergence, self-organization, evolutionary theories, darwinism) as well as to philosophy of ecology (sustainable development, human/nature relationships) and the ethical dimensions of scientific research.

## 8.3 Policy options and national recommendations

### *8.3.1 Lessons learnt: a brief history of TA in Wallonia*

As Wallonia experienced two initiatives for setting up a TA office, the failure of these experiences should be rapidly exposed and explained (for more details, see Delvenne 2009, 2011).

The first reflection on TA in Wallonia started in 1984, when the Minister in charge of New Technologies (Melchior Wathelet, Christian democrat) was intrigued by the recent transformations in Flanders, e.g. the so-called "third industrial revolution" campaign and the creation of *Stichting Technologie Vlanderen*[229]. On the Walloon side, the interest was quite limited. Some labor representatives and social partners of the Walloon economic and social council (CESRW) were in favor of such an initiative. However, at the same time there was strong parliamentary opposition, mainly from the liberal and Christian-democrat parties who were afraid of a TA model that would reinforce the social partners. Nevertheless, at the end of his mandate in 1988, Melchior Wathelet proposed a study on the opportunity and the feasibility of a PTA institution in Wallonia. This study was delegated to the CRID (Research Center in Informatics and Law), Facultés Universitaires de Namur. The CRID team visited several TA institutions (like OTA and DBT) and recommended a TA model quite similar to OTA. When it came to assessing this study, the CESRW pointed out that this proposition did not fit the Walloon context nor the needs of potential users. In addition, it criticized the limited institutional approach and its disconnection to European evolutions (e.g. the participatory turn in Denmark or constructive TA in the Netherlands).

The second initiative came from Gérard Valenduc, then representative of the Christian trade union at the CESRW, and sitting in its research commission (which later became the CPS). Valenduc was also active at the (labor/work)-university foundation (FTU) and was a Professor at the Facultés Universitaires de Namur (FUNDP). At the end of the 1980s he refocused his work on TA and resigned from his position at the CESRW to avoid any conflict of interests. In 1991 he obtained from the new Minister in charge of New Technologies (Albert Liénard, also Christian-democrat) a new exploratory project called EMERIT (Experiences of Mediation and Evaluation of Research and Technological Innovation). His idea was to catch up with recent developments in other European regions in terms of regional TA (e.g. in Baden-Wurttemberg) and TA based on social dialogue. The objective differed quite a lot from the original project of supporting parliamentary decision-making and was rather centered on creating the conditions for an innovation-friendly socio-economic climate. The project put forward the idea of enlarging the social dialogue to S&T issues, with the participation of civil society, while acknowledging the formalized and structured social dialogue typical of the Belgian model of social concertation. In 1994, following a conference in the framework of the EMERIT project, Minister Liénard announced his proposition to assign the CPS (the Commission nested within the CESRW) with a TA mission. The CESRW accepted but remained somehow suspicious about Technology Assessment, an activity it had not been prepared for. This new TA mission for the CPS had 4 axes: technological scouting and foresight; impact analysis; elaboration of alternative technological

[229] A foundation composed by members of the Flemish economic and social council (SERV). This institution carried out some TA-like activities but was rather based on a social concertation model than regular PTA activities. Until 1998, when the focus was explicitly put on "innovation at work", STV was also called "the Flemish Foundation for Technology Assessment".

scenarios; information and vulgarization of science. The users were identified as the Government, the Parliament and the administration. A coordination committee was set up. A specific budget was made available (17 millions Belgian Francs (+/- 425000 €) for 1995-1998 and 8,7 millions Belgian Francs (+/- 220 000€) for 1999-2002). Studies were attributed to research centers through calls for tenders. During the first programming period, the committee realized an urban transport study (impacts and alternatives scenarios) and disseminations activities on "new materials". During the second period the CPS organized some vulgarization activities and commissioned two studies: the first on the relationship between NTIC and new work patterns in the press sector and the second on domestic waste reduction, which became a didactic example of technological impact.

In 2002 CPS decided to stop its TA mission, considering that it had not succeeded attracting the attention of its main "clients". It never received any formal demand from the Parliament nor from the Government. Their most successful activities were the ones dedicated to vulgarization of science, which were not tailored to meet their users' political needs and failed to push the social debate forward.

### *8.3.2 Emerging opportunity structures for TA in Wallonia*

In 2011 the authorities (Parliamentarians and Ministers) announced the project to start a pilot for a Walloon Institute for Technology Assessment. How did TA come on the agenda?

In 2008, Pierre Delvenne (Université de Liège, SPIRAL) engaged with different Walloon innovation actors in the framework of his PhD research, whose objective was to understand why there was no PTA in Wallonia in contrast with the Flemish IST. This research contributed to substantially raise awareness about TA in Wallonia and to some extent to put TA on the political agenda. In a first phase of the research 51 actors from public administration, government, parliament, consultative organs, labor unions, CSOs, industry, competitiveness poles, universities and research centers were interviewed. Out of them, 38 took part in an online two-rounds Delphi inquiry and were invited to a workshop to discuss the results of the Delphi (Université de Liège, 10/10/2012). The main results of this exploratory research process can be summarized as follows. We updated and extended these results with more recent data gathered in the framework of the PACITA project (see annex with interviewees).

#### ***What should be the missions and clients of a Walloon TA (by order of importance as addressed by the participants)***

13. Economic missions: participants suggested TA could contribute to investment in new technologies, help stimulate growth and employment promising structures, avoid technological lock-ins, or provide legal advice for enterprises. The emphasis concentrated on the economical dimension of a potential Walloon TA. As potential users of a Walloon TA, the experts considered as the three most important beneficiaries of the knowledge produced by a TA institute (in order of importance): the Government, the Administration (Ministries) and the Parliament (interestingly, the Parliament was never mentioned without the Government and the comments tended to consider the parliamentary institution as an obstacle to governmental decisions: this is indicative of the relatively weak separation of powers in Wallonia). Economic actors were also mentioned: some argued that a TA office could be particularly supportive for SMEs in terms of technology scouting. TA was also understood as a mean to bridge the gap between research and industry. In the current project the TA institute is also intended to work for both parliament and government.

14. Support political decision-making: participants suggested that TA could provide with data designed for (strategic) policy making, inform decision-makers about impacts, promises and risks of

technological developments and, thus, broaden the knowledge base and improve the quality of decision-making process.

15. Knowledge production: participants considered TA could organize a technology scouting mission, popularize S&T related activities for a broad audience, observe the unintended impacts of S&T policies, stimulate and contribute to social debate on new technologies.

16. Stimulation of participation methods and research orientation. The participants' views on citizen participation in TA knowledge production revealed a lack of knowledge concerning participatory TA rather than a real opposition to it. Most of the actors agreed on the important "whistleblowing" role of citizens but opinions diverged when it came to the embedding of participation in the democratic process and institutional landscape. Second, they stressed that the low participation rate in public inquiries reveals a lack of (direct) participation culture in Wallonia. In more recent interviews, the deficit model of public understanding of science (see e.g. Irwin and Wynne, 1996) remained omnipresent. It is expected that TA would help "overcome public resistance and solve techno-scientific controversies by better informing citizens".

***The political independence of a TA institution, as stressed as very important by a majority of participants***

The participants considered the Flemish IST model as relevant in terms of political independence, a quality considered as very important by a great majority of involved experts. They pointed out some additional factors that needed to be considered with regards to political independence under the form of professional and editorial independence. Other preferred to speak in terms of counter-power instead of independence while the idea was introduced to add economic actors, consultative organs or social partners to the TA board. The CESRW itself or some of its consultative councils, some participants said, could have a legitimate place in the TA organs. More recently, the Danish Board of Technology has been mentioned a couple of times as a model for setting up a Walloon TA. In addition, during the first national workshop held in Namur on the 31st of May 2012, the participants had the occasion to learn about TA-Swiss and see what lessons can be drawn from their 20 years of experience with TA. Also in the interviews, the difference was made between independence at different levels and according to different scenarios. A TA body located in the parliament would provide certain independence by pluralism. However, the "partycratic" system and voting discipline play against such arguments.

***The institutional location of a TA structure***

In 2008, based on the first round of the Delphi inquiry, two options were presented to the participants: either the extension of an established structure to TA missions[230] or the creation of a new TA structure.

A majority declared not to be in favor of the creation of a new structure. Among the proposed structures, CPS benefitted from the broadest support for its pluralist character, its relative neutrality and its distance from decisional areas. However, participants expressed the need to establish an *ad hoc* commission at the Parliament (a similar suggestion the German TAB's Group of Rapporteurs) in order to encourage demands of MP's. The success of CPS can be related to the history of TA in Wallonia (see above). CPS, while claiming their interest for the development of PTA in Wallonia, was not very keen on taking up this mission

[230] In DGO6 (Ministry in charge of economy and new technologies), CPS (Science Policy Council), AST (Agency for technological stimulation), ISSeP (Public Scientific Institute), IWEPS (Walloon Institute for Evaluation, Prospective and Statistics)

because they were afraid of a second failure and because they were not allocated additional resources for the mission. They confirmed that in our more recent interviews, while they stressed they were very interested in the development of PTA in Wallonia (as their participation to our first national workshop also attests).

***Political uptake of Technology Assessment and actual impasse***

During the 2008 workshop, the MP Joëlle Kapompolé (socialist) publicly announced a proposal for a parliamentary decree. Other MPs (Hervé Jamar, liberal-democrat and Georges Gilkinet, ecologist) as well as the former Minister for New Technologies and Research (Marie-Dominique Simonet, christian-democrat) declared standing behind the proposition. The parliamentary decree's proposal then passed unanimously at the Committee for International Relations, International Cooperation, Research, New Technologies and Telecommunications at the Walloon Parliament in November 2008. It was stated that a special line of funding could be considered (like for the Marshall plan). According to the proposal, the TA "would be located (again, see below) inside the CPS, should make use of participatory methods and function as an exchange and discussion platform for constructive social debate on technological options without being an obstacle to technological development". Lots of questions remained, though. During the regional elections in 2009, the idea was taken up by the socialist and ecologist parties programs, and after the elections, when a political majority (socialists, ecologist, Christian-democrats) was in place, installing a TA institution became part of the Government's agenda.

In May 2011 the Ministers Jean-Claude Marcourt (socialist in charge of New Technologies) and Jean-Marc Nollet (Ecologist in charge of research and science policy) referred to Kapompolé's initiative to announce a joint initiative for a Walloon Institute of Technology Assessment. They emphasized its clarifying role for policy-making as well as its contribution to social debate. The idea of broadening CPS' missions to TA was abandoned and it was rather proposed to create a new structure dedicated to TA as a completely independent office within the Parliament. The TA would rely on a network of experts. The Government and the Parliament were identified as main users of a TA structure, and to a certain extent it was even suggested that organized citizen groups would be able to ask the TA office to commission studies. Is it also worth adding that this current project emphasizes the importance for the future structure to be able to mobilize participatory methods[231]. An explanatory phase and a pilot-project were planned to start at the end of 2011, with a budget of € 250 000.

However, political tensions between the two Ministers in charge led to a blockade of the project. These relate to divergent political visions for Wallonia, rather than to opposing perspectives on TA itself. The main issue concerns the addressees of the TA institute: one Minister (Marcourt, a strict convinced regionalist) wants the TA institute to work exclusively for the Walloon region (Parliament and Government) while the other wants the TA to also address the Parliament and Government of the French Community. The regionalist argument refers to regional innovation theory and the importance of territorial aspects, which are supposed to considerably differ between Wallonia and Brussels. On the other hand, the ecologist Minister Nollet orientates to research landscape, with a vision of a greater integration of both French-speaking territories. He planned to establish a new Science policy across Wallonia-Brussels. He has similar plans for TA and wants it to work for both entities. These incompatible views are at the heart of the current (1/10/2012) blockade.

Another point of concern is the relatively small budget of money foreseen (250.000 € for a pilot project). The risk is high that such an organ would not be able to take up all allocated mission after the pilot project.

[231] It is relatively innovative and uncommon if one thinks back of the lack of direct participatory culture in Wallonia/Belgium, very much influenced by a neo-corporatist tradition.

***Upcoming activities***

We need to stress that the PACITA project and related initiatives to raise awareness and expand the TA landscape have been successful in inviting Walloon decision-makers (from both Parliament and Government) to engage in debates on TA in Europe.

The actual blockade between the two ministerial cabinets in charge of the TA dossier led us to consider other actors. The President of the CPS invited us to come present deeper insight into concept and the work of TA before the Board of representatives in October 2012. They were interested in other European TA experiences, but they nevertheless did not come up yet with a recommendation to the government in support to the TA file.

Together with the Walloon MP Joëlle Kapompolé, we settled a "raising awareness" program aimed at parliamentarians for the whole year 2013. We plan to organize 6 sessions during lunchtime, called "Les midis du Technolology Assessment". The format will be one 15 minutes presentation from a TA expert/guest speaker followed by 45 minutes of debates with MPs. The first session will be co-chaired by Joelle Kapompolé and Pierre Delvenne and it will aim at officially launching the program with a press conference. The second session will be dedicated to a brief overview of TA institutions and TA practices across Europe. The three next sessions will be dedicated to a TA simulation on a topic of interest for MPs (bottom up selection with 4 MP representative of the four major political groups) to show the MPs, in a simplified, open and real-time fashion, how TA frames issues and handles complex topics in order to inform and support decision-making. The last session will contribute to the evaluation of the program and to the discussion over the next steps for TA at the Walloon Parliament. An encouraging sign is that there is support, including an agreement on a small financial support, of one Minister's cabinet for organizing the program at the Parliament.

## 8.4 Case study – Mobile phone antennas controversies - between public health and environmental framing of electromagnetic fields in a multilevel polity

### *8.4.1 Introduction*

This section is an analytical document derived from a case study (Joris 2011) and updated with recent desk research and interview materials. It gives a comprehensive and critical overview of the transformation of public regulation processes which arouse around the controversy of electromagnetic fields (EMF) in Wallonia (and Belgium). We discuss the socio-technic controversy surrounding EMF as a sort of informal Technology Assessment activity (Joly, 2001, Rip, 1986). That means that there is no clear mandate for this exploration and actors, focus and relevant levels of power are negotiated, co-constructed, and reinforced during the controversy. Furthermore, the issues surrounding the installment of mobile phone antennas in the Walloon Region is illustrative of the complexity and the way socio-technical uncertainties and S&T controversies are discussed and dealt with in the multi-level polity of Belgium.

The issue of mobile phone antennas is highly sensitive in Belgium and in the Walloon Region in particular: the state has sold exploitation rights to companies; European obligations in terms of network covers apply to the territory; resistances to antenna construction notably slow down the development process of mobile telephony. Resistance is mainly coming from local citizen initiatives most of the time connected to regional associations. Because protests were largely slowing down the development mobile phone network coverage, authorities and mobile phone operators tend to associate. As early as in 1985, the first regulation defined the level of exposure to EMF. It was then the sole responsibility of the state (not the Regions) and the authorities gave to the national telecom office (IBPT) the mission to control the level of exposure of antennas. The

situation became much more controversial when international research showed signs of possible non-thermic impacts of human exposure to EMF. The World Health Organization (WHO) stated the necessity of developing a precautionary approach when regulating this issue and the European Commission itself chose the question of EMF as an opportunity for enforcing its presence in the policy domains of environmental health.

When addressing the problem, one directly notices the constant and complex interplay and interpenetration of different levels of power and competences with regularly occurring power struggles between these levels. Siting occurs locally and the urban regulation is in the hand of Regional and local authorities. The latter have a very strong say not only regarding the content of the application file for a construction, but also to organize locally a public consultation on the project (all issues can be considered). Specific to the Belgian federalism, the competence on "environmental health issues" is not clearly attributed to one authority. Regions are responsible for environment issues and the federal state is responsible for health related issues (public health and the financing of health sector). It took almost decennia before the situation was clarified. One can state that the case of EMF "represents a local concretization of a public policy decided at a higher level" (Fallon et al. 2009). We will show that the relative weight of the different actors varies in relation to these levels.

First, we will see that the call for precaution regarding possible health effects of EMF is mainly appraised under the single perspective of the outcome. Procedural aspects of precaution (such as inclusiveness or a comparative approach) are neglected. A second aspect is that to this particular precaution approach adds up a typical Belgian institutional dynamic, which has often proved to overrule precautionary considerations. This situation leads to concurrent framings of the problem: a sanitary issue for federal authorities and an environmental issue for regional authorities while the social actors address them indistinctly and find a hard time dealing with it. In the present case, scientific data and norms may be taken at first sight for granted and perceived as objective. However, when these data are used in the social interactions at different levels of regulation, they may be understood as resources for actors, all mobilizing the same scientific data's in the name of the precautionary principle (PP) but inducing various social and political effects.

### *8.4.2 The Federal Level: a closed-door precautionary approach in sanitary regulation*

Traditionally federal authorities are in charge of product norms, emission norms and authorizing licenses for telecom network operators. On the other hand regional authorities have competences over urban development and environmental aspects relating to mobile phone antennas.

The federal authorities, which see their competences gradually threatened, found in the EMF sector an opportunity to invest and impose themselves as legitimate actors in the environmental issue since this competence remained parallel in the Belgian federal configuration. When the ecologists entered the federal government in 1999, they had the agreement of their partners to regulate their flagships-domains with the use of a precautionary approach. The Health Minister (a Flemish ecologist) invited two scientific experts and a member of a Belgian NGO (Teslabel - very active in health effects of EMF) to give her an advice as to the type of regulation and the level of the norms which would be acceptable with a precautionary lens. This first law was abrogated because the Minister did not consult beforehand the formal advice body on health issues: the Superior Health Council (Conseil Supérieur de la Santé). She was obliged to ask for their advice and a group of experts — organized by the Health Council independently — was asked to analyze the content of the legal proposition. Within this second group of experts, a university researcher who had been active on the issue of radiation pollution found a very broad audience and the Council finally expressed severe critics regarding possible health effect of EMF.

Finally, the federal authorities hoped to close the recurrent debates on possible health effects of EMF by adopting a "precautionary approach", in this case, they adopted norms three times higher than the ones

recommended by the WHO and the European Union. The norm itself excludes any contextual consideration with regard to different environments or exposed groups. The federal agency, *Institut Belge des Postes et Télécommunications* (IBPT) is in charge of controlling this norm. The precautionary approach was based on a consultation of two scientific experts (including the independent Superior Health Council). Based on scientific data, on the advices from internationally known experts and adopting restrictive norms, the authorities thought that they had done everything to ensure a high level of protection. The precaution thus mainly referred to content. But a series of actors will rapidly contest the lack of a more procedural and inclusive aspect (procedural fairness) of the so-called precautionary approach. Indeed, participation and inclusion of stakeholders was pretty limited with the notable exception of the association of the NGO Teslabel in the first expert group (with an NGO), the consultation of the Superior Health Council and auditions of experts in the federal Parliament. During the elaboration of the federal norm, mainly experts had a say and very little space was left to other social actors and their expectations led to several conflicts, in particular in urban environments (Fallon et al., 2009).

The Region of Brussels and the Flemish Region both attacked the new federal regulation on the level of exposure to EMF, by invoking the Constitution and the distribution of competences between the levels of government. The highest judicial body in charge of deciding on such issue is the Constitutional Court, which in 2009 overtly decided that the fundamental text attributes the full responsibility for environmental law Constitution to the Regions. Health and environment are recognized as too closely related to be practically regulated by different authorities. The Regions are responsible for all the measures related to the pollution of the environment, and pollution by EMF is one of them. The federal matters (production of norms of products and telecommunication law) can be handled while integrating the different decisions taken by the three regional bodies. After 2009, the federal authorities left the EMF scene. Even IBPT resigned from its mission of control of pollution level around the antennas.

### *8.4.3 The Walloon Level: urban and environmental regulation*

The Walloon Region positively considered this appropriation of the public health issues by the federal level in the early 2000s. This issue is considered as politically sensitive and not politically rewarding, and the regional Minister in charge of urban development was very happy up to 2009 to rely on a federal norm in this matter. Furthermore, Walloon politicians see encroaching on federal competences such as public health with a very skeptical eye as it would open the door to further decentralization of competences such as social security — the symbol of dismantling the federal state for the French-speaking part of Belgium. The precautionary aspect is thus pushed in the background by the institutional logic underpinning the competence repartition. At the same time, mobilizing the federal norm was understood by EMF opponents as a blackboxing of the decision-making process, particularly because the control agency itself (IBPT) in charge of enforcing the new law was unknown to the general public, making its acceptance even harder.

Authorizations related to individual antennas are decided together by Regional and local authorities, according to the regional regulation for construction and urban planning. Local authorities have consultative voice and play an important role in the instruction of installment dossiers. The urban and territorial planning has reached unseen juridical complexity in Wallonia. Its logic pursuits two objectives: the decentralization of competences and an opening of decision-making processes. The instruction of urban permits is therefore transferred to local authorities in compliance with their proximity to the site and their local knowledge in urban matters. At the same time, consulting local stakeholders is entrenched in this law as an inducer for a greater effectiveness in the management of projects as well as more social acceptance. The regulatory frame objectifies facts and the emergence of participatory spaces allows for social aspirations, whether they be legal, sanitary or economic to be taken into account. Citizens associations contested the distribution of competences and the federal regulation by mobilizing a new construction of specific target populations,

which are supposed to be particularly vulnerable to EMF, such as children or elderly people, or people carrying pacemakers, for instance. At the local level, stakeholders raised a number of issues and questioned the validity of scientific studies by their own means of information search and selection. They did not accept that the files of antennas project were not obliged to have a specific full fledge environmental impact analysis. Neighbors, local associations, environmental organizations and scientists then call upon the public authorities to consider the impossibility of the urban planning administration to take into account all questions raised by mobile phone masts, arguing for the need for the search for alternative installment regulation processes from the local authorities, taking "procedural fairness", environmental, social, health and economic factors into account.

The conflicts around the projects of antennas became so numerous that the regional authorities in Wallonia stated that the closeness of municipal institutions with their citizens threatens their independence and objectivity when it comes to assess data or navigate between general and particular interests. The regional authorities also formulate certain objections as to participation, considering the mobilized associations as badly informed and led by other interests. Accordingly, these participation processes would therefore only slow down and block certain projects. The regional authorities passed a regional law in 2008 defining a new procedure for the authorization of projects with important regional interest and the construction of a full network of antennas across Wallonia was considered as a "project of regional interest" (PIR). For such projects, the new regional law stated that the decision would be taken by the Parliament upon the initiative of the Government: the discussion at the level of the elected body would make local consultation of stakeholders super facetious. Many considered this legal framework as a step back in the participatory dynamics in Wallonia.

Such a management empowers the regional authorities along with the economic actors. The PIR projects address the problem at a more general level by also taking into account economic challenges and wider social considerations applying to mobile telephony with regard to the whole community. By framing political issues in this way, local resistance is reduced to the NIMBY syndrome and disqualified. The participatory aspect then takes the shape of a transparent debate among MPs. Those are supposed to be legitimate representatives of local interests. Such a procedure, which entrusts this mission to the parliament as participation and mediation instance, threatens the decentralization and dialogical logic with the local level. As the parliament is supposed to hold the mediation role as well as the representational role of local entities, it renders a true mediation procedure difficult. Furthermore, the Regional parliament is not considered as an independent institution but as an instance that confirms decision taken at governmental level (cf. our earlier remark on the weak separation of powers in Wallonia).

Finally, these PIR projects managed to change the modalities of participation and the opportunities for legal contestation. They also imposed the urban planning framing as being the only one relevant for the Region and it contributed to reify the federal emission norm while marginalizing the concerns of local citizens as well as the environmental associations. Given the controversial aspect of the issue, the regional authorities proposed to refer to the institute in charge of air quality control (ISSeP) to also control the emission levels of EMF around antennas. Such a practice for trust building has become widespread and it is also becoming a window of opportunity for citizens to contest the decisions as soon as a slight deviation from the issued recommendations is observed.

### *8.4.4 Stakeholder consultation*

In the middle of the institutional battle about the definition of responsibility distribution in the competences of environment and health, the Minister in charge of territorial planning and urbanism, André Antoine (Christian-democrat), asked in 2008 the environmental NGO Inter-Environnement Wallonie (IEW) to

organize a consultation of stakeholders on the issue of health effect of antennas. This commission can be seen as a kind of trade-off. Instead of putting an administrative service in charge of the consultation, the Minister chose to give the lead to this NGO, which defines itself as union for the environment and federates over 150 environmental organizations across Wallonia. It has established itself as a representative of local demands and claims in recurrent interactions with regional public authorities. It considers itself as a center of environmental expertise, issuing studies and recommendation to ministries and cabinets. It is also represented in some public decision-making instances, such as the consultative bodies in the matters of concern for sustainable development (CWEDD). The financing of the organization is also heavily dependent on public funding. Choosing this organization was a strategic choice of the Minister. On the one hand the organization has the legitimacy as an autonomous organization representing the social actors at stake. On the other hand IEW is already largely aware of the dynamics and peculiarities of public policy. Its position therefore is often consensual, balanced and moderate, which may also explain its financing by public funds.

This 2008 consultation process was intended to gather the different stakeholder positions on urban, environmental, sanitary and legal aspects of mobile telephony as well as the fears questions and improvement suggestions to the current situation. The Minister promised to take these considerations into account as long as they were legally and politically feasible. The consultation was carried out in two phases. First a questionnaire was circulated to targeted stakeholders. Second, a workshop was organized in October 2008 in order to list the claims and recommendations to be issued to the Minister. Even though, IEW was theoretically left free to choose the methodology and to give the main orientation of the consultation, the Minister managed to considerably frame the consultation process in a variety of ways. From the beginning it was clear that the Minister wanted to reduce the polarization of the positions. He imposed three themes to be investigated: 1) the relevance of the norms in place and the precautionary principle; 2) urban planning dimension of masts and 3) the relevance of the public inquiry.

By doing so, the public authorities managed to avoid the question of the Walloon competence about the public health issues in this file, by focusing solely on urban planning and procedural aspects. Regarding the actors to be consulted, the public authorities also imposed a series of actors to be taken into account: mobile phone operators, public administrations, consultative commission in urban planning and environment, scientists that are close to public institutions, the Walloon Union of Cities and Municipalities. By doing so, the more radical opponents to mobile phone antennas' installments were progressively marginalized and counterbalanced by more consensual positions. In addition, local concerns were progressively pushed to the background of the discussions. In sum, the two rounds methodology contributed to further embrace a more general view, while delegitimizing the radical and local concerns. The final report thus comprised weakly polarized demands and it remained framed at a general level.

In the end, it appears that the public authorities managed to narrowly frame the consultation and retain the recommendations that suit their problem appreciation: establishing a global plan to manage antenna installments at the regional level; avoiding resistances and blockades at the local level; clarifying the leadership in the field of EMF; changing the terms of participation in the urbanism procedure. With regard to sanitary aspect, the consulted actors raised their concern for a continuous scientific monitoring and, if necessary, for changing the emission norms accordingly.

Following the report of IEW, the Minister issued a circular stating that every new antenna shouldn't exceed 3V/m. This is surprising because a circular cannot have juridical effects. Such "illegal" executive action can therefore only be considered as a symbolic gesture from the Minister. The participation exercise did not change much and it reinforced the administration's perception that participation has no added value where there are economic interests and/or a "regional interest" at stake, whatever it stands for. By contrast to the government's intentions to close the controversy, the issue remained sensitive and all the consulted actors

did not subscribe the political conclusions drawn based on the IEW study. Later on, IEW itself issued a press communication stating that the consultation procedure can be resumed to a bluff.

With these results, the public actors then felt comfortable to come up with the concept "Plans of Regional Interest" (PIR). Those PIR projects are meant to centralize projects at a regional level because they present a regional interest and might be rejected at the local level. After the decision of the Constitutional Court in 2009, the Regions became fully competent for this norm emission. Frustrated by the outcomes of the consultation and the neglecting of their demands for negotiation and contextualization at the regional level, the associational actors then continue their battle at the local level.

### *8.4.5 Conclusion: a felt need for institutionalized TA in Wallonia*

In the described controversy around mobile phone mast, there was little space to discuss health related fears neither with local authorities nor with public health administration.

> *"The stakeholders then chose to contest the official appraisal framework and declared the norm illegitimate and inadequate. What was at stake for the local neighbors was a political forum were all the dimensions of their concerns could be integrated in a meaningful framework. But their concerns were considered as illegitimate as the debate had already been closed upstream with the setting of the federal norm. Closing down the final decision was done without contextualization." (Fallon et al., 2009).*

Most of consultation and participation in such questions is foreseen at the local level as a matter of decentralization in the sector of urban planning. With regard to the sanitary aspects, however, the federal precautionary approach consisting in a simple raise of emission norms did not meet contextualization and participations demands. The unconditional reliance of regional authorities on this norm further contributed to blackbox the decision-making process and additionally raised resistance. The bureaucratic and sectorial decision-making process of adopting a federal norm rendered local health and precaution concerns irrelevant and thus excluded them.

The analysis of the EMF controversy show the piecemeal consultation processes of experts at federal level and a reluctance of all public authorities to organize public debate and consultation on issues related to the impacts of technological development. They rather tried to avoiding controversies by closing the spaces for discussions as much as possible. Even the consultation exercise of the regional authorities in 2008 has been considerably framed by the government.

Social actors were first and foremost searching for an institutional forum for their interrogations and for expertise. There was no official venue for providing such arena along the process, as the legal and administrative procedures only offer limited room for participation, and were narrowed down to some specific points of urban policy (pretty much downstream of the decision making process). This did not provide much possibility to negotiate or discuss the alternatives nor to address health issues and pending uncertainties with involved and concerned stakeholders.

A room for discussion and contextualization should be left for the involvement of stakeholders, and for improving the quality and accountability of the decision-making process. Clearly, a TA institute could play a role in this respect. And its independent character (as it is what the two Ministers in charge of the TA dossier claim they want) would prevent from direct political interference in controversy management, potentially leading to a too early or unproductive closure. In comparison to this informal and politically driven TA activity, which has a important controversy-management dimension, the added-value of having a formal and independent, institutionalized TA organization in the Walloon context is even more evident.

## 8.5 References


Biatour, B., Chatelain, C., Kegels, C. (2010): Le système d'innovation en Wallonnie [the Belgian innovation system], Working Paper 1-10, Bureau Fédéral du Plan.

Bruno, N., Van Til, J. (2011): Mini Country Report/Belgium, under Specific Contract for the Integration of INNO Policy TrendChart with ERAWATCH.

Bruno, N. (2011): National profiles, ERAWATCH Research Inventory Report: New research policy development, ERAWATCH & European Commission.

Conseil wallon de la Politique Scientifique (2011): Evaluation de la politique scientifique de la Wallonie et de la fédération Wallonie-Bruxelles – 2010 et 2011 [Evaluation of the science policy in Wallonia and in the Federation Brussels-Wallonia/French Community – 2010 and 2011], Conseil économique et social de la Wallonie.

Delvenne, P. (2009): Gouvernance et Technology Assessment en Wallonie [Governance and Technology Assessment in Wallonia], Courrier Hebdomadaire du CRISP 2037,p. 1-43.

Delvenne, P. (2011): Science, technologie et innovation sur le chemin de la réflexivité. Enjeux et dynamiques du Technology Assessment parlementaire [Science, technology and innovation on the reflexivity pathway. Challenges and dynamics of Parliamentary Technology Assessment], Louvain La Neuve, Belgique: Academia Bruylant.

Fallon, C. (2011): Les acteurs-réseaux redessinent la science. Le régime de politique scientifique révélé par les instruments [Actor-networks reshape science. The science policy regime revealed by instruments]. Thélème 8. Louvain La Neuve, Belgique: Academia Bruylant.

Fallon, C., Delvenne, P. (2009): Les transformations actuelles du régime de l'innovation en Wallonie: une analyse des pôles de compétitivité [Current transformations of the innovation regime in Wallonia: an analysis of the competitiveness clusters]", Innovation - the European Journal of Social Science Research 22-4.

Fallon, C., Joris, G., Zwetkoff, C. (2008): Using stakeholders'expertise in EMF and soil contamination to importe the management of public policies dealing with modern 348risk: when uncertainty is on the agenda. In Martorell, S. (Ed.) et al., Safety, reliability and risk analysis, Vol.2, Londres, pp.1609- 1617.

Halleux, R., Xhayet, G., Demoitié, P. (2009): Pour la science et pour le pays, 50 ans de politique scientifique fédérale [For Science and for the Country, 50 years of federal science policy], Éditions de l'Université de Liège.

Halleux, R., Pirot, P. (2011): Trente ans de politique scientifique en Wallonie 1980-2010 [Thirtee years of science policy in Wallonia 1980-2010], Editions de l'Université de Liège.

Joly, P.B. (2011): Les OGM entre la science et le public ? Quatre modèles pour la gouvernance de l'innovation et des risques [GMOs between science and the public? Four models of innovation and risk governance], Economie Rurale, n°266, novembre-décembre 2001, pp. 11-29.

Joris, G. (2011): Un médiateur invisible. Analyse et mise en perspective du régime de régulation des ondes électromagnétiques. [An invisible mediator. The regulation regime of electromagnetic waves analysed and put into perspective] Unpublished PhD thesis, Université de Liège, Liège, Belgique.

Lijphart, A. (1968): Typologies of Democratic Systems, Comparative Political Studies, pp. 3-44.

Nelly, B. (2011): National profiles, ERAWATCH Research Inventory Report: New research policy development, ERAWATCH & European Commission.

Politique scientifique fédérale [Federal Science Policy] (2010): Rapport belge en matière de science, technologie et innovation 2010 [Belgian Report on Science, Technology and Innovation 2010], Brussels, Belgium.

Politique scientifique fédérale [Federal Science Policy] (2010): Crédits budgétaires de R&D des Autorités belges au cours de la période 2000-2010 [R&D credits of Belgian authorities *along the period 2000-2010]*, Brussels, Belgium.

Rip, A. (1986): Controversies as informal technology assessment, Knowledge: Creation, Diffusion, Utilization, n° 8 (2), pp. 349-371.

Rivera León, L., Miedzinski, M., Reid, A (Technopolis Group) (2011): Cohesion policy and regional research and innovation potential; An analysis of the effects of Structural Funds support for Research, Technological Development and Innovation 2000-2010", European Commission, Luxembourg : Publication Office of the European Union.

Serret, P. (2011): C'était le chaînon manquant" ["it was the missing link"], in L'Avenir.

Vincent, A. (2009): les acteurs de la recherché en Wallonie et à Bruxelles [Actors of research in Wallonia and Brussels], Courrier Hebdomadaire du CRISP, N° 2016-2017.

## 8.6 Appendix

### *8.6.1 National Workshops*

#### *First National Workshop, 31.05.2012, Namur*

#### *Agenda*

In Wallonia, that has been a couple of years that the concept Technology Assessment has slowly made its way on the political agenda. The aim of this first national workshop was then to give an additional push by civil society, academic and other policy-relevant actors to this increasingly significant topic for politicians.

To further advocate Technology Assessment, the Swiss and Walloon partners chose to take up front some critiques usually addressed at TA in order to get those critiques demystified. The workshop was meant to give some informed answers about such allegations (see programme below), relying on Swiss experts and policy-makers' opinions and experience, and further inform Walloon actors about the rationale, working methods and added value of the Swiss institution.

*Organized with TA-SWISS*

*Provocative Reflections to Build a Technology Assessment Capacity in Wallonia*

*Workshop held (in French) at the Château de Namur, 31st May 2012*

**Program of the workshop**

13h-13h30: Introduction to the workshop and brief presentation of PACITA (Pierre Delvenne, SPIRAL, Université de Liège)

13h30-14h: *"Traveler, there is no path: the path is made by walking. Role and evolution of TA in Switzerland*. Sergio Bellucci, Director of TA-Swiss.

**Roundtable 1**

14h-14h45: *Is TA a club for environmental NGOs or a democratic façade serving industrial interests? Come on, let's be serious…* René Longet, former Swiss MP and Director of an environmental NGO (15min). Debate: 30min. Moderator: Sébastien Brunet (Director of IWEPS, Professor at Université de Liège).

14h45-15h: pause café

**Roundtable 2**

15h-15h45: *Is TA just a new institutional creature?And who ever reads TA reports?* Fulvio Caccia, President of TA-SWISS (15min). Debate: 30min. Moderator: Sébastien Brunet (Director of IWEPS, Professor at Université de Liège).

15h45-16h15: reception

***First National Workshop, 31.05.2012, Namur***

***List of Participants***

| | |
|---|---|
| 1) Sergio Bellucci | Directeur du TA-Swiss |
| 2) Paul Berckmans | Directeur du Conseil Economique et Social Flamand (SERV) |
| 3) Robby Berloznik | Directeur de l'Instituut Samenleving & Technologie |
| 4) Paulette Berzi | Gestionnaire de la Recherche à l'Université de Liège |
| 5) Sébastien Brunet | Administrateur général de l'Institut Wallon pour l'Evaluation, la Prospective et la Statistique et Professeur à l'Université de Liège |
| 6) Véronique Cabiaux | Directrice de l'Agence de Stimulation Technologique |
| 7) Fulvio Caccia | Président du TA-Swiss |
| 8) Florence Caeymaex | Chercheur qualifié FRS-FNRS, Université de Liège (Philosophie politique) |
| 9) Nathan Charlier | Chercheur à l'Université de Liège et à l'Université de Namur |
| Pierre Delvenne | Chargé de recherches FNRS, SPIRAL, Université de Liège |
| 10) Amar Derni | Directeur Général adjoint au Service de la Réglementation et de la Recherche Scientifique du Ministère de la Fédération Wallonie-Bruxelles |
| 11) Anaïs Deville | Conseillère, Centre de Recherche et d'Information des Organisations de Consommateurs |
| 12) Fabienne Dideberg | Secrétaire du Conseil Wallon de la Politique Scientifique |
| 13) Jérémy Dodeigne | Aspirant FNRS au SPIRAL, Université de Liège |
| 14) Luc Etienne | Interface Entreprises-Université de Liège |
| 15) Catherine Fallon | Chargée de cours, Directrice du SPIRAL, Université de Liège |
| 16) Dominique Graitson | Secrétaire du Conseil Wallon de la Politique Scientifique |
| 17) Kim Hendrickx | Doctorant au SPIRAL, Université de Liège |
| 18) Mark Hongenaert | Consultant en participation publique |
| 19) Joëlle Kapompolé | Députée wallonne |
| 20) Chantal Kauffmann | Directrice générale de la Direction générale de l'Enseignement non obligatoire et de la Recherche scientifique |
| 21) Marcel Lambert | Directeur general f.f. de l'Institut Scientifique de Service Public |
| 22) Martine Lefèvre | Attachée scientifique à l'Institut Wallon pour l'Evaluation, la Prospective et la Statistique |
| 23) Vincent Lepage | Directeur à la Direction Générale Opérationnelle 6 (Economie, Emploi, Recherche) |
| 24) Claire Lobet-Maris | Professeur à l'Université de Namur et Directrice de la Cellule Interfacultaire de Technology Assessment |
| 25) René Longet | Ancien membre du Comité Directeur du TA-Swiss et ancien Parlementaire |
| 26) Henri Monceau | Chef de cabinet du Ministre Jean-Claude Marcourt |
| 27) Céline Parotte | Chercheuse au SPIRAL, Université de Liège |
| 28) Michèle Pichot | HEC école de gestion de l'Université de Liège |
| 29) Nicolas Rossignol | Chercheur au SPIRAL, Université de Liège |
| 30) Benedikt Rosskamp | Doctorant au SPIRAL, Université de Liège |

| | |
|---|---|
| 31) Luc Simons | Président de l'Agence Wallonne des Télécommunications |
| 32) Alain Stéphenne | 1er attaché, Direction Générale Opérationnelle 4, Service Public de Wallonie |
| 33) Aline Thiry | Chercheuse au SPIRAL, Université de Liège |
| 34) Gauthier Viatour | Secrétaire particulier d'Hervé Jamar, Député wallon |
| 35) Pierre Wolper | Vice-Recteur à la recherche de l'Université de Liège |

***First National Workshop, 31.05.2012, Namur***

***Minutes by Benedikt Rosskamp***

First, Pierre Delvenne (chargé de recherches FNRS, SPIRAL University of Liège) welcomed the participants and presented the Swiss delegation, before introducing the PACITA project to the assembly and giving a brief overview about the history and state of TA in Wallonia.

Second, Sergio Belluci, director of TA-Swiss, presented an overview of his institution. Entitled "Walker, there is no path, the path is made by walking" his presentation addressed the history of the Swiss TA organisation, its mission, addressees, products, quality criteria and added-value with a special emphasis on a long lasting experience with participative methods.

From this moment, after each presentation, there was a discussion part in order to make the workshop more interactive. The debates were moderated by Sébastien Brunet, General Administrator of the Walloon Institute for Evaluation, Prospective and Statistics and Professor at the University of Liège.

René Longet, former member of the Swiss parliament and nowadays NGO representative, initiated the first discussion round. His talk entitled "Is TA a club for environmental NGOs or a democratic facade for industry? Let's be serious." was intended to deal with a first set of critiques towards TA. Stressing that TA responds to a true public demand for bridging the gap between citizens, politics and technology, Longet argued that it can offer clear, unbiased and anticipatory information. He also stressed the methodology and organisational structure as a warrant for impartiality. The presentation was followed by 30 minutes of debate with the audience.

Finally it was the turn of Fulvio Caccia, President of TA-Swiss. His task introducing the second discussion roundtable was to address the question: "Is TA just a new institutional creature? Who reads TA reports?" In his presentation, he showed how a dedicated TA institution offers a specific added value and fosters trust and credibility. Furthermore he enumerated TA-Swiss' different addressees and the effects on the policy system in the broad sense. Again, the presentation was followed by 30 min of discussion.

***Second National Workshop, January, 08.03.2013, Walloon Parliament, Namur***

The second National workshop was postponed to the 8th of March 2013 for two major reasons – an agenda conflict and a strategic reason.

First, the timeframe normally foreseen for the second national workshop overlapped with the period of municipal elections in Belgium. Those elections were important for local actors as much as for the highest level of policy-makers in the country. Organising an event in that timeframe would almost certainly have been a failure in mobilising relevant political actors.

Second, there was a strong awareness and involvement of the Walloon Government (especially two Ministers) in the TA project — which is however slowed down for political reasons — but at the same time there was a deficit of knowledge about TA within the Parliament.

On the initiative of SPIRAL and MP Joëlle Kapompolé and together with a group of Walloon MPs from all democratic parties, it was decided to settle a "raising awareness" programme targeting parliamentarians for the whole year 2013 thus creating a synergy between PACITA activities and recent developments in the parliament. At the same time, a working group on the “Evaluation of technological choices” was formally established within the Parliament[232] in December 2012, gathering 8 MPs from across the majority/opposition divide and representing the main 4 democratic parties.

The format of the raising awareness programme is one of 5 sessions during lunchtime of one hour each, starting in March. It is called "Les midis du Technology Assessment" (TA working lunches at the Parliament). The format will be one 15 minutes presentation from a TA expert/guest speaker followed by 45 minutes of debates with MPs. The main objective is to facilitate the interaction with the MPs in order to show them “in real-time” what a TA institute could deliver and how much those TA processes and products differ from what they already use in their daily work. Upon the basis of a list of topics that SPIRAL provided them with, the programme has been defined by the parliamentarians in order to fit their needs and preferences. The MPs chose three topics to be covered during the “TA working lunches”:

- Data mining and cloud computing (April 2013);
- Ageing society (June 2013);
- Carbon foodprint (September 2013).

The last session will be held in November and aimed at evaluating the programme and measure how much the support base for TA has been (hopefully) broadening within the Parliament during the year 2013.

Hence the inaugural session of the “Midis du Technology Assessment” was extended to a full day of conference and organized as the PACITA Second “National” Workshop in order to get as much visibility as possible. In order to reach a broader audience in Wallonia, the organisers only invited French-speaking experts, which however proved to cover a great diversity of countries, backgrounds, institutional affiliations and expertise. It was an important symbol to organize such a unique event in the plenary of the Parliament and both the MPs and PACITA partners deployed an important communication strategy to advertise the conference. For instance, 4 MPs of the working group on TA at the Parliament even posted self-made

[232] http://parlement.wallonie.be/content/default.php?skip=&tri=com&nrow=50&id=161&p=01-04-00&com=Groupe+de+travail+%22%E9valuation+des+choix+technologiques%22

interviews on Youtube[233] where they were testifying on the interest of TA for Walloon decision-makers and inviting any interested citizen to attend the conference. In addition, MPs also created a Facebook page[234] of the event and twitted about it at the conference. In total, 119 participants registered and there were also non registered participants who came to attend. Various groups were represented: MPs and their assistants, Ministers representatives, public servants, civil society representatives, industrialists, scientists, university rectors and interested citizens. Many PACITA partners and other TA experts were represented and took part in the event, thus increasing the visibility of the PACITA project in Wallonia and testifying the broad support of the project to expanding the TA landscape in Europe.

Here is the programme of the conference (more information available on http://tapw.wordpress.com [in French]):

# Les nouvelles technologies en débat

## Colloque inaugural des « Midis du Technology Assessment » au Parlement wallon

## 8 mars 2013, 9h30-17h30

Parlement wallon, Bâtiment Saint-Gilles, rue Notre Dame 1, Namur

**Programme :**

9h30-9h45 : Accueil des participants

9h45-10h : Mot d'introduction par **Michel Lebrun**, Secrétaire du Parlement wallon

10h-10h30 : Pratiques du TA en Europe et perspectives pour la Wallonie (**Pierre Delvenne**, ULg, SPIRAL).

10h30-11h : Pause café

11h-12h30 : Table ronde : « Réflexions croisées sur le futur du TA »

[233] The four video scan be found here : https://www.youtube.com/watch?v=jcyeFiby_1Q&list=UUjKj1cJdiR7klOBSeOQx_WA&index=1 (Joëlle Kapompolé), https://www.youtube.com/watch?v=_NRqp8ln18g&list=UUjKj1cJdiR7klOBSeOQx_WA (Hervé Jamar), https://www.youtube.com/watch?v=WV8SXlzmLKw&list=UUjKj1cJdiR7klOBSeOQx_WA (Anne-Catherine Goffinet) and https://www.youtube.com/watch?v=1F114iV65bY&list=UUjKj1cJdiR7klOBSeOQx_WA (Christian Noiret) [Consulted on the 26th of march 2013]

[234] https://www.facebook.com/events/415811828509056/ [consulted on the 26th of March 2013]

- **Robby Berloznik**, Ancien Directeur de *l'Institut Société et Technologie* (IST) au Parlement flamand, Coordinateur de Recherche au VITO (10 min)
- **Theodoros Karapiperis**, Chef du Secrétariat Scientifique du *Science and Technology Options Assessment* (STOA) au Parlement européen, *Directorate for Impact Assessment and European Added Value* (10 min)
- **Michael Nentwich**, Directeur de *l'Institut de Technology Assessment* (ITA) à l'Académie des Sciences d'Autriche (10 min)
- **Todd LaPorte**, Professeur à la *George Mason University*, Washington D.C., et ancien *staff Member* de *l'Office of Technology Assessment* du Congrès Américain (10 min)
- **Christian Noiret**, Député wallon et Membre du Groupe de travail « Evaluation des choix technologiques » (10 min)
- Discussion : 30 minutes

12h30 – 13h30 : Walking lunch

**13h30-17h30 : Atelier créatif et interactif**

**PANEL 1** : ***Thème : Technologies de l'alimentation*** (13h30-15h10)

- **Dorothée Goffin**, *Spin-off manager* de IMONIC et Chercheuse à Gembloux Agro-Biotech, ULg : « Le rôle et la commercialisation des prébiotiques » (20 min)
- **Kim Hendrickx**, Chercheur à l'ULg, SPIRAL : « Qui en a dans le ventre ? Enjeux politiques et sociaux des allégations santé et de la nourriture fonctionnelle » (20 min)
- **Danielle Bütschi**, *Senior project manager* au TA-SWISS : « Comment le TA peut-il aborder une telle thématique pour informer les décideurs politiques ? » (10 min)
- **Anne-Catherine Goffinet**, Députée wallonne et Membre du Groupe de travail « Evaluation des choix technologiques » (10 min)
- Discussion : 25 minutes

14h55-15h10 : Animation et improvisation par le collectif Cortex Formation

15h10-15h30 : Pause café

**PANEL 2.** ***Thème : Technologies de la démocratie*** (15h30-17h)

- **Min Reuchamps**, Professeur en Science Politique à l'UCL et coordinateur de la méthodologie du G1000 (10 min)
- **Gérard Valenduc**, Directeur de la Fondation Travail-Université et Professeur aux FUNDP et à l'UCL (10 min)
- **Nicole Dewandre**, Commission Européenne, Conseillère à la DG Société de l'Information et Médias (10 min)
- **Claire Lobet**, Vice-Recteur à la qualité et Professeur aux FUNDP (10 min)
- Discussion : 25 minutes.

16h35-16h50h : Animation et improvisation par le collectif Cortex Formation

16h50-17h05 : Résumé de la journée et prochaines étapes pour le TA au Parlement wallon, par **Joëlle Kapompolé**, Députée wallonne et Présidente du Groupe de travail « Evaluation des choix technologiques »

17h05-17h25 : Clôture de la journée par **Marie-Carmen Bex**, Chef de Cabinet adjoint du Ministre Jean-Marc Nollet et **Jérôme Vandermaes**, Collaborateur au Cabinet du Ministre Jean-Claude Marcourt.

# Broadening the Knowledge Base in Policymaking: Notes on a Symposium on Technology Assessment in the Walloon Parliament[235]

By Michiel van Oudheusden, post-doc researcher at SPIRAL, University of Liège

How can technology assessment (TA) broaden and deepen the knowledge base of decision making in science, technology, and innovation? This question was at the forefront of a symposium entitled "Debating new technologies" (Les nouvelles technologies en débat), held on March 8 at the Walloon Parliament in Namur, Belgium. It expresses an aspiration shared by Walloon TA professionals, science and technology researchers, as well as certain members of Parliament (MPs), to render TA serviceable to policymaking in Wallonia. It also reflects the aim of PACITA, an EU-funded project that supports TA initiatives involving policymakers and civil society organizations in "non-TA" countries and regions like Wallonia.

Broadly speaking, TA is the systematic study and evaluation of technologies. When tailored to meet the demands of policymakers and MPs in particular, it is termed parliamentary TA (PTA). As symposium organizer Pierre Delvenne (SPIRAL, University of Liège) remarked at the symposium's outset, various countries (e.g. USA, Denmark, The Netherlands, Switzerland) and regions (e.g. Flanders, Catalonia) have established PTA traditions, but TA was never durably institutionalized in Wallonia. Why is that?, he asked. And how can TA processes and tools inform Walloon policymaking, taking into account the needs of scientists, societal actors, citizens, and politicians?

*Useful but fragile*

During the first half of the day, a roundtable of TA experts offered their responses to the above questions. Michael Nentwich (ITA, Austria) and Theodoros Karapiperis (STOA, EU Parliament) illustrated how expert studies and citizen consultations, among other TA activities, can support technological innovation in domains such as energy, health technologies, and nanotechnologies. A more intriguing note, however, was sounded by Todd LaPorte, formerly with the US Office of Technology Assessment, OTA. Intent on sharing his OTA experiences with the audience, LaPorte underlined that PTA is a fragile policy tool, as TA processes provide interdisciplinary, long-term oriented knowledge that must be "de-politicized" in order to tailor to all political factions. The difficulty, said LaPorte, is that PTA inputs into policymaking are almost by definition threatening to the political and economic status quo, because they urge policymakers to take measures that surpass the short term of politics. A good example is global warming, which in the US has not resulted in notable policy action. Furthermore, PTA institutes tend to lack "outside constituencies"; that is, they can be so firmly wedded to Parliament that they are unable to target other societal actors, such as the media, civil society organizations, and the citizenry. As a consequence, many PTA institutes are fully dependent on Parliament and Parliament only.

Recent political-institutional developments lend support to LaPorte's fragility thesis. In 2011, the Danish Government announced that it would reform the Danish Board of Technology. In the same year, the Flemish Government called for the disbandment of the Instituut Samenleving en Technologie (IST), which advised the Flemish Parliament on matters relating to science and technology. Little surprise then that symposium participants asked IST director Robby Berloznik to expound on the recent restructuring of his institute. In line with LaPorte, Berloznik responded that PTA organizations must continuously adapt to changing political

[235] Research note submitted by Michiel Van Oudheusden to the *EASST Review*.

cultures, which can be hard to fathom. He argued that when PTA was initiated in Flanders in 2000, Parliament was considered the bastion of people's power. This "strong" conception of the role of Parliament has radically weakened in recent years. Due to political shifts, Parliament and its affiliated organizations have come under increasing ideological pressure and face budgetary restrictions.

Fragility thus set the tone for the morning discussions. Offering his reflections on the issue, Deputy Christian Noiret even went so far as to point out that relatively few Walloon MPs were in attendance in the present session. He hastened to add, however, that TA is far from redundant. Policymakers, he argued, can utilize TA as a tool to reach more informed decisions, but this requires experimentation with TA processes and ideas, as well as openness from all involved parties. Experimentation and openness imply integrating representative (parliamentary) and deliberative-participatory (TA) rationales in decision making, he said, as well as carefully listening to, and assessing, the needs of MPs when it comes to technological innovation.

*Expanding TA*

After a walking lunch in one of the underground galleries of the Parliament, it was time for the first of two thematic sessions. Two early-career researchers presented their research on food technologies, to which Danielle Bütschi (TA-SWISS) and Deputy Anne-Catherine Goffinet responded. Building on observations raised by Kim Hendrickx (SPIRAL, University of Liège) as to how scientists, regulators, and policymakers categorize foods in different, potentially conflicting ways, Bütschi acknowledged that TA processes are always interpretive. This is why writing policy recommendations is so difficult, she said, as PTA reports must avoid using politically sensitive words in order to assure the impartiality of PTA. To illustrate her point, she referred to the height of public controversy around genetically-modified organisms. At the time, the word "moratorium" was taboo in Switzerland, as it was elsewhere.

Bütschi's remarks reflect earlier concerns about retaining the political independence of PTA. If the independence of a PTA institute, or more accurately, the perception of independence, is breached, PTA risks losing political credibility and clout. Picking up on these concerns, Goffinet emphasized that the added value of PTA lies precisely in "bridging" the worlds of academia, industry, civil society, and politics. While the neutrality of PTA can be questioned on scientific, legal, political, and philosophical grounds, "neutrality" is also a tool that enables PTA actors to draw together, and facilitate, multiple innovation rationales, vocabularies, values, and interests.

The second afternoon panel, entitled "Technologies of democracy," comprised contributions from Gérard Valenduc (Universities of Namur and Louvain-la-Neuve), Nicole Dewandre (Advisor to the Director-General of the DG CONNECT, EU Commission), and Claire Lobet (vice-rector of the University of Namur), among others. Valenduc, who in the eighties and nineties pioneered various TA initiatives in Wallonia, praised the symposium organizers for revitalizing, and possibly reinventing, TA in the Walloon region. Reiterating an earlier remark by Delvenne, Valenduc contended that policy-oriented TA now has more momentum than ever before, as both TA practitioners and politicians make a concerted effort to explore and use TA for policymaking.

Thankfully, both Dewandre and Lobet provided resources to work with, or around, the opposition between ostensibly "detached," academic research and "practical" policymaking. Lobet by highlighting that she has developed participatory methods with philosophers that can be of service to TA, and by evoking ethical questions specific to technology that directly impinge on the lives of citizens; Dewandre by insisting that "evidence-based policymaking," on which many TA formats draw, does not necessarily muster the kind of evidence policy actors like herself are looking for. What is needed, argued Dewandre, is an analytical

practice that does not take technology as a given object that must be "assessed," but understands technology as a societal project.

*TA working lunches*

As the symposium drew to a close, Deputy Member and President of the Parliamentary Working Group on the Assessment of Technological Choices (Evaluation des choix technologiques) Joëlle Kapompolé, thanked the symposium organizers and speakers for their contributions. She pledged to draw political support for PTA in Wallonia and reminded attendees of a series of "TA working lunches" that will be held with TA researchers and MPs in the Walloon Parliament from April onwards. She also sounded two notes of caution. First, contrary to what some symposium attendees had suggested, the PTA activities in the Walloon Parliament serve to explore the potential uses of TA for policymakers based on the latters' expectations and concerns. In other words, the present initiatives are not an attempt to erect a full-fledged TA institute within the Parliament – at least not just yet. Second, there is a need for TA professionals and researchers to communicate in a transparent and clear language in order not to exclude broader segments of society. While speakers in the symposium achieved a high level of debate on a range of important issues, it is necessary to "vulgarize" TA outputs in the best sense of the term.

In their closing remarks, Marie-Carmen Bex (representing Minister Jean-Marc Nollet) and Jérôme Vandermaes (representing Minister Jean-Claude Marcourt) likewise underlined the added value of TA for policymaking processes. Echoing Kapompolé's point that the question at present is to sensitize MPs to TA ideas and approaches, Bex spoke of launching a "TA awareness campaign" within the Parliament. Vandermaes added that such a campaign should target all political factions, without exception.

These reactions suggest that PTA in Wallonia is "on the move," to cite Delvenne; although the direction in which PTA is presently heading is not yet clear. The follow-up initiatives, such as the TA working lunches, should help involved parties to outline the possibilities and cease the opportunities for PTA. The same initiatives will also have to address the various challenges raised in the symposium, such as the fragility of PTA institutions, if PTA is to leave a lasting imprint on Walloon policymaking circles and Walloon society at large.

For more information on the March 8 symposium and upcoming Walloon PTA events, visit http://tapw.wordpress.com (in French).

### *8.6.2 Interviewed Experts*

| Category | Organisation | Expert | Expert´s position | Date of interview |
|---|---|---|---|---|
| Science | Université de Liège | Pierre Wolper | Vice Rector for Research | 21 May 2012 |
| CSO | Walloon Council for Science Policy and Representative of the Socialist labor union at the CESRW | Gianni Infanti | President | 11 June 2012 |
| CSO | Walloon Council for Science Policy | Dominique Graitson and Fabienne Dideberg | Secretaries | 11 June 2012 |
| Governmental Authorities | Department Competitiveness and Innovation | Daniel Collet | Director | 16 mai 2012 |
| Governmental Authorities | Walloon Agency for Technological Stimulation | Véronique Cabiaux | Director | 18 April 2012 |
| Governmental Authorities | Minister for Economy and New Technologies | Henri Monceau | Head of Cabinet | 11 June 2012 |
| Governmental Authorities | Minister for Research and Science Policy and with Gian-Marco Rignanese, scientific expert for the same Minister | Marie-Carmen Bex | Head of Cabinet | 14 June 2012. |
| Parliament | | Joelle Kapompolé | Member of Parliament | 31 May 2012 |
| Science | Cellule Interfacultaire de Technology Assessment, Université de Namur | Claire Lobet | Director | 31 May 2012. |
| CSO | Flemish Economic and Social Council | Paul Berckmans | Director | 31 May 2012 |
| Science / Governmental Authotities | Walloon Institute for Evaluation, Prospective and Statistics | Sébastien Brunet | Director | 31 May 2012 |