EUROPEAN COMMISSION

RESEARCH

Commissioner: Philippe Busquin

Directorate-General for Research

Director General: Achilleas Mitsos

The Directorate-General for Research initiates, develops and follows the Commission’s political initiatives for the realisation of the European Research Area. It conceives and implements the necessary Community actions, in particular the Framework Programmes in terms of research and technological development. It also contributes to the implementation of the “Lisbon Strategy” regarding employment, competitiveness at international level, the economic reform and the social cohesion within the European Union.

The Directorate “Knowledge-based economy and society” (Directorate K) contributes to the realisation of the European Research Area in the fields of the social sciences, economic, science and technology foresight, and the respective analyses. To this end, it monitors and encourages science and technology foresight activities, conducts the economic analyses necessary for the work of the Directorate-General, and co-ordinates policy as regards the relevant political, economic, human and social sciences. It prepares the European reports on science and technology indicators, and it contributes to the development and implementation of the Framework Programmes in these fields. It monitors the progress made in the implementation of the Lisbon strategy. It is responsible for encouraging investment in research and technological innovation. To this end, it develops policies and measures to improve framework conditions for private investment and the effectiveness of public financing instruments.

The unit K2 “Science and Technology Foresight: links with the IPTS” contributes to the development of policies and policy concepts through Foresight analyses and activities. Together with other Directorates and General Directorates, and specially the IPTS/JRC, the unit develops the co-operation between Foresight practitioners and users in Europe. In addition, it is responsible for the implementation of the respective activities in the 5th and 6th Research Framework Programme.

Director: Jean-François Marchipont

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Editorial

«Foresighting Europe» is the newsletter published by the Science and Technology Foresight Unit of DG Research. This first issue is a special edition “Highlights 2002”. The selected articles offer an overview of the major events organised last year by the Foresight Unit and give a first review of the most relevant conclusions and recommendations produced during the year.

Within the context of international conferences or meetings with high-level experts, famous international experts, national and European decision-makers, as well as the other stakeholders, were brought together to debate on current topics articulated mainly around three themes: "A European Area for Foresight in the making", "Support to the elaboration of European policies" and finally "Science and Technology policy in a long-term perspective".

The starting point for the development of the first theme “A European Area for Foresight in the making” was the report of the High Level Expert Group on European Foresight. The role of foresight at European and regional level was debated during three big conferences.

Another report, produced by the High Level Expert Group on "Foresight for the relations between higher education/research" was a prospective contribution to the elaboration of the Commission’s Communication on "The role of the universities in the European of Knowledge", which was diffused for consultation on 5th February 2003.

The future of Science and Technology policies was also on the agenda in 2002. Two events were organised in order to provide the Commission with a long-term vision of the S&T policies landscape in Europe: first, a workshop on the new challenges and new responses for S&T policies in Europe and second, a round table organised in the context of the big conference for the launch of the sixth framework programme.

This newsletter finally ends with a presentation of an interesting event for 2003 in the field of foresight.

HIGHLIGHTS 2002

A European Area for Foresight in the making

Final report of the High Level Expert Group (HLEG) on “Developing Foresight to strengthen the strategic basis of European Research Area (ERA)”, March 2002 (pp.3)

Spanish EU Presidency Conference: “The role of Foresight in selecting research priorities”, Seville 13-14 May 2002 (pp.4)

Conference “Europe’s Regions Shaping the Future – the Role of Foresight” Brussels, 24-25 September 2002 (pp.6)

Foresight to scenarios workshop: Landscaping methods and tools Brussels, July 2002 (pp.7)

Support to the elaboration of European Policies

Report of the High Level Expert Group on “Foresight for the relations between higher education/research” (pp.10)

Science and Technology policy in a long-term perspective

STRATA consolidating workshop: “Science and Technology policies in Europe: new challenges, new trends”, Brussels 22-23 April 2002

Science and technology policies in a long-term perspective (pp.11)

Science Foresight for the 21st century, based on a paper by Thierry Gaudin (pp.13)

Strengthening interfaces in innovation systems: new policy instruments are needed, based on a paper by Ruud Smits and Stefan Kuhlmann (pp.15)

Round Table on the “Future of Science and Technology policy in Europe” Brussels, 11-12-13 November 2002 (pp.19)

Perspectives 2003

The Ioannina International conference (pp.21)
The High Level Expert Group (HLEG) on “Developing Foresight to strengthen the strategic basis of the European Research Area (ERA)” delivered its report in March 2002.

The setting up of a High Level Expert Group (HLEG) on “Developing Foresight to strengthen the strategic basis of European Research Area (ERA)” was timely as there are specific European policies (the Lisbon Strategy, the development of the ERA, the reform of European Governance) that call for a greater and more co-ordinated attention to Foresight thinking. The report was delivered in March 2002 and offered options to support European co-operation in Foresight.

This High Level Expert Group composed of experts coming from Research Ministries, Foresight institutions, Parliamentary Technology Assessment organisations, and industry was set up to explore in depth the options for developing Foresight to strengthen the strategic basis of the ERA.

Relevance of Foresight

Due to accelerated social and technological change, a new culture of future-oriented thinking in society is needed. Decision-makers need to acquire new skills in the face of the declining role of traditional value systems and the erosion of traditional interest groups combined with calls for more accountability and accelerated technological change. This new culture should focus on producing a strategic framework for better-informed policies, based upon transparent, participatory and flexible decision-making in the face of complex challenges.

As science and technology are amongst the main drivers of change, foresight activities are an important vehicle in prompting broad social debates based upon expert inputs and mobilising broad sections of all stakeholders to give collective thought on priorities and actions. Bringing together experts with people from different disciplinary and sectoral backgrounds, makes it possible that next to possible impacts on policy-making of the products of Foresight activities, the processes that lead to that output also change the perceptions and beliefs of the participants.

Foresight impact on other policy fields

Starting from a science & technology perspective, and then integrating horizontal “science-society” questions, Foresight activities contribute to the development of the European knowledge-base and propose visions for the future of European society. They thus offer a framework for policy development, allowing a coherent development of these policies in all fields. Strengthening the European dimension of Foresight, therefore, highlights one of the key messages of the Lisbon strategy: the design and implementation of RTDI policies play an important role in policy development, in general, towards achieving the Lisbon goals.

Implementation of Foresight in Europe:

The actual implementation of Foresight should be conducive to building new competencies in all societal sectors at all levels and should take the potential benefits of economies of scale into account. The following five functions would benefit from being organised at a trans-national European level:

- Creation of a learning space: Formal and informal learning processes should be supported in order to ensure that lessons learnt are passed on to ensure increasing Strategic Intelligence.
- Open co-ordination of foresight exercises: In order to exploit economies of scale in terms of expert recruitment, shared resources and the building up of comparative experiences, foresight exercises should be co-ordinated and run in parallel wherever possible.
- Monitoring: A continuous monitoring activity accessible via the website would represent a useful resource for practitioners.
- Common European Foresight projects: Common analysis of main generic issues and trends would produce strategic intelligence outputs on common drivers and trends in policy areas with Community level competencies.
- Dissemination: Foresight products should be disseminated via an Internet Foresight portal. Secondary analysis of the results should be undertaken in seminars, working groups, dissemination activities and separate publications.

Setting up of a Knowledge Sharing Platform:

The report supplies the Commission with recommendations that could support a European development into a stronger capability of future-oriented thinking as a basis for strategic planning, policy and decision-making. The set of options proposed by the group reflects the diversity of

1 By monitoring we mean identification of the multiple Foresight activities we call for at all levels, compilation and analysis of best practice and results.
foresight-related actors and activities. In particular the group suggests the setting up of a Knowledge Sharing Platform for the European Foresight community of practitioners and users. Foresight programmes, initiatives and institutions might, in this way, be better interconnected and supported in close co-operation with all relevant actors in Europe and, when necessary, geared towards common problems and issues, at transnational, inter-regional or European level through “open co-ordination”.

**Recommendations for Foresight activities at a European level:**

- Two broad strands of activities should be developed at the European level:
  - activities to tackle European-wide issues;
  - the development of open co-operation between Foresight activities implemented at the various levels in Europe.

- Foresight should be encouraged through a series of targeted projects, based on appropriate issues that are inherently transborder and/or particularly complex. These projects should involve key stakeholders in an open and interactive process.

- A Knowledge Sharing Platform should be developed as an intellectual infrastructure for experience sharing and discussions. It could allow actors to benefit from the diversity of their activities and should provide services to support the development of a European-wide foresight community.

- Evaluation instruments for assessing the quality of foresight in Europe need to be developed.

**Short-term recommendations to the Commission:**

- The European Commission should undertake a feasibility study on the establishment of a Knowledge Sharing Platform to be set up during the 6th Framework Programme.

- With regard to the 6th Framework Programme, it is recommended to the Commission that:
  - A sufficient number of targeted Foresight projects on European Futures should be initiated.
  - Networks of excellence on Foresight in Europe should be supported under FP6.
  - An infrastructural support service for cross-connecting regional or transborder foresight projects should be set up.

**Main Conclusions**

By implementing the HLEG recommendations the European Commission could contribute to develop European Foresight efforts in a co-ordinated way, while at the same time encouraging multiplicity and competition. In addition, Foresight’s role as a catalyst for the advancement of the European Research Area would also be supported by the recommended actions. These can contribute considerably to joint visions and goal setting and can help facilitate the European Research Area.

The various concrete actions needed to contribute to creating a European Foresight Area in its own right now need to be defined. In this way a knowledge infrastructure that reflects the most crucial future problems and challenges of science and technology related to the European knowledge society can be developed and used by all actors in the ERA.

**“The role of Foresight in selecting research priorities” Spanish EU Presidency Conference, Seville 13-14 May 2002**

The Commission (IPTS/JRC and DG RTD K) and the Spanish Ministry for Science and Technology organised a Conference on the role of foresight in research policy gathering together 300 participants from academia, industry, public bodies and practitioners from various national as well as from regional authorities. The conference was the follow-up of previous Foresight Conferences like the one held in Stockholm under the Swedish Presidency in 2001.

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A central document of the Conference was the report of the High Level Expert Group<sup>3</sup> “Developing Foresight to Strengthen the Strategic Basis of ERA” commissioned by DG RTD K2. The report was freshly issued. It was presented for the first time, broadly discussed and received a warm welcome. There was wide consensus on its main recommendation to establish a platform on foresight at European level for information sharing, monitoring and benchmarking. Foresight is mostly a national exercise and should now move to the wider dimension, where transnational issues can be better tackled. To consider foresight contributing to building up strategic intelligence in the process of policy-making, particularly in research policy, was the leitmotiv of the Conference. Although there is no standard procedure to integrate foresight into policy-making, keynote speakers agreed on the principal hypothesis and rephrased the leitmotiv from different points of view as follows:

- Prof. Marimon, Spain’s Secretary of State for Research opened the Conference and welcomed the widespread use of foresight by Member States. For the Framework Programme, he suggested a continuous process of accompanying foresight measures for each of ERA’s thematic priorities.
- Later, Mr Bernabei (ESC) suggested to flank FP6 with a process integrating monitoring, evaluation and foresight that could be understood as a management tool to guide FP6.
- Mr Herrero delivered Commissioner Busquin’s opening speech. He mentioned that the Commission initiative for developing ERA is in itself forward-looking and has thus many similarities with foresight. Foresight, he added, has an important role in ERA and in the Commission’s FP6 proposal. Foresight should contribute to bringing science and technology closer to the citizen by an open and participatory process involving societal stakeholders. He stressed that the EU research policy is a central element of the Lisbon strategy, as confirmed by the Barcelona Summit where the EU Head of States agreed to set a target of 3% for Europe’s GERD by 2010, and foresight may be instrumental in suggesting ways about how to achieve this goal.
- Prof. Mulgan, Adviser to Mr Tony Blair, described foresight as presently at the core of the UK governmental policies. Two units, with a total staff of 100, are directly attached to the Prime Minister’s Office to carry out forward-looking analysis of policy issues. He stressed that foresight has an important role to counter-balance day-to-day policy pressure (i.e. more prevention and less reaction) with long-term strategy.
- Prof. Ernst the Nobel Prize Laureate in Physics went in his lecture into the unexpected long-term impacts of science and politics. Also he supported foresight for a more rational process of policy-making.

- Mr Caracostas (DG RTD K2) pointed to Europe’s world-leading role in foresight practice and called on the research community for action to participate in the different research priorities of FP6 by, e.g., accompanying initiatives related to the priority themes or as integrated parts of Integrated Projects or Networks of Excellence. He announced the issue of an outline Guide<sup>4</sup> to opportunities offered by the Sixth European Community Research Framework Programme for supporting co-operation in the field of Foresight in Europe (to be updated regularly) to help those wishing to join their efforts at EU level, showing where the foresight researchers and practitioners could participate in the different parts of FP6.
- Prof. Koukios, the co-ordinator of the implementation of the Greek Government foresight project, announced a Greek Presidency Foresight Conference<sup>5</sup> in May 2003.

**IN CONCLUSION**

- Progress has been made since the 2001 Swedish Presidency conference in Stockholm (e.g. a guide for regional foresight developed by the FOREN project - “A practical Guide to Regional Foresight”).
- However, the process of spreading national foresight to other countries is under way (e.g. a proposal from Portugal to unite forces with Spain) and collaborative efforts have to be undertaken now in order to set up networks and projects addressing pan-European issues.
- Also, Industry currently uses foresight at a product level. Public-level foresight is nonetheless important to characterise future environment for industry and anticipate societal trends. Industry is willing to share knowledge on their foresight analyses, as these affect decisions only indirectly. Nokia, for instance, has a policy of great transparency with the public: 600.000 people are subscribing to the Forum Nokia enabling the company to spot early signs for prospective developments.
- FP6 will have to prove that foresight can contribute to embed science and technology better into society by involving stakeholders in foresight activities.

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<sup>3</sup> The Final Report can be found at: http://www.cordis.lu/rtd2002/foresight/main.htm

<sup>4</sup> This guide “Strengthening the dimension of Foresight in the European Research Area” can be downloaded at http://www.cordis.lu/rtd2002/foresight/cooperation.htm

International competitiveness depends increasingly on an active search for and development of the regional strengths and peculiarities, and their regional and global marketing. Regional innovation systems with their very specific innovative networks govern the opportunities for becoming a dynamic player both in the local and the global environment. In addition, a regional focus helps all actors to become aware of their potential capabilities and thereby also to improve their performance. In the end, the region may develop a stronger feeling of identity and a strategic vision of its path to prosperity.

The European diversity and multi-cultural tradition can be made a driving force for innovations in the Europe’s regions. These innovations relate to the technological, economic, organisational or social dimension. Regional foresight and assessment institutions can play a catalytic role for establishing regional innovation initiatives, monitor performance and suggest improvements and changes in the course of implementation.

About the conference

The Conference involved various Commission Services, European organisations, and policy-makers and experts from Member States and Candidate Countries. The scope was to contribute to the networking of regional decision-makers, as well as foresight practitioners, promoters and stakeholders connecting Europe’s regions.

The first day was dedicated to inserting regional foresight in a broader context (New European Governance, EU Enlargement, Lisbon Strategy, European Research Area) and presenting concrete results already achieved. The objective of the second day was to actively engage, on the one hand, promoters and sponsors of regional foresight (national and regional authorities, Commission Services, other supporters), and, on the other hand, practitioners and stakeholders (participants from the public and private domain). They developed ideas for new activities to harness the potential of foresight to contribute to the ‘Lisbon goals’.

European consortia of regional Foresight Initiatives could be seen as strategic contributions to the realisation of the European Research Area (ERA), the far-reaching goal of European RTDI policy in the coming years. They can support the ERA development by reinforcing and widening European unity through co-ordinated diversity and strengthening regional development in all Member States. This will be specifically important for the Candidate and Cohesion Countries, as they could then develop their own path to modernisation and innovation, and nevertheless link to all types of European networks and regions. Therefore, the conference focused on regions both in Member States and Candidate Countries, with additional expert input from outside Europe.

The Plenary sessions gave overviews on the state-of-the-art from different perspectives (regional, to-be-enlarged EU, global): major policy developments, regional development and economic growth on the one hand, and ongoing and future foresight-supporting schemes on the other. Detailed reviews related to practical applications of regional foresight were provided during the thematic workshops, more specifically regarding the impacts for Policies, Governance and Integration, the contribution to the European Research Area, Quality Control and Benchmarking (understood as a tool for social learning).

6 For presentation see: http://www.regional-foresight.de/
Informal but professionally structured discussions (thematic discussion tables) were also organised. They focused on common interests and co-operative projects with the aim to create the basis for new networks of practitioners and researchers, and to promote further cross-national co-operation when designing and implementing strategic regional activities: Biotechnology; Information Technologies; Public Participation and Discourse, the Role of Stakeholders; Methodology and Benchmarking; Foresight and Consumers; Foresight in Industry; Regional Economic Restructuring; Foresight and Sustainability; Foresight and Energy.

Conclusions
The Conference was an important step towards a new European climate of integrating regional variability and European unity. Participants voiced their interest in trans-regional collaboration in regional foresight to accelerate mutual learning effects, especially in the context of an enlarged European Union. Regional foresight can help to create social capital, participatory policy-making approaches and institutional learning. Mobilising the regional foresight potential across and for the ERA can create a ‘strategic knowledge pool’ combining the regional development potential of Europe with an enlarged and competent network of regional-foresight-capable institutions. This type of network will contribute to the debate regarding globalisation, multi-level governance and the European Research Area, and facilitate the involvement of the Candidate Countries in the European integration process. It will address the challenges of the globalised markets linking our increasingly knowledge-based economies to ensure the quality of life of our citizens and the social cohesion of our societies.

“Foresight to Scenarios – Landscaping Methods and Tools”
Workshop held in Brussels, July 2002

The meeting entitled Foresight to Scenarios - Landscaping Methodology and Tools was attended by 100 people from 16 countries and 3 continents. Everyone had to bring a case history or paper about their experience. The purpose of the meeting was to explore the apparent gap between foresight, which tends to be near- and medium-term; and scenarios, which tend to be long-term stylised “pictures”.

Scenarios as a tool to think about the future go back to the futurist Herman Kahn, who developed them in the early 1960’s as a method to explore the consequences of nuclear war - thinking the unthinkable or "out of the box". Now they are used by commercial, public and voluntary organisations at national, regional, local or sectoral level - to help them develop strategic visions of futures which they would...
wish to strive for. Foresight is a more evolutionary look at how futures may develop in various contexts, finally exemplified by scenarios. The concept of a united Europe is 50 years now in the making, and at a time when the scientific community is coming together to create a momentum for a European Research Area, it is even more important that every actor, every region, every member state, every candidate for membership and the Commission itself develop visions of their future. We cannot predict the future but we can ensure it addresses the goals we, as a people, want to address. As a number of European Union milestones approach, strategic visions and options are key inputs to better understanding of such futures.

Therefore we are encouraging the development of a European Research Area for foresight studies, for systematic reflection and thinking about the future. We also encourage the articulation of specific policy issues with foresight in the framework of policy development at all levels. Traditional “Foresight” is a more cautious, extrapolatory way of thinking, it defines the limits of "the box", albeit in a forward-looking fashion. But for that it looks at what else is in the box and makes the best use of its resources. The question is, how to bridge the two for continuity? And then what links this with strategic planning by industry and government alike? But foresight is an essential ingredient to growth.

The logical connection was that “if technology is such a predominant driver of growth”, and “foresight helps shape technology”, then it should be "possible to also influence the nature of the long-term scenarios". Scenarios vector along 4 key axes depending on the precise nature and objective of the exercise. Political high level work tends to have little technical content but relatively high social and economic content. The opposite may be said for technical foresight exercises. Foresight vectors along the same 4 axes as the diagram shows:

Foresight tends to be shorter term than scenarios, and take a systemic look at all relevant factors; while scenarios extrapolate one or more factors to a longer time scale to highlight a specific trend or set of possible realities. As a result they tend to also factor differently across the 4 axes. Some experts add a fifth axis - environment - to the above factors, but we propose that environment is already a combination of social and economic factors above all else.

When a foresight exercise and scenario exercises in the same region or socio-economic area have similar approaches, i.e. factor similarly along the four axes, a powerful evidence-based strategic planning and development tool can be developed.

When this evidence base is transformed into policy at predominantly the social axis, a rational socialism evolves; if the technical axis predominates with the political axis also strong a technocracy evolves; where the economic and technical axis are strongest, a free market situation emerges. As the diagram shows, the skill of Politics is to ensure these three extremes are balanced and used in a mutually supportive and not destructive system.

INITIAL CONCLUSIONS
We heard about the landscape of Norway 2030, and how it is set in the European Union’s own medium-term context, on the first day. The second day was more technically driven, about how the actors interplay and can work together using a variety of tools and methods to describe different parts of the topography of foresight to scenarios, methods and tools. The final presentations were curtailed to expand the total time for discussion and this proved very useful indeed.

Clearly most tools are focused on the technical aspects of the science and technology layer of the “sandwich”, but now more methods are being used which allow tools and methods to be applied more flexibly. What is missing is a methodology that can shadow a strategic exercise as it moves from foresight to scenarios, then reflects itself in strategic planning and is finally implemented in one way or another. Modern ICT can not only support that process, but can fundamentally impact the way an exercise is not just run; but how continuity can be created into the planning process.

Evidence-based policy development needs evidence, and when that policy is forward-looking, that evidence has to be the best estimate for the future we want.

KEY ISSUES RAISED DURING DISCUSSION
➢ Is it a question of a missing link between foresight and scenarios, or are they different issues? Without getting hung up on definitions, it seems important that the longer-term vision and the nearer-term foresight are undertaken by different actors for different purposes. Therefore
landscaping the middle ground would be difficult unless an intermediate language was forthcoming, or these different things overlapped. It looks like they may overlap, which is an easier issue than bridging a psychological discontinuity.

- There is a general absence of portable and reusable tools, and those which can help visualise outcomes for consumption by policy-makers, as well as tools which could be used to transmit the outcomes of the exercises into strategic policy-making, either at company or public level. Taking foresight and Scenario output and translating them into strategic policy is a gap in current tools.

- There is potential opportunity in foresight when technologies interact, as well as potential weakness where the 4 main axes of scenarios (The Porter axis less Environment) interact. Focusing research on these two areas would progress the discipline greatly. All types of exercises result in a great deal of cross learning, and that alone merits much of any initial activity.

- There was both a need to review past work sometime to reap benefits of history and experience, while promoting out-of-the-box futures thinking based on youth. This also increases engagement by clients in the exercise, builds networks early on and keeps them involved. Discourse models, and also better semantic analytical tools would help, for both differ but both are valuable inputs to scenario work in their own right and should be better balanced. Role-playing tools and groupware to promote open working were also mentioned as tools for better methodologies and involvement of stakeholders. Also planned continuity avoids the "kill the messenger" philosophy, suffered by several good exercises, and shows a commitment by the specialists to the quality and relevance of the work.

- The European Union model is an inclusive social model, giving a unique opportunity to develop foresight and scenario work based on dialogue, and develop common visions of the future. This increases ownership and sense of purpose, as opposed to large-scale Delphi exercises⁷, or purely market-driven models⁸. "Workshops like this just don’t happen in the US, but they need to"⁹. The European Union can also bring a unique international dimension to individual exercises at national and regional level.

- Good exercises sometimes suffer, after the first wave or initial conclusions are published. Sometimes there is an anti-climax as exercises present their initial findings. There is lack of thought about foresight and scenarios as a continuous process of refinement and development and tuning, as world, national and local events unfold and technology develops. Few exercises, for example, build-in any way of measuring their own impact.

**KEY ISSUES RAISED DURING DISCUSSION**

- Missing link, they are different issues
- Tools to develop strategic application
- How can tools be made more portable, reusable, tools of methodology
- Re-use of experience/use of "youth"
- Visioning the output to capture the imagination
- Weakness where axes interact in scenarios
- Opportunities exist where foresight interacts
- What can history teach us? Repeat, break cycle
- Semantic tools to develop literary scenarios?
- Can scenarios engage kids, SME’s, local/regional governments?
- Implicit learning process can yield long term results
- Good exercises get killed off
- Role playing tools, groupware, open space
- EU social models more inclusive
- International dimension?
- Metrics of impact
- What if tools, educate policy-makers
- Gaming theory, peace games?
- Disarm the media at the start!
- It is not a one-shot thing, follow through, update
- Integrate via people networks not tools?

These conclusions fit well with the High Level Expert Group outputs on the European dimension of Foresight, which state that:

- decision-makers need to acquire new skills
- these actions are "important vehicles in prompting broad social debate"
- potentially "offer a framework for policy development, allowing a coherent development of these policies", as well as supporting many of the individual elements proposed under the "Implementation" recommendations.

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⁷ As in Japan.
⁸ As in the US.
⁹ S W Popper, RAND
Support to the elaboration of European Policies

Researchers and citizens-researchers in the knowledge-based economy: Key messages of the "Godelier-Bourgeois" report

This report produced by the High Level Expert Group on "Foresight for the relations between higher education/research" comes just at the right moment: it can bring a prospective contribution to elaborate new Commission's initiatives in this area. It has already been taken in account for the Commission's Communication, on "The role of the universities in the Europe of Knowledge".

The setting up of this expert group, chaired by anthropologist Maurice GODELIER (Etienne BOURGEOIS, researcher in education science, as Rapporteur) brought together 21 experts and more than 15 discussants from Europe and beyond. This group has been set up to implement some of the guidelines of the Lisbon and Göteborg strategies15, as well as the guidelines of the Bologna declaration and of the Prague meeting on higher education14, in the specific area of the research function of universities.

The Commission has now clearly stated - in its Spring Report to the European Council of Barcelona - that, in the implementation (among others) of the European Research Area and of the European Area for higher education, a knowledge-based European Area needs to be set up. This aims to enable Europe to take its right place in a world where the production of knowledge by research and access to knowledge by teaching and education are more than ever the key factors of competitiveness and quality of life.

The "Godelier-Bourgeois" report on "Foresighting the relations between higher education/research" comes just at the right moment: it can bring a prospective contribution to elaborate new Commission's initiatives in this area. It has already been taken in account for the Commission's Communication, on "The role of the universities in the Europe of Knowledge", which has been launched for consultation on 05/02/200312. The consultation is open till the 31st May 2003.

TRENDS AND STRAINS ON STRUCTURES

Two key tendencies affect European institutions of higher education, which are also actors in the research field: globalisation and the ageing of the population.

The globalisation of markets (which started to erode the nation-states’ power and impinges increasingly over their capacity for social welfare) is accompanied by an ideological movement for generalisation of the market's logic in all the social practices. This has as consequence:

- a high political and social pressure for a tailored response of the activities of higher education and research — beyond their own internal standards — demanded by the business sector (focus on "employability" in the short run and on applied research) in a context of budgetary restriction;
- a tendency to a "consumerist" approach from the students who are increasingly in demand and enrolment by fashion rather than vocation (lawyers not science);
- a request for new governance systems for the higher education–research institutions stressing their economic and social responsibility (accountability), which implies the co-existence of the traditional academic logic of independence with the logic of being accountable and the organisational changes resulting from this.

The ageing of the European population affects, for its part, the human resources of the higher education – research system, both students (fewer young people) and teachers-researchers.

The conjunction of these two tendencies leads to a diversification of the functions and an increased differentiation and competition within and between the components of the system:

- diversification of the functions carried out by the institutions which, beyond education and research, undertake various service provider's activities and vocational training; this diversification occurs at the same time within and between institutions and calls for new methods of regulation (combining competition and co-operation) and of interoperability - synergy;
- social differentiation and tensions between the requirements for excellence and for maintenance of social cohesion which can be resolved only by active measures of professional knowledge recognition, and specific support (financial and

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12 The Lisbon and Göteborg strategies are decisions taken by the European Council in order to make the European Union by 2010 "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion".

14 The Bologna Declaration (1999), followed by the Prague Meeting (2001) are decisions of the European Council of Education Ministers which have resulted in "the commitment to co-ordinate their policies to reach, in the short term, and in any case within the first decade of the third millennium, a set of objectives, considered to be of primary relevance in order to establish the European area of higher education and to promote the European system of higher education world-wide".

15 http://europa.eu.int/comm/research/consultations/list_en.html
pedagogical) for the students in difficulty; and finally institutionalisation of life-long learning;
- competition between institutions and between departments to attract the best students and teachers from Europe and third countries;
- increasing differentiation within the student population (various categories in terms of age, social and cultural origin, gender, school level, etc.).

At the same time, the "knowledge-based society" emerges as a strong political theme at national and European level, which claims for a re-evaluation of the fundamental knowledge that a citizen has to acquire throughout their lifetime. Introducing the concept of "sustainable employability", the authors emphasise the importance of the permanent capacities to "learn to learn", which are very close to the attitudes and knowledge necessary for the researchers. These capacities are not reduced to knowledge/professional competencies in order to meet a short-term request of the business sector.

**Towards Citizens-Researchers: Teaching to Everybody a Researcher Attitude Throughout Life**

Responding to the above-mentioned challenges implies a review of the contents and of the competencies to acquire. Faced with a rapid obsolescence of knowledge, it becomes necessary to focus higher education on the essential core knowledge, i.e. on the knowledge which enables the student to learn throughout their life, in the context of a discipline or of a profession. Tensions between preparation to the short-term employability and training in citizenship require a solution that combines and schedules studies on multidisciplinary/general competencies and specialised competencies.

There is no insuperable contradiction between the core competencies required for the professional life and those developed by the Humboldt ideal, on the contrary. As regards critical thought, capacities of analysis and argument, aptitude to work independently, learning to learn, problems solving, decision-making, planning, co-ordinating and management, working in a group, these core competencies for professional life are also increasingly those required for research activities.

If this new stock of knowledge intended for all is taken seriously, it inevitably opens question on the increasing segmentation between the first cycle of higher education for short vocational guidance, where teachers who are not researchers intervene and education of the second and third cycles where teachers-researchers intervene. The call to the teachers-researchers in the first cycle and the incentives to persuade prestigious researchers to devote part of their time to teaching are not sufficient: there is a need for new "educational environments" which transmit to the students the critical attitude of the researcher vis-à-vis the knowledge. Moreover, faced with complex problems that a researcher and/or citizen will have to address in every day life, the question of inter-disciplinarity (in education and research) arises in an acute way.

Individualisation of the learning paths, induced by individualism and the specific needs of the student, has to be conceived in order to maintain over a given period of study, the consistency of the core competencies to be acquired. This individualisation can be achieved by setting up individual paths integrated in a common curriculum. The challenge for the education-research systems is growing since new groups of students are flowing in: those of the "second chance" (the young people who resume studies after having worked) and those of the "return" (older persons who go back to university during their professional life or after retirement).
scientific advice within the decision-making system. underscored the importance for governments to effectively use sound, social, technological advice in reaching policy and regulatory decisions, particularly characterised by problems that are chronic, complex and global.

Not only the means and tools have to be assessed, but S&T policies also have to take into consideration the conditions under which problems are identified and defined, and the relevant research efforts shaped. Our notions about legitimate policy-making should be reconsidered, especially when taking seriously the concept of a “knowledge society”. This issue is particularly crucial when dealing with the procedures, processes and instruments which are at the heart of the transformation of S&T policy formulation and implementation. Foresight, technology assessment, evaluation, evidence-based policies, public debate or “technical democracy” are critical to the shaping and conduct of future S&T policies in order to meet the emerging societal needs and challenges.

In this context, STRATA (Strategic Analysis of Specific Political Issues) was launched in 1999 to provide support on a limited number of specific issues relating to scientific and technology policy, aiming at bringing together policy experts with policy-makers. After three years of implementation through a number of calls for proposals, STRATA has funded and is funding 28 thematic networks and accompanying measures which constitute the current “STRATA project portfolio”. The issues tackled by STRATA and identified in the IHP specific programme cover the broad areas of globalisation, changes in social demands (sustainability and science and society issues), framework and evolution of the objectives and priorities of S&T policies (new rationales, new policy design tools) and evolution of policy implementation instruments. The work is being carried out by groups of experts from specialised national and international groups and includes studies, seminars and conferences. After a detailed analysis of this portfolio, it came out that the fifth thematic area, concerning the implications for S&T policies of the challenges posed by scientific and technological change, had not been covered by the current set of STRATA projects.

In order to cluster the projects around these five common themes, the DG RTD-K2 Unit decided to organise, in Brussels on the 22nd and 23rd of April 2002, a STRATA Consolidating Workshop. The different co-ordinators of the STRATA projects, external experts and EC "policy-shapers" were all invited to take part in a constructive debate on the theme “New challenges and new responses for Science and Technology policies in Europe”. The main scope of this workshop was to provide the Commission with a new vision of the "Science and Technology policies" landscape in Europe, with an emphasis on emerging issues to be addressed for future EU R&D policies programmes and the future responses to cope with the new emerging challenges.

The workshop was articulated around five main clustering thematic areas:

1. Globalisation: Strategies of MNCs, international research co-operation and implications for S&T policies in Europe (session 1).
2. Sustainability: R&D policy, the precautionary principle and new governance models (session 2).
4. New instruments for Implementation of Science and Technology Policy (session 4).
5. What the future can do for you: a look at science and technology trends and policy implications (session 5).

The next two papers report on two presentations made during the workshop.

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13 STRATA is part of the line “Supporting the development of Science and Technology policies in Europe” in the Improving the Human Potential Programme of P5.
14 Improving the Human Potential Programme.
16 Multinational corporations
Science Foresight for the 21st century, based on a paper by Thierry Gaudin

Technology changes occur in relatively rapid cycles separated by long periods of absorption and readjustment. The characteristics of the current phase carry opportunities with it to reclaim the future for all mankind.

Global technical system changes occur in long-term cycles approximately every 9 centuries and can take 2-3 centuries to complete. Each system can be characterised by a 4 dimensional vector:

- **Time Scale**
- **Materials**
- **Energy**
- **Man-Environment Relationship**

Now though we are experiencing an exceptional situation. The Industrial revolution 1780 to 1980 may be considered as one of these synchronised global changes in technology and civilisation, and the vector is instantiated by the following diagram:

- **Steel, Cement**
- "Greening" Microbiology
- **Combustion**
- **Microprocessor, Robotics**
- **Plastics, Polymers**
- **Electricity**

The question is: can society manage to accommodate and reap the benefits of two such movements in the space of an anthropological eye-blink? The last two big waves were followed by centuries of oblivion, as the post-Roman (technology) and post-Norman (agricultural) aeons are affectionately known as the Dark Ages.

Perhaps Industrial and Cognitive Revolutions are two aspects of the same wave. Maybe the first element of the wave relied on the horizontal vector - industry driven - and now we see the vertical axis stronger and balancing the development and just extending the time scale a little. The horizontal axis is a "materialistic" ideology. The cognitive approach activates the vertical one: time-life, man-environment; which is inevitably stronger at the end of a material boom as society contemplates its surpluses and conscience.

Certainly the advent of marginal-cost global communications allows the luxury of mutual cognition to be exercised. We have had 200 years of science focused on the artefact, now it’s time to start thinking about understanding complex knowledge-based systems as a science - perhaps this is essential to feed the next revolution. Perhaps the reservoir of knowledge needed to drive one cycle is exhausted, and we need to replenish it. The past 200 years have also shown that great technological change inspires great social change, European industrialisation was accompanied by democratic - if bloody in the short term - revolutions. United States economic forces led to its war of secession from Great Britain, Africa was colonised in the search for raw material - cut free when these ran down.

The cognitive economy values autonomy and mutual recognition above all other values, and coupled with global communications infrastructure will lead to profound social change which we have hardly begun to imagine. The media and information, and perceptions of information will become the weapons of future psychological warfare. The battle for the mind is on. That is why Europe must maintain a healthy cognitive plurality in thought, word and deed - that has been our strength over two millennia. Even more so when one considers that the role of the Church, the one great constant over this period, is now in a phase of disenchantment. Cognition and spirituality are two sides of the same coin, and the Church must be there to act as a flag carrier for the cognitive foot-troops; society at large. God will continue to be the reason for much irrational behaviour for some time.

Emerging waves of dis-information are in direct opposition with the basic requirements of Classical Economic theory, which assumes "perfect information". An inversion of values is developing (see the recent Porto Alegre Social Summit). The more we know, the more confusion can be spread. The greater the confusion, the greater the temptation to think and act only locally.

Science Policy should be based on a sound global metrological infrastructure. Precision Time started a thousand years ago with Su Song, but only now is it

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17 Taylorism refers to the work management principles of Frederick Taylor (1856-1915).
18 The term ‘dark age’ is not unique to Europe between the fall of the Western Empire and the start of the Middle Ages. ‘Dark age’ refers to a decline in literacy stemming from political chaos and social disorder. A dark age is a partial reversion to pre-history, and the time after the fall of the Western Empire was such a dark age. The literate Romans were followed by illiterate barbarians.
19 By assuming agents are all perfectly informed.
20 “A Wind of Hope in a World At War" advanced the organising theme that “another world is possible.”
21 Metrology is the scientific study of measurement.
22 Su Song is a Chinese expert in the calculation of calendars built on advanced astronomical clock.
becoming critical as the time signature on information is dominating the content often! By keeping some sort of global synchronised step, the risks of development of extremists tribal and/or religious movements is reduced. Cognitive thinking supports such concerns, industry shuns it.

The mapping below is an attempt to visualise the science map for the 21st century. On the right side, the "hard sciences" (characterised by Plato), on the left the "life sciences" (Aristotle) and, in the middle the new intermediate "soft" approaches characterised by the cognitive paradigm, benchmarked by metrology, and enabled by global communication.

Previous globalisations, such as the overland caravanserai-based Silk Road27, and the multi-modal transport globalisation of the 19th-20th century, have now been succeeded by electronic globalisation through the Internet. But the Internet revolution is globalising thought, words and deeds - it trades between cognitive models. That is the key difference, that is the key hope for the future.

There is no dominant belief on earth currently, Huntington's prediction28 of belief-driven strife in the metrolological communications infrastructure is perceived as inclusive rather than exclusive in the economic and personal sense.

Creative destruction is, according to Schumpeter, the very essence of capitalism. The modern - western - world acts under the influence of one of the three functions. Creative Destruction mobilises billions of Dollars and costs human lives in one way or another, and it's just economics, this Dismal Science29. May be this imbalance spirals and generates destructive destruction30. In economic war, the conquest is not the control of land and territories. The armies are money, stock brokers, security dealers, forex speculators, lawyers and ironically - your pension funds. For the loser; economic slavery, intellectual and cultural death are imminent.

The challenge for the social model in Europe is to create a society where there is balance - wherever every human being has a place; a share in education, a say in research and access to knowledge, so that as an aggregated entity our anti-immune system (to American cultural imperialism for one) is healthy. Lots of Vitamin E and C.

23 G. Dumezil "A la découverte des Indo-Européens ".

24 SHIVA is the Lord of peaceful sleep, the god of dreams and unconsciousness, SHIVA is Kali, the power of time, that uses and destroys, because everything in this world, existence and non-existence, joy and pain depend on time. Vishnu is the Indestructible One, who surrounded us before our birth, and was there before the Creation of the universe. Brahma is a form personifying immensity. The religious sages called "Brahmans" educate the faithful to maintain respect for the traditions and to explain the meaning of them and their symbols to the members of the Hindu religion. Considered from the start as the god that personifies Everything, he is the Source of the universe, the Creator, "Cosmic man": http://members.tripod.com/ihstore/orient/1 индее.htm.

25 The World Summit on Sustainable Development.

26 The first Symposium 'Planetary Garden '99", held in Chambéry in March 1999, considered the long-term perspectives of our planet, taking a very broad approach.

27 The Silk Road (around 600BC) was not a trade route that existed solely for the purpose of trading in silk; many other commodities were also traded, from gold and ivory to exotic animals and plants. Also, it was not one Road, it was many different routes between various staging points between East and West.

28 Samuel Huntington's prediction that the foreign policy landscape in the 21st Century will be dominated by a "clash of civilisations".

29 Coined by two acclaimed economists, Kenneth Markue and Keith Antonsynyn.

30 Schumpeter also first attributed this paraphrase. There are innumerable instances of man having destroyed great civilisations by overexploiting nature, deforestation and overgrazing.

31 Europe and Community!
are prescribed - this regular dosage has kept Europe peaceful and prosperous, and has made the recipe so desirable that a dozen countries with hundreds of millions of inhabitants want to adopt the model32.

So what do we need to do in the next century, what do we need to tell our children now that they should be doing as adults? We need to move from consuming to partnership, from abuse to understanding, from just reaping the harvest to becoming planetary gardeners.

In the search for the Holy Grail and immortality, Indiana Jones picked the simplest cup, least adorned, probably from Carrefour rather than Harrods. The power of the grail was great in a small area. But overall, it was just a symbol. We must look beyond the symbols to reality.

Do that, counsel that, whenever you can, and you can tell your children that "you have chosen wisely" for their futures.

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Strengthening interfaces in innovation systems: new policy instruments are needed, based on a paper by Ruud Smits and Stefan Kuhlmann

Apart from the well-known existing instruments (financial, dissemination-oriented and managerial), new types of instrument - the so-called systemic instruments - are emerging as a result of the co-evolutionary development of innovation practice, innovation theory and innovation policy. Lessons can be drawn for policy from a first analysis of some systemic instruments 'avant la lettre' and themes for a further research agenda can be proposed.

Assuming that the national innovation system concept (NIS) is taken as a point of departure, the three co-evolutionary developments in innovation practice, innovation theory and innovation policies and intervention strategies have a strong impact on the instruments used by policy-makers and other actors involved. The key question raised by the contribution made by Ruud Smits and Stefan Kuhlmann for Session 4 of the workshop (New instruments for Implementation of Science and Technology Policy) is to what extent does the instruments portfolio of innovation policy-makers meet these demands? It is important to characterise the direction in which innovation policy is developing and the implications for the development of new types of instruments to support this policy, in response to the emerging challenges that innovation policy has to cope with.

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In all our lives - even more so because many of you have the privilege to influence others - we have the power of choice every second of every day, and to make others think to:

- Strengthen the global metrological infrastructure
- Support intermediate disciplines, such as cognitive sciences, ethology, techno-society issues
- Partner nature not for harvesting but for autonomy and diversity
- Strengthen comparative religion study and ethology for understanding
- Develop sustainable renewable energy
- Resist excessive domination, keep a balance
- Develop indicators for welfare and sustainability to show sharing, caring
- Develop planetary infrastructure and S&T programmes for global benefits
- Develop science for the service of law and order, safety and security for all
- Strengthen local systems as a basis for regional and national and cultural strength.

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Five functions playing a crucial role in the management of present-day innovation processes, are identified and should be covered by the policy instruments in order to adequately support the actors, i.e.:

1. Management of interfaces aiming at transferring knowledge and stimulating debate;
2. Organising innovation systems with the construction and deconstruction (creative destruction) of sub-systems, initiate and organise, discourse, alignment, consensus;
3. Providing a platform for learning and experimenting;
4. Providing an infrastructure for strategic intelligence by identifying sources (Technology Assessment, Foresight, Evaluation, Benchmarking), building links between sources, improving accessibility for all relevant actors (Clearing House) and stimulating the development of the capacity to produce strategic information tailored to the needs of specific actors;
5. Stimulating demand articulation, developing instruments for strategy and vision development.

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Innovation policy instruments: the rise of the so-called ‘systemic instruments’

When compiling the present-day portfolio of innovation policy instruments, it appears that the instruments already existing can be classified into three categories - financial, dissemination-oriented and managerial support - with a heavy predominance of financial instruments. But a characterisation of these instruments in terms of legitimisation, type of knowledge, the nature of the problem addressed, the object and level of intervention, the goal, client and nature (content- or process-oriented), leads to the conclusion that the existing instruments fail to support the five functions adequately. They still take the individual organisation, usually a company, as the unit of analysis, and hardly play any role as system builder and system organiser. They fail to pay much attention to learning processes, platforms for experimentation, customised strategic intelligence, and most of the time they focus more on the private sector, and far less if at all on the public sector and public-private alliances.

To cope with this problem it is argued that the development of a (relatively) new type of instruments, so-called systemic instruments, should be further investigated and added (to a larger extent) to the instruments portfolio in order to effectively tackle the challenges of contemporary innovation systems and innovation processes. With no intention for them to ‘take over’ the role of the traditional instruments, but rather try to complement them and thus achieve a better balance in the portfolio! Apart from adding new functionalities to the toolkit used by policy-makers and other actors willing to intervene in innovation processes, systemic instruments often contribute to an improvement and/or reshaping of the ‘old’ instruments. For instance, they may have a positive impact on managerial instruments that support the development of innovation strategies because these instruments may help to obtain a better view of the context in which the innovating firm has to develop. But although strong indications show that policy-makers are constantly becoming more aware of the necessity to include systemic instruments in the portfolio, these systemic instruments are still seriously under-represented in the portfolio to date.

The table 1 helps to clarify the differences between the various instrument types: it compares their major functions and shows how the systemic instruments relate to the other types of instruments and what they add to the instrument portfolio. The conclusion is that financial, dissemination and managerial instruments only contribute marginally to the 5 functions. The table also shows that the four types are not mutually exclusive. Dissemination types of instruments, such as innovation centres, are also involved in managerial support, and managerial instruments also deal with strategic questions and systemic instruments with operational issues and individual organisations.

Some examples of ‘systemic instruments’:

Systemic instruments are developing in some areas. It is important to note that the portfolio of these instruments is heavily dominated by Dutch – and to a lesser extent – German instruments, so that at present an evaluation can’t be carried out. Moreover for most of them, there is little information available as to their performance, the majority of the instruments having been introduced recently.

Four examples of ‘systemic instruments avant la lettre’ can be given:

1. The transformation of the NRLO (Dutch Council for Agricultural Research) into the Innovation Network Rural Areas and Agricultural Systems: the role of the NRLO is to formulate options and priorities for research in their sector in the medium and long term on the basis of a thorough exploration of scientific and societal trends and developments. If necessary, sectoral councils translate these results into a research programme outline.

2. The Programme for Sustainable Technological Development (DTO)

3. The Cluster approach

4. The German foresight process called “Futur”, run on behalf of the German Federal Ministry of Education and Research (BMBF): it is a means of priority-setting for future innovation-oriented research policies and it is oriented towards the identification and inclusion of societal needs in future research agendas.

In this regard, two specific instruments that are the subject of projects within the framework of the STRATA programme can be seen as ‘systemic instruments’: public/private partnerships analysed by the STRATA-COVOSECO project and science shops covered by the STRATA-SCIPAS project, both focusing on strengthening interfaces, respectively science-economy and universities-societal groups.

1. The COVOSECO project in particular is providing the basis for the development of a process-oriented self-evaluation tool (an empowerment evaluation tool which is very promising in the context of the further development of systemic instruments). As to SCIPAS, the main goal of the project was the development and further reinforcement of science shops. As a matter of fact, the Science Shops movement originated in the Netherlands in the early 1970s with the main goal of improving the democratic level of decision-making on science and technology, and at the same time increasing the societal relevance of university research. In this respect, the Science Shop movement can be seen as an systemic instrument ‘avant la lettre’.
A new research agenda is proposed for the European Union policy:

From the analysis of the experiences of the systemic instruments, lessons can be drawn for policy implementation and themes for a new research agenda are proposed as an answer to the main questions raised. What role could the government play in stimulating the development and use of these ‘new instruments’? How to differentiate between national and supra-national (EU) levels? To what extent can experiences and instruments be imitated, transferred from one country to another? How can research help to further the development and use of these new instruments.

There is evidence that the governments’ role in furthering research and innovation is changing considerably these last years. Political systems and national systems of research and innovation are co-evolving. The emergence of systemic instruments is thus reflecting both changes in research and innovation and in the political system, more specifically in the political governance of research and innovation where more interrelationship and interaction between heterogeneous policy agendas, actors, and arenas are required. As far as public policy gets involved, there is a need for horizontal and systemic policy co-ordination: new innovation-focused, systemic and co-ordinating modes of governance should thus be envisaged.34

### Table 1: Functions of policy instruments:

(terms linked to the five functions above-mentioned are in italic in the table)

<table>
<thead>
<tr>
<th>INSTRUMENTS</th>
<th>PRIMARY GOAL</th>
<th>CLIENT</th>
<th>CONTENT</th>
<th>PROCESS</th>
<th>SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINANCIAL</td>
<td>Stimulating R&amp;D</td>
<td>One to one; Private firm</td>
<td>R&amp;D subsidy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DISSEMINATION</td>
<td>Transfer of knowledge and/or technological competence</td>
<td>One to one; Private firm (Public institution)</td>
<td>Science subjects; Formal</td>
<td>Limited to specific technical project</td>
<td>-</td>
</tr>
<tr>
<td>MANAGERIAL GAP</td>
<td>Support running a business</td>
<td>One to one; One to few (co-makerships); Private firm</td>
<td>Social science; Formal; Tacit</td>
<td>Limited to specific consultancy project; Demand articulation; Strategy development</td>
<td>Organising small chains and clusters; Management interfaces</td>
</tr>
<tr>
<td>SYSTEMIC</td>
<td>Facilitating change</td>
<td>Chains; Networks; Systems; Science, social sciences; Formal; Tacit; Strategic Intelligence</td>
<td>Management complex projects; Strategy &amp; vision development; Demand articulation; Stimulate learning; Stimulate experimenting</td>
<td>System organiser; System builder; Management interfaces; Identifying, mobilising, involving users; Guarding democratic content; Developing infrastructure strategic intelligence</td>
<td></td>
</tr>
</tbody>
</table>

Transferring this concept into the European innovation policy arena would mean the following: while regional or national authorities would continue to improve the competitiveness of “local” innovation systems, the EU would act as a “mediator” between the competitors and as a “moderator” for their conflicts in a European multi-level, multi-actor policy field, instead of running their own funding programmes. An important task of the EU would also be to facilitate the transferability of the systemic instruments, developed in heterogeneous national, regional or sectoral contexts, across Europe, thereby providing a forum to debate the degree of immediate imitation versus the need of “domestication”\(^\text{35}\).

Another key issue for new, systemic governance of innovation policy is the involvement of a “new breed” of innovation policy-makers, working in a reformed, systemically inter-linked institutional setting, fostering experimentation and learning. Therefore, one important precondition is a reformed education and training system for policy-makers, including lessons on the conditions, means, impacts and pitfalls of systemic policy-making. The EU Commission could facilitate the formation of this new generation of systemically oriented policy-makers by supporting and making use of an infrastructure of Distributed Strategic Intelligence\(^\text{36}\) through a network of inter-linked relevant sources of information on innovation processes into a structured whole capable of tracing and getting access to information.

Therefore a growing number of participative and communicative instruments have been developed and applied over the past decade, one of the best examples could be the so-called Policy Laboratory\(^\text{37}\).

A Policy Laboratory is a location where the knowledge, expertise, people and instruments required for the purpose of adequately supporting actors involved in the management of transition processes are gathered together\(^\text{38}\). On the one hand the concern is to transfer knowledge and use instruments, and on the other hand to develop further that knowledge and those instruments.

In conclusion, the European Union might play its part in supporting the development and the use of the new systemic instruments, particularly by creating the required conditions to carry out the research agenda proposed by Ruud Smits.

**POLICY LABORATORY**
(Taken from: Bongers, Wieringa, Smits, Glasbergen (2001) ‘Het beleidslaboratorium aan de Universiteit Utrecht’ [The policy laboratory at Utrecht University]. Utrecht University, Faculty of Geographical Sciences.)

Numerous initiatives are taken in the Netherlands every day for the purpose of involving citizens, experts and non-governmental organisations in the policy-making process and its subsequent implementation. This can be in the form of more traditional methods such as district discussion panels, debating forums, public enquiries or hearings. To an increasing extent this entails more cohesive methods for the involvement of stakeholders in which the interactive media are now starting to play a more intensive role. Several of these tools and methods are focused on in the Policy Laboratory. For instance: electronic meeting systems, referred to in the literature as Group Support Systems or GroupWare Play Simulation (role playing with or without modelling data), digital or Internet debates, scenario workshops, civic debates and citizen panels, focus groups, local policy conferences or consensus conferences.

**PROPOSED RESEARCH AGENDA:**

**Furthering Research and Development of the ‘systemic instruments’**

- Inventorisation and comparison of the systemic instruments: function; setting.
- In-depth analysis of a limited number of systemic instruments: contribution to 5 functions; impact on instruments in portfolio; how to organise evaluation; facilitate learning; transferability and best practices.

**Network infrastructures to facilitate learning:**

- Process: Policy Laboratory
- Content: Distributed Strategic Intelligence


\(^{36}\) As suggested by Kuhlmann et al, ‘Enhancing Distributed Intelligence in complex innovation systems’, TSER, 1999


Philippe Laredo (Ecole Nationale des Ponts et Chaussées, Laboratoire Techniques Territoires et Sociétés) introduced the Round Table on the “Future of Science and Technology policy in Europe” with a very interesting talk on the main challenges public intervention in higher education, science, technology and innovation have to face in the future. Six main challenges can be identified and are directly linked to the present dynamics of knowledge creation.

**CHALLENGE 1: CHANGING “SEARCH REGIMES” AND THE GROWING ROLE OF “SCIENCE DISTRICTS” AND “POLES”**

The converging dynamics of the new leading science (information technology and biotechnology) shows that we have changed of “search regime”: we are no longer into an era of large centralized program but we enter a period where the issue is to favor the emergence and development of “decentralized poles” and “science districts”. Research and innovation efforts of large firms are no longer ‘multi-national’ but ‘multi-local’ or multipole. Large firms research facilities agglomerate in the “existing science districts” largely linked to the presence of research universities and their poles of excellence, but also to the presence of a wealth of small high-tech firms and of competitors.

**CHALLENGE 2: FOSTERING KNOWLEDGE CIRCULATION AND THE NEED TO REVISIT THE FOCUS ON PATENTING**

What is new for Europe is that, to be competitive, we require, as in the United States, an active federal level which insures adequate, coordinated and timely investment. This is a central issue for increasing the attractiveness of Europe for ‘global players’.

This goes along with a renewed view of what constitutes a favorable knowledge infrastructure. Science and Technology policies cannot only focus on knowledge appropriation. They will have to address simultaneously and in the same framework, issues of production, ownership, access and trading of knowledge.

On the one hand, the too often taken for granted patenting policies should be completely re-appraised. On the other hand, ownership, circulation, access and trading of knowledge are different facets of the same reality which requires a comprehensive approach and not a one-sided treatment linked to appropriateness.

**CHALLENGE 3: SME INNOVATION CAPABILITIES AND THE GROWING ROLE OF “REGIONS”**

The observed growing role of the “subnational” level (hypothesizing the growing differentiation between regions as more intra-national than inter-national) leads to the conclusion that for research and innovation we can no longer equate public policy with national policy. It is difficult to think of the European Research Area mainly as an issue of articulation between national and European levels, going on forgetting or putting aside the regional dimension. This growing ‘territorial’ relevance links with the radical shift observed the last decade in all policies addressing industrial research from ‘national champions’ towards small and medium enterprises (SMEs). In all our countries the ‘sub-national’ level is growing in importance, and everywhere focuses on supporting SME innovation capabilities as well as the birth of new high-tech SMEs.

Science and Technology policies have to be thought of and conceived in a multi-level process involving not only co-ordination and complementarity, but competition and redundancy. This multiplication of

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19 An issue strongly raised by E. Ormala, the technology director of Nokia at the above-mentioned Round Table.
public interventions in research and innovation and their articulation constitute a third major challenge national and European Union Science and Technology policies are faced with.

**CHALLENGE 4: THE COMPOSITION AND OPERATION OF PUBLIC SECTOR RESEARCH**

The extent, composition, organisation and dynamics of public sector research should be taken seriously and defined in a broad terminology, thus including universities, government labs and the thriving not for profit sector.

**FIRST GOVERNMENT LABS:**

The Eurolab project (EC project 2002) that privatisation has remained a marginal phenomenon and that their assimilation with “applied research” is an oversimplification. In most cases, we de facto face public institutions in charge of handling all the range of research activities in one area, from “services” to the most fundamental research activities. More and more hybridisation drives to joint labs with universities, requiring that we rethink the too simple notions we have about institutional borders.

To aggregate capabilities on a leading edge science or technology or to organise problem-solving driven research activities, the disciplinary department is no longer adequate, specific structures are needed to organise the research activities of university professors, whatever their terminology is – center, unit, group, institute or laboratory. As universities and public sector research at large are a critical feature of any future S&T policy, there is a clear implication at European Union and national levels: the need to address simultaneously and in the same “sectoral” policy, issues related to science, technology, innovation and higher education.

**CHALLENGE 5: RETHINKING THE PUBLIC ENGINE TO INNOVATION IN EUROPE**

Stating that there is a public engine to innovation, that Defense plays this role in the United States and that it should be different in Europe, military needs should be replaced by collective issues. We need to truly build, in research and innovation, a federal level addressing the main public issues we face. This point is central to a pro-active building of the European Research Area by adding to the Framework Programme a European-wide innovation fund dedicated to collective goods and services, built along the lines of the present structural funds (both in its working and in its size).

**CHALLENGE 6: STRATEGIC INTELLIGENCE AND PUBLIC DEBATE AT THE CORE OF POLICY-MAKING PROCESSES**

Change is not only required because of the multiplication of public authorities, it is also required at the level of each public authority, of each government, because of the dynamics highlighted. The central role of universities in knowledge creation as well as the changing role of government labs call for a coherent approach which empirical evidence shows to be difficult to obtain through the co-ordination between separate ‘sectoral’ departments. It thus calls for a new sectoral divide putting together higher education and Science and Technology administration.

Such a change does not only require that the Union invests more on these issues than it does presently, but calls for a full reappraisal of the locus and the dynamics of such a “mission-oriented” policy. In this reconsideration, strategic intelligence and public debate are two central keywords, essential in the definition of instruments well-adapted to the future of European and national policies.
Ioannina International conference

The Hellenic General Secretariat for Research and Technology, under the aegis of the Hellenic Presidency of the European Union, is organising an International Conference "Foresight in the Enlarged European Research and Innovation Area". The conference is to be held in Ioannina, in Greece, on 15-16 May 2003.

More than 200 high level people from European and national institutions, industry, academia, users, societal actors, as well as the national and regional authorities of the current and future Member States, will join forces in exchanging valuable experiences and expertise to form best practices and propose actions to exploit Foresight in building the future Knowledge Based Societies in the Enlarged European Research and Innovation Area.

1 http://medlab.cs.uoi.gr/conf2003/
“Foresighting Europe” Newsletter

The newsletter «Foresighting Europe» is prepared by the Science and Technology Foresight Unit of DG Research, which fulfils within Directorate K «Knowledge-based economy and society» the 3 following missions:

- It promotes co-operation in the field of Science and Technology Foresight in Europe. It implements the setting-up of the foresight Knowledge-Sharing Platform, manages the different related activities within the 6th Framework Programme.
- It exploits foresight knowledge in Europe and elsewhere in order to contribute to the Directorate-General’s reflections on the challenges and opportunities to be taken into account for the development of European research policy.
- It continues to implement the action “Strategic Analysis of Specific Political Issues” (STRATA) of the 5th Framework Programme.

In fulfilling these missions, the DG RTD K2 unit works closely with the JRC/IPTS, as well as the national and international foresight institutions.

It also promotes results dissemination and experience sharing on the basis of the activities that have been carried out.

- Information on the foresight activities of DG Research: http://www.cordis.lu/rtd2002/foresight/home.html
- Information on STRATA: http://www.cordis.lu/improving/strata/strata.htm
- Information on DG Research’s initiatives: http://europa.eu.int/comm/research/index_en.html
- Information on the JRC/IPTS’s activities: http://www.jrc.es/welcome.html

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**PUBLICATIONS OF DG RTD K2:**

- Final report of the STRATA workshop, EUR 20440
- Proceedings of the STRATA workshop, EUR 20441
- Thinking, debating and shaping the future: foresight for Europe - report of High Level Expert Group on European Foresight, EUR 20560
- The potential of regional foresight, EUR 20589
- Practical guide to regional foresight, EUR 20478
- Higher Education and Research for the European Research Area: current trends and challenges for the near future - Final report of the STRATA-ETAN expert group, EUR 20511
- Strengthening the dimension of Foresight in the European Research Area – Outline Guide to opportunities offered by the Sixth European Community Research Framework Program for supporting co-operation in the field of Foresight in Europe
- Promoting co-operation in foresight in the European Research Area – Missions and activities of the Science and Technology Foresight Unit

*These publications can be obtained at the following address: patrick.lages-carvalho@cec.eu.int*