Towards a Foresight Culture

SELECTED READINGS: FORESIGHT EXPERIENCES
IN EUROPEAN UNION & LATIN AMERICA
UNDER THE 7TH FRAMEWORK PROGRAMME FOR RESEARCH AND TECHNOLOGICAL
DEVELOPMENT
WORKSHOP: “COOPERATION IN FORESIGHT BETWEEN
EUROPEAN UNION & LATIN AMERICA”
FLACSO-MEXICO
OCTOBER 22ND & 23RD, 2008

---

CONTENTS:

I. THE EU EXPERIENCE IN FORESIGHT
1. SIXTH FRAMEWORK PROGRAM – FP6- (2002-2006): 2
   EUROPEAN S&T FORESIGHT KNOWLEDGE SHARING PLATFORM (KSP) 5
   METHODOLOGY
3. FORERA: FORESIGHT FOR THE EUROPEAN RESEARCH AREA 6
4. MUTUAL LEARNING PLATFORM (MLP) FOR RESEARCH AND 7
   INNOVATION IN EU REGIONS
5. FORESIGHT ACTIVITIES UNDER THE 7th FRAMEWORK PROGRAMME (FP7) 8
6. FORESIGHT NEW VISION: ENHANCING THE PARTICIPATION OF DIVERSE 11
   ACTORS
7. FORESIGHT APPLIED STUDIES 12

II. LATIN AMERICAN EXPERIENCE IN FORESIGHT
1. UNIDO SUPPORT TO LATIN AMERICAN FORESIGHT 17
2. NATIONAL FORESIGHT EXPERIENCES 18
3. FORESIGHT IN ARGENTINA 18
4. FORESIGHT IN BOLIVIA 19
5. FORESIGHT IN CHILE 19
6. FORESIGHT IN CUBA 20
7. FORESIGHT IN ECUADOR 21
8. FORESIGHT IN MEXICO 21
9. FORESIGHT IN PERU 21
10. FORESIGHT IN URUGUAY 23
11. FORESIGHT IN BRAZIL 24
12. FORESIGHT IN COLOMBIA 26
13. FORESIGHT EXPERIENCES IN VENEZUELA 29
14. THE LATIN AMERICA FORESIGHT PANORAMA 32

REFERENCE 34
III. THE EUROPEAN UNION EXPERIENCE IN FORESIGHT


Following the activities of Fourth and Fifth Framework Programs\(^2\), the Sixth Framework Program set up the European S&T Foresight Knowledge Sharing Platform. His main idea was the diffusion and exploitation of the information on useful results from forward-looking activities. These Foresight activities aiming at informing policy-makers dealing with research and innovation are carried out at all levels in Europe.

The platform was created by the Science and Technology Foresight unit of DG. The objective was to develop a coherent supportive framework at the European level to ensure systematic use and optimum benefit of Foresight, and to identify and mobilise all relevant actors (at every governance level) to enable EU-wide networking and capacity building. It will moreover support the self-organisation process of the ”Foresight Community” through knowledge sharing activities and events. The platform is structured in three different layers of activities\(^3\).

The prospective studies go beyond prioritizing a group of generic technologies, they imply the creation of productive networks and a change in the behavior amongst the social agents involved. Collective learning acquires a significant role, generated by research groups that approach new territorial perspectives, new indicators addressing emerging problems and issues, such as the implementation of new institutional procedures for the transfer of knowledge (universities, businesses, intermediary organizations, foundations, cluster). Such accomplishments imply the acquisition of competition, be it for the policy makers,

---

\(^2\)The Fourth Framework Program developed projects as: Formakin (Foresight as a Tool for the Management of Knowledge Flows and Innovation); Eurolux (European Participatory Technology Assessment); y ASTPP (Advanced Science and Technology Policy Planning). At the Fifth Framework Program, stand out initiatives as: DFFN (Design For Future Needs); eORESEE (Exchange of Foresight Relevant Experiences for Small European and Enlargement Countries); Europolis (Scenarios for the Evaluation of the European Science and Technology Policy); Foren (Foresight for Regional Development); Fornofo (the Four Motors Foresight Initiative); ITSAFE (Integrating Technological and Social Aspects of Foresight in Europe); y TAMI (Technology Assessment in Europe; Between Method and Impact). At: http://cordis.europa.eu/foresight/research.htm.

or for entrepreneurs who can evaluate strengths and needs, such as knowing which are the vacancies that can demand research. For researchers and those responsible for public and private intermediary organizations this implies the development of new knowledge (methodology, indicators, patents, of technological vigilance, of scenarios) to be circulated among different groups in society, with the capacity to respond to national and regional challenges fortifying public and private consensus.

The Global Foresight Outlook (GFO,2007) outlines the most common objectives of foresight, after a exhaustive mapping of foresight exercise. These have been broken down into nine multiple facets and dimensions.

a. Fostering STI cooperation and networking
b. Orienting policy formulation and decision
c. Recognizing key barriers and divers of STI
d. Encouraging strategic and futures thinking
e. Supporting STI strategy and priority-setting
f. Identifying research/investment opportunities
g. Generating visions and images of the future
h. Helping to cope with Grand Challenges
i. Triggering actions and promoting public debate

GFO show typically the foresight exercises had three to four specific objectives, spread across two or three of the target pointed before. However, the situation was different when we looked at large national foresight initiates.

One of the most common general objectives in European foresight is to foster cooperation and networking in STI. This implies the creation of a common space for open thinking, with the engagement of key STI stakeholders at various levels (International, European, national, sub-national). These activities require the development of knowledge platforms and research infrastructures that create the need for formal agreements about use and sharing of intellectual property and particular technologies.

The most common objective of the foresight activities in Europe is to provide orientation to policy formulation and decisions. This often involves: the mapping of promising technologies, successful research and business models, and infrastructures requirements, the identification of promising markets and business directions, the translation of key STI barriers and driving forces into opportunities for both public and private industries, the adaptation of innovative industrial policies and strategies into national and regional contexts, The exploration of potential impacts of the growth or reduction of production capacity, consumers demand or market share, the exploration and evaluation of entrepreneurship trends, the benchmarking of future -oriented action plans, the identification of (new)
industry products and services capable of creating new ways of reducing societal problems, and the improve of the capacity to anticipate and prepare for new science risks and opportunities.

i. Monitoring Foresight activities in Europe and fostering their European dimension

This proposal, conducted by the Institute for Strategy, Technology and Policy -TNO-STB, was based in three activities:

1. Monitors ongoing and emerging foresight activities and disseminates information about these activities to a network of policy researchers, foresight practitioners;
2. Monitors and maps Foresight activities all over the world. By April 2006 the EFMN had already identified and mapped more than 1000 foresight initiatives in countries as varied as the EU member states, Japan, China and Korea, the US, Canada and Brazil; and,
3. The revision of foresight activities to make an annual mapping of national activities, and the identification of emergent topics for S&T policies.

ii. FOR-LEARN Project: Support to mutual learning between foresight managers, practitioners, users and stakeholders of policy-making organisations in Europe

The FOR-LEARN project is run by DG JRC (Joint Research Centre)-IPTS (Institute for Prospective Technological Studies), on a mandate from the European Commission DG RTD. It covers the entire range of activities related to the promotion and the structuring of a European science and technology Foresight area.

FOR-LEARN take on a more concrete form, through practical steps towards the development of the KSP. FOR-LEARN contribute to the codification, assessment and dissemination of the existing Foresight knowledge and know-how. FOR-LEARN aims make practical knowledge on how to carry out Foresight more accessible.

FOR-LEARN developed an Online Foresight Guide together with a group of Foresight experts from the ESTO network. This guide seeks to inform Foresight practitioners as well as users about various issues related to Foresight.

---

iii. Promoting EU-wide Foresight approaches

The third area of activities of the KSP, includes these 10 thematic projects:

- The future of R&D in services: implications for EU research and innovation policy (2004-2005);
- Emerging science and technology priorities in public research policies of the European countries, the US and Japan (2004-2005);
- Perspectives of national and regional research and innovation systems in an enlarged EU 2015: specialization, complementarity and competition;
- The future of research and innovation policies in an enlarged EU: key issues 2015;
- EU research and innovation policy and the future of the European Common Foreign and Security Policy;
- Scenarios of future science and technology developments in emerging economies 2015;
- Scenarios for research and technology development and cooperation with Europe - Scope 2015;
- Professions with a science and technology dimension in Europe 2015: implications for education and training policies;
- New expert group on "Key technologies for Europe 2020".


Between 2003 and 2007, the COST Institute develops COST A22 Project. In 2001, several European foresight institutes expressed an interest in creating a network for the research and development of foresight methodology. For COST A22, foresight must have the ability to create and maintain a high-quality, coherent, and functional forward view; and to use the insights arising in organisationally-useful ways. For example, to detect adverse conditions, guide policy, and shape strategy and to explore new markets, products and services.

With the goal to enforce the developments in European foresight in all its facets (such as methodology, product, communication, and dissemination), the participant institutions paid special attention in two aspects:

---

Research and development of foresight methodology: attending the imbalance between the high level of operational use of foresight and the relatively low level of research and development of its methodology

Communication of and co-operation on foresight methodology among researchers and practitioners in a cross-disciplinary way: to enhance learning and the development of methodological aspects of foresight, and the training of a younger generation of foresight researchers and practitioners involved in PhD-research projects.

3. FORERA: Foresight for the European research area

The FORERA Project was impulse by the Knowledge for Growth (KfG) Unit of the Institute for Prospective Technological Studies (JRC-IPTS). For FORERA, future-oriented thinking is a necessary policy response to the environment of socio-economic and technological changes. The activities under the FORERA Action, focus on consolidating the Foresight knowledge base by contributing to the development of a scientific reference system in FTA (Future-oriented technology analyses). This applying Foresight practices to gather anticipatory intelligence in specific policy fields, with special attention to issues investigated in the other Actions of IPTS; and in search of improve the functionality of Foresight as a relevant tool for policy making.

In addition to FOR-LEAR Project, the main activity of FORERA is the International Seville Conference on Future-Oriented Technology Analysis (FTA). The conference of October 2008, will be a major occasion for experts, practitioners and decision-makers to bring their ideas and knowledge together in a highly interactive environment. The activity includes themes as: methods and tools Contributing to FTA; the use and impact of FTA for Policy and Decision Making; FTA in Research and Innovation; FTA and equity: new approaches to governance; and FTA in Security and Sustainability.

4. MUTUAL LEARNING PLATFORM (MLP) For Research and Innovation in EU regions

MLP encourages regional policy makers to share their experiences and enable regions to participate fully in the knowledge-based society. The platform is a joint initiative of the Commission’s Enterprise and Industry, Research, Regional Policy

---

9 At: http://www.csila22.org/mou.php
10 The Institute for Prospective Technological Studies (IPTS) is one of the seven scientific institutes of the EU Joint Research Centre (JRC).
and Information Society DGs, with the active involvement of the Committee of the Regions (CoR).

The MLP aims to support regions in developing their research strategies, taking into account their specific situation and needs. Its activities concentrate on three core topic areas, within the field of research and innovation: regional foresight, regional benchmarking and regional profiles. Working groups comprising around 60 regional actors, have been established and series of workshops organised under each of these headings, with the objective of sharing experiences and making suggestions for regional policy makers across the EU14.

The Regional Foresight Working Group update and complement existing foresight tools and disseminate them to regional actors, by paying particular attention to foresight as a means to build cohesion and competitiveness at trans-regional level. The MLP Foresight working group, help to disseminate the tools and collective learning developed by the DG RTD ‘Science and technology foresight’ Unit; and to contribute to the networking of regions facing similar challenges or using similar approaches 15.

5. Foresight activities under the Seventh Framework Programme (fp7) 16

At FP7, Foresight activities are part of the Socio-Economic Sciences and Humanities theme of the Cooperation specific programme. To implement the activities, 3 calls for tender were launched in 2007:

A- Scale and scope as drivers of the ERA. The objective of this call is to test one of the core assumptions underlying the ERA idea: economies of scale and scope matter in research funding and execution, and that therefore coordination and collaboration in research funding and execution are beneficial, and fragmentation and dispersal are pernicious.

B- Mapping the past in view of the future developments of the ERA. This call aims to carry out a targeted assessment of the past and the present of the ERA, and to clarify the main drivers of European S&T integration, in order to develop perspectives on the future of the ERA.

C- Lead markets and S&T specialisation in Europe. The objective of this call is to provide European, national and regional policymakers with a basis for more informed decisions shaping the future European S&T specialisation, through the use of demand-oriented policies and instruments. For this purpose, is required an understanding of the mechanisms and drivers shaping market demand and how these in turn influence and are influenced by the technological supply.

14 At: http://www.innovating-regions.org/mlp/index.cfm
15 At: http://www.innovating-regions.org/mlp/projects.cfm?sub_id=60
16 At: http://cordis.europa.eu/foresight/home.html
6. FORESIGHT NEW VISION: Enhancing the participation of diverse actors

The foresight practices evolution in EU, reflects the contemporary tendency to develop processes and prospective systems, and the permanent construction of future scenarios. This instead of old no-systematic practices of futures in a given country, region, sector or S&T area (Medina Vázquez y Ortegón, 2006).

Progressively, the foresight activities emphasize the role of learning at the foresight experts' community and policy-makers, supported by the information dissemination and experience exchanges.

Increasingly, the foresight is viewed as a S&T political instrument that contribute to strengthen the capabilities of a sector, or, very specially, a region. More widely, the foresight is conceived as a way that promotes the development of national capabilities of innovation. These transformations deal with the new challenges and relations of the actual innovation phase. Where are necessary trans-disciplinary answers that integrate strategic management and entrepreneurship (Voros, 2007).
Foresight projects at the EU and participant institutions.

<table>
<thead>
<tr>
<th>Project</th>
<th>Participant institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- PREST (United Kingdom)</td>
</tr>
<tr>
<td></td>
<td>- VDI (Germany)</td>
</tr>
<tr>
<td></td>
<td>- ARCS (Austria)</td>
</tr>
<tr>
<td></td>
<td>- FhG-ISI (Germany)</td>
</tr>
<tr>
<td></td>
<td>- MCST (Malta)</td>
</tr>
<tr>
<td></td>
<td>- TCP (Czech Republic)</td>
</tr>
<tr>
<td></td>
<td>- Atlantis (Cyprus)</td>
</tr>
<tr>
<td></td>
<td>- LL&amp;A (France)</td>
</tr>
<tr>
<td></td>
<td>- DIALOGIK (Germany)</td>
</tr>
<tr>
<td></td>
<td>- CKA (Belgium)</td>
</tr>
<tr>
<td>FOR-LEARN</td>
<td>- Institute for Prospective Technological Studies (IPTS).</td>
</tr>
<tr>
<td>FORERA</td>
<td>- PREST (United Kingdom)</td>
</tr>
<tr>
<td></td>
<td>- TNO (Netherlands)</td>
</tr>
<tr>
<td></td>
<td>- ARCS (Austria)</td>
</tr>
<tr>
<td></td>
<td>- SERVILAB (Spain)</td>
</tr>
<tr>
<td>The future of R&amp;D in services: implications for EU research and</td>
<td>- CM Internacional (France)</td>
</tr>
<tr>
<td>innovation policy</td>
<td></td>
</tr>
<tr>
<td>Emerging science and technology priorities in public research policies of</td>
<td>- Logotech (Greece)</td>
</tr>
<tr>
<td>the European countries, the US and Japan (2004-2005)</td>
<td></td>
</tr>
<tr>
<td>Perspectives of national and regional research and innovation systems in</td>
<td>- Socintec (Spain)</td>
</tr>
<tr>
<td>an enlarged EU 2015: specialization, complementarity and competition.</td>
<td></td>
</tr>
<tr>
<td>The future of research and innovation policies in an enlarged EU: key</td>
<td>- ISIS (Belgium)</td>
</tr>
<tr>
<td>issues 2015</td>
<td></td>
</tr>
<tr>
<td>EU research and innovation policy and the future of the European Common</td>
<td>- Ernst &amp; Young- Real Estate Advisory Services, B.V. - Netherlands.</td>
</tr>
<tr>
<td>Foreign and Security Policy</td>
<td></td>
</tr>
<tr>
<td>Scenarios of future science and technology developments in emerging</td>
<td>- PREST (United Kingdom)</td>
</tr>
<tr>
<td>economies 2015</td>
<td></td>
</tr>
<tr>
<td>Scenarios for research and technology development and cooperation with</td>
<td>- RAND Europe (Netherlands)</td>
</tr>
<tr>
<td>Europe - Scope 2015</td>
<td></td>
</tr>
<tr>
<td>Professions with a science and technology dimension in Europe 2015:</td>
<td>- Institut Jules Destrée (Belgium)</td>
</tr>
<tr>
<td>implications for education and training policies.</td>
<td></td>
</tr>
</tbody>
</table>
Foresight projects at the EU and participant institutions (cont.).

<table>
<thead>
<tr>
<th>Project</th>
<th>Participant institutions</th>
</tr>
</thead>
</table>
| COST A22 | - Studiedienst van de Vlaamse Regering, Administratie Planning & Statistiek (Belgium)  
- Fondation Travail-Université (Belgium)  
- Academy of Sciences, Centre for Science Studies and History of Science (Bulgary)  
- The Technology Centre, The Academy of Sciences (Czech Republic)  
- Risø National Laboratory, Systems Analysis Department, Technology Scenarios (Denmark)  
- Technical University of Denmark, IPL/Innovation and Sustainability (Denmark)  
- Institute of Educational Research, Tallin University of Educational Services (Estonia)  
- Estonian Institute of Future Studies (Estonia)  
- Finland Futures Research Centre (FFRC) & Finland Futures Academy (FFA), FFRC, Turku School of Economics and Business Administration (Finland)  
- Government Institute for Economic Research (Finland)  
- VTT Technology Studies (Finland)  
- ENGREF, Département Environnement (France)  
- Groupe Futuribles (France)  
- Universität Gesamthochschule Kassel (Germany)  
- Potsdam Institute on Climate Impact Research (Germany)  
- National Technical University of Athens, Dept. of Geography and Regional Planning (Greece)  
- Institute of Economics, Hungarian Academy of Sciences (Hungary)  
- Budapest University of Economics Sciences and Public Administration (Hungary)  
- Gregorian University, Instituto Internazionale, Maritain (Italy)  
- Fondazione Ugo Bordoni (Italy)  
- Council for Science and Technology (Malta)  
- The Edward de Bono Institute for the Design and Development of Thinking (Malta)  
- Wageningen University, Environmental Systems Analysis Group, Department of Environmental Sciences (Netherlands)  
- The International Centre for Integrative Studies (ICIS), University of Maastricht (Netherlands)  
- Stavanger University College (Norway)  
- Fundação Calouste Gulbenkian (Portugal)  
- ISCTE (Portugal)  
- Slovak Academy of Sciences (Slovakia)  
- Universidad Barcelona, Organisme Facultad de Ciencia Económicas (Spain)  
- Fundación OPTI, Organisme Observatorio de Prospectiva Tecnológica Industrial (Spain)  
- Stockholm Environment Institute (Sweden)  
- Institute for Future Studies (Sweden)  
- EPF Lausanne (Switzerland)  
- University of Teesside, Teesside Business School (United Kingdom)  
- The Macaulay Institute (United Kingdom)  
- University of Manchester (United Kingdom)  
- Scottish Environmental Protection Agency (United Kingdom) |
The goals outlined in the European experience are a result of multiple investigations and experiences applied in different countries and regions, this contribute as a guidance and to compare situations, processes and results for the case of Latin America. Despite the specificity in the contexts of economic, institutional, academic and social who are different, the European experience provides a clear platform for comparative purposes in evaluating the implementation of programs, establish priorities, guide sectoral developments and built social consensus to extend the area of interaction public-private.

7. Foresight Applied Studies

Contemporary Foresight studies are characterized by a expertise in organizing processes and long-term programs, and the ability to deploy the convening power of the society through national and regional systems of innovation.

Science and technology Foresight exercises are becoming increasingly attractive for governments, national research agencies and businesses in their efforts at doping with increasing complexity of new Technologies and decision environments, in an increased techno—economic competition world-wide.

The evolution of the technological transformations generated relevant in approach, the key actors involved, institutional structures and the reason that justify its implementation.

<table>
<thead>
<tr>
<th>Generation</th>
<th>Focus</th>
<th>Key actors</th>
<th>Program structure</th>
<th>Reasons for economic development that justifies the foresight</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Technology forecast</td>
<td>Experts</td>
<td>Science and Technology</td>
<td>Economic planning</td>
</tr>
<tr>
<td>Second</td>
<td>Technology and Markets</td>
<td>Academy and industry</td>
<td>Sectors of industry and services</td>
<td>Market failures, Firms with short-term horizons</td>
</tr>
<tr>
<td>Third</td>
<td>Technology, markets and social dimension social</td>
<td>Academy, industry, government, and social actors</td>
<td>Resolving socioeconomic problems</td>
<td>Failures of social system, Inadequate institutions-bridge</td>
</tr>
</tbody>
</table>


The methods and processes are multiple and not only generate different types of products, also response a different objectives and audiences. The application of technology foresight tools used to raise alternative strategies and joint solutions to social problems through the development of strategic plans territorial, export,
changes in university structures. TF programmes are ways of obtaining opinions, conflicting or otherwise, about future developments, most of which are already established. TF is an essential contributor to the creation, either collectively or individually, of models of the future. There are capable of creating synthesis, they are disruptive and interfere with current modes of thought (Kuhlman et al. 1999)

The actual uses made of TF exercises have not yet been studied and evaluated sufficiently. This is one of the areas for future research in the field. In some, national TF programmes have been performed without enough consideration of the uses of the results and the necessary follow up actions.

The problem at hand is that, as a cognitive creation .TF cannot be considered as a final aim or output (in contrast to scientific discovery) and supposes political continuity, plus commitment to implement the results in some sense.

The majority of experts considerer TF essentially as a collective and consultative process, with the process itself being equally or even more important than the outcome. (Kuhlmann et. al.,1999)

8. **Foresight as a new strategic concepts in RIS**

Regional Foresight emerged at the interface between public policy and the social coordination of collective action Koschatzky (2005) indicated three starting points for strategy development and implementation -socio-economic and scientific – technological subjects and objectives of regional Development, competence building and sustainable trajectories.

- the shaping and improvement of the relevant systems (i.e.education and research ,industry, policy, demand) their systemic integration and their institutional and organizational settings.
- governance of innovation promotion, learning and qualification , i.e. programmes, measures, regulations, their implementation and evaluation, and the ability to continuously adjust improve

New strategic concepts emerged in recent years; related social capital of a region is Regional Foresight. The regionalization of governance implies an urgent demand for regionally tailored development strategies as a means to address strategic questions in a locally restricted but socially comprehensive manner (Gertler & Wolfe, 2004). Foresight activities can provide robust orientations for regional decision-makers in detecting and identifying opportunities for further development, and pointing out networks of actors necessary to take advantage of these opportunities, as well as identifying barriers and risks that need to be addressed in advance. The advantage of the regional level is that a wide constituency of societal stakeholders can be involved and new inter-group networks can be generated.
Foresight contributes to knowledge sharing, regional learning and institutional reflexivity, because individual or group-based opinions have to be mediated in such a way that consensus-building processes will be possible. Thus, regional foresight can help to create and develop social capital, participative policy-making approaches and institutional learning (Renn & Thomas, 2002; Renn, 2003). Foresight has become a planning tool and, due to its process character, a strategy by itself. It is an open and fragile process, because the achieved results and their implications emerge only during the foresight exercise and cannot be anticipated from the beginning. Policy based on foresight thus has a strong experimental character.

Foresight exercises are open for all subjects, so that social, economic, scientific and technological issues can be addressed. In regions, foresight can be used to develop a joint vision for science base, foresight can be used to find ways to improve integration of the scientific and industrial system and to foster knowledge flows between science and industry. Since both systems, despite the need for hybrid organizations (Kaufmann & Tödtling, 2001) and the inherent triple-helix structures (Etzkowitz & Leydesdorff, 2000; Leydesdorff & Meyer, 2003), operate according to own rules and incentives, the mediation between these system, supported by the policy-makers, can contribute to a better understanding of each other’s interests and can open ways for efficiently bridging both spheres by an improved transfer of knowledge and technological solutions. From being involved in this foresight exercise, regional governments come to a better understanding of the needs of each side and are able to implement tailor-made policy measures supporting a sustainable future orientation of the region and its different subsystems.

The regionalization of governance implies an urgent demand in a locally restricted but socially comprehensive manner (Gertler & Wolfe, 2004). Foresight activities:

- Foresight can be one instrument for deriving a regional innovation strategy. Structured and mediated by external support, individuals and interest groups can be brought together who otherwise would not automatically exchange opinions and information. However, this mediation is a difficult process and needs diplomatic and tactical skills by which the majority of the involved parties can be convinced to accept and support the achieved results. This process is fairly time-consuming and finds good starting conditions in social systems which are already experienced in bargaining between different societal actor groups. It is no doubt important that all innovation-relevant stakeholders are involved in the foresight exercise and that it is made clear from the beginning that results will be transformed into policy action.

Central elements in foresight exercises are not only workshops, focus and discussion groups, but also the detailed quantitative analysis of the starting
conditions for a possible enhancement of regional innovation activities. This concerns both potentials, and the external factors influencing regional development and competition. The analysis should paint a realistic picture of the starting conditions, because a too optimistic view could direct the foresight process and the vision to be achieved into a wrong direction.

- An important requirement which favours regional self-governance is a certain degree of autonomy. This autonomy can have different characteristics. It could be political like in the case of Trento where the regional government has the right to issue its own laws and funding programmes. It could be financial in a way that at least a certain budget is available for the execution of regional strategies and activities. It could be cultural in such a way that cultural identity and self-motivation resources are pooled together and synergy effects are created, so that at least certain activities can be implemented.

Important is also the availability of strategic intelligence in terms of an explicit system of research priority-setting and coherent research planning. In light of the increasing speed of development and change of international markets and technologies, as well as the shortening of the validity of knowledge, it is foreseeable that such a system has to be designed not only to adapt flexibility to these changes but also to proactively conceive and pursue strategies that will sow the seeds for the future welfare even in functioning of such a system that will be fitting for the emerging knowledge age.

- In the case of Trento, three major governance factors were always important to consider: policy, resources and business attitudes. Policy issues are related to the institutional setting of the scientific and industrial system, to regulation and to administration. Resources deal with higher education, scientific and business competences, human capital, and infrastructure. Business attitudes address networking, knowledge transfer, entrepreneurial attitudes, and intermediary organization. Depending on the regional conditions and the specific strengths and weaknesses in each of these governance factors, different recommendations with regard to the improvement of systemic interaction and the upgrading of the regional science and technology base are possible.

- The characteristics of the governance factors are also highly correlated with the vision and objectives which can possibly be developed during a foresight exercise. Therefore no general conclusion can be drawn. An open question in this respect concerns the time horizon of the vision and the related strategies. Usually, a time horizon of 5 to 10 years is rather short, while over 20 years seem to be too vague for precise future projections.
IV. LATIN AMERICAN EXPERIENCE IN FORESIGHT

Foresight entered the Latin America policy environment as a tool for anticipating possible futures but has been characterized by varying interpretation and uses. Some countries adopted the term to refer to activities, while some focus on the French “strategic prospective” approach (see Chapter 2 and 3). More recently, in part due to international initiatives –the Caribbean (TFLAC) and a number of European networks and projects –some countries began to practice foresight as a combination of prospective thinking with wide participation to inform policy-making. International foresight experiences, mainly European, had a very strong influence in the last decade, but many Latin American countries have had to introduce new practices (especially cost-effective ways to gather experts’ knowledge) to cope with challenges of having limited amount of resources allocated to foresight activities at both regional and national levels.

The degree of international influence and foresight knowledge transfer normally varies depending on the rationales, objectives, time horizon, the sponsors and organizer. However, since de 1970s, three major drivers have allowed for the internationalization of Latin American foresight:

- The creation of major centres, e.g. Bariloche Group in Argentina, Jose Barros Sierra Foundation in Mexico, Centre for Development Studies (CENDES) in Venezuela, the S&T Observatory (OCCT) in Cuba, the Centre for Management and Strategic Studies (CGEE) in Brazil, and the recently created National Institute of Foresight, Innovation and Knowledge Management, in Colombia.
- The support of international organization, largely with expertise, financial contributions, political support, dissemination and capacity building activities, in particular UNIDO, ECLAC, CAB, CAF and European Union (EU).
- The emergence of research projects and mapping exercise based on collaborative work between international organizations, government...

---

18 See Herrera et.al.,(1976)
agencies, and research and mobility networks, including the CYTED network, Quo Vadis and the Euro-Latin SELF-RULE network of higher education institutions, among others.

All this experiences has produce an extensive literature (mostly in Spanish and Portuguese), interesting methodological innovations and a wide range of organizational forms.

Organisational Forms of Foresight

As in Europe, Latin American foresight could be described using various organizational forms which normally depend on the experience and internal conditions of national environments. These forms vary in terms of their scope (more or less inclusive) and organizational structure (more or less formal).

![Organisational Structure]

**Figure: Organisational forms of foresight**

The prevailing organizational forms are:

- **National and international foresight programmes** with Brazil, Chile, Colombia and Venezuela establishing the first national foresight programmes in the region. UNIDO, CAB and ECLAC have also launched major cross-national initiatives,

---

19 SELF-RULE is an academic network funded by the European Commission’s ALFA Programme and several Latin American universities.
20 For further information on:
- Latin experience, see also: Montañolas (1987); Yero (1989, 1991); Medina (2000); Dagnino and Thomas (1999); Suarez (2000); CYTED (2003); Masi (2003); Medina and Ortega (2006); Popper and Villaruel (2006); see cases at [http://www.4-sight-group.org/case_studies/latin_american](http://www.4-sight-group.org/case_studies/latin_american).
- General vision of the region, see also: Valenzuela, S. and Valenzuela, A. (1978); Matus (1993, 2000); Galopin (1995); ECLAC/CDCC (2000); Melo (2001); Chomsky (2004); Castro et al., (2005); Popper (2005); see also [http://prest.mbs.ac.uk/prest/SCOPE/documents/LA_Scenario_4_Success.pdf](http://prest.mbs.ac.uk/prest/SCOPE/documents/LA_Scenario_4_Success.pdf).
- Recent international collaborations, see also: UNESCO-Gregoriana-Univalle (Angulo et al., 2000); Nuevo Paradigma (Castro et al., 2005) and SELF-RULE ([http://www.sell-rule.org](http://www.sell-rule.org)).
- Caribbean, see also: Downes (2000).
- Argentina, see also: Francois (1977); Mari (2005).
- Brazil, see: Moura (1994); Marcial and Grumbach (2002); Cristo (2003); Santos et al. (2004); Canuso and Tigue (2004); Aulicino and Kruglanski (2004); Canongia et al. (2006); Oliva (2007).
- Colombia, see: Mojica (1990, 2000); Medina (1996, 2000); Angulo et al. (2000); Suarez (2000); Popper and Myles (2004); COLCIENCIAS (2006); De Peña et al. (2006); Medina and Rincón (2006).
- Cuba, see: Díaz Otero (2005).
- Peru, see: Popper (2002); see also [http://www.unido.org/doc/56607](http://www.unido.org/doc/56607).
- Uruguay, see Cabrera (2003).
- Venezuela, see Del Olmo (1984); Yero (1989, 1991); Villaruel et al. (2001); La Rosa (2004); Romero (2004); Villaruel and Popper (2006).

21 CAB’s Science and Technology Foresight Programme is a joint initiative with the main S&T governmental agencies of twelve (12) countries: Bolivia, Colombia, Cuba, Chile, Dominican Republic, Ecuador, México, Panama, Paraguay, Peru, Spain and Venezuela. Since 2003 the programme, under the
while other regional institutions have included sectoral exercises in their working agendas; e.g. CAF’s Andean Competitive Programme (PAC);

- **One-off projects and exercises** with limited duration. These are often nationally funded and sector-oriented (i.e. Chilean Software Industry 2010\(^\text{22}\), and Colombian 2015, \(^\text{23}\) for example). However, international organizations like UNIDO and the European Union have also organized sectoral and cooperation-oriented exercises, such as the Brazilian Civil Construction 2013,\(^\text{24}\) and SCOPE-2015,\(^\text{25}\) respectively;

- **Specialized centres and groups** organizing and supporting foresight research; e.g. CGEE and EMBRAPA\(^\text{26}\) in Brazil, the Cali Foresight Observatory in Colombia and 4-Sight-Group\(^\text{27}\) in Venezuela. Some countries have also built capabilities in university departments and research institutes;\(^\text{28}\)

- **National and International networks** bringing expertise from various countries and building foresight capabilities, such as the CYTED network (2003-2007) and SELF-RULE network.

While Brazil, Chile, Colombia and Venezuela created foresight programmes within national bodies (in particular, ministries of industry, economy and S&T), countries like Peru and Ecuador have constituted “Prospective Consortia” linking universities to the industrial sector. In addition, the Colombian and Venezuelan regional science, technology and innovations (STI) agendas have played a particularly special role in generating STI priorities and achieving consensus and engagement of key stakeholders, including the civil society.

In terms of capacity-building, the region has benefited from the various regional UNIDO courses.\(^\text{29}\) The activities inspired certain countries to organize national and sub-national courses, e.g. Colciencias and Univalle University in Colombia, between 2001 and 2006, have organized numerous courses and seminars in collaboration with Futuribles/CNAM (France) and PREST UK). In Peru, Concytec and the Consortium Prospective Peru (CPP) have promoted international congresses, and CGEE in Brazil is planning to have a role here too.

1. **UNIDO SUPPORT TO LATIN AMERICAN FORESIGHT**

As already mentioned, UNIDO has made significant effort to promote forward-looking projects to analyze major technologies affecting key productive and

\(^{22}\) See Wilson et al., (2004).
\(^{23}\) See De Peña et al., (2006).
\(^{24}\) See Escola Politécnica de USP (2002).
\(^{25}\) SCOPE 2015 developed 4 scenarios for RTD cooperation between Europe and Latin America, see http://prest.mbs.ac.uk/prest/SCOPE/ and success scenario at http://prest.mbs.ac.uk/prest/SCOPE/documents/LA_Scenario_4_Success.pdf.
\(^{26}\) EMBRAPA is a Brazilian Agricultural Research Corporation with recognized expertise in Productive Chain methodology, see: http://www.embrapa.br/.
\(^{27}\) See http://www.4-sight-group.org/.
\(^{28}\) E.g. UFRJ, USP and Unicampi (in Brazil); Univalle and Externado (in Colombia); the National Autonomus Univerisity (in Mexico); and UCV, ULA, UNEFM and UNEFA (in Venezuela).
\(^{29}\) Some of these course include Venezuela (1999); Uruguay(2000); Colombia, Brazil and Peru(2004) and Ecuador (2005), among others.
industrial sector in Latin America. Furthermore, in some countries UNIDO has helped the creation of national technology foresight programmes. This has been done through the TFLAC initiative launched in 1999 during its first international TF seminar in Trieste, with the participation of around 150 industrialists, high-level governmental officials and several academicians from 20 countries. The objectives of the seminar were (a) to offer an overview of international TF practices, (b) to discuss the status of TF in Latin America, and (c) to prepare recommendation on how the TFLAC should operate. This initiative led Argentina, Brazil, Colombia, Mexico, Uruguay and Venezuela to launch preparatory activities for setting up national programmes, but only some of these countries managed to institutionalize a TF Programme.

This initiative is still active in some countries where TFLAC has provided funds, technical expertise and logistical support for capacity-building activities (e.g. training courses and seminars) and regional exercises, such as the 2005 study on the “Future of the Fishery Industry in the south American Pacific Coast” (UNIDO,2005) and the study on the “Future of Andean Products in the High Plateau and Central Valleys of the Andes”.  

As a result, it is possible to conclude that UNIDO has played a pivoting role in the development of a foresight culture in the region and, at the same time, the promotion of a wide range of cross-national experiences.

2. NATIONAL FORESIGHT EXPERIENCES

This section presents a short description of national foresight experiences in Argentina, Bolivia, Chile, Cuba, Ecuador, Mexico, Peru, Uruguay, Brazil, Colombia and Venezuela.

3. FORESIGHT IN ARGENTINA  

In Argentina, the TF programme began with a strong political commitment from the Secretary for Science and Technology (SECYT) to the setting up of a national TF Observatory in 2000 (following an agreement with UNIDO). That year, a small team reviewed several international experiences and prepared various diagnostic studies which included socio-economic and demographic scenarios for the country. But a combination of internal political and economic crises and other external factors affecting the TFLAC project contributed to the interruption of the Observatory and other ongoing studies, such as the Technology, Employment and Technical Training exercise, and three other initiatives concerning the

---

32 Argentina was a pioneer in the production of forward-looking reflections in Latin America. Amilcar Herrera and the Bariloche Group lead the first global model produced in Latin America in the 1970s. This model was considered by many scholars as one of the deepest and most creative reactions to the Limits of Growth study produced by Club of Rome. Another pioneering study lead by Herrera was the Technological Outlook for Latin American project (PTAL) (see Herrera et al., 1976; Albomoz, 2006). However, the Argentinean leadership in foresight has been disbanded over the last years.
biotechnology, chemical and textile industries (Mari, 2005). In 2003 the National Observatory of Science, Technology and productive Innovation (ONCTIP) launched the Strategie Mid-Term Plan of STI for 2015, which involved over 4,000 people with a methodology based on experts panels, surveys, workshops and prioritization of key S&T areas. The process finished in 2005 and its main goals were: (a) to strengthen and enlarge the National System of STI; (b) to improve the quality, efficiency and pertinence of S&T activities; (c) to increase S&T expenditure; and (d) to increase the contribution of the private sector’s spend on R&D.

4. FORESIGHT IN BOLIVIA

In December 1996, the National Academy of Sciences of Bolivia, together with UNIDO and the International Centre for Science and High Technology (ICS), organized an Expert Meeting in Santa Cruz to discuss important developments in technology foresight and main lessons from European and Japanese experiences. In 1999, the Organisation of American States (OAS) supported the attendance of regional experts to the annual PREST Foresight Course in Manchester, and later on a Bolivian delegation participated in the launching of the TFLAC programme in Trieste, Italy (Aguirre-Bastos, 2004). Despite these efforts, various factors, such as lack of political commitment, did not contribute to the creation of national foresight programme. However, Bolivia has remained active in cross-national studies through UNIDO-sponsored projects, such as the “Future of Andean Products in the High Plateau and Central Valleys of the Andes”, which also involves Ecuador & Peru.  

5. FORESIGHT IN CHILE

The Chilean TF Programme was launched by the President of the Republic together with top business and academic representatives, and was institutionalized within the Ministry of Economy in 2001. The government defined foresight as “a process that allows the discovery of pathways toward a desired future and the identification of strategies or action plan for its achievement”. In so doing, national experts have been regularly invited to participate in the formulation of investment strategies for both the public and private sectors. The Chilean programme began with the identification of strategic S&T areas and then focused on specific sectors and themes. Between 2001 and 2005 the programme completed various national exercises an one international study. All of the studies applied Delphi surveys in addition to workshops with targeted experts. Given the national character of most studies, experts have been selected from different regions of the country.

---

33 See http://www.ppt.cl
The first study, the largest in scope, covered the whole spectrum of economic sectors, and was aimed at the identification to those “key economic activities” with the largest potential in the next decade.

Subsequent exercises had more sectoral scope, some including:
- “E-ducational industry” (ICT applied to education);
- Biotechnology applied to fruits to horticulture;
- Biotechnology applied to forest industry;
- Chilean software industry 2010;
- Wine production and exports;
- Aquaculture industry.

Each exercise normally requires the creation of an experts database with on average 180 specialists. The TF Programme has also made sure that results get published and reports are downloadable from the web. The methodology is rather conservative, with nearly all exercises following a similar design (i.e. desk research for the diagnosis phase; brainstorming sessions to identify topics and keys issues; workshops with targeted experts to discuss the Delphi design; and an on-line Delphi to gather views and opinions about the future).

Three studies were launched in 2006, two related to the agriculture industry (on “Post-graduate knowledge and skills required by the food industry productive chain of crop products” and “Post-graduate knowledge and skills required by the food industry productive chain of livestock products”). The third study was the debut of the technology foresight programme into the regional (sub-national) foresight arena, with an exercise on “Economic activities contributing to the development of the Maule Region in the next 10 years”.

6. FORESIGHT IN CUBA

Cuban foresight has been mainly carried out by the Cuban Observatory of Science and Technology (OCCyT) which has given the Cuban exercise a strong emphasis on technology watch and competitive intelligence activities. Monitoring emerging technologies is perceived as crucial for being ready and prepared for technological changes. Technology monitoring is used as a valuable input for developing foresight exercise in key strategic sectors. The three most relevant areas of work are: health, biotechnology and information technologies. Cuban foresight practices have been interesting for many countries in the region mainly because of the effective integration of S&T issues with economic, political, social and environmental factors, thus making Cuban foresight highly interdisciplinary. The Cuban experience is also characterized by the creative use of limited resources and its focus on the development of human capital with proactive attitudes as opposed to reactive. Such proactive thinking has helped Cuban foresight to focus on the identification of technological and social disruptions and to establish
research programmes which may facilitate the country’s transition towards a knowledge-based economy.

7. FORSIGHT IN ECUADOR

In Ecuador there have been foresight-type initiatives in various universities in Quito and Guayaquil. Some training courses have also been supported by international organizations, such as CYTED and CAB, for example. However, applications of foresight to technology management and territorial development have mainly been done by a reduced number of individual consultants. In particular, the Polytechnic School of the Ecuatorian Army (ESPOL) has been keen in providing training courses on foresight and technology watch to army officials. Some thematic and regional experiences include work on professional skills, technological opportunities, and the future of the Pichincha Province. In 2005, an international project on the Fisheries Sector was carried out with the support of UNIDO and OPTI (Spain) and the participation of Colombia and Peru.34

8. FORSIGHT IN MEXICO

While Mexico has a long tradition in forecasting and futures research, it has yet no organise a fully-fledged national foresight programme. As a pioneer producing some of the first books and exercises in the 1970s, Mexico has focused on capacity-building and teaching programmes mainly located in the Javier Barros Sierra Foundation, the College of Mexico, the Autonomous University of Mexico, and the Technological Institute of Monterrey. In the 1980s Mexico led the first Latin initiative to promote the integration of foresight efforts in many countries, the so-called Technological Prospective for Latin America (TEPLA), which helped to translate selected European foresight experiences into Spanish. During the 1990s the country showed a decline in regional leadership but since 2000 foresight work has begun to recover. Current activities are mainly related to entrepreneurial foresight and efforts of public institutions focused on education, science and technology. There is also a Mexican node of the Millennium Project, a chapter of the World Futures Society (WFS) and an online journal for prospective studies which has provided a space for disseminating experiences in Spanish.

9. FORSIGHT IN PERU

The Peruvian experience began in March 2001 with the negotiations for the creation of a national programme involving the ministry of Industry, the National Science and Technology Office (Concytec) and other actors. Among the initial activities that were agreed upon are: the preparation of an Inventory of foresight-

34 See http://www.unido.org/doc/56607
In terms of foresight experiences, the promotion of training courses and seminars; and the beginning of a pilot exercise in a strategic industrial sector.

The Inventory produced a database of over 1,000 experts and 425 institutions from selected sectors: agriculture, industry, mining, fishing, tourism, energy, construction, health and defense. The exercise was considered useful but commentators suggested that more sectoral representation was needed, given that the agricultural sector alone had 35 per cent of the experts and private sector institutions represented 74 per cent of the sample, leaving the public and academic sectors poorly represented.

In June 2001, TFLAC ran a workshop-type course which produced seven reports on the following sectors: textile and clothing; biotechnology and agriculture; sea products and water; new materials; energy; housing and constructions; and tourism. The reports included results on brainstorming and cross-impact exercises and identified a series of drivers and stakeholders shaping the development of sectors. Later in November a group of academicians, who took part in the TFLAC course, set up the Consortium Prospective Peru (CPP) then organized in 2002 a visioning workshop facilitated by international team. The main result was a research agenda based on 22 critical factors for the socio-economic development of the country by 2020. In 2004, all four universities in the Consortium joined SELF-RULE network thus allowing Peruvian researches to take part in advanced training and mobility programmes in Europe and Latin America.

Equally important have been the activities promoted by Concytec since 2003. Three large-scale international foresight seminars were organised in cooperation with members of CPP and other international institution.

In terms of foresight experiences, four recent exercises include:

1. A multi-country initiative on the productive chain of the fishery industry of the South American Pacific coast, with a ten-year time horizon. Here, Colombia, Ecuador and Peru followed a particular methodological design proposed by TFLAC;
2. A sectoral study of the Alpaca by 2014, sponsored by the National Commission for South American Camels (CONACS) and supported by Concytec;
3. A pilot on the future of Peruvian agriculture and biotechnology;
4. A project on the “Future Andean Products” in Bolivia, Ecuador and Peru, launched in 2006 with the support of UNIDO and OPTI. The main objectives of this study

35 UNIDO promoted the elaboration of National Inventories in various countries. This activity contributed to the creation of a database of experiences, institutions and people involved in projects with a long-term time horizon.
36 Victor Quevara (National Agrarian University La Molina), Edwin Dextre (National University of Engineering), Isias Quevedo (University of Lima) and Sandro Paz (Pontific Catholic University of Peru).
37 The Consortium included seven institutions: four universities (ULIMA, UNI, UNALM and PUCP), the National Service of Training in Industrial Work (SENATI) the National Institute of Agricultural Research (INIA), and the National Society of Industries (SNI).
were: to identify strategy technology areas for selected products and industrial sectors; to raise the competitive advantage of national products; and to provide national products with better access to regional and global markets.  

10. FORESIGHT IN URUGUAY

The Peruvian experience began in March 2001 with the negotiations for the creation of a national programme involving the ministry of Industry, the National Science and Technology Office (Concytec) and other actors. Among the initial activities that were agreed upon were: the preparation of an Inventory of foresight-type experiences, the promotion of training courses and seminars; and the beginning of a pilot exercise in a strategic industrial sector.

The Inventory produced a database of over 1,000 experts and 425 institutions from selected sectors: agriculture, industry, mining, fishing, tourism, energy, construction, health and defense. The exercise was considered useful but commentators suggested that more sectoral representation was needed, given that the agricultural sector alone had 35 per cent of the experts and private sector institutions represented 74 per cent of the sample, leaving the public and academic sectors poorly represented.

In June 2001, TFLAC ran a workshop-type course which produced seven reports on the following sectors: textile and clothing; biotechnology and agriculture; sea products and water; new materials; energy; housing and constructions; and tourism. The reports included results on brainstorming and cross-impact exercises and identified a series of drivers and stakeholders shaping the development of sectors. Later in November a group of academicians, who took part in the TFLAC course, set up the Consortium Prospective Peru (CPP) then organized in 2002 a visioning workshop facilitated by international team. The main result was a research agenda based on 22 critical factors for the socio-economic development of the country by 2020. In 2004, all four universities in the Consortium joined SELF-RULE network thus allowing Peruvian researches to take part in advanced training and mobility programmes in Europe and Latin America.

Equally important have been the activities promoted by Concytec since 2003. Three large-scale international foresight seminars were organised in cooperation with members of CPP and other international institution.

---

38 This was a demonstrative activity which takes up previous work initiated by UNIDO in 2001 with the leadership of the National Agrarian University of the National Agrarian University La Molina, The National University of Engineering (UNI) and the methodological support of the CPP, PREST and SELF-RULE: Univalle University in Colombia and 4-Sight-Group in Venezuela helped to design the Pre-Foresight Phase of the project (see: http://www.4-sight-group.org/self-rule/peru/un/).

39 UNIDO promoted the elaboration of National Inventories in various countries. This activity contributed to the creation of a database of experiences, institutions and people involved in projects with a long-term time horizon.

40 Victor Guavarra (National Agrarian University La Molina), Edwin Dentre (National University of Engineering), Isias Quevedo (University of Lima) and Sandro Paz (Pontific Catholic University of Peru).
In terms of foresight experiences, four recent exercises include:

1. A multi-country initiative on the productive chain of the fishery industry of the South American Pacific coast, with a ten-year time horizon. Here, Colombia, Ecuador and Peru followed a particular methodological design proposed by TFLAC;
2. A sectoral study of the Alpaca by 2014, sponsored by the National Commission for South American Camels (CONACS) and supported by Concytec;
3. A pilot on the future of Peruvian agriculture and biotechnology;

A project on the “Future Andean Products” in Bolivia, Ecuador and Peru, launched in 2006 with the support of UNIDO and OPTI. The main objectives of this study were: to identify strategy technology areas for selected products and industrial sectors; to raise the competitive advantage of national products; and to provide national products with better access to regional and global markets.

11. FORESIGHT IN BRAZIL

Elaborated in 1998, Brazil 2020 was the first experience of governmental planning integrated in Brazil, in the recent years. Even without the sense of making a precise orientation for the public investments or for the budgetary organization of the activities of the State, this project represents a landmark and has used the scenarios methodology with the elaboration of some exploratory and a desired scenarios dealing with to guide the Brazilian itinerary of development. (Sardenberg, 2001)

Main Objectives: a reflection exercise, aiming at outlining views for the future of Brazil, and therefore, guides the elaboration of some exploration scenarios to guide Brazilian itinerary of development.

FTA Techniques

Scenarios: Issues as information society and the challenges for education and training, new jobs, ageing, unemployment, laws and regulation, new economy sectors, new relationships at work was discussed and considerate to generate the scenarios (exploratory and normative (desired scenario)). The scenarios denomination refers to national culture and linguistic. The results has showed three exploratory scenarios (A,B and C) and one normative scenario (D) or desired, as follows:

- scenario A – GOOD – called ABATIAPÉ

---

41The Consortium included seven institutions: four universities (ULIMA, UNI, UNALM and PUCP), the National Service of Training in Industrial Work (SENATI) the National Institute of Agricultural Research (INIA), and the National Society of Industries (SNI).
42This was a demonstrative activity which takes up previous work initiated by UNIDO in 2001 with the leadership of the National Agrarian University of the National Agrarian University La Molina, The National University of Engineering (UNI) and the methodological support of the CPP, PREST and SELF- RULE. Univatle University in Colombia and 4-Sight-Group in Venezuela helped to design the Pre-Foresight Phase of the project (see: http://www.4-sight-group.org/self-rule/peru/).
• scenario B – FAIR – called BBORÉ
• scenario C – BAD – called CAEETÉ
• scenario D – DESIRED – normative called DIADORIM

The Prospectar Program
The Prospectar Program (Barros, 2002; MCT, 2006) was the first foresight initiative in Brazil. It was launched under the CCT Prospective Commission and has the characteristic of being national. The main objective was to develop prospective activities to support the decision-making process on questions such as priority identification of investments on science and technology, promotion of networks to spread the prospective practices and aiming to become a permanent process of identification of scientific and technological needs, for both government and private sector. Eight fields of investigation were selected. In addition, it was expected that the results could provide qualified information for the investments to the Sectorial Funds (private contributions to the development of S&T in Brazil) managed by MCT.

Selected Themes: The sectors to be studied was: Aeronautics, Agriculture (includes forest, fishing, livestock farming, agribusiness, biotechnology), Energy (includes biotechnology), Health (includes biotechnology), Materials, Outer Space, Water Resources and Telecom & Information Technology (includes electronics). Contou com oito instituições âncora, cada uma para ancorar um dos temas selecionados.

FTA techniques: Delphi Survey – three rounds
To define the Brazilian national project, the MCT organized a three day seminar to discuss and to absorb the international practice in foresight, through the successfully experiences of Australia, France, Germany, Korea, Japan and Spain. A representative of IPTS – Institute for Prospective Technological Studies – was also invited to present a comparative analysis.
By the end of the third round, the topics were organized and listed. Each field was statistically described, after receiving a first identification of the percentage of each topic, according to each variable. After that, a cluster analysis was applied in each field.

Final Remarks
Based on the above discussions, one can see that Brazil, in the last few years, has experienced a strong growth on the use of the FTA methods and techniques as well as expanding the culture of prospective studies.

Looking at the classification of FTA methods (Porter et al., 2004), one can summarize that: There is a clear evidence of the wide use of qualitative and soft methods, mainly from the Expert Opinion family;
• The use of methods from Bibliometrics and Monitoring families are also growing recently;
• There is a need to increase the use of methods from the Scenarios, Trend Analysis, Descriptive, Statistical, Modeling & Simulation and Valuing/Decision/Economic families;
• there is no evidence of the use of methods from the Creativity family.

12. FORESIGHT IN COLOMBIA

Since the early 1970s Colombia has carried out important future-oriented studies including Antioquia 21st Century; Valle 2000; Destiny Colombia; Workshops of the Millenium – Reconsidering the Country; Where is Colombia going?; The Cali We Want; and many others. While these earlier experiences have been important for the development of national foresight skills, at the international level Colombian foresight is mostly recognized for its work on the Colombian Technology Foresight Programme (CTFP). For this reason, we dedicated this section to the evolution of the Programme.

The Genesis of the CTFP (2001-2002)
The CTFP was officially created in 2002 by Colciencias (Colombian Office of Science and Technology)45, the Ministry of Commerce, Industry and Tourism and Andean Development Corporation (CAF). During 2001 and 2002 a kind of incubation process began whereby organizational and conceptual schemes were prepared. Initial activities helped raise awareness of national and international foresight practices and key stakeholders via conferences supported by UNIDO and the Ministry for the Economic Development. The management team included a group from El Valle University (Univalle) lead by one of this chapter’s authors, and the National Centre of Productivity (CNP), both based in Cali.

The First Cycle of the CTFP (2003-2004)
The first cycle of the CTFP focused on building foresight capabilities both nationally and regionally. Several seminars, congresses and training courses were organised with recognized national and international foresight experts. The overall objective of this phase was to initiate a process whereby key stakeholders of Colombian society become aware of the importance of building a foresight tools and other software packages and provides advanced training courses to a small group of people who later became the technical support team for the Programme. Two calls for proposal were launched for foresight on economic sectors (first call) and regional Clusters and Productive Chains (second call). The first call (2003) supported three sectoral projects:
1. Electrical sector;
2. Food packing sector;

45 See http://www.colciencias.gov.co/.
3. Dairy sector.

The second call (2004) attracted several proposal on Secto-territorial Foresight with 24 of them being submitted to national and international evaluation committees pre-defined evaluation criteria. The selected projects on Secto-territorial Foresight were:

- Export potential of the health sector cluster in the Cauca Valley;
- Agro-industrial productive chain of vegetable fibre in Santander;
- Horticulture productive chain of the Bogotá plains;
- Making Cartagena a tourist destiny.

The second Cycle of the CTFP (2005-2006)

In the second cycle, Colciencias led the new management structure and provided technical and methodological assistance provided to exercises approved under the second call. Another key task for CTFP was the identification of strategic economic sectors and important emerging challenges of the country (e.g. Free Trade agreements, productive transformation, etc.) CTFP thus emerged as a decision-support platform for a large variety of national and regional socio-economic and political processes promoting the transformation of the country into a knowledge-based economy. The Programme also forested national Centres of Excellence by supporting four Technological Foresight exercises:

1. New Materials;  
2. Tuberculosis;  
3. Genetic resources and biodiversity;  
4. Natural products and essential oils.

Equally important is CTFP’s support for Colciencias’s new thematic areas related to the current structure of the National System of Science, Technology and Innovation: Fundamental research, Energy and materials, Biological processes, Agricultural products and biodiversity, Human beings and the environment, Education, Institutions and culture, and Technological convergence. CTFP supported other foresight exercises, including the National Biotechnology Programme with the assistance of PREST and the International Fishing Sector exercise sponsored by UNIDO and the Ministry of Industry, Commerce and Tourism. More recently, the CTFP provided methodological assistance to a study on productive transformation towards a knowledge society in Colombia, to help the National Planning Departament execute its Internal Agenda and develop a Vision for 2019. This involved a Delphi surveys on “Strategic sectors and the Colombian knowledge economy”.

---

46 Lead by UNIVALLE University.  
47 Lead by Antioquia University.  
48 Lead by Pereira Technical University.  
49 Lead by Industrial Santander University.
The CTFP team has led various foresight initiatives in Latin America, related to the Programme for the Technological Innovation of the Andean Community (PAITEC); CAB’s Prospective Programme; and the foresight training component of CYTED, CTFP support from Colciencias, CAF, UNIDO and the national Training Services (SENA), has contributed to its process of existing experiences. This has been achieved 4-sight-Group which developed an online mapping platform to comprehensively monitor Colombian and Latin American foresight experiences with the supports of Univalle and the Cali Foresight.

**Foresight Outlook in Colombia**

Colombia has a strong tradition in foresight and is considered a reference point for the Latin America region. The CTFP interacts with large numbers of national and international stakeholders and promotes the “foresight culture” within universities, research institutes and governmental agencies across the country. In 2007 the second cycle of the CTFP began a process of evaluation looking a lessons drawn from the first cycle (Popper and Miles, 2004) and main outcomes from the rich pool of national experiences (Medina, 2006a). These have helped to identify various critical factors affecting current practices in Colombia:

- **Innovation and learning capabilities of practitioners and user.** Foresight needs to focus more on adding value to existing knowledge and on developing complementary techniques.
- **Social participation and interaction.** More effective communication channels and tools to mobilize key social, business and political leaders;
- **Productivity of foresight processes.** Sponsors and organizers need to understand that exercises require flexibility in the way the process is managed, as well as the way the process is managed, as well as the ways in which internationally available methods are chosen and used;
- **Pertinence of foresight exercise.** More focus on key social needs and efficient use of resources, whereby regions share resources and information in the pre-foresight phase;

*Quality of foresight reflections.* The need for more reliable indicators and deeper conceptual understanding of the “foresight process”, together with the strong interregional differences in terms of human capabilities.

---

50 See http://www.4-sight-group.org/mapping/.
51 See Popper et al., 2007.
13. FORESIGHT EXPERIENCES IN VENEZUELA

Since the 1970’s a large number of “strategic prospective” projects have been launched nationally and regionally with both sectoral and thematic focuses (some relevant examples are: Industrial Prospective 1970-2000; Venezuela: Perspective Study 1975-1990; Tourism 2020; Possible Venezuela in the 21st Century, and Zulia Third Millennium, among others). Several stakeholders and institutions have been responsible for these experiences, including the Centre for Development Studies (CENDES), the Institute for Advanced Administration Studies (IESA), central University of Venezuela (UCV), Zulia University (LUZ), Los Andes University (ULA) and the state oil corporation (PDVSA), among others.

However, Venezuela has been mainly recognized by its forward-looking culture in the energy sector (including the oil, petrochemical and natural gas industries). Proven oil reserves (approximately 77 billion barrels) together with an estimated 235 billion barrels of oil in the Orinoco Belt mean the country has virtually the largest petroleum reserves in the world. Moreover, at largest natural gas reserves (OPEC, 2006). This energy potential has been the main driver of the “2012 Strategic Roundmap” (prepared by PDVSA and the Ministry of Energy), which led to a wide range of long-term initiatives, such as PetroCaribe, PetroSUR, the Energy Security Treaties (TSE) signed by several Latin American countries and the ambitious project of building a South American GasPipeline, for example.

Another important accelerator of foresight in Venezuela has been the creation of the Ministry of Science and Technology (MCT) in 1999 and, within it, the Directorate General for Foresight and Planning, with the overall mission of supporting the development of the National System for Science, Technology and Innovation. For this reason, the remainder of this section will focus mainly upon the two most important foresight experiences organised and conducted by MTC in the beginning of the 2000s:

1. The Venezuelan Technology Foresight Programme;

The Venezuelan Technology Foresight Programme (TFP Venezuela)

With the setting up of the Foresight Sub-Direction in 2001, the MCT signed an agreement with the TFLAC Programme for launching the Venezuelan Technology Foresight Programme (TFP Venezuela) in which UNIDO agreed to contribute with around 200,000 USD, foresight expertise and institutional support.

---

52 We are grateful for the information provided by Yuli Villarreal, Yadira Córdova, Luis Marciano, Thiisay Hung, Grisel Romaro, Rubén Reinosa, Hilda González, Irma La Rosa, José Cruces, Omar Ovalles, Alirio Martínez; Nina Sánchez and the great amount of documents available in Spanish in the Venezuelan S&T Ministry website which helped to research this section.
The first cycle of TFP Venezuela (2001-2002) had four initial objectives:
1. To prepare a National Inventory of foresight-type experiences;
2. To undertake a pilot Delphi exercise on the Oil Industry;
3. To build foresight capabilities tought seminars and workshops;
4. To support research programmes in key priority areas.

The National Inventory, which initially covered 43 exercises, identified a large number of lessons learn from past and ongoing studies and contributed towards the generation of the network of foresight competences and capacities.

In parallel, a pilot study-on existing local potential to competitively produce de chemical inputs that are required in the drilling and productions activities of the petroleum industry (Aguirre-Bastos, 2004) –was conducted by Intevep-PDVSA and MCT. The methodology involved expert consultation via Delphi, preparation of scenarios and identification of potential areas for investment. As a result, several business plans where elaborated together with major chemical input producers.

The other two objectives were led by mathematician Yuli Villarroel who organised various foresight capacity-building workshops for the regional science and technology offices (Fundacites) and other institutions linked to MCT. International foresight practitioners from Brazil, Colombia and México were invited as speakers while national experts brainstormed on key sectors and opportunities for the country. As a result of these and other regional working session, TFP Venezuela launched a multi-region foresight exercise on the Yucca (cassava or manioc) sector. The main objectives were: a) to generate possible scenarios for the next 10-15 years; b) to design a “success scenario” (attractive for the stakeholders involved); c) to forecast the future development trends of the Yucca productive chain; d) to build networks to influence on key drivers of the agricultural system; e) to identify influential stakeholders and secure their commitment; and f) to build a “shared vision” with an action plan.

The study involved more than 300 experts and individual from civil society, and the public and private sectors from five States, and produced the “Yucca in Gondola” report with a success scenario for 2016 (Villarroel, et.al.2001). however, as many would expect, after the failed 2002 coup against President Hugo Chávez, the government temporarily suspended its foresight activities at MTC –including TFP Venezuela- and devoted its attention to emerging short-term priorities (i.e. regaining control of key institutions, such as PDVSA). It was only after this was achieved that TFP Venezuela managed to resume its activities. This phase, also know as the second cycle of the programme (2004-2006), provided support to the National STI Plan 2030, as well as other sectoral and thematic projects.

53 See chapter 2 for discussion about the Strategic Prospective.
54 A research institute of the State oil company PDVSA.
Some of these include:
- Shared vision of the future of the gas industry;
- Scenarios for agro-biotechnological development;
- Foresight on biotechnology for agro-food security by 2011;

The National STI Plan 2030
In the year 2000, the government launched the National Plan for Economic and Social Development (PDES) which conceived the development of the country on the basis of the five equilibriums: economic, social, political, territorial and international. However, in 2004 a longer-term vision for the country’s STI policies was still required and MCT embarked on a process aimed at answering two key questions: a) What STI was needed?, and b) for what type of development? With this in mind, an expert panel and a strategic team were assembled to analyze the type of desired development embodied and formulate a National STI Plan (STI-Plan) using foresight to create shared vision on endogenous, sustainable and human development (MCT, 2005).

STI-Plan time horizon was 2030 and its key objective were:
- To develop science and technology for social inclusion where social actors actively participate in the formulation of the public policies;
- To promote scientific and technological independence and achieve higher levels of technological sovereignty;
- To generate higher STI capacities.

STI-Plan involved two phases supported by virtual discussion forums and feedback platforms. Phase One aimed at defining strategic directions for 2030 with experts and public consultation. Over 2,000 people participated in various activities lead by MCT, including:

- A public perception survey;
- Seven visits to different States;
- A methodology validation workshop;
- A survey on the role and SWOT of regional foresight agendas;
- A capacity-building workshop for regional technical teams;
- Interactive focus groups with community stakeholders;
- Several meetings with the central administration.

Phase Two focused on the definition of the STI-Plan’s strategies and goals based on contribution from nearly 1,350 people and further analysis of Phase One consultation as well as interviews with key stakeholders of the STI system. A total of 1,921 strategies and goals were generated and later clustered into six

55 Arzóátegui, Aragua, Cojedes, Miranda and Zulia.
categories, namely a) strengthening the STI system; b) promotion of research; c) sustainable development; d) endogenous development; e) Ibero-American integration; and f) science and technology visibility and culture. Some resulting strategies included the creation of STI networks on priority areas; the matching of STI activities to the needs of excluded people; and the creation of R&D centres, among others. In addition, the Plan proposed 17 challenges for the future.56

Foresight Outlook in Venezuela

In recent years the number of strategic long-term initiatives promoted by Venezuela has grown considerably –e.g- PetroCaribe, PetroSUR, TeleSUR and the Bank of the South- all with a strong regional integration component. Furthermore, the institutional framework of the 1999 Constitution has increased democracy and participatory policy-making at many levels of the public sector. As a result, forward-looking activities are moving from traditional top-down approaches to more inclusive bottom-up practices, where both theoretical and methodological designs are adapted to the local contexts, thus making it possible to undertake more socially and regionally pertinent studies (with the help of community workshops and citizen panel, for example). Against this background, a look across the two cycles of TFP Venezuela would suggest that-after the development of the STI Plan –there are some important actions that need to be taken in the near future, for example:

- To create mechanism capable of shaping citizens’ visions and institutions’ objectives in accordance to emerging social, economic, scientific and technological needs;
- To promote coordinated activities to achieve major national (and shared cross-national) STI objectives;
- To promoted the evaluation of foresight and its policy impacts;
- To ensure that researchers have access to state-of-the-art information system (e.g. database, web-libraries, knowledge banks, etc.); and
- To created and strengthen foresight groups and networks capable of a) supporting national, sub-national and international initiatives, and b) building a “foresight culture” at universities, research institutions and government agencies (including embassies and consulates around the world).

14. THE LATIN AMERICA FORESIGHT PANORAMA

The re-emergence of foresight (or ‘la prospectiva’) in the Latin region represents, as in Europe, a challenge for newcomers as well as for experienced practitioners and scholars. For this reason, in this section we expand the typology (state of evolution, level, focus, objectives) proposed by Johnston and Sripaipan to include

56 MCT, FONACYT, FUNDACITES, IVIC, INTEVEP, CDCH, and major universities, among others.
academic developments and described the status of foresight activities in 13 Latin American countries.

As observed in table 12.1, nearly half of the Latin Countries considered have well-recognised adaptation and innovation capabilities in foresight. This is reflected in the originality of methodological design and the use of online tools (e.g. software applications), especially evident in Brazil, Colombia and Venezuela, followed by Argentina, Cuba and Mexico. In terms of levels, these countries have national, regional, sectoral, organizational and academic foresight experiences. Objectives relate mainly to anticipation, networking, action achieved, and action proposed.

**Table: National foresight activities in Latin America**

<table>
<thead>
<tr>
<th>Country</th>
<th>State of Evolution</th>
<th>Level</th>
<th>Focus</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>A/I</td>
<td>R, Se, O, Ac</td>
<td>F/s,P</td>
<td>A, Ne, Act-P</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Im</td>
<td>Se</td>
<td>F/s</td>
<td>A</td>
</tr>
<tr>
<td>Brazil</td>
<td>A/I</td>
<td>N, R, Se, O, Ac</td>
<td>F/s,P</td>
<td>A, Ne, Act-P</td>
</tr>
<tr>
<td>Chile</td>
<td>Le</td>
<td>N, R, Se</td>
<td>F/s,P</td>
<td>A, Act, Act-P</td>
</tr>
<tr>
<td>Colombia</td>
<td>A/I</td>
<td>N, R, Se, O, Ac</td>
<td>F/s,P</td>
<td>A, Ne, Act, Act-P</td>
</tr>
<tr>
<td>Cuba</td>
<td>A/I</td>
<td>R, Se, Ac</td>
<td>F/s,P</td>
<td>A, Ne, Act, Act-P</td>
</tr>
<tr>
<td>Ecuador</td>
<td>Le</td>
<td>Se, Ac</td>
<td>F/s</td>
<td>A</td>
</tr>
<tr>
<td>Panama</td>
<td>Im</td>
<td>Se</td>
<td>F/s</td>
<td>A</td>
</tr>
<tr>
<td>Paraguay</td>
<td>Im</td>
<td>Se</td>
<td>F/s</td>
<td>A</td>
</tr>
<tr>
<td>Peru</td>
<td>Le</td>
<td>N, R, Se, O, Ac</td>
<td>F/s,P</td>
<td>A, Ne</td>
</tr>
<tr>
<td>Mexico</td>
<td>A/I</td>
<td>N, Se, O, Ac</td>
<td>F/s,P</td>
<td>A, Ne</td>
</tr>
<tr>
<td>Uruguay</td>
<td></td>
<td>N, R, Se</td>
<td>F/s</td>
<td>A</td>
</tr>
<tr>
<td>Venezuela</td>
<td>A/I</td>
<td>N, R, Se, O, Ac</td>
<td>F/s,P</td>
<td>A, Ne, Act, Act-P</td>
</tr>
</tbody>
</table>

**Notes:**

a. **State of evolution**: position of foresight/future activities in the country along a spectrum from imitation[Im], via learning [Le] to adaptation/innovation [A/I]
b. **Level**: national [N], regional [R], sectoral [Se], organizational [O], academic programmes [Ae]
c. **Focus**: foresight [F/s], policy action [P]
d. **Objectives**: anticipation [A], networking [Ne], action achieved [Act], action proposed [Act-P]

Another group of emerging practitioners is lead by Chile with a large variety of objectives mainly focused at the national level (with some sectoral and regional projects too). In contrast, Peru shows activities at different levels but mainly oriented towards anticipation and networking objectives. The growing number of foresight capacity-building activities in countries like Peru and Chile may soon result in better adaptions and innovations in focused on sectoral projects. To sum up, Latin American foresight is very rich and varied.57

---

57 Some of these include: increasing S&T expenditure to 2 percent of GDP by 2010; increasing by 50 per cent students in S&T related careers; and creating a technological park to produce medicines with local technology, etc.
REFERENCE


Keenan, Michael (2003) Rationales for foresight and international experiences, PREST, University of Manchester


Electronic resources:

COST A22.

FORERA.
Knowledge Sharing Platform.  

Knowledge Sharing Platform 1: European Foresight Monitoring Network.  
http://www.efmn.info/

Knowledge Sharing Platform 2: FOR-LEARN.  

Knowledge Sharing Platform 2: FOR-LEARN guía on-line.  
http://forlearn.jrc.es/guide/0_home/index.htm

Knowledge Sharing Platform 3: Promoción de enfoques más profundos de Foresight en la UE.  
http://cordis.europa.eu/foresight/platform3.htm

Mutual Learning Platform (MLP): Regional Foresight.  

Proyectos Cuarto y Quinto Programa Marco.  
http://cordis.europa.eu/foresight/research.htm

Proyectos Foresight Séptimo Programa Marco.  
http://cordis.europa.eu/foresight/home.html

PREST

SELF-RULE  
http://www.self-rule-org/

4-Sigth-Group  
http://www.4-sigth-group.org/

UNIDO  
http://www.unido.org/

EMBRAPA  
http://www.embrapa.br/

COLCIENCIAS  
http://www.colciencias.gov.co/