SCHWERPUNKT

Foresight

Foresight Somewhere in the Expanse Between Futures and Technology Assessment

Introduction to the Special Section

At around the time when ITAS was starting its involvement in foresight with the FISTERA network, *Newsweek* ran a special report on Futurology. Historically minded readers and those with memories reaching back thirty or more years, will recall the vogue for "futurology" and such names as Alvin Toffler, Herman Kahn or Bertrand de Jouvenel. As the *Newsweek* feature pointed out, the professional association of futurologists or futurists, as they prefer to call themselves, had a membership of almost 60,000 in its heyday.

Since those heady days, membership of the society has fallen to less than half of its former number and its 2002 annual convention was attended by around 150 people. After outlining the history and the major success stories of future studies, the *Newsweek* article closes with the remark, "Futurists no longer have entrée to the corridors of power, which may be a sad commentary on our uncertain times" (Newsweek 2002).

In marked contrast to the decline of futurists proclaimed by *Newsweek*, the annual conferences on foresight which seem recently to have become a regular feature of European Commission activities attract hundreds of delegates and new foresight projects are announced, if not daily then at least monthly.

Researchers working in foresight are always quick to point out that foresight has nothing to do with forecasting or predicting the future. Nonetheless, the roots of foresight can easily be traced back to future studies activities which took place in the 1970s or even earlier:

- The method of Delphi surveys, which is often wrongly equated with foresight, was originally developed at the RAND Corporation in Santa Monica after 1948 in the context of military forecasting. This in turn had been motivated by a book by Vannevar Bush "*Science, The Endless Frontier*".
- As Werner Wobbe points out in his article, there was a specific French tradition of future studies, known as "la prospective", which was influential at the level of the EU Commission and gave birth to such institutions as the Commission President's "cellule de prospective". A prominent representative of "la prospective" was Bertrand de Jouvenel, whose work was identified with the futurology movement in the 1970s. Outcomes were a journal and a network, both under the name of "*futuribles*" which exist until this day under the leadership of Bertrand's son Hugues.

The term "foresight" appears to have been coined by Irvine and Martin in the early to mid 1980s to indicate the communication and procedural powers of the methods it denotes. The new term was linked strongly with the notion "that the actions of social systems, in particular science communities, cannot be predicted in terms of natural laws, and that future events in science and technology cannot be determined by extrapolating" (Grupp, Linstone 1999, p. 87). However, proposals for the implementation of foresight developed at around the same time led to very little activity.

When foresight did gather momentum, it was due to increasing globalisation, to the need for a mechanism to select promising candidates for the allocation of decreasing state resources earmarked for research and development (cf. the article by Cuhls), or to the so called "European Paradox", the realisation that countries producing world-class results in research are unable to capitalise on them through excellence in industry. Miles and Keenan confirm that this was indeed the diagnosis leading to the first foresight exercise in the UK (see their article in this issue). Most early foresight was specifically to be on technology. The involvement of stakeholders in foresight and networking among participants in the process has been recognized early as an important goal and potential benefit of foresight. In this connection, Martin and Johnston (1999) speak of "wiring up" innovation systems.

As Miles and Keenan note, the "technology" part of the label "technology foresight" was later dropped and the second cycle of UK foresight had a strong societal bias from the outset. The Austrian national foresight programme was the first such exercise to incorporate a separate component on societal trends. At the European level, Paraskevas Caracostas and Ugur Muldur produced a report for the European Commission "Society, the endless frontier", which subtly paraphrases the title of Vannevar Bush's groundbreaking 1945 book to indicate the shift in focus. A tendency to examine technology in its societal context can be seen in virtually all recent studies, including those ostensibly focused on identifying "key technologies". This has led to proposals for the classification of foresight studies by "generations" (e.g. Georghiou 2001). Tempting as such schemes may be for analytical purposes, they are probably an over-simplification and do not do full justice to on-going studies, which might be classified as belonging to "first" or "second" generation foresight. In our own analysis for the FISTERA network, we argue that there is still a place for studies of the "key technology" or first generation type, depending on the goals pursued by studies (cf. the article by Rader and Böhle).

A trend can also be observed from the general to the specific in those countries where foresight has a longer history, i.e. countries have tended to start with a very broad systematic exercise, analysing a wide range of trends and possibilities linked closely with decision-making agenda. Although some, like the well-known example of Japan have repeated such exercises at regular intervals, the general trend has been to revise concepts or diversify: although foresight has been institutionalised within the Department of Trade and Industry in the UK, the programme has been continually revised, opened up to other actors in the shape of the so-called associate programmes, transmitted to the regional level, and finally centred on specific areas of technology. While these changes have not been without controversy in the UK, they are symptomatic of what has happened elsewhere: in Sweden the first national exercise has been followed by regional and industrial foresights and there are increasingly studies labelled as foresight on such extremely specific topics as the future of mobile telephony.

Foresight and "la prospective" have often emerged in countries where the concept of "technology assessment" has not taken root. Experience with the ITAS Technology Assessment Database has shown that it is notoriously difficult to identify technology assessment activities in France, and our mid 1990s interviews for an EU project in the run-up to the fifth Framework Programme revealed that the term had fallen into disrepute in the United Kingdom at the time, probably due to political connotations or its being derided as "technology arrestment". Even so, it is quite likely that the different terms are used for activities of very similar types. At the European Union level for example, the fifth Framework Programme included measures for Technology Assessment, the sixth is addressing Foresight. In his brief history of foresight at EU level in this issue Werner Wobbe includes activities under several headings, among them technology assessment, and Miles and Keenan point out that activities have been re-branded as foresight to jump on the band-wagon and share the limelight (and money). To counter such tendencies, PREST (Policy Research in Engineering, Science and Technology) has developed the concept of "*fully-fledged foresight*", which is defined as involving "networking of key agents of change and sources of knowledge, around the development of *strategic visions* based on *anticipatory intelligence*" (see the article by Ian Miles and Mike Keenan in this issue). If applied strictly, the PREST definition would mean that there are few genuine foresight studies.

Many of the goals Foresight sets out to fulfil are similar to those targeted by Technology Assessment, i.e. looking as far into the future as possible, separating true potential from hype, considering alternatives and providing input for decision-making processes on science and technology policy. Both also share a pragmatic approach to the selection of methods, with "toolboxes" containing many of the same elements. The "Handbuch Technikfolgenabschätzung" (Bröchler et al. 1999) for examples includes chapters on Delphi and Scenarios quite naturally in its part on methodologies. They also share common ground in their close relation to social sciences, and often an acknowledged TA institution is able to perform Foresight exercises and vice versa. Nevertheless Foresight has its

own properties. Due to the lack of absolutely clear distinctions, we would just like to raise four points on differences and overlap:

- Foresight has developed its own jargon with key words like "visions", "time horizon", "disrupters", "wildcards", "scenarios", "SWOT", "drivers", "priority setting" etc. to be found less often in typical TA studies. Its dominant methods are Panels, Delphi, and Scenarios (cf. the article by van der Meulen). Foresight also seems to be closer to the nitty gritty of technological developments as demonstrated by studies on "critical technologies", "emerging technologies", "key technologies" and "technology roadmaps".
- Technology Assessment was originally conceived as a concept to balance power between the branches of government: The Office of Technology Assessment of the US Congress for example was designed to provide the legislative branch with knowledge and information to compensate for the executive branch's far closer ties to public administration and publicly funded research. Foresight often seems to have a more direct and visible impact on policy making of the executive branch. There are many examples where national foresight had an immediate impact on research and innovation policies, e.g. Sweden, Ireland, Czech Republic. Twice in this issue the concern is even raised that ex-communist states might misunderstand Foresight as a new form of central planning.
- At the same time however Foresight has shifted its focus away from the state as the major actor in science and technology policy-making to a broad range of stakeholders, including science, various parts of industry (manufacturing, service providers etc.), users and other affected parties. This underlines the importance of second order effects of foresight like networking, consensus building etc. Since its beginnings Foresight has always had several interfaces. Technology Assessment has experienced a similar evolution later in parts of the world. During its history, Technology Assessment has been confronted increasingly with the demand for knowledge to actively shape technology in a way that is beneficial to as many stakeholders as possible. This has led to the emergence of such

concepts as participatory TA, consensus conferences, discursive TA etc. Foresight and TA have therefore developed in the same vein of new concepts of governance. Knowledge in society is distributed and as Guimarães Pereira and Funtowicz point out, participation of citizens is seen as "quality assurance mechanism of governance processes".

- Foresight has always been understood as a means to support the "innovation system", mainly the *national* innovation system. Today we can observe that Technology Assessment is also shifting towards "innovation". This is paramount in the shift from "Technology Assessment" to "Innovation and Technology Analysis" (Innovations- und Technikanalyse) within the BMBF (see the contribution of Malanowski et al. in the Discussion forum). This shift was already apparent at a conference celebrating 25 years of TA in Germany (and the 65th birthday of Herbert Paschen; see Petermann and Coenen 1999). There Ruud Smits already stated that TA had been transformed from "watchdog" to "sleuth dog", and Thomas Petermann, deputy director of the German Office of Technology Assessment, made clear that Technology Assessment is in fact dealing with complex technological innovation processes beyond the control of the state. Therefore new forms of cooperation make sense: cooperation between the state and societal actors, and new forms of cooperation between experts, decision makers, stakeholders, and others affected.

Despite the differences mentioned, the bottom line is that foresight and technology assessment respond to the same societal concerns and problems. There is no reason to artificially separate Foresight from Technology Assessment, and there is evidence that knowledge sharing and common actions are already taking place. Therefore no further explanation is required why TA-TuP should have organised a special on Foresight. By the way, futurists also "have entrée" to TA-TuP as the report on the conference "FutureScene 2003" (by Karlheinz Steinmüller, who is incidentally also an author of science fiction, p. 143 ff.) and a review of a recent study by Z-punkt (by Knud Böhle, p. 118 ff.) in this issue reveal.

In the remainder of this editorial we will provide an overview of the contributions and explain the structure of the thematic focus which consists of three parts. The first part is on national foresight experiences in Germany and the United Kingdom, the second on foresight at the European level with main contributions from the foresight unit of DG Research, the chairman of the High Level Expert Group on European Foresight, and from the Commission's Joint Research Centre (IPSC). The third part is specifically about foresight dealing with Information and Communication Technologies (ICT), which we have selected for an in-depth look due to our involvement in FISTERA. One contribution discusses the integration of technical and social dimensions in several ICT foresight studies; the other main contribution presents first findings of the European project FISTERA. Each of the parts is complemented by pertinent conference reports.

The scene for the three specific parts is set by a thorough policy science article which describes and analyses innovation policies in the context of European multilevel governance. We invited **Heiko Prange**, senior researcher at the **Chair for Political Science at Technical University of Munich**, which is renowned for its innovation policy research, to write this article. Prange claims that the role of European level innovation policy has increased steadily, despite the relatively strong autonomy of national and regional innovation policies. He underlines that the importance of the European policy can not be judged in terms of budget alone, but has to take into account the European Commission's "soft governance" concept, in particular the co-ordination of regional, national and European policies and the enabling of "transnational learning". The article is written in German but will be made available in English in the Online-Version. As in this article where the national and the European level are shown as belonging together, the entire focus theme aims at integrating national and European perspectives.

On the subject of national foresight, **Kerstin Cuhls of the Fraunhofer-Institute for Systems and Innovation Research**, an organisation which has been closely linked with German foresight efforts from the start, presents an overview and outlook of Foresight in Germany. The sketch of foresight history starts in 1991 with a study on "Technology at the Beginning of the 21st Century", passes through various Delphi studies and leads to "Futur", which started in 2001. In her outlook, Cuhls reflects on issues of demand-orientation, implementation, the question of "neutrality" and independence of the process, the question of broad participation, and the role of regional and European foresight. She holds that, to date, there has been no comprehensive European foresight activity and that such an endeavour would be difficult to organise (different innovation systems, languages, cultures, comparability). Perhaps the strongest message in the article is not to overload foresight in terms of expectations or in terms of functions that are to be fulfilled simultaneously.

The next contribution by **Volkmar Dietz of the German Ministry of Education and Research** (BMBF) is devoted to the future of FUTUR, the most recent German foresight exercise and its follow up. It contains a short reminder of the project, the results of the evaluation and lessons learnt. Futur will be continued at least till 2006. The production of "lead visions" will remain the principal aim of the project. The design of the project to achieve this goal will however slightly change with, for instance, a new element called "future dialogue" which emphasises involving the public.

A third contribution dealing with Foresight in Germany is a report by **Knud Böhle, ITAS**, about an international "Futur-Workshop" in Berlin (December 13 - 14, 2002). In particular the nexus of participation in foresight and legitimacy of political decision making seems still to be a controversial and unresolved matter. In other words the role of foresight in new governance still requires further policy analysis. In addition to the methodological reflections of the workshop, the report gives indications of foresight activities in countries like Japan, UK, Denmark, Ireland, Finland, France, The Netherlands or Sweden. The Swedish experience is especially interesting because it also took a look back ("Technology Hindsight") to identify the typical pitfalls of foresight studies.

The next article in the focus theme by **Ulrich Riehm, ITAS**, also takes a look back, going back to the year 1970 when Helmut Krauch, one of the founding fathers of systems analysis and technology assessment in Germany, published "Prioritäten für die For

schungspolitik" (Priorities for Research Policy). It is amazing to see how many ideas of demand driven, societal foresight were already on the agenda more than 30 years ago.

Ian Miles and Michael Keenan of PREST provide an intriguing overview of and outlook for Foresight in the United Kingdom under the title "Two and A Half Cycles of Foresight in the UK". The article retraces the events leading up to the first cycle of UK foresight, tells the story of the evolution from technology foresight to plain foresight and the ensuing changes in the second cycle. From the viewpoint of this article, the second cycle of UK foresight was cut short before it could fulfil its true promise – hence the half cycle. The third cycle has narrowed the scope of foresight to very specific themes, and on a positive note for its supporters, foresight has been successfully institutionalised within the Department of Trade Industry's Office for Science and Technology, and the first and second cycle seem to have had considerable impact.

It might be tempting to compare the course of Foresight in the UK and Germany. The change of approach after general elections and change of government, the abandoning of Delphi and currently a focus on specific themes like "cognitive systems" or its equivalent in Futur, the "lead vision" "Understanding Thought Processes" provide food for thought.

The European part is opened by **Werner Wobbe** of the **Science and Technology Foresight unit of the European Commission's Directorate-General for Research**, who provides an introduction to the foresight concepts of the European Commission. Like Kerstin Cuhls and the researchers from PREST before, he combines a brief foresight history with pointers to recent activities and reflection. The short history reveals interesting details like the role of Ralf Dahrendorf or the early French and British influences on the Commission's orientation. The current effort to establish a "European Foresight Knowledge-Sharing Platform" confirms the function of European policy to co-ordinate activities as Prange has argued before. The context of new governance and the "open method of coordination" is exactly where foresight comes in. Foresight is expected to contribute to the new methods of governance. It "touches the dimen-

sion of soft power embodied in the governance concept" as Wobbe says.

The next article is written by **Luk Van Langenhove of the United Nations University**. He was the chairman of the STRATA High Level Expert Group (HLEG) of the European Commission, which published the report "Thinking, debating and shaping the future. Foresight for Europe". The present article goes further, discussing the deficits marking the current situation of European Foresight and proposing measures beyond what has been launched by the Commission so far. He strongly advocates complementing the national and regional foresights with foresight exercises at a European level. There is need, he argues, for a global Science and Technology Foresight where Europe is considered as one macro-region amongst others. In addition he argues for strengthening the participative element in science and technology policy to overcome the democratic deficit, and he insists on closer links from Science and Technology policy to the *societal* objectives for Europe. Last not least, he recommends exporting the expertise of the TA community to the field of Science and Technology Foresight.

The authors of the next article on European Foresight would obviously agree with Van Langenhove on the importance of participation. **Ângela Guimarães Pereira and Silvio Funtowicz of the European Commission's Joint Research Centre** (IPSC) start from the assumption that there has been an evolution of governance encouraging more active involvement of citizens. New governance requires the creation of new interfaces between science, society and policy, and it requires appropriate methods. The participation of citizens; and in particular ways of enabling them to develop visions of future technologies and applications of technology, are among the great challenges to foresight and the work of the IPSC group is specifically addressing this challenge. Scenarios are regarded as a useful tool to provide input for debates and dialogues, as well as for informing policy making. The general assumptions are discussed and underpinned by experiences from three European projects on sustainable planning with different scopes and scales, namely VISIONS, ULYSSES and GOUVERNe.

The part on European foresight is brought to an end with a report by **Carsten Orwat, ITAS**, on the Ioannina conference (Epirus, Greece, May 15 - 16, 2003), the latest of the regular EU events on foresight to which we have referred earlier. Foresight in enlargement countries was on the agenda of this conference, and thus the report nicely broadens the European view. Worth highlighting is the recurring issue whether the method of open co-ordination is sufficient to strengthen the European position in global competition (cf. especially the references made to the contributions of L. Van Langenhove, A. Mitsos, and H. Diehl in the report).

The third part starts with **Barend van der Meulen, University of Twente**, reporting how the social dimensions of technology have been integrated in past foresight studies on ICT. In his view the integration of social and technological dimensions is not a fundamental problem of foresight methodologies: integration is feasible. In particular, scenario studies can be used successfully to integrate social aspects of ICT into foresight. Van der Meulen in this respect singles out the ICM panel of the second UK foresight, the micro-optics scenario study carried out as a Dutch university project, and the ISTAG Scenario Study on Ambient Intelligence.

Next are some results from the first report of FISTERA, a thematic network on Foresight on Information Society Technologies (IST) in the European Research Area. In common with the experience from FUTUR reported by Dietz in his article, the comparative study carried out by ITAS revealed that findings on IST contain few surprises and tend to be very much in line with European mainstream thinking; the major application areas for IST were at the same time usually those high on the political agenda for other reasons, e.g. health care and applications for the elderly. Findings on IST tend to be scattered across the reports on each foresight study rather than concentrated in one place. The final (!) reports often contain little on the visions of the emerging information society, and little about the analysis of strengths, weaknesses, opportunities and threats (SWOT) carried out. Despite the fact that all studies came from countries which are either current or future members of the European Union, the European dimension played a minor explicit role in most foresight exercises.

Again this section closes with a conference report. This one by **Bálint Dömölki and Ferenc Kovats** from Hungary is about the UNIDO Technology Foresight Summit 2003 in Budapest in March this year. The scope of the summit was very wide although it focussed on problems of Central and Eastern European countries and the Newly Independent States. In response to our request, the authors focused their report on sessions treating information and communication technologies. The last section of their report contains the conclusions of the ICT oriented panels agreed on in Budapest. It reads almost like a manifesto on the directions foresight should take. Most of the concerns raised are of course of a general nature and not only desiderata for particular countries.

In conclusion, we can see that foresight is operating in much of the same problem area as technology assessment. TA-TuP will run other stories on developments, so watch this space!

(Knud Böhle and Michael Rader, ITAS)

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