FORESIGHT on
INFORMATION SOCIETY TECHNOLOGIES
FISTERA
in the EUROPEAN RESEARCH AREA

Findings of Selected National-level Foresight Studies on ICTs
Michael Rader
Institute for Technology Assessment and Systems Analysis
Karlsruhe Research Centre
Karlsruhe, Germany

Sources for Errors in Predictions

According to a comparison of Delphi studies to prepare Delphi Austria, ICTs are not a priority field in Europe (none of top ten items in any study was on ICT).

The Swedish Foresight Programme included a feature known as "technology hindsight", which looked back at predictions made about technology in the past to examine if and to what extent these predictions had been fulfilled. Among them is falling victim to "Zeitgeist", or believing that today's big issues will also be the big issues of tomorrow (examples man space travel, nuclear power).

The continued importance of ICTs is rarely doubted: In many contemporary foresight projects, a major role in the future is assigned to information and communications technologies (ICTs) and biotechnology to the extent that these are sometimes treated as a "cross-sectoral" or "underpinning" issue.

Doubts concern details. What can be learned from the examples of "failed" technology predictions is that it is not only important to concern oneself with the technology in the narrow sense, such as "gallium arsenide chips" but with their application in a socio-economic context. This is one of the strengths of socio-economically oriented foresights compared to those attempting to identify technologies that are promising from a scientific point of view.

An additional factor especially relevant for assessing ITs is the extremely dynamic nature of the technology. In some foresight exercises, the work on IT was deliberately focused on a shorter time horizon than work on other technology for this reason.

Comparing the results of Foresight Studies on ICTs

Foresight is frequently fuelled by the wish to achieve a better transition of the results of research into practical products which are marketable by industry, preferably by industry located in the country where the research took place. Even in a country like France, ostensibly attempting to define "key technologies", the items submitted for ranking had a distinct functional dimension: "By essence, technology foresight is bound to be a dual exercise, both technology and demand led: technology and functional need are two sides of the same coin" (Durand 2002, p.6).

How, then have ICTs been treated in the foresight studies examined for this paper? Table 1 provides an overview:

Country	Type of Study	ICT subject of separate panel/section	Treatment of ICT in other panels/sectors
Austria	Delphi	no	"casual", items on applications
Czech Republic	Panel	Yes "information society"	"casual", but panel on social transformation recognises emerging "knowledge-based and information society"
France	Delphi	Yes, "ITC"	"casual"
Germany	Panel/working groups		
Hungary	Panel using	Yes,	"casual"

	Delphi/scenario		
Spain	Delphi	Yes, with different focus in each of three years	
Sweden	Panel	Yes, information and communication systems	"casual"
United Kingdom	Decentralised panel	Yes, ICM	As "underpinning technology", panel members appointed to give special attention to IT

Delphi Austria was regarded as a "search tool" to identify Austrian strengths in R & D, in particular to identify potentials and niches within technology, where Austria might find opportunities to achieve leadership within the next 15 years. Due to the comparative analysis of foreign Delphi exercises, and presumably the minor importance of the ICT sector for Austrian industry, there was no separate sector on ICTs. All items including applications of ICTs were included under other sector headings. A general finding of the Technology Delphi Austria was that organisational innovations tended to be ranked as more important than technology innovations.

The primary objective of the **Czech** foresight project was to prepare a National R&D Policy. The organisational structure included a separate panel on the information society, but ICTs were also treated in other panels. There is recognition that the country is heading for a "knowledge-based and information society", but treatment in the other panels was largely casual. The outcome of the project is a Proposal for a National Research Programme, which includes five main thematic programmes, among them "information society".

The second "Technologies Clés" study in **France** focused mainly on identifying technologies important for the future of Europe, at the same time assessing the relative strengths of France and Europe in the global context. The study employed the Delphi method with most work done in thematic sub-groups. Among the 8 thematic groups was one devoted to ICT (ITC in French). Certain of the items proposed and identified by other sub-groups had an IT component.

The **German** "Futur" project, which is the most recent project under the "foresight banner" in the country, is described as the "German Research Dialogue". Its starting point was a series of 9 workshops, which produced a collection of about 10.000 topics, which were classified by a list of 21 subject bundles comprising a total of 63 topics. The outcome were a series of "guiding visions" designed to provide input for the design of R&D support programmes by the ministry. These all contain aspects related to IT, with two visions strongly IT-oriented.

The aims of the Hungarian Foresight programme (TEP) included enhancing competitiveness and improving the quality of life for **Hungary**'s citizens. Explicit mention was made in the goals of the project to the identification of needs for changes in regulation and government policiesThere was a separate panel devoted to information technologies, while others dealt with sectors or social functions. ICTs were also debated in some of the latter. The recommendations are grouped according to their addressees and again include many socio-economic issues, mainly intended to enable or facilitate the use and overall situation of ICT in Hungary, and to ensure their widespread use throughout Hungarian society.

Sweden is a rare case of a technology foresight not commissioned by the government. A major aim appears to have been encouraging the development of a "forward-thinking" culture in private companies, public agencies, organisations and even the public at large. The project also pursued the aim of identifying areas with the potential for growth and renewal. One of the eight panel was devoted to information and communication systems, albeit from the "user perspective" which was employed for

all panels in the Swedish Foresight project. Obviously most of the other panels also addressed IT related aspects of their subject area. An important factor to considered in all assessments of the outcomes of the Swedish Foresight Programme on IT is the existence of an IT Commission at Government level. The commission which changes regularly in its composition, has already addressed very similar questions to those guiding work on IT in the Foresight Programme.

Findings on Information and Communication Technology

The main conclusions from these findings are:
1. More recent foresight studies tend to focus, probably correctly, on the socio-economic context of ICT rather than on technology in the narrow sense.
2. Recommendations to support specific technologies are usually the result of an analysis of national strengths and weaknesses, opportunities and threats (SWOT).
3. Few foresight exercises attempt to identify specific areas of technology which should be backed. This could be due to strong socio-economic orientation, in particular due to the realisation that high-class research, which some countries identify as a strength for certain areas, is seldom translated into economically viable products by indigenous industry.
4. Many recommendations are concerned with creating a favourable framework for the oncoming information society.
5. Education and training for ICT use was an issue in some studies.
6. The technical areas seen as offering greatest were concentrated in relatively few clusters: displays and human-machine interfaces, software (in particular application software), games and multimedia, with more than one country seeing a potential in medical information systems.