WP 1 – REVIEW AND ANALYSIS OF NATIONAL FORESIGHT

D1.1UK – CASE STUDY

UNITED KINGDOM – 2ND UNITED KINGDOM FORESIGHT CYCLE 1999 - 2002

STATUS: PUBLIC

PARTNER RESPONSIBLE:
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The FISTERA network is supported by the European Community under the FP5 specific program for research, technological development and demonstration on a user-friendly information society (1998-2000).

WHAT IS FISTERA?

FISTERA is a Thematic Network on Foresight on Information Society Technologies in the European Research Area.

The **FISTERA** network is supported by the European Community under the FP5 specific program for research, technological development and demonstration on a user-friendly information society (1998-2002).

The aim of the FISTERA Thematic Network is bring together on a systematic and extended basis, actors and insights in national foresight exercises on IST in the Enlarged Europe.

Main objectives:

- Compare results of national foresight exercises and exchange visions on the future of IST
- Provide a new forum for interactive consensus building on future visions for IST
- Contribute to the European Research Area through benchmarking and community building, by providing a dynamic pan European platform on foresight on IST

In order to meet these three key objectives, FISTERA will:

- Review and analyse the national foresight exercise outcomes (a country synthesis report)
- Build aggregate pan European Technology trajectories (a roadmap of potential developments of key emerging technologies)
- Map the European IST actor space (an analysis of the EU IST actor space)
- Provide an IST Futures Forum (strategically selected scenario exercises that will look at wider aspects of applications of IST)
- Disseminate the results to a targeted audience by various means (a dynamic website at the address http://fistera.jrc.es, an e-mail alert service, publications, conference presentations, a "road-show" of workshops and a final conference)

Network Membership:
Core partners (coordinators, work package leaders):

- JRC-IPTS (Institute for Prospective Technological Studies), part of the European Commission's Joint Research Centre, Scientific Coordinator of the network.
- FZK - ITAS (Forschungszentrum Karlsruhe GmbH in der Helmholtz-Gemeinschaft, Institut für Technikfolgenabschätzung und Systemanalyse), Germany.
- TILAB (Telecom Italia Lab – Scenarios of the Future), Italy.
- ARC/sr (ARC Seibersdorf research GmbH, Division Systems Research Technology-Economy-Environment, Seibersdorf), Austria.
- PREST (Policy Research in Engineering, Science and Technology) of the University of Manchester, United Kingdom.
- GCI (GOPA - Cartermill International), Belgium, Administrative and Financial Co-ordinator.

The group of **Members**, which is expected to grow over the duration of the contract, currently includes the following organisations: TNO-STB (The Netherlands), Danish Teknologisk Institut (Denmark), TecnoCampusMataró (Spain), Observatório de Prospectiva da Engenharia e da Tecnologia-OPET (Portugal), ARC Fund (Bulgaria), IQSOFT (Hungary), Tubitak (Turkey), The Researchers' Association of Slovenia (Slovenia), NMRC, University College Cork (Ireland) and BRIE-Berkeley University (USA). In addition, McCaughan Associates (McCA) runs a group of High-level Experts to the Network Management Committee.

FISTERA Web site: http://fistera.jrc.es/

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Summary

The United Kingdom is currently involved in its third cycle of foresight. Each cycle has differed in its organisation from its predecessor, partly as the result of consultations with participants. The second cycle, which was brought to a premature end, ran from 1999-2002 and was organised in 8 sector panels and 3 thematic panels with another 30 so-called associate programmes managed by various organisations outside the Department of Trade and Industry, which was the main organiser of the programme. While a major aim was still to set priorities for science and technology policy, there has been a tendency to downplay this goal in favour of creating something like a “forward thinking culture” in the UK. Each panel was responsible for its own work and overseeing related task-groups or associate programmes. In contrast to the first UK cycle, this round did not include a Delphi survey, but there was a “knowledge pool”. Public participation via websites, workshops etc. was stressed strongly for this cycle. The time horizon was 15 to 20 years.

1 Background and Objectives

One of the main roots of UK foresight was a review in 1984 by Ben Martin and John Irvine of SPRU covering overseas foresight exercise. The client was the Government's main advisory body on S&T matters, the Advisory Council for Applied Research and Development (ACARD). In 1986, this council produced a blueprint for a national foresight exercise, which was never implemented following a recommendation that foresight was best left to industry. Although industry failed to follow through this recommendation, there were several Government departments or Research Councils which did foresight-like exercises designed to help identify priorities.

Following a general election, the incoming Government created a separate ministry for science and technology in the shape of the Office of Science and Technology (OST) in 1992. OST was situated in the Cabinet Office and thus close to the Prime Minister. The OST was given responsibility for the science councils, but responsibility for the bulk of public spending on science and technology remained with the ministries. OST was charged with the task of providing an overview of all public spending on S&T and with providing incentives for better coordination. The foresight programme was conceived in this context as a mechanism to improve the collection of information and for coordination.

The Office of Science and Technology became part of the Department of Trade and Industry in 1995. The Secretary of State (Minister) for Trade and Industry has overall responsibility for the UK Government's science policy and for support for science and technology in a cross-department role as Cabinet Minister for Science and Technology. There is also a Minister for Science (actually a Parliamentary Under-Secretary of State) within the Department of Trade and Industry, who is directly responsible for OST.

A technology foresight programme was among the recommendations included in a 1993 Government White Paper "Realising our Potential". Basis of this recommendation was a blueprint developed by PREST and PA in 1992. The primary aim of the foresight programme was to build and strengthen networks, more specifically to improve the connection between the science base and the goals of wealth creation and improved quality of life. Other aims included the setting of priorities and the promotion of a "foresight culture", i.e. future-oriented thinking among actors with vested interests in science and technology.

The first UK foresight cycle involved work in panels, Delphi studies and a long period of public consultation. It has been highly influential in the design of technology foresight studies in other countries (Hungary, South Africa and Austria). It was regarded as such a success by it clients that a second cycle was launched in 1998. It is the second cycle of UK foresight which will most concern us here, since this was completed in 2000. A subsequent, third, cycle has taken a slightly different approach and is focusing on selected topics for "in-depth" treatment on an annual basis.

The second round of UK foresight was an outcome of two rounds of consultation toward the end of the first cycle in 1997/98. Preliminary discussions were held with a wide variety of interested parties: panels, companies, industry associations, universities, government departments and agencies, Research Councils, learned societies, think tanks and regional bodies. The results of these discussions informed a formal consultative document published in March 1998 by the Office of Science and Technology which contained specific proposals for the structure and approach to the new round. This was followed in December 1998 by a "blueprint" retain

ing most features of the earlier proposals, but going into more detail (cf. Georghiou/Keenan op. cit., p, 10f).

The aim of this exercise was to re-orient UK foresight to the changed conditions prevailing in the late 1990s, and also to address any gaps not filled by its predecessor. Its aims were ostensibly broadly similar to those of its predecessor, namely to develop visions for the future and to discuss options for current actions to address the challenges these visions raise, to build bridges between the various stakeholders in business, science and government, and to increase national wealth and quality of life (cf. Georghiou/Keenan op. cit., p.11).

2 Organisation of the Foresight Exercise

The second foresight cycle began officially on 1 April 1999. It again employed panels as its means of division of labour. While the panels in the first UK foresight cycle had a focus on areas or sectors of technology, those in the second round have a more supply-chain-based approach oriented towards applications. In addition, the second cycle saw the introduction of three thematic panels as a new element. Georghiou/Keenan (op. cit. p. 12) regard the introduction of such thematic panels on the ageing population, crime prevention and manufacturing, as "symptomatic of a broader tendency to locate research in the context of socio-economic goals". The crime prevention panel was funded by the Home Office, which is responsible for policing, indicating closer ties between the panels and policy-making. Other Ministries, such as the Departments for Education and Employment and the Department of Health were involved in the second Foresight cycle from the outset, with others joining as the programme progressed.

The activities were supported and coordinated by the Office of Science and Technology, with a steering committee composed of representatives of government, industry, research and development and academia. The first cycle of the programme had been clearly under resourced (Wood 2001, p. 3). In the second cycle, panels tended to be rather smaller than in the first, and composed of individuals selected for their wide of view of the panel topic and their energy and drive to ensure that actions were implemented (ibid.) rather than on account of expertise. The panels had the mandate to set up task forces and associate programmes, which were run by organisations outside the OST on topics of particular interest to their membership, independently from the main governmental programme. At least the materials panel concentrated on topics which tended to cut across disciplines and which did not fall squarely into the interests of an easily identifiable group of actors (cf. Wood, op.cit.). This had been a major recommendation of a review of the first cycle by the Parliamentary Office of Science and Technology (POST 1997).

An important job of the panel members was to support the activities of task forces and associate programmes, which required considerable effort from each panel member, at least initially. Due to the distributed nature of activities, a system of "branding" or quality control was installed to ensure an adequate standard of output under the "foresight" label.

The interactive element was stressed possibly more for the second cycle than for the first: the reports were regarded primarily as a vehicle to start a dialogue involving as large a community as possible, and there was a requirement that the panel reports should relate to each other "so that coherent messages and actions are identified" (Wood op.cit, p. 10).

All panels were asked to give consideration to two cross-sectional aspects, namely education, skills and training, and sustainable development. In addition, each panel had members intended to give special attention to the so-called "underpinning" technologies, information technology

and biotechnology. Thus, the second cycle had more intentional links between the panels than the first.

While the chairpersons of the panels in the first UK foresight cycle had typically been the research directors of major companies, an attempt was made in the second cycle to involve company chairmen and chief executives. The panels were operated as strategic entities and formed task forces – over 50 in all – to address specific issues. Some of these task forces formed a link with the first foresight round by implementing the recommendations of the panels in the first cycle. Membership in the task groups was not restricted to panel members.

There was no Delphi survey in the second foresight cyclee, but there was a common resource, the "knowledge pool", a collection of data, information and complete documents designed to support and provide a common basis for work in the panels and their task groups. This pool initially contained results and other documents from past foresight activities in the UK and other countries, official reports relevant to science and technology policy from national, European and OECD sources. The pool was conceived as a professionally managed library available both on the internet and in hard copy. The existence and widespread availability of this pool was described as a major achievement of the second foresight cycle, both by participants (cf. Wood 2001) and the OST (2nd Whitehall Foresight Progress Report).

Some of the task forces were a direct result of the recommendations of the first cycle panels, in some cases even spanning the interests of more than one panel. The task forces were generally set up to explore specific issues identified as being of significance by the sectoral and thematic panels. Their major benefit was probably the involvement of an even greater constituency of stakeholders in the foresight programme.

3 Method and Procedure

The panels each were required to produce an action plan in summer 1999. These plans outlined the necessary steps leading to the production of final reports by November 2000. Most panels produced and circulated consultation documents, partly drawn from the knowledge pool. These documents reflected the panels' initial ideas and proposals and were intended to be sounded against the views of a broader constituency of stakeholders. Opportunities for this were provides through a variety of regional events, such as workshops and seminars. Drafts and other documents were posted on the programme's website for open consultation.

One of the shortcomings of the first UK foresight cycle was perceived to be its failure to substantially engage small and medium-sized enterprises (SMEs). This had been done during the closing stages by targeting intermediary organisations, such as trade associations. In the second cycle, support materials for such potential facilitators were made available early on in the process. The regional perspective was included by involving the Regional Development Agencies in the English Regions, Scotland, Northern Ireland and Wales. This was also seen as an important factor in reaching the SMEs.

In all, there were 160 workshops and seminars in the second cycle, not including panel and task force meetings. Additionally, there were 52 regional seminars. There were on average 46 500 website visits per month. A total of 103 papers and reports were published, including the main panel reports in December 2000. Membership in panels and task forces amounted to a total of over five hundred.

The second round of UK foresight was terminated prematurely due to changes at the Office of Science and Technology, principally a change in the office of Chief Scientist.

4 IST in the United Kingdom Foresight Exercise

4.1 General findings on IST

In the second cycle of United Kingdom foresight, ISTs were treated as an underpinning technology by appointing two members to each thematic panel with special responsibilities for IT. The panel on Information Technology was officially titled “Information, Communications and Media” (ICM panel). This included a working group on “Information Technology, Electronics and Communications”. The final report by the ICM panel entitled “Let’s Get Digital” was published in December 2000. There was also a consultation document, “ITEC Technologies”, by the ITEC. This document was intended for broad discussion. The ICM panel published the following reports:

- Information Relationships Report - The Importance of information relationships as the online economy develops
- ITEC Report - Technology issues in the ITEC sector and what business, government and academia can do to support and enhance the UK's competitiveness
- Let's Get Digital - ICM Panel Final Report - Final report and recommendations for maximising the economic and social opportunities from new digital technologies
- ITEC Vision - The effects of technology in everyday life
- Smoke on the Water - A Fire in the Sky - E-commerce Task Force Consultation Report - How Britain should prepare for the coming world of electronic commerce, communications & connections
- ITEC Technologies - How life and work may change through developments in ITEC
- Universities in the Future - University education of the future - paying particular attention to the needs of socio-economic groups

The report by the ICM panel identifies four pre-conditions for the maximisation of the social and economic benefits of new digital technologies:

1. **Critical mass**: the UK is seen as too small a digital economy to make the country a global leader in the field, thus it is important to ensure the interoperability of systems and devices to avoid fragmentation.
2. The Internet is leading to the emergence of **new business models and practices**, so it is vital for UK businesses and the Government to understand the economic dynamics of the networked society to take advantage of change and to create new markets.
3. **Citizen empowerment**: Access to the Internet and broadband communications are regarded as vital for citizens to gain experience and confidence with digital technologies.
4. **Highly skilled workforce**: This is required to develop and service the new economy and is a matter of education and training taking full advantage of the opportunities of the new technology to provide personalised education and training. This has both a technological aspect and an aspect related to the flexibility and adaptability of the education and training systems.

Apart from the ICM panel, IST figured highly in the work of such task groups as integrated transport chain futures, chemicals in IT, infrastructure for financial services, technology and communication in the food chain, biotechnology and medical devices, the learning process, retail e-commerce, and the task forces on ageing and crime prevention.

There were eleven main areas addressed in the recommendations of the ICM panel:

1. The development of universal broadband access is regarded as too slow if left to market development based on private initiatives. The panel recommends a Government analysis of the impacts of creating universal broadband access itself.
2. "Attention" and data of individual users are seen by the panel as an emerging new "currency", which may be traded by consumers in return for goods and services in much the same way as cash. Current data protection regimes are seen as a barrier to this development, and the panel urges for an adaptation of existing laws to enable consumers to balance their right to privacy with the ability to control and trade their data more precisely.
3. Development of an understanding of newly emerging peer-to-peer economic and social activities.
4. Adaptation of competition policy in conformity with the needs of global markets.
5. Empowerment of consumers through digital and online applications in education, encouraging the growth of the "attention" economy, ease of use of services and applications, special assistance for the disadvantaged to participate in the network economy.
6. Fiscal policy for growth, in particular to encourage technology-led start-ups and to ensure the attractiveness of the UK as a location for technology-driven investment.
7. Regulation for growth and sustainability, more specifically urging for internationally agreed open standards in electronics, computing and telecommunications.
8. ITEC education, skills and training: A major problem apart from general IT literacy is seen in the shortage of skilled manpower for ITEC professions.
9. The creation of universal broadband networks for learning is regarded by the panel as a Government priority.
10. New roles for education and teaching professionals are needed, in particular involving the use of new technology.
11. The panel recommends the creation of a "Broad Church of Learning", involving both official institutions and citizens' homes. The panel recognises the opportunity for the UK to be a "centre of excellence" in developing learning materials. Private and state providers of qualifications should be accorded equal recognition.

A large part of these recommendations are obviously driven by concerns about e-commerce, which was at the forefront of attention from the stock exchange and the popular press at the time of the foresight cycle.

Although the points contained in these recommendations are still valid, most are probably not as urgent as suggested by their inclusion in a short list of 11 items. The other major concern indicated by the recommendations is education and training, at both the level of general IT literacy and the professional level. This illustrates not only the difficulty to escape from the traps of "Zeitgeist" but also that of focusing on a long time horizon.

4.2 Analysis of National Strengths and Weaknesses

The SWOT analysis contained in the consultation document of the ITEC sub-group of the ICM panel is obviously provisional since the working group particularly invited parties having further information to make it available for the Foresight activity. The main results of the SWOT analysis are contained in the following table (Table 11). This seems to be the only genuine SWOT analysis, since it contains not only strengths and weaknesses, but also opportunities and threats.

Strengths	Weaknesses	Opportunities	Threats
Excellence in maths and physics	Insufficient translation of research into actual products and systems	Mobile services	Skill shortages (in the ITEC sector, computer literacy of the population, academic IT professions)
Strength in computer theory and Software engineering	Inadequate "innovation culture"	Digital products	Need to import hardware
Strength in creative industries, such as content provision for information and entertainment, design skills, design of computer games		Non-volatile, low-power devices	Drainage of expertise
High quality research in photonics and opto-electronics		Graphic design in user interfaces	Lack of security and trust
Strong higher education sector		E-business, e-government	IT dependence (vulnerability)
		Providing digital content	Failure of sustainability
		Photonics and opto-electronics	
		Research support for grid computing and bio-informatics	

Table 11: Strengths and Weaknesses, Opportunities and Threats for the United Kingdom

Apart from attracting investment by the leading multi-nationals, the ITEC group sees opportunities mainly in niches, i.e. by choosing a few key long-term technologies "in which the UK could 'leap frog' volume producers of conventional products, and/or by "adopting and excelling in a particular role within global manufacturing where the UK can dominate a niche"(3.2.1).

On the subject of semi-conductors, the ITEC group report notes that multinationals have tended to draw more on the manufacturing-oriented skill base in parts of the UK rather than on "high-level R&D", although electronics multinationals were increasingly creating their own UK-based R&D facilities.

4.3 IST Visions

One of the sub-groups of the panel on Information, Communications and Media was on Information Technologies, Electronics and Communications (the ITEC Group). This produced a number of documents including one on IT visions. These are described as "fairly informal glimpses of the possible future" for seven broad, sometimes overlapping, themes: work, leisure, learning, health, transport, public administration and use of the Internet. Each vision is contained in one or more narrative, describing the way IT was likely to have impact in these areas. There are 15 of these narratives in all. The individual technologies, expected benefits and issues requiring resolution underpinning the narratives are shown in Table 13, subdivided by application area.

Area	Functions	Perceived Benefits	Issues
Work	Universal high bandwidth connectivity Powerful portable PCs Radio/mobile networking Reliable and flexible software components Cheap on-line computing services	"Remote" working for knowledge workers Reduction of commuter journeys Powerful, "pocket-size" databases less dependence on corporate IT Automatic data exchange improved suppler-customer relations Adaptability to new models and/or best practice Simplifies regulatory compliance/best practice easy	When to work at home/workplace/third-party sites Balance between work, leisure, training domestic life Maintenance of data integrity Maintaining privacy Handling large volumes of transaction data Monoculture: dependence and vulnerability Danger of over-regulation; validation of source mat.
Education and learning	Universal high bandwidth connectivity Access to worldwide resources Virtual training methods/processes Use of Internet for research and scholarship Changes in educational administration Growth of new cultures "on-line"	Remote multimedia learning; independence of time and space "Best" available to all Choice possible; development of individual learning profiles; variety of setting and methods possible International teams; access to mass data Point to point learning possible; educational establishments less important; world student market Emergence of new social structures/relationships	When to learn at home/work/institution Balance between learning, work and leisure Loss of diversity; Quality hallmarks needed. Individuals responsible for choice; social education must be included Changes in publishing; methods for evaluation Public/private distinction blurring; major players might dominate, physical institutions endangered Intangible benefits of education endangered
Leisure and entertainment	High-quality virtual reality at "domestic" prices Very high bandwidth universal network Advanced video games, graphics, 3-D displays Better consumer access to GPS, mobile computing, mobile data etc. Advanced domestic appliances Spread of interactive games and pastimes	Enabling remote versions of many experiences Access to multi-media material from anywhere Improved human-machine interfaces Leisure pursuits enhanced, increased safety of challenging sports "Smart homes" organised automatically More entertainment facilities for individuals	Addiction to VR; devaluation of "real thing" Digital rights management; filtering undesirable content Exploiting UK's excellence in graphic arts Use of IT in traditional pursuits; should extreme sports be encouraged by safety features? Time reduction for undesired domestic duties Threat to communal activities
Health Care	Remote diagnosis Human/non-human intervention or advice Body monitoring	Healthy, long life Speed of service Fewer lost working days	Confidentiality Cost, impact on taxes Hypochondria
Transport	Safety critical systems Unmanned vehicles Guidance systems and monitoring High speed networks in trains Intelligent systems for repair and reconfiguration	Fuel efficiency Enhanced connectivity to information Reduced congestion Enhanced safety and reliability	Connection of vehicle to external networks Impact of telepresence on need to travel Impact of home working
E-commerce	Home shopping Home banking and financial services Virtual experiences Portable access to information	Cashless society Choice Accessibility Personalisation of content through agents	Reduced need to travel Impact on high street shops Confidentiality and security Impact on social interaction
Government/public administration	Access to government processes and decisions Interactive debate Focus groups	Influence on decision making processes Freedom of information Increased breadth of democratic process	Is democracy enhanced? Confidentiality Spin doctoring and/or brain washing

Table 1: Visions in the UK ITEC Sub-Group (adapted from: *ICM Panel: ITEC Visions***,** London, DTI: June 2000)

5 Other Important Results of United Kingdom Foresight

As stated previously, the second foresight cycle was stopped short when a new Chief Scientist took office in 2002. Since then, the foresight programme has focused on currently two, but up to four, topics per year.

The steering group did not publish any recommendations of its own, but a 15-page brochure describing some of the main messages. Individual reports have been criticised in parliament by the ministers responsible for the area, despite a mechanism put in place to ensure that products bearing the "foresight" stamp met at least an agreed standard. Despite the praise initially heaped on the knowledge pool, apparently little use was made of this resource. Overall, the second cycle had far less impact than the first (Ian Miles, personal communication 2003). This could be due to the extremely broad range of activities initiated under the "foresight" banner, which must have taxed the coordination skills of panel members, who were responsible for liaison with the task groups and the associate programmes and were fewer in number than in the first cycle. Due to the premature end of the cycle, little has apparently been done to bring the results of the multifarious activities together in few, concise reports.

Since the second cycle was a continuation of the first, the achievements of UK foresight should also take into account the impact of the first round. The materials panel during the first cycle is said to have been a major driving force behind the acceptance in the UK of nanotechnology as one, if not the, key area of technology for the future. For example it has encouraged support for two Interdisciplinary Research Centres in nanotechnology. The creation of thirty-two Associate Programmes, undertaken by other organisations (mainly professional institutions and research and technology organisations) in support of the central programme may be interpreted as a measure of its widespread popularity and acceptance in the UK.

Inspired by the Foresight programme, the Department for Education and Science, Foresight has supported the Young Foresight initiative. This project is aimed at giving students direct experience in all the skills needed to create a successful product or service: from conceptualisation, to design, to adaptability in the market place.

The programme has had impact on governmental funding of projects run jointly by academia and industry through Foresight Challenge Awards, supporting twenty-four consortia and three rounds of Foresight LINK Awards (FLAs), involving funding of £29M to 39. Altogether, with industry support, these projects are worth a total of £152M.

Foresight activities have since been established at the level of the regions, so in total the UK Foresight programme would seem to have had very enduring effects.

6 Literature

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Annex 1: Tabular Overview

Foresight effort Second Foresight Cycle 1999-2002/ United Kingdom		
Categories, Criteria & Questions	**Answers**	**Comments**
Project promoter / initiator	– Department of Trade and Industry, Office of Science and Technology	– DTI is responsible for science in UK
Agency or organization responsible for the foresight activity	– Office of Science and Technology	
Scope / areas covered	– 10 sectoral panels – three thematic panels (ageing, crime prevention, manufacturing) – two underpinning themes(Sustainable development, education, skills, training) – over 30 “associate” programmes	– supply-chain based approach, oriented towards applications in contrast to first cycle, which was focused on areas of technology
Time horizon	– 15 to 20 years	
Societal dimension	– Supply-chain based approach	
European dimension	– pro-active involvement of UK in shaping EU policy and regulation – foresight results to inform UK participation in FPs – GRID computing as major area for European cooperation – UK seeks to influence EU through people in strategic positions – partnerships and alliances	
Major explicit objectives	– increase UK exploitation of science. Identify potential opportunities for the economy or society from new science and technologies, consider how future science and technologies could address key future challenges for society. – build and strengthen networks – wealth creation, improved quality of life	– goals as stated on website
Second order objectives and indirect effects	– creation of “foresight culture” – future oriented thinking among actors in S&T	– grew in importance as exercise progressed
Impact	– second cycle stopped in 2002 – “Link” project selection influenced heavily by foresight – Young Foresight programme – regional foresights	
Target groups	– Ministries – Research councils – industry – “intermediary” organisations (e.g. trade associations) – “society” as a whole	special efforts to target SMEs
Participation	– 160 workshops and seminars – website with reports, consultation documents (46,500 visitors monthly average) – over 500 participants in panels and task forces	
Major Characteristics	– successor to first cycle incorporating changes due to consultation – main work in panels and task forces	Delphi survey abandoned from first cycle to second

	– associate programmes run by associations etc. – "knowledge pool" as common support tool	
Methodology	– main work in panels/task forces with production of reports after one year. – 160 workshops and seminars – 52 regional seminars – consultation phase for comments/revisions to reports – active dissemination policy	
In which way have IST been included and treated in the FS exercise?	– "underpinning" technology with two members in each panel responsible for giving attention to IST – separate panel on Information, communications and the media – task groups on Information technology, electronics and communications, learning in 2020, information relationships in ICM panel – further task forces, e.g. On e-commerce, IT in crime prevention etc.	
Strengths/opportunities weaknesses/threats identified in IST	Strengths: – excellence in maths/physics – strength in computer theory/software engineering – creative industries (content provision, information, design skills – high quality research in photonics/optoelectronics – strong higher education sector Weaknesses: – insufficient translation of research into practice – inadequate "innovation culture" Opportunities: – mobile services – digital products – non-volatile, low-power devices – graphic design of user interfaces – e-business, e-government – digital content provision – photonics, opto-electronics – grid computing, bio-informatics Threats: – skill shortages – dependence on hardware imports – drainage of expertise – lack of security and trust – IT dependence – failure of sustainability	
Dissemination	– over 100 reports published – all reports available on web – seminars, workshops	