FORESIGHT on INFORMATION SOCIETY TECHNOLOGIES
FISTERA
in the EUROPEAN RESEARCH AREA

Forschungszentrum Karlsruhe
in der Helmholtz-Gemeinschaft
Institute for Technology Assessment and Systems Analysis (ITAS)

Fistera
Delphi Austria

Carsten Orwat
Forschungszentrum Karlsruhe
Institute for Technology Assessment and Systems Analysis

Outline

1. Overview
2. Objectives and Approach
3. Innovative Features
4. Elements
5. IST Coverage
6. Analysis:
   - Results and Policy Recommendations
   - Impact on R&D Policy and Business
   - Self-Assessment by Organizer
   - IST relevant Results
   - Benefits
7. Next Steps and Open Questions

1. Overview

- duration: from 1996 to 1998
- ordering body and main stakeholder: Ministry of Science and Transport
- budget: 700,000 US-Dollars
- major elements:
  - preparatory studies
  - Technology Delphi
  - Society and Culture Delphi
  - integrative analysis

2. Objectives and Approach (1)

- strictly tailored to Austria as a small country
- to identify innovation potentials and niches within technology trends
  - possibilities of Austrian leadership within next 15 years
  - to strengthen her long-term competitiveness
- further explicit objectives:
  - to improve anticipatory intelligence
  - to use results for determining priorities
  - to take into account the broader societal context of technological innovation

Source: Aichholzer (2001), p. 13, 15

2. Objectives and Approach (2)

- broad Delphi approach including technological and social aspects
  - but not a comprehensive Foresight study because Delphi Austria concentrates on a selection of priority fields
- concentrating on thematic fields rather than technology sectors
- problem- and demand-orientated
- implementation-orientated

Source: Aichholzer (2001)

3. Innovative Features

- combination of Technology Delphi and Society and Culture Delphi
  - evaluation of societal trends as an innovative element
- broad definition of experts
- primarily designed as a Decision Delphi:
  - to coordinate multiple decentralised decisions in the innovation area
  - to shape or at least to influence the future
  - expert panels elaborated and analysed the questionnaire
- „higher degree of finalisation“

Source: Aichholzer (2001)

4. Elements: Involved Institutions and Persons

	Coordination, Preparation, Execution, and Analysis	**Survey Participants**
Steering committee:	largely representatives of the Ministry of Science and Transport	
Preparatory Studies:	implementing agencies	experts survey (n = 350) consumer survey (n = 1,000)
Technology Delphi:	ITA and 7 expert panels with 128 experts in total	3,748 addressed experts 1,638 responses (1st round) 1,127 responses (2nd round)
Society and Culture Delphi:	ITK and 7 expert panels	4,102 addressed experts 1,764 responses (1st round) 1,040 responses (2nd round)
Integrative Analysis:	Holger Rust	

Source: ITA (1998), Aichholzer (2001)

4. Elements: Preparatory Studies

- to define thematic fields of Delphi surveys and to select panel members
- elements:
  - analysis of foreign Delphi studies
  - strength/weakness analysis of the Austrian competitive situation
    - secondary analysis of existing (economic) studies
    - survey among 370 experts
  - consumer survey (1,000 persons questioned).
  - media and trend analysis
  - co-nomination study
- as a result of the preparatory studies IST were not regarded as an important strength of Austria

4. Elements: Thematic Fields

Technology Delphi	Society and Culture Delphi
Lifelong Learning	Lifelong Learning
Environmentally Sound Construction and New Forms of Housing	Environmentally Sound Construction and New Forms of Housing
Medical Technologies and Supportive Technologies for Elderly	Medical Technologies and Supportive Technologies for Elderly
Cleaner Production and Sustainable Development	Cleaner Production and Sustainable Development
Organic Food	Ageing and Life Cycle
Mobility and Transport	Structural Change of Work
Tailor-Made New Materials	Social Segmentation

4. Elements: Technology Delphi

- questionnaire contained:
  - self-assessment of expertise for each statement
  - statements/hypotheses describing the state of innovations and questions to assess them (innovativeness, importance, chance of realisation within 15 years, desirability, chance of Austrian thematic leadership in R&D, economic exploitation, organisational and societal implementation)
  - lists of policy measures to be assessed
  - question for suggestions for other innovations
  - assessment of 17 so-called ‘megatrends’

4. Elements: Society and Culture Delphi

- questionnaire contained
  - self-assessment of expertise
  - statements of almost 400 social, cultural, economic and political trends
  - questions of relevance/importance for Austrian society, desirability of the trend, potential for realisation in 5, 15, 30 years, degree of priority for Austrian politics, degree of priority for Austrian research policy, degree of conflict potential for Austrian society.

5. Coverage of IST applications and services (1)

- no separate thematic field for IST applications and services, but as cross-cutting technologies in every thematic field
- Overview:
  - combinations of home control technologies and information technologies and care of the elderly, emergency services, surveillance technologies
  - concepts of ‘intelligent offices’, ‘smart homes’ and home control technologies, as well as ‘smart constructing’
  - combined concepts of tele-working and office work, decentralised office parts
  - rehabilitation technologies and eye-controlled and voice-controlled systems for handicapped and sick people

5. Coverage of IST applications and services (2)

- conjunction of neurophysiology and communication technology
- tele-learning (and educational reform)
- applications of virtual reality in building industry and architecture
- safeguarding techniques
- industrial information networks, data transfer, system providers (processing and intermediation of data)
- transport logistics

Source: Rust (1998), p. 88

6. Analysis: Results and Policy Recommendations (1)

Evaluation by respondents:

- most promising technologies:
  1. simulation models
  2. high-tech steels and light materials
  3. recycling of composite materials and material combination
  4. noise-reduced railways
  5. environmentally sound production procedures
- chances of Austrian leadership:
  - mostly in fields in which Austria already had a strong position
  - in fields with high (not highest) technology build in mid-tech products with highest quality

Source: ITA (1998)

6. Analysis: Results and Policy Recommendations (2)

- characterisation of required policy measures:
  - broad networking-orientated measures including organisational aspects rather than fewer individual promotion measures
- policy recommendations in detail:
  - promotion of cooperation
  - pilot projects and experiments
    - organisation-orientated
  - establishment of new institutions (i.e. competence centres)
  - promotion of cluster-building

6. Analysis: Impact on R&D Policy and Business

Self-Assessment:

- inspired ‚Target Impulse Programmes', including Competence Centres (also for IST applications)
- input to „Green Paper on Austrian Research Policy 1999"
- guiding document for Research Strategy 2000
- stimulation of cluster building
- triggered analyses partly with foresight character, including mobile communication and ‚new economy'
- involvement and networking of participants as positive impact in itself

Internal Assessment by Ministry of Science and Transport:

- 110 Million Euro invested in public R&D initiatives, which were recommended or confirmed by results of Delphi Austria

Source: Aichholzer (2001), p. 23-25

6. Analysis: Self-Criticism

- lessons learned from Delphi Austria
  - locate Foresight programmes as close as possible to most relevant actor in RTD policy
  - lean steering committee for fast and flexible decisions
  - problematic late integration of other ministries and major political actors
- attitudes towards foresight after Delphi Austria
  - decision-makers in technology policy: positive
  - business and research: mixed (criticism of IST neglect)
- follow-up activities (implementation) deemed to be suboptimal
  - insufficient planning of dissemination

Source: Aichholzer (2001)

6. Analysis: IST relevant Results

- IST were involved in nearly all promising innovations and developments,
  - but as independent technologies only in a few niches
- strongest impulses for IST innovations from the field „medicine“
- proposed policy measures were dominated by demand for a high-capacity and cost-efficient telecommunication infrastructure

6. Analysis: IST in „Lifelong Learning“

Examples of evaluations by respondents:

- high-capacity information infrastructure was regarded as generally available
- ‚intelligent‘ access and selection systems were regarded as innovative and promising for Austrian leadership
- new learning and teaching methods with the use of interactive, multimedia technologies as promising organisational innovation
- further relative high leadership chances for:
  - self-learning media
  - electronic networking between educational advice services

6. Analysis: IST Coverage

Our Hypotheses:

- the range of analysed IST applications depended on initial selection of thematic fields and selection of topics within the thematic fields
  - problem of neglected fields of IST and specific IST applications and services (e.g. entertainment industry)
  - problem of bias towards societal problems and relevant IST which were most prominent at time of selection
  - problem of leading questions
- criticism of a modest innovation level of the whole Delphi Austria is also the problem of considered IST applications:
  - due to lack of time for preparing the questions, lack of interaction (no „pre-Delphi“ seminars or workshops were done), and problem of closed groups

6. Analysis: Benefits of Delphi Austria

Our Hypotheses:

Delphi Austria was ...

- beneficial to assess „public“ opinions and evaluations of societal and technological trends and therefore the problem-solving roles of *selected* IST applications
- beneficial to assess the domestic R&D, economic and organisational capability to contribute IST and IST applications
- beneficial to assess the recommended policy measures
- less beneficial to discover new IST and new IST applications and services (was not the objective)

7. Next Steps and Next Questions

- to validate (or falsify) the hypotheses
- do the IST applications proposed by Delphi Austria contribute to the mitigations of the mentioned societal problems?
- qualifying impacts
  - „durability“ of Delphi results?
  - does the selected method reinforce existing technologies and views?
- qualifying the networking benefits
  - more cost-efficient alternatives to Delphi?
  - problem of exclusion of experts by the authority selection and co-nomination process (‚old boys networks‘ and neglected innovators)?

Thank you for your attention