FORSCHUNGSFORUM
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ENVIRONMENT

DELPHI REPORT AUSTRIA

FUTURE-ORIENTED APPROACHES TO THE LONG-TERM COMPETITIVENESS AND LOCATIONAL QUALITY OF AUSTRIA

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DELPHI REPORT

TECHNOLOGY-DELPHI AUSTRIA

Foresight studies as input for long-term technology policies and as incentive for future-oriented discussion and cooperation

The Delphi report Austria is the largest coherent research program commissioned by the Austrian Federal Ministry of Science and Transport aiming at the development of future-oriented approaches to the long-term competitiveness and locational quality of Austria. The Delphi experts opinion poll is an opinion-forming survey which is to systematically evaluate and analyze the insights and the prognoses of selected experts. The research program Delphi Austria follows the concept of ***„foresight exercises“***, similar studies have already been successfully carried out in some industrial nations in the past few years.

More than 2.500 experts in the fields of economy, research, interest groups, and administration contributed to this project, which was commissioned by the Austrian Federal Ministry of Science and Transport and coordinated by two research institutes. The Technology-Delphi project conducted by the Institute for Technology Assessment at the Austrian Academy of Science has now yielded first results. A second part, the concomitant “Society and Culture Delphi“ project carried out by the Institute for Trend Analyses and Crisis Research will follow in the near future. The cross-section analysis “Österreich 2013“ by Holger Rust will mark the conclusion of the Delphi research program.

Contrary to some other countries, Austria's Technology Delphi did not aim at developing new, future-oriented technologies but to identify already existing strong points and to highlight potentials for development.
The objective of the Austrian “foresight exercise“ is to pave the way for future-oriented decisions and for the adaptation of Austria's technology policy in a national and international context. Here, the relevant fields of action in which Austria could become a leader within the next fifteen years have been delineated and the necessary measures have been elaborated.

The Austrian approach follows a model that could be called “Decision Delphi“: In contradisdinction to other international Delphi studies the issue is not to reveal patterns in the development but rather to structure a development that is determined by numerous individual decisions and to make this development transparent for all those involved in the process. Thus, the technology Delphi project takes into account Austrian peculiarities and follows a selective, problem-, and implementation-oriented approach. There is a bottom-up approach: The relevant questions will be formulated by several groups of experts and after the process of evaluation analyzed by these experts. The quality of the Delphi study also manifests itself in the fact that the players acting in the fields of economy, science, and administration analyze different possible scenarios, which, in turn, will be influenced and determined by their own desisions. The experts identified seven different innovative fields of action in which Austria could assume a leading role on a long-term basis:

- Materials with special, defined characteristics
- Biological food and raw materials
- Medical technology and counseling for elderly persons
- Physical mobility
- New forms of housing and environmentally sound construction
- Environmentally sound production and sustainability
- Life-long learning

The technology Delphi program has shown that Austria already plays a decisive role in some fields and that there are good chances for Austria to reach a leading position in some other fields within the next fifteen years.
For small countries it is particularly important to invest in the development of their own innovative potential. Therefore, Austria ought to further develop already existing strong points but also to look for market niches that offer long-term perspectives for high-tech developments.

One important approach for Austria in this context will be to depart from its hitherto successful role of technology consumer to a strategy of technology development. Concerning this central challenge the Delphi report has shown that companies as well as implementation-oriented research institutions still lack a long-term perspective for planning and that the competitive situation and the requirements of the market as it will develop in the course of the next decade have not been sufficiently taken into consideration.
In this context, there is predominantly a need for technology policy to support networks and to promote cooperation to a greater extent.

„Foresight exercises“
differ from earlier forecasts in so far as they do not presume only one possible future but are rather based on a model including several possible futures with various degrees of probability. Which one of these possible futures will be realized depends not least on the decisions made today (including those made by the experts interviewed). Delphi studies have been first conducted in Japan and, in the 1990's, also in the U.S.A., Western Europe, Australia, Thailand, Korea, Indonesia, and Israel. Numerous other countries have prepared to implement similar studies.

RESULTS IN TWO INNOVATIVE FIELDS



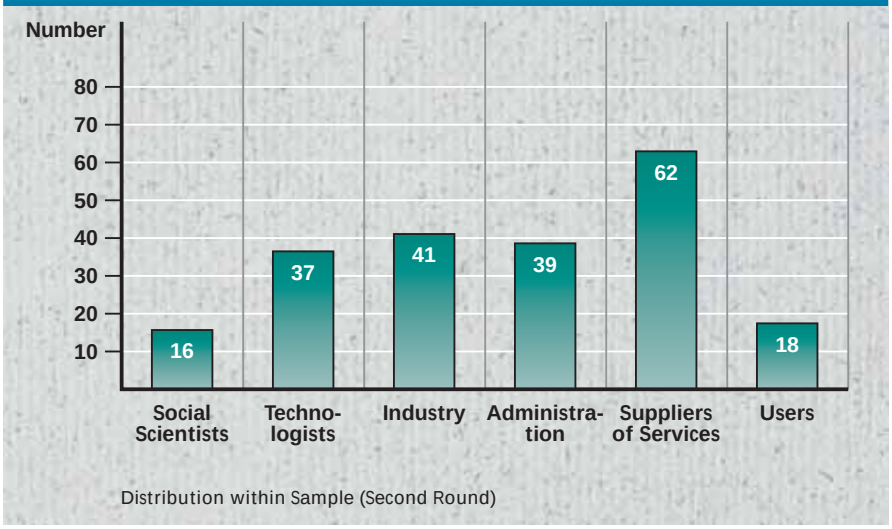
The "Technology Delphi" program is based on preliminary studies that identified seven different fields of action in which Austria stands a good chance of assuming a leading role. For each of these fields a group of experts has been commisssioned with the formulation of relevant theses. The number of theses had been limited to about 40 per field of action. For each of the theses a set of questions was formulated: Expertise of the respondent, innovative potential, priority, chances of realization, and desirability as well as Austria's chances concerning research and development, organizational and societal implementation, and economic usability within a period of fifteen years. Altogether, 3748 questionnaires have been sent out in a first round, 1597 in a second round; return rates were 46 and 71 per cent, respectively, thus, in the second round 1127 questionnaires have been evaluated.
For each topic, between 90 and 218 questionnaires have been worked on.

NEW FORMS OF HOUSING AND ENVIRONMENTALLY SOUND CONSTRUCTION

A group of experts defined this topic more precisely, identified seven subgroups and elaborated between five and ten theses for each of these subgroups. The experts analyzed the following areas: construction technology (not including wood), wood and other traditional building materials, integrated urban development, project development, redevelopment, technological aspects of housing construction, in particular energy, quality of housing, and cultural aspects of housing construction. For each of these categories between 16 and 23 measures have been identified.

In organizing the work group, the foremost goal was to include all relevant persons involved in the process. Three criteria were important in selecting the experts to be interviewed: Interest and renown in the fields of energy- and material- saving construction, renewable raw materials or new forms of housing; a broad-based, country-wide sample including representatives of architecture, building technology, and industry but also users, such as cooperatives, administration, and representatives of the social sciences.

Respondents in the Field of New Forms of Housing and Environmentally Sound Building Construction



Source: Technology-Delphi Report

As far as environment related megatrends are concerned, there were standardized questions for all different sections of the "Technology Delphi" program and the experts working in this particular field were especially optimistic. Compared to others, a higher percentage of this group agreed with the thesis that the principle of a sustainable economy will be of growing importance in Austria's societal and economic development.

In the field of building construction an emphasis on ecologial development in the building and construction industries and in planning has been evaluated as important, desirable, innovative, and capable of realization by the participants of the study.
A high degree of approval was noted concerning theses and proposals referring to ecologically acceptable measures, energy saving, longevity, sustainability, "solar building construction", recycling, and closed production cycles.
In this context, concrete insight has been gained in which one of the fields Austria could assume a leading role: solar building, wood technology, integrated building technology, and redevelopment.

Numerous political measures to promote future-oriented developments can be identified on account of the experts' evaluations. The main emphasis was on further education and training, legal measures, a specific promotion of certain R&D activities, as well as on regulating tax and financing models. According to the experts, public pilot projects with appropriate follow-up and feedback activities as well as their communication are of great importance.

ENVIRONMENTALLY SOUND PRODUCTION AND SUSTAINABILITY

In the field of "environmentally sound production and sustainability" four topics have been identified and 8 to 9 potentially successful developments have been formulated for each of these fields. Altogether, the field comprises 35 theses. The topics are:

- Environmentally more acceptable forms of production
- Products made from renewable raw materials
- Renewable sources of energy
- Dematerialization and decentralization of economy

The objective of this part of the Delphi study was to identifiy those developments in the field of environmentally sound production and sustainability in which Austria shows a high potential for a leading role. In line with with these prerequisites, a number of concrete future-oriented issues and measures have been highlighted in the study. It was not a task of the study to identify the developments that could best support Austria in the transition to a sustainable economy. For this purpose, other innovations and measures may be conducive, however, in this field, Austria needs not necessarily take a leading role in the development.

Austria's potentials have been assessed very differently by the experts, there was no single field that was identified as especially promising. The reason for this fact lies in the intentionally broad diversification of the topics in this field which is to present a cross-section of the issues in question. There are, on the other hand, certain focal points that become apparent. The following spheres show an especially high potential for development according to the experts' opinion:

Environmentally more acceptable forms of production

The further development of production processes that already constitute strong points in the areas R&D and economic implementation in order to create an ecologically still more acceptable economy constitutes one of the most promising sectors in Austria. Here, Austria's technological and ecological assets could be utilized to produce synergy effects in the future-oriented market of ecologically sound production processes. Processes in the fields of metal-working industry, paper production, and surface treatment technologies - some of the strong points in Austria's industrial sector - could be a starting point for new developments.

Materials made from renewable raw materials

The synergy of existing know-how in the development of new materials on the one hand and strong points in the field of renewable raw materials could form the basis for a focus, which also contains a high potential for research. Small R&D companies have been successful in this area; a growing interest in this new market on the part of traditional materials experts could reveal new perspectives for the future and bring a break-through for developments already initiated in Austria.

Centers for a sustainable economy

Austria's pioneering role in the field of environmental protection could receive an additional impetus by the establishment of centers for a sustainable economy. These could be centers for the promotion of sustainable product design, repair- and recycling-oriented products, or of the joint use of capital-intensive technologies; in all of these fields of action Austria shows a very high potential for organizational and societal implementation.

Appropriate measures aiming at a stimulation of the potential existing in the area of environmentally more acceptable forms of production refer above all to the cooperation between basic research, implementation-oriented research, and production, as well as between the different fields of processing technologies and the various materials. In the field of materials made from renewable raw materials, as well, the cooperation between research, production, and marketing has to be improved. As far as renewable sources of energy are concerned, the initiation and implementation of pilot projects and the improvement of the efficiency of technical processes are essential for the utilization of potentials existing in Austria.

In order to stimulate existing potentials in the fields of dematerialization and decentralization of the economy a broad-based set of measures involving economic, educational, social, but also technological aspects and cooperation has been proposed by the experts.

Average Potentials in Austria

Topic	Research & Development	Economic Implementation	Org.-Societal Implementation	Social/Ecol. Relevance
Environmentally more acceptable Production	■■■	■■■■■	■	■■■■■
Products from Renewable Raw Materials	■■■■	■■■	■	■■■■
Renewable Energy	■■■	■■■	■■	■■■■
Demater. and Decentralization of Economy	■	■■	■■■■■	■■■■

■■■■■ very high ■■■■ high ■■■ rather high ■■ medium ■ low

Source: Technology-Delphi Report

AUSTRIA 2013

■ The cross-section analysis "Österreich 2013" presented by the communication researcher Holger Rust marks the conclusion of the Delphi-Research program. The results of the two Delphi-studies have been analyzed in greater detail and consolidated in this study.

This final report contains the results of a secondary analysis of the findings of four topics of the Delphi-Austria research program. These topics were examined as to their technological aspects as well as to their societal and cultural implications.

- Lifelong learning
- New forms of housing and living/construction
- Medical Technology/Counseling
- Environmentally acceptable production and sustainability

Within the scope of this study, these individual topics have been re-examined from a higher viewpoint as to four cross-section issues. These issues are considered essential elements of change in the discussion of social, economic, and structural policies, today: the sectors of services, knowledge and education, communication technology, and marketing incentives. In this context, the analysis focuses exclusively on such theses that show technological impetus for the four cross-section issues. In addition, the analysis effects a further condensation in that it concentrates on three relevant key-criteria of the review:

- the importance of the thesis for Austria
- the realizability of the thesis within the next 15 years
- the political importance of the thesis with a view to the time horizon until 2013

Thus, each topic has been analyzed from four different perspectives and on the basis of three criteria. Finally, in a summarizing survey, the general priorities have been filtered out of the secondary analysis and, on the basis of the criteria "important", "realizable", and "politically relevant" a list of priorities has been established for the theses under study.

The five theses that the technology experts and the society and culture experts considered being of the highest political priority in the field of "Environmentally Sound Production and Sustainability" may serve as an example here. On account of a positive evaluation as to their future political importance, these theses might also be seen as recommendation of the Austrian experts to politics. On the whole, they show a trend towards ecological solutions and sustainable forms of production and economy.

The technology experts attributed the highest political priority to the following theses:

■ Regional centers for small- and medium-scale enterprises will be developed with the goal to develop products that better comply with the principles of a sustainable economy (in particular taking into account regional resources).

■ Counseling for consumers and entrepreneurs with a view to a creative, individual re-use of products at the end of their useful life will be widespread.

■ Networks for the repair and the re-use of products will reduce repair costs and will be commonly used by consumers (extension of the useful life of products).

■ Small-scale enterprises commonly use new methods of distribution (e.g. via the internet) in order to bring together offer and demand (local safeguarding of jobs, reduction of transport paths etc.).

■ Regional centers for the joint use of disassembly and recycling technologies as well as of remarketing knowhow will be commonly used by small- and medium-scale enterprises of the region (reduction of material input, waste avoidance).

In this context, the society and culture experts gave top priority to the following theses:

■ Regionalization and locally integrated production technologies will counteract the global division of labor and safeguard regional jobs.

■ The joint agricultural, structural, and regional policies of the EU will be based on the principle of sustainable development and promote environment-orientated innovation in Austria.

■ An effective eco-tax system based on the polluter-pays principle, that brings about truth in costing of external effects (environmental damage), prime costs for resources taking into account ecological effects, and that reduces the tax burden for the factor labor will be established in all states of the EU.

■ Ecological farming will constitute an essential pillar of Austria's agriculture.

■ The evaluation of the performance of national economies will take into account ecological criteria.

D E L P H I R E P O R T

SOCIETY AND CULTURE DELPHI AUSTRIA

The Delphi report documents the potential for development and the principles of the transformation process from a "modern industrial society" to a "post-modern information society".

Technological development can not be studied and evaluated without considering the societal and cultural context. Therefore, a "Society and Culture Delphi Austria" program accompanying the "Technology Delphi" has been elaborated to supplement the technology program. This report commissioned by the Federal Ministry of Science and Transport and presented by the Institute for Trend Analyses and Crisis Research examined future socio-cultural developments and a possible foreseeable potential for conflict.

The following seven problem-oriented topics, which will gain increasing importance in Austria, have been analyzed within the "Society and Culture Delphi" program:

- Health and illness in times of social change
- Old age and life cycles
- Life-long learning
- New forms of housing and living
- Structural revolution of the sphere of work (including new information and communication technologies)
- Societal differentiation
- Environmentally sound production and sustainability

The focal point of the analyses is the question of what are the expectations of the Austrian experts concerning the economic, societal , cultural, and political transformation processes that will affect Austria's society in the future. The goal of the study is to delineate the transformation into a "post-modern information society" with its potential for development in all its different aspects.

The time horizon consists of three phases: the short-term perspective extends to the year 2003, the medium-term perspective until 2014, and long-term prognoses extend until 2029.

PROJECT SPONSORS

The DELPHI-REPORT "Technolologie-Delphi Austria" was commissioned by the Austrian Federal Ministry of Science and Transport and elaborated by the Institute for Technology Assessment at the Austrian Academy of Sciences.

The DELPHI-REPORT "Gesellschafts-Kultur Delphi Austria" was also commissioned by the Austrian Federal Ministry of Science and Transport and elaborated by the Institute for Trend Analyses and Crisis Research. This report has not yet been published.

The final part of the DELPHI-REPORT, a study entitled "ÖSTERREICH 2013", presents a cross-section of the Delphi Austria progam was worked out by Holger Rust on commission of the Ministry of Science and Transport.

PUBLICATIONS

Series
DELPHI REPORT AUSTRIA

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