

STI OUTLOOK 2002 – COUNTRY RESPONSE TO POLICY QUESTIONNAIRE

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1. General framework and trends in science, technology, and industry policy**1.1. Overview and assessment of policies for science, technology, and industry***Background*

The Austrian National Innovation System is characterized by a relatively low level of R& D as percentage of GDP compared to other countries in OECD. The R& D structure shows a high percentage of public funding and the industrial structure is oriented towards more “traditional” branches with low and medium technological level which results in a trade structure revealing a technology gap compared to some other OECD countries.

Still, the macroeconomic performance is very positive. To preserve this economic performance it is necessary to keep up with an autonomous technology and knowledge production.

Against that background the Austrian Government Agreement (2000–2003) sets the objective of increasing the share of R&D expenditures in the GNP significantly, *i.e.* to 2.0% by 2002 and to 2.5% by 2005.

Austrian Council for Research and Technology Development

The amendments of the Forschungsorganisationsgesetz– FOG (Research Organisation Act) and the Forschungs- und Technologieförderungsgesetz - FTFG (Research Funding Act / Research and Technology Funding Act) to the plan of the Austrian Government for 2000–2003 have laid the legal foundations for establishing an 'Austrian Council for Research and Technology Development' at the Federal level, which is to replace all 'councils' established up to now. According to the Research Funding Act / Research and Technology Funding Act (FTFG, section IV §17), the council has the following mandate:

- To advise federal government and ministers on research and technology issues.
- To develop a long-term strategy for research and development and to monitor its implementation.
- To prepare guidelines for setting priorities and focused areas for national research and technology programmes.

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- To develop recommendations to improve Austria's position in international scientific collaborations.
- To autonomously recommend national research and technology programmes.
- To propose measures that lead to a better co-operation between science and industry.
- To monitor all research, innovation, and technology-oriented institutions on the federal level.

The Council was inaugurated in September 2000. According to the council's recommendations 508.7 million of extra-budgetary funds will be allocated over the years 2000-2002.

1.2 Changes in the nature and process of policy evaluation

Benchmarking

Benchmarking methods are increasingly used in the field of information technology or research-industry co-operation. Most of these studies are realised in the framework of European benchmarking projects.

Evaluation

Evaluation as a policy tool has increasingly been used in the course of the last five years. Evaluation exercises, however, are mainly carried out at the programme level.

In 2001 the platform on research and technology evaluation changed its organisational setting from a rather informal group of interested parties into an association of its own right. Its partners are three ministries, research promotion funds and research institutions. The platform aims at *i*) rising awareness on evaluation issues amongst science and technology policy institutions, *ii*) establishing standards, and *iii*) contributing to the diffusion of good practice principles.

Technology foresight

The Austrian Academy of Science hosts the well-established "Institute of Technology Assessment". In 1998, a big foresight study, based on Delphi methodology, has been undertaken (Delphi Austria 1998).

2. Public sector research and public research organisations¹

2.1. Policy changes related to public sector R&D

Shifts in changes in the priority and balance/weight of government support/funding

The Austrian Council for Research and Technology Development has recommended an overall strategy to increase both public and private RTD expenditures. These recommendations include all types of institutions including the private sector. As a general set of objectives for the next five years, the Council recommended:

- Zero real growth for general university funds (1 : 1).
- To increase private RTD spending by 100% (1 : 2).
- To increase RTD in public research institutions by 200% (1 : 3).

Creation / support of prioritised areas

1. Biotechnology

The Federal Ministry for Education, Science, and Culture is inviting tenders for the “Austrian Genome Research Programme GEN-AU” (GENome Research in AUstria). It will focus, strengthen, and integrate research capacities. The programme will cover research areas that will secure and expand Austria's competitiveness and ability to cooperate on an international level. Efficient and targeted technology transfer measures will guarantee the implementation of the research findings. Thus the programme will significantly improve the conditions for investment in genomics and biotechnology and support the creation of new jobs. The programme attaches particular importance to supporting young scientists and to strengthening university research. GEN-AU, the “programme of the future”, will cover a time span of nine years with 10.5 million investments each year.

2. Information and Communication Technology

The Federal Ministry of Education, Science, and Culture (BMBWK) has launched a comprehensive programme, eFIT, aiming at the implementation of electronic based teaching, training, and research: Education and new media, IT-training, e-content for education and training, research and development, e-culture, e-government in education, infrastructure.

The “FIT-IT programme” has been proposed by the BMVIT (Federal Ministry of Transport, Innovation, and Technology) and is supposed to promote prototype development in the IT sector. The programme will be launched by implementing a series of Call-for-Proposals within pre-selected fields. The first CfP will be focused at “embedded systems”.

The “e-Business Programme” is currently launched by the BMWA (Federal Ministry of Economics and Labour). It consists of six action lines: Information and Awareness, support of internet-based start-ups, research and development, e-Content, technology transfer, e-location (“Gateway to East”).

1. This section, especially sub-section 2.2 partly overlaps with a separate questionnaire circulated to members of the CSTP Ad hoc Working Group *on Steering and Funding of Research Institutions*. When appropriate, countries could make references to responses given to that questionnaire.

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4. Aeronautics & Space

The aeronautics programme 'take off' that has been launched by the BMVIT (Federal Ministry of Transport, Innovation, and Technology) aims at introducing Austrian companies as tier-1 suppliers to the large aircraft manufacturers. Among other things the programme subsidizes specific projects, and it improves training and further education. A specific action line is addressing the need for developing the capacity and capability of the national aeronautics certification authority.

Moreover, the Austrian Council for Research and Technology Development has recommended to allocate 7.27 million for the realisation of the "Austrian Space Plan". Future projects funded under this scheme will foster scientific excellence and market possibilities of the Austrian scientists, research organisations and industries involved.

2.2. *Reforming the organisation and governance of universities and other public research organisations*

Background

At the moment there are 12 main universities (including two technical and one mining university) and five universities of the Arts. These Austrian universities are state-owned. In the recent past five private universities have been approved and/or established. The establishment of non-state universities should be conceived as a major issue in the transformation of the higher education sector in Austria for the long-term future.

Universities as a whole are the main R&D performers in public research in Austria, accounting for roughly 75% of total R&D expenditure in publicly financed research. They receive the operational funding for teaching and research from the federal (GUF). The 12 main universities educate 93% of all students in Austria while universities of Arts and Humanities educate 3.5%.

Polytechnic colleges have gained much attention in the last five years. They were established as an alternative to classical university education. Education in polytechnics is characterised by practice orientation and shorter courses of studies (3 years plus practice). The pre-requisites for access to polytechnic colleges are the same as for students in the main universities but increasingly, students must undergo a selection process. The demand for polytechnic colleges has grown very quickly with an annual growth rate of students enrolled of over 30%. Currently, almost 100 study courses have been approved. In contrast to universities, polytechnic colleges are set-up and sustained not only by the federal government, but also by regional and local governments, membership organisations or legal persons of civil law. Although they are bound by law to fulfil research tasks, most Austrian polytechnics lack the financial resources for doing so.

Measures

In order to improve the efficiency of the public universities a new university organization act is under way that is envisaged to be enacted in October 2002. Its goal is the full legal capacity ("Vollrechtsfähigkeit") of the federal universities. This would lead to full financial and managerial autonomy. Financial relationships between the State and Universities would then be subject of individual contracts of each university, including deliverables and minimal service requirements. In the future the university would also be able to determine the requirement for permanent positions individually and create them by its own. Accompanying measures were the introduction of obligatory study fees for all students in 2001 and the reform of the laws concerning the status of university teachers. In October 2001, a new status for university

staff was introduced, ending civil servants status and opening up a three-tier career path on the basis of 4-6 years contracts and renewed application for posts before tenure. Formulation of university profiles and of disciplinary focal areas in teaching and research is obligatory to strengthen competition among universities for students and funds for research from industry and other sources.

In April 2001 the Austrian Council for Research and Technology Development released programmatic paper called “Vision 2005 – Through Innovation among the best” in which a new university structure is proposed. The Council suggested:

- Entrance examinations for universities.
- Introduction of a three year bachelor degree.
- Limitation of free research to one day a week for university assistants.

3. Government support for private-sector R&D and innovation

3.1. Enhancing the effectiveness of policy instruments used to provide public support for private sector R&D and innovation

Tax reforms

Due to the tax reform of 2000, companies can deduct 25% of their R&D investments from their profits. For R&D investments that lie above the average of the preceding three years, even 35% of those investments can be deducted from the tax base.

Public Private Partnership in R&D

Because of the dominance of the university sector in the Austrian research system, the links between academic and private sector R&D are weak. Consequently, research-industry co-operation has become an increasing concern of Austrian technology and R&D policy in recent years. Several schemes have been developed:

In 1997, the BMWV (now BMVIT, i.e. Federal Ministry of Transport, Innovation, and Technology) has developed a competence center programme (Kplus) aiming at the establishment of high level co-operative institutes for pre-competitive industrial research. The prerequisite are a minimum of five participating companies (including foreign firms) that bear at least 40 % of the expenses. The remaining share of 60% are granted by the BMVIT and the regions. The selection and evaluation process is managed by the BMVIT-owned Technologie Impulse Gesellschaft (TIG). By end of 2001, 12 competence centres have been established (the volumes refer to the total budget of the first four years).

- Advanced Computer Vision (ACV) – 11 million, 2000-2004.
- Bio-Molecular Therapeutics (BMT) – 12 million, 2000-2004.
- Carinthian Tech Research (CTR) – 10 million, 1998-2002.
- Applied Electrochemistry (ECHEM) – 14 million, 2000-2004.
- Research Centre for Telecommunications (FTW) – 16 million, 1998-2002.
- Knowledge Management Centre (KNOW) – 10 million, 2000-2004.

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- Linz Centre of Competence in Mechatronics (LCM) – 2000-2004
- Competence Centre for Light Metal Ranshofen (LKR) – 7 million, 1998-2002.
- Materials Centre Leoben (MCL) – 12 million, 1998-2002.
- Software Centre Hagenberg (SCCH) – 11 million, 1998-2002.
- Centre for Virtual Reality and Visualisation (VRVis) – 9 million, 2000-2004.
- Wood Composites & Chemistry Competence Centre (WOOD) 2000-2004

Moreover, in January 2002, BMVIT approved the establishment of six further Kplus centres:

- Applied Biocatalysis (AB), 2002-2006.
- Austrian Bioenergy Center (ABC), 2002-2006.
- Center of Natural Hazard Management (AlpS) – 9 million, 2002-2006.
- Polymer Competence Center (PCC), 2002-2006.
- The Virtual Vehicle (ViV) – 16 million, 2002-2006.
- Industrial Tribology (ACT) – 10 million, 2002-2006.

Kind, Knet are two programmes, launched by the BMWA (Ministry of Economics and Labour). They are aiming at collaboration in R&D with a stronger emphasis on firm-involvement. Whereas Kind subsidises co-operative research at a specific location, Knet allows for co-operation in dislocated networks. The budget of a Knet centre is typically much below that of a Kind centre. Since May 1999 the following projects have been launched:

- Vehicle acoustics (Graz) (Kind).
- Mechatronics (Linz) (Kind).
- Energy from Biomass (Güssing) (Knet).
- Interactive e-Business (Graz) (Kind).
- Electronic Commerce Centre (Vienna) (Kind).
- New Media Lab (pilot phase) (Salzburg) (Kind).
- Wood (Knet).

In addition to the programmes mentioned above, the Christian Doppler Society is the first bridging institution between long-term basic research and project-based development. CD laboratories receive a 50 % funding from the state; the remaining share has to be provided by other partners, in particular firms. Today, there exist 16 CD laboratories. They are located in various fields, with a specialisation in material science, measurement technologies, and thermodynamics. The Austrian Council for Research and Technology Development allocated 4 million for the Christian Doppler society.

3.2. *Changes in the balance and/or priority of public support of business R&D and innovation*

Start-ups

The Austrian Council for Research and Technology Development has suggested a strategy that should lead to a 100% increase of high tech start ups within the next five years. The measures include:

- Improving incentives for the establishment of new companies.
- Ease of administrative burdens.
- Reduction of tax burden including reduction of taxes on patents and licences.
- Support for seed financing and early stage investment.

Supporting SMEs in their ability to adopt new technologies

There are a number of programmes that try to strengthen the technological absorptive capacity of SMEs. MINT (Managing the Integration of New Technologies) and FINT (Promotion of Innovation and Use of New Technologies) promote the use of innovation management systems. Those programmes are conducted by the Economic Promotion Institute (WIFI) and offer mainly training courses on technology management.

4. **Technology transfer, diffusion, and commercialisation of new technologies**

4.1. *Promoting collaboration and networking among innovating organisations*

Networking

Austrian Cooperative Research (*Vereinigung der kooperativen Forschungsinstitute*, ACR) is the umbrella organisation of 20 private non-profit and 6 profit-oriented co-operative research institutions, financed by industrial members. ACR is a platform of technological development especially for SMEs. Since 1995, ACR receives support from the BMWA.

The “*Technologiekontakte*” (technology contacts) programmes is supported by the Federal Ministry of Economics and Labour. Its single service is to organise company visits, which are highly acclaimed by the industry.

Cluster initiatives

A series of cluster initiatives have been established in various provinces in Austria: for example in Styria and in Upper Austria in the area of automotive, plastics, wood, Diesel technology, environmental friendly energy and food. Other states and regions run an increasing number of cluster and network initiatives as well

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Regional development programmes

The RegPlus programme of the Federal Ministry of Transport, Innovation, and Technology, administered by Technologie Impulse Gesellschaft (TIG), aims at promoting innovative projects through technology centres, science parks and impulse centres, RegPlus projects have a focus on intangible investments and assistance such as management, business consultancies, coaching, networking, financing. As far as impulse centres, technology centres etc. are concerned, RegPlus projects are aiming at spill-overs from the centres to the larger region.

4.2. Strengthening industry-science relations

Commercialisation of technology developed in universities

The newly developed promotion programme A plus B (Academia plus Business) is an initiative of the Federal Ministry of Transport, Innovation and Technology (BMVIT). The Technologie Impulse Gesellschaft (TIG) has been commissioned with the management of the programme. AplusB supports the establishment and operation of business incubators within the university sector. By 1st of November 2001 TIG received six proposals from the provinces of Tyrol, Salzburg, Carinthia, Styria, Upper Austria and Vienna. Almost all Austrian universities are represented. Moreover, professional schools, research establishments, promotion agencies and private companies are part of the consortia. Altogether over 100 partners are involved. The projects intend to support 250 founders over the next five years. The entire proposed project volume amounts to approximately 35 million for five years, out of which 15 million are public subsidies. Up to now a budget of 8.3 million has been granted. Project selection will be early next year based on the recommendation of an international expert jury.

Technology licensing

The Austrian Innovation Agency (Innovationsagentur) is a private company with the BMWA (Ministry of Economics and Labour) and Austrian Chamber of Commerce as partners. It runs the TECNET programme that provides information, market analyses, and consulting to technological companies, lenders and investors (such as banks, investment companies and business angels). Specialised databases, experts, national and international organisations are utilized for that service. In its TECMA programme the Innovation Agency offers a virtual market place for high tech licenses and patents.

Financing high-tech firms and start-ups

The Innovation agency (Innovationsagentur) runs a seed financing programme that targets young high-tech businesses and start-ups. It provides capital and consultancy services during the establishment and expansion phases. The Innovation agency finances costs that occur in connection with market development and establishing the business. The agency does also assist the entrepreneurs with management issues.

5. S&T human resources

5.1 Addressing real or perceived shortages of scientists and engineers

The Austrian Council for Research and Technology Development strives for a 100% increase of graduates in technical and natural sciences. To reach that goal, the Council recommends that science education should be strengthened already at high school level.

5.3 *Policy responses to the international migration and mobility of S&T personnel*

The FWF (Austrian Science Fund) runs five programs for the promotion of young scientists.

- Erwin Schrödinger Fellowships, a programme financing access to new methods and scientific areas for excellent post-doctoral scientists in all scientific disciplines abroad.
- The Erwin Schrödinger Follow-up Programme was established to facilitate the reintegration of young post-doctoral researchers who have spent a continuous research period of at least two years at research institutions abroad.
- The Lise Meitner Programme should contribute to improve the quality and reputation of the Austrian scientific community through fostering international contacts by financing research stays at an Austrian institution of highly qualified foreign scientists from all scientific disciplines.
- The Charlotte Bühler Programme for Women, focuses on funding talented young women who hope to become university lecturers during their final phase of their “habilitation”.
- The Herta and Paul Amirani Programme for Women aims at providing optimal support for highly qualified female university graduates (post-PhD) and to promote their research early in their career or when they re-enter the job market after maternity leave.
- The “Post Docs for Industry” programme has been launched by the Austrian Science Fund. It subsidised the salary of Post Docs that work in small private enterprises.

The Austrian Council for Research and Technology Development has allocated 7 million for higher endowment of mobility grants for Austrian researchers. Moreover, starting in 2002, a new grant system to attract foreign researchers and scientists to Austria is being planned. The Council also recommends to finance scholarships for the PhD programme of the Vienna BioCenter that is affiliated to the University of Vienna. The proposed budget for that measure is 1.5 million for four years.

6. **International co-operation and globalisation**

6.1. *Promoting international co-operation in science, technology and innovation*

Bilateral Governmental Agreements on Scientific and Technological Co-operation which are in the responsibility of the Austrian Federal Ministry of Education, Science and Culture are important and cost effective instruments of the Austrian research policy. Austria has agreements with 11 countries and another 4 with EU candidate countries in Central and Eastern Europe as well as third countries like Croatia are currently being prepared. With a budget of about 516 000, 340 bilateral research co-operations were funded in 2001.

The main goal of the bilateral Agreements on Scientific and Technological Co-operation is the stimulation and support of bilateral research co-operations with the potential to become multilateral co-operations within the research programmes of the European Union in a second step. Therefore, calls for joint research proposals with a focus on mutually agreed areas and young, especially female, researchers are published every two years. Travel expenses are included within the agreement, thus fostering the mobility of researchers. This is important for researchers from non-EU member-states.

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Regional, bilateral co-operations are the basis for multinational project partnerships that are important especially for the integration of researchers from the EU-candidate countries. The co-operation with China and Russia is also developing successfully.

In close co-operation with the Austrian Bureau for International Research and Technology Co-operation accompanying bilateral activities like science days, workshops and events in the fields of science, research and technology are organised.

6.2 *Fostering international collaboration in research*

In its meeting of November 20th the Austrian Council for Research and Technology Development recommended to join the 'European Synchrotron Radiation Facility (ESRF)'. Initial investments would amount to 0.87 million. Please describe policy initiatives to attract foreign direct investment into local high-tech industries and R&D activities.

7. *Industry-related policies*

No changes during the period of observation.

See 3.1.