

STI OUTLOOK 2006 – POLICY QUESTIONNAIRE

Purpose

1. DSTI is preparing the 2006 edition of its biennial publication, *Science, Technology and Industry Outlook*, which will be issued in the Autumn of 2006. The document will contain a chapter reviewing national science, technology, and industry policies in OECD countries. The enclosed questionnaire is intended to compile information on science, technology and innovation policies that are being developed, were recently implemented, or were recently evaluated by Member countries. It also gathers information about anticipated trends and policy challenges. The topics addressed in the questionnaire relate to areas of ongoing or future interest to the CSTP and its working parties, including policy mixes, globalisation of innovation and human resources for S&T, and will contribute to monitoring the implementation of previous recommendations and development of further policy recommendations.

2. The OECD Secretariat intends to synthesise the information provided by Member countries in a summary document for comment and/or discussion by the Committee for Scientific and Technological Policy (CSTP) at its first regular session in 2006. The revised document will form the basis of a chapter of the 2006 *Outlook* that reviews main trends and expectations in science, technology and innovation policy. Some of the information gathered through the questionnaire will be incorporated into other chapters of the *Outlook* that focus on specific policy issues. The individual country responses will also be made available on the OECD's public Web site, www.oecd.org/sti/sti-outlook.

3. The success of this exercise is directly dependent on the quality of information provided by Member countries, and the Secretariat appreciates the comprehensive responses provided by many countries for previous *Outlooks*. In addition to providing information for the *Outlook*, this exercise provides Delegations with a framework to compare their experiences, exchange views on the effectiveness of different policies and discuss the international implications of recent trends in science, technology and industry policies. It also helps the CSTP identify future projects and issues for investigation.

Guidelines

4. In completing this questionnaire, countries are requested to provide a general overview of the science, technology, and innovation policies implemented in their countries and to provide information on major changes that took place in 2004 and 2005 or are anticipated in the future in specific policy areas listed below. Delegates will have an opportunity to update this information prior to publication in order to incorporate information on policies introduced in early 2006. Countries need not provide information on all the topics indicated below, but should concentrate on those areas in which the most significant policy developments have occurred. They may draw upon existing policy documents where possible and are encouraged to submit additional supporting materials and links to relevant Web sites along with their written responses.

5. The responses to this survey need not be excessively long, but because they will provide the primary material for the Secretariat's report, they should at minimum: *i*) highlight significant policy changes in the areas listed and outline the background and rationale of these policy changes (such as assessments of previous policy initiatives), *ii*) indicate and describe the new programmes and measures that

reflect these policy changes and how they differ from past policies, *iii*) briefly recall ongoing programmes or measures that remain in place (indicating changes in implementation conditions that may have occurred)¹, and *iv*) include supporting quantitative data where possible. For reference, the previous country responses for the 2004 edition of the Outlook may be consulted on the OECD Web site. (www.oecd.org/sti/sti-outlook)

6. In terms of its content, this questionnaire differs from previous Outlook questionnaires in two important ways:

- It includes more questions regarding perceived changes in policies and priorities and the balance among them, as well as expectations regarding future priorities. These are intended to help identify important trends in policy development and implementation.
- It also requests more quantitative information about programmes and policy instruments (such as levels of financing, numbers of participants) to enable more direct comparison among national policies.

7. In addition, Delegates will this year have two options for completing the questionnaire. As in the past, they may insert responses into the electronic version (MS Word version) of the questionnaire and send it to the Secretariat via email. In addition, the Secretariat is developing a dedicated Web site that will permit Delegates to insert responses directly into a Web-based form. Further information on the Web site will be made available in a separate Room Document and on the Outlook Web page [www.oecd.org/sti/sti-outlook]. Delegates wishing to use the Web-base system may also contact the Secretariat directly for information [Mr. Byung-Seon Jeong].

8. It is requested that countries' responses be submitted to the Secretariat **no later than 15 January 2006** to allow the Secretariat sufficient time to clarify information and draft a summary document for the CSTP meeting in March. Additional background material such as white papers (in English or French) may be sent by regular mail if they are not readily available in electronic format. Email responses should be sent to:

Mr. Byung-Seon Jeong
E-mail: byung-seon.jeong@oecd.org
Address: 2 rue André-Pascal 75775 Paris Cedex 16 FRANCE
Tel.: +33-1-45 24 96 24, Fax: +33-1-44 30 62 64

9. In completing the Questionnaire, CSTP delegates are encouraged to consult with delegates to CSTP working parties (TIP, WPB, NESTI) as appropriate. Nevertheless, country delegations are requested to designate a **primary contact person** with whom Secretariat staff can communicate regarding the survey responses.

¹. References could be made to country responses to the 2004 *STI Outlook* questionnaire.

REQUEST FOR INFORMATION

10. Please provide a written response for Section A below, which addresses general science, technology and innovation policies, and for those topics identified in Sections B through G in which significant shifts in policy have been made or new initiatives launched in 2004 or 2005. Information on anticipated changes in 2006 (or beyond) should also be included, where possible.

Section A: General framework and trends in science, technology, and innovation policy

1. Please provide a brief overview of the main directions, objectives and elements of national policies for science, technology, and innovation, highlighting the following topics:

- Main features of recent science, technology, and innovation policy developments (*e.g.*, including new innovation strategies) and the rationale behind them:

Response:

Financial resources devoted to R&D by the Italian government have slightly been increased, after some years of decreasing, by financial law 2004-2006, and changes have been introduced in their allocation: public research institutions received block grants to cover basically their current expenses (salaries, infrastructure, etc.) while additional funding was made available on a competitive basis through specific Funds.

The general strategy for science, technology and innovation adopted by the Italian Government since 2001 starts from the consideration of the unique characteristic of the Italian industrial sector, based on a large number of SMI (ca. 5 million), 25% of all European SMI, the most innovative of them grouped in more than 200 industrial districts accounting for a large part of the export capability of the country. The so called “made in Italy” range of products, concentrated in some traditional sectors (shoes, textiles, furniture, fashion products, tiles, jewels, agricultural products) has been threatened by the accelerated process of globalisation. The research private sector has supported in the past only 50% of expenses in research and innovation of the country and only a small group of high tech Italian industries can be accounted for in the area of telecommunications, robotics and automation, car manufacturing, aerospace, and pharmaceuticals. The public sector of science and technology, especially universities, on the other hand, has been for a long time concentrated on basic science, such as physics, astrophysics, molecular biology, neuroscience, with little interaction or push towards the new high tech sectors such as pharmaceuticals, ICT, nanotechnology. Filling the gap between public and private sectors has been the main object of the science and technology policy of the Government in the past years.

- Major changes in the legislative, administrative, organisational, institutional, or budgetary framework for the formulation and implementation of science, technology, and innovation policies (*e.g.*, new Ministerial structures, better inter-Ministerial coordination, increased involvement of non-governmental stakeholders):

Response:

Two main documents and two laws have been passed by the government in order to address such problems:

- Guidelines for Science and Technology Policy of Italian government, 2002;
- the National Programme for Science and Technology 2005-2007, 2005;
- the law to reform public research Institutions;
- the law to reform the status of University professors and researchers.

A general directorate was set up at MIUR for internationalisation of research.

ICT based methodologies were implemented for management of industrial research incentive schemes.

A new law on universities was passed (Act 270/2004) and an incentive for the creation of Industrial Liaison Offices were introduced.

- New policy measures to foster increased innovation and productivity growth in the service sector (both services in general and specific service-sector, finance, etc.).

Response:

The target for management of relationships between citizens and the Public Administration totally based upon ICT was introduced by Ministry for Technology Innovation.

2. Please describe major shifts or changes in the priority given to different areas of science, technology, and innovation policy listed below or the policy instruments used to achieve them: i) strengthening the science system; ii) supporting business innovation; iii) linking science to innovation; iv) developing human resources for S&T; and v) establishing framework conditions that are conducive to innovation (e.g., IPR regimes).

Response:

The PNR 2005-2007, adopted by the government in April 2005, identifies the following strategic targets:

- strengthening of the scientific base of the country by supporting basic and “mission oriented” research, and by promoting multidisciplinary and interdisciplinary research activities;
- increasing the technological level of the productive system by promoting, among the others, the creation of high-tech “spin-off” and “spin-out”.
- developing the human capital for science;
- intensify the collaboration among PROs, universities and enterprises.

3. Please describe the primary challenges that are expected to be addressed in future science technology and innovation policy initiatives and/or that have been identified in forward-looking exercises, such as foresight and technology road mapping (i.e., in the 2007-08 timeframe).

Response:

MIUR supported the preparation of the “2nd Report on National Priorities of Industrial Research, presented to the international press by 27 October 2005. Many experts coming from Universities, PROs and enterprises took part to the foresight exercise. The feasibility of homogeneous clusters of technologies particularly impacting national competitiveness was evaluated. Proposals for supporting industrial research in selected clusters were put forward. Schemes of actions were also presented, that take into consideration the systemic nature of innovation processes, including stable and continuous cooperation among different

agents concerned (PROs, universities, enterprises, VC, technology mediators, etc) together with tailoring to national needs specific efforts in large areas, such as ICT, advanced materials, nanotechnologies, biotechnologies, energy technologies, manufacturing, space technologies.

Section B: Public sector research and public research organisations

1. Please describe major policy changes related to the financing of public R&D, to include the following:

- Changes in overall levels of R&D funding for public research organisations during last few years.

Response:

Table 1 - R&D resources in Italy (million euro)

Year	R&D expenditure (million euro)					R&D/GDP (percentage)			
	Public sector	Private-non-profit	Business enterprises	Higher education	Total	Constat (2000) prices	Total	Public sector	Business enterprises
2000	2.365	-	6.239	3.865	12.469	12.469	1,07	0,53	0,53
2001	2.493	-	6.661	4.418	13.572	13.222	1,11	0,57	0,55
2002	2.565	186	7.057	4.792	14.600	13.802	1,16	0,58	0,56
2003	2.582	208	6.979	5.000	14.769	13.563	1,14	0,58	0,54
2004	2.337	214	7.501	5.245	15.297	13.690	1,13	0,56	0,56
2005	2.374	225	7.882	5.512	15.993	14.032	1,16	0,57	0,57

Source: Istat.

* Data for the Higher education sector in the years 2004 and 2005 are estimates.

If funding data is available, please provide it below:

Data from Table 1 show that: i) the ratio R&D/GDP remained stable over the last few years at around 1.1%; ii) in the most recent years the great majority of additional money from government to the public sector was allocated to universities, while public research agencies like CNR and ENEA have experienced a decrease both in current and in constant terms – this was also due to the fact that the government pushed PROs to find additional funding from competitive public grants and from private sources. In fact, the decrease in public funding has been partially offset by additional income from private, public and foreign organisations.

- Shifts in the allocation of funding across the following areas (please provide quantitative information if available):

1) different types of public research organisations (*e.g.* universities vs. government research institutions)

Response:

Within the public sector, universities received more resources than public research agencies.

2) different socio-economic objectives (*e.g.* general advancement of knowledge, health, national security, environment, energy)

Response:

The funding was granted according to the four major areas set out in the 2002-2006 government Guidelines for R&D:

- curiosity driven research;
- research with medium term impact;
- industrial R&D;
- local development (high-tech districts).

The most important socio-economic objectives are: health, industry, environment. Over the last few years there have not been any significant changes amongst socio-economic objectives.

3) different fields of science and technology (*e.g.* information and communications technology, biotechnology, and nanotechnology.)

Response:

Priority was attached to: nanoscience, bioscience, infoscience.

- Changes in the use of different types of funding instruments for financing R&D or the balance among them, *e.g.* institutional funding (block grants) and project funding (contracts and grants), or public funding vs. private funding. To what extent have funding mechanisms become more competitive?

Response:

There has been a shift from block grants to competitive project funding, while the balance between public and private has remained basically unchanged.

It should be added that there has been a substantial increase of the amount of money given to each recipient. Contracts allocated through the fund for basic research (FIRB) have ranged from 2 to 10 million euro. All contracts and grants have been allocated through a process of international peer review.

2. Please describe major initiatives to reform the organisation and governance of universities and other public research organisations to improve the quality of their R&D or their ability to contribute to economic growth and other social objectives. Please consider reforms such as:

- Initiatives to increase the flexibility and/or accountability of universities and other public research organisations (*e.g.* granting more autonomy, performance measurement systems or stronger evaluation, new funding structures).

Response:

In order to promote research and excellence in Universities, the government adopted (Acts 2003, 2004 and 2005) a new university reform. This reform introduced a new strategy pursuing the following objectives:

- i) increase of the “quality of universities standards, in particular the reduction of the drop-out rate;
- ii) increase of the competitiveness of Italian universities both in the national and international context, promoting cooperation with both private and public organizations;
- iii) support to the international competitiveness in relation to the Lisbon strategy.

The above objectives have been pursued over the last few years, introducing the necessary adjustments as required by emerging needs. Italy was one of the first countries to achieve the Bologna standards and to introduce the European credit system for university students.

Financial resources granted to universities through the yearly block grant (Fondo Finanziamento Ordinario) were increased from 6.163 million euro in 2001 to 6.933 million in 2005. Between 2001 and 2005 some additional 7.000 university teachers were hired. The funding of universities is based on the following criteria: number of enrolled students (30 per cent), number of credits (30 per cent), research results (30 per cent), specific incentives (10 per cent).

The government introduced a clearer definition of the role of Public Research Organizations (PROs) (CNR, ASI, INAF, ENEA) while assigning them greater autonomy than before. In particular, the new mission of PROs requires that they respond more closely to socio-economic needs emerging from citizens and firms. In order to achieve this goal, PROs receive a block grant intended to cover basic expenses, and are encouraged to compete for additional funding from government departments as well as private and public, national and international, sources.

- New organisational structures for performing R&D, such as larger-scale research teams, centres of excellence, multi-disciplinary research centres, research networks, etc.:

Response:

In 2005 the government financed 19 research projects to promote a multi-disciplinary and networking approach, involving public and private laboratories. These laboratories are spread over the whole national territory (Bari, Catanzaro, Chieti, Firenze, Genova (2), Lecce, Lodi, Milano (3), Perugia, Roma (3), Torino, Trieste, Venezia) and cover the following S&T areas: new materials, biotechnology, and other relevant areas to sustain new high-tech industries. The financing devoted to the projects was 85 million euro.

- Revised procedures for setting research priorities at the institutional level in universities and public research organisations (*e.g.* involvement of outside stakeholders):

Response:

The call for proposal launched in summer 2005 for “Project Ideas” in the mainframe of a strategic action for competitiveness support was based upon joint participation of enterprises, universities and PROs.

- Reformed rules governing ownership and licensing of publicly-funded research results, support for technology licensing, etc., whether or not these measures are focused on a specific type of IPR (patents, copyright, *etc.*) or certain technological fields:

Response:

New procedures were introduced whereby basic research projects (PRIN, FIRB) are evaluated by national and foreign referees.

Besides, according to the reform of PROs, stakeholders like representatives of industry and of central and local authorities sit in their governing boards.

- Other

Response:

- 3. Please identify major shifts or changes in priority among the approaches for strengthening public sector research, including efforts to: *i*) increase levels of funding; *ii*) alter the structure of funding (e.g., institutional vs. project-based funding; public vs. private-sector funding); *iii*) reform the governance of public research organisations; *iv*) implement new structures for performing research (e.g., centres of excellence, multi-disciplinary centres); *v*) changing guidelines for ownership and management of IPR; and *vi*) implementing new evaluation procedures).**

Response:

A new law was passed whereby researchers-inventors in public research agencies and universities are entitled to receive a reward from patented inventions and, if their employer does not exploit the invention within a prefixed period of time, they become the sole owners of the patent.

- 4. Please describe any new or recent changes in policies adopted by government, public research funding bodies or public research institutions to improve access to data resulting from publicly funded research.²**

Response:

A scheme for monitoring the follow-up of industrial research projects is under preparation. CNR set up a new internet portal for opening the access to all the information concerned with its activities (www.cnr.it).

- 5. Looking to the future, what are the main challenges that the science system is expected to face and the main issues that policy makers will need to address? What future actions are anticipated?**

Section C: Government support for private-sector R&D and innovation

- 1. Please describe major policy changes in the instruments used to support private sector R&D and innovation, including:**

- Tax treatment of business R&D (e.g. tax credits for R&D expenditure, changes in corporate tax regimes that could affect business R&D activities):

Response:

² Delegates may wish to consult with experts participating in the electronic discussion group to develop OECD guidelines for access to research data.

The “Tecno-Tremonti” decree (passed in 2003) introduces, for the 2004 fiscal period, a tax exception for firms’ income corresponding to 10% of research and development labour costs (applied research), recorded among immaterial immobilizations.

Furthermore, the decree grants fiscal benefits to Italian researchers resident in foreign Countries, aimed at facilitating their re-entry and beginning of research activities in the next five years. Earnings or payments to managers or researchers are taxable at a rate of 10% of the income, and totally exempted from IRAP (Regional Tax for Productive Activities). Such benefit is applicable in the tax period in which the researcher becomes resident, in fiscal terms, in Italy and in the two following periods.

Overall, this measure was basically satisfactory and the first experience showed that it could be more successful by widening the allowable actions and by re-focusing some specific tools. CREST recommendations presently in preparation to fully meet Lisbon and Barcelona agreements are expected to contribute to address re-design of this type of instruments.

- Direct public funding of business R&D and innovation (*e.g.* grants, contracts, loans, etc.):

Response:

The principle of competition is replacing schemes based upon “knocking door”.

- Public procurement policies, new contractual guidelines, more competitive selection processes, etc:

Response:

No major procurement policies have been introduced.

- Changes in IPR regimes to create additional incentives for business investments in innovation, such as via new or revised guidelines for specific types of inventions (*e.g.* genetic, software, business methods), or new or strengthened mechanisms for enforcement of IPR (*e.g.* specialised courts):

Response:

The homogenisation of internal legislation to European rules is expected to be completed by March 2006.

- Other forms of public support for innovation (*e.g.* consulting services and extension programmes):

Response:

At the end of 2004 the MIUR has allocated the following financial resources:

- (i) 1.5 Billion € for the year 2005
- (ii) 2.5 Billion € for the year 2006

to promote the University activities for the exploitation and the diffusion of the results of research and their use in production processes characterized from a high level of innovation.

2. Please describe policy changes in programmes to support R&D and innovation in SMEs and new technology-based firms, e.g., via efforts to:

All the items below are concerned with two main initiatives:

1. Technology Districts (TDs). TDs are territorial systems set up by the confluence of Universities, PROs and enterprises (both Large and SMEs) into an integrated organization. The target is to focus and to integrate the activities within specific research fields in order to develop new technologies to support enterprises' production.

TDs are characterized by:

- involvement of public Institutions
- participation of innovative companies
- participation of private investors

TDs are set up by political agreements between regional Governments and MIUR: therefore, they must be considered top-down political initiatives. The initial phase of the setting up and the first triennium activities are financed by MIUR by means of the FAR mechanisms.

2. Public-private research laboratories: defined as a localized concentration of scientific and technological competences, characterized by a strong collaboration between industrial enterprises and public research bodies, aiming at supporting the modernization processes of productive systems and increasing the number of high-tech enterprises.

3. Institute for the Industrial Promotion. The Institute for Industrial Promotion (from now on, IPI), is a company, owned by the Ministry for Production, entrusted to the promotion of innovation in Italian enterprises. Its main activities are:

a) Support to the definition of policy for innovation and technological transfer IPI develops technical assistance activities in:

- identification and monitoring of the competences and of the technologies offered from universities and PROs;
- specification of the needs of financial and technological services for the birth and the development of high-tech enterprises;
- identification of public and private financial tools for innovation;

b) RIDITT - Italian network for the diffusion of innovation and the technological transfer. RIDITT is an initiative geared at improving the competitiveness of the productive system by the exploitation and the integration of the offer of services for the industrial innovation. RIDITT represents an infrastructure across which the community - made up by the main public and private actors of the national innovative system - may interact to the end of:

- promoting the information exchange, methodology and good practices;
- improving the marketing diffusion, the services for innovation and the technological transfer;
- strengthening the existing networks for innovation and stimulating the birth of new networks on interregional base;
- facilitating the access to financial resources for the creation, the extension and the development of the networks for innovation and technological transfer;
- encouraging the internationalisation of the structures dealing with innovation by the connection with the international association INSME (International Network for SMEs).

- Establish and develop venture capital funds and/or second-stage financing for the support of new technology-based firms or spin-offs from public research organisations:

Response:

- Provide additional R&D funding targeted to SMEs and new technology-based firms

Response:

- Encourage entrepreneurship through training, information services, or other means:

Response:

3. Please identify major shifts or changes in the mix of instruments used to provide public support for private sector R&D and innovation, to include: *i*) direct financing of R&D, *ii*) R&D tax incentives, *iii*) support to entrepreneurship and SMEs and *iv*) IPR protection and other framework conditions. What shifts in the policy mix are anticipated in coming years?

Response:

Participation of enterprises in definition strategic industrial research initiatives (see the above mentioned call for proposal “Project Ideas”).
Increased support to PPP (Public Private Partnership) and to setting up a “knowledge transfer environment”, according to expected CREST recommendations.

4. Looking to the future, what are the main issues that policy makers will need to address regarding support to the business innovation system? Please describe any efforts that have been taken to identify or address them.

Section D: Enhancing collaboration and networking among innovating and research organisations

1. Please describe major initiatives to promote collaboration and networking among innovating firms, e.g. via joint R&D programmes, regional innovative clusters, international co-operation (attracting research labs of foreign firms or supporting access of domestic firms to foreign programmes).

Response:

The promotion of firms’ innovation capability through systemic aggregations at territorial level is one of the main objectives of the S&T Italian policy, as described in the Guidelines (2003-2006). The objective is to develop a stronger competitiveness of the existing productive capacity, highly export intensive, by revitalizing them through R&D activities on key technologies, enabling product and process innovations. In order to attain this goal, the government has recently adopted two initiatives: on the one hand, the creation of “joint labs” (see also section B, nr. 2) between university or public research agencies and industry, in some specific area (new materials, biotechnology, and other relevant areas to sustain new high-tech industries) and, on the other hand, the creation of technological districts (TDs) in designated geographic locations in Italy.

The table below shows the list of 12 already financed TDs.

12 already financed TDs	
District	Region
Wireless and wireline technologies	Piemonte
Advanced mechanics	Emilia Romagna
Nanotechnologies	Veneto
Polymeric and composite materials	Campania
Biotechnologies	Lombardia
ICT	Lombardia
New Materials	Lombardia
Micro- and Nano-Systems	Sicilia
Aerospace & Defence	Lazio
Integrated Intelligent Systems	Liguria
Molecular Biotechnology	Friuli Venezia Giulia
ICT and security	Toscana

Technological Districts (TDs) are territorial systems set up by the confluence of Universities, PROs and enterprises (both large and SMEs) into an integrated organization. The target is to focus and to integrate the activities within specific research fields in order to develop new technologies to the support of enterprises' production.

TDs are characterized by:

- involvement of public Institutions;
- participation of innovative companies;
- participation of private investors.

TDs are set up by agreements between regional Governments and Ministry of Research: therefore, they must be considered top-down political initiatives. The initial phase of the setting up and the first triennium activities are financed by MIUR by means of the FAR mechanisms.

The conditions for their creation are:

- presence of a plan - developed by scientific, technological and market analysis - identifying district's mission;
- coherence of the plan with the National Research Plan (PNR) and its strategic fields;
- identification of a specific productive sector in which the district has to operate;
- presence of public organisations with specific competences in the specific sector of activity;
- existence of a "governance" structure, with the participation of productive, scientific and technological organizations, to promote an efficient management of the district;
- involvement of both public and private funding, with particular emphasis to banking foundations, private foundations and venture capital funds, in order to supply "seed capitals" and early stage financing and to promote the development of spin-off and spin-out;
- medium to long term analysis of the district's self-supporting capacity.

In this way, TDs not only produce a strong coordination and re-orientation of already existing public and private activities, but also provide a powerful stimulus to the development of new and integrated actions.

2. Please describe major policy initiatives to promote stronger industry-science relationships, such as efforts to:

- Enhance collaborative research (*e.g.*, through changes in regulations governing the types of agreements negotiated between public research organisations and businesses and their implications for access to and exploitation of research results);

Response:

A recent Act (November, 2005), dealing with the “status” of university researchers and professors, grants both MIUR and each individual university - in its autonomous governance - the capability to enhance collaborative research tools.

This objective is embedded in the whole policy initiatives, including the 12 major projects.

- Increase the mobility of human resources between public and private sectors (*e.g.* by revising employment and financial rules governing public-sector researchers to allow them to more easily collaborate with industry, move between the public and private sectors, participate in the creation of spin-offs, take equity positions in technology-based firms emerging out of public research, *etc.*);

Response:

Law “Treu” introduced a mechanism for enhancing mobility from universities and public research agencies to firms. According to the law, researchers and technicians can spend a period of time working in private firms keeping their salary and career path, and receiving an additional salary from the company. This measure, for the first time introduced in Italy, allows public researchers to take advantage of this mobility opportunity – for the time being only few public researchers were involved in the scheme.

- Set up new modes of public/private partnerships for research and innovation:

Response:

- Others:

Response:

3. How has policy shifted in recent years in its support for different channels of industry-science linkages (*e.g.*, collaboration, licensing, spin-outs, public/private partnerships). Please describe any anticipated shifts or changes in policy for strengthening industry-science linkages.

Section E: Globalisation³

1. Please describe the most important policy issues and objectives with respect to the process of internationalisation of R&D:

Response:

³ Many of these questions on globalisation were asked in a questionnaire circulated in November 2004 in the context of the CSTP/TIP project on globalisation of R&D. 13 countries (Australia, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Netherlands, New Zealand, Norway, and Poland) replied. These countries are invited report only significant changes since November 2004.

Increased support and attention to participation in international networks (MIUR or Italian Institutes are partner in more than 60 ERA-NET).
Bilateral research agreements; already in operation Italy-USA, Italy-Russia, Italy-Israel, Italy-India, Italy Japan, Italy-UK; for other countries negotiation is on-going.

2. Please identify and describe changes in policies to attract R&D through foreign direct investment. This may concern:

- Direct financial support
- Fiscal incentives (tax breaks, R&D tax credits ...)
- Administrative support
- Provision of infrastructure
- Public procurement
- Active recruitment of foreign firms
- Advertising
- Other measures:

Please check the boxes above to indicate the types of policies used and provide more detail information here:

3. Please describe any changes in the principles concerning the treatment of foreign firms (both non-domiciled firms and foreign-owned subsidiaries) or foreign research institutions in national R&D programmes (e.g., access to national R&D funding programmes, rules for co-operation with domestic public research institutions, rules for co-operation in public private partnerships, public procurement, etc.)

Response:

Firms are entitled to receive public support in the country as long as they have a "stable organisation" in the national territory.

4. Please describe specific measures to support the internationalisation of domestic public research institutions (e.g., such as additional funding for projects with international partners, co-funding for project partners not located in-country, support for setting-up affiliates abroad).

Response:

More than 70 agreements have been signed with foreign research organisations.

5. Please describe measures to link domestic firms, in particular SMEs, to foreign sources of research and innovation, including international co-operation in R&D (e.g., additional/preferential funding for projects with international partners; co-funding for project partners not located in the country; and support to find international partners, etc.).

Response:

Section F: Human resources⁴

1. Please identify and describe recent efforts to improve supplies of university graduates with science and engineering degrees (both quantity and quality), in particular as relate to the following areas:

- Raising interest in and awareness of science among youth;
- Revising academic curricula to make science and technology more attractive to students, such as by expanding interdisciplinary training in S&E education;
- Improving teaching in mathematics and science, including through the use of ICT in teaching content and delivery;
- Reducing gender and ethnic minority gaps in science and technology education
- Enhancing financing opportunities for PhD study and post-doctorate training (such as through fellowships, funded research opportunities, *etc.*)
- Improving the quality of secondary university research laboratories/infrastructure
- Demand-side policies to increase the attractiveness of employment in public research organisations, make public sector employment more flexible, or improve provision of information to students regarding job opportunities in the public and private sectors.
- Others:

Please check the boxes above to indicate the types of policies used and provide more detail information here:

The National Conference of Deans of Science and Technology Faculties (Con-Scienze) in cooperation with the Association of Italian Industries (Confindustria) and MIUR set up the Progetto Lauree scientifiche (The Science Diploma Project) in order to provide a unified view of the path that brings young individuals from school to university and from university to the job market, and to guarantee a better diffusion of scientific knowledge. The short term goals of the Project are aimed at facing the crisis of enrolments in science courses and specifically to increase the number of (high-quality) students enrolling in hard-science university curricula, and increase the number of people with diploma in hard sciences to be placed in the job-market. A network of regional and local stakeholders are also involved, on the school, university and enterprises sides.

The SD project is implemented through different means:

Ad hoc pre-University orientation for high-school students through appropriate information on the job prospects in synergy between school, university and enterprises, including experimental activities for students. Pilot courses in Chemistry, Physics, Mathematics and Material Sciences through the active involvement of high-school teachers for the production of new material, design and realization of new experiments with their students in University labs and realization of those experiments back to their schools. A Fellowships program for high-school students has been provided.

The Project also includes the monitoring of the reform of the higher education system specifically in order

⁴ These questions are broader than those included in the OECD Questionnaire on the Working Conditions and Attractiveness of Research Careers in the Higher Education and Public Research Sectors (April 2005). Delegates may wish to consult their SFRI delegates in responding to these questions.

to prevent early withdrawal, and of assuring the completion of the three-year degree within the standard timeframe.

The project includes the evaluation of the training paths for Chemistry, Physics and Mathematics jointly with the business world and to compare the professional profiles with the needs of the business sector

The Project intends to enhance internships in companies for students in Chemistry, Physics, Mathematics and Material Sciences. It will be created a free-access, nation-wide database for demand (students) and offer (companies).

In order to create closer ties between universities and companies the Project designed a Master program involving university, research institutions and business sector to prepare inter-disciplinary professional profiles and career oriented courses also to update “old” graduates, enhancing all interdisciplinary aspects that characterize the new fields of application.

The Hard-Science Diploma Project has been financed for two financial years: 2005 and 2006 for a total amount of 8.5 million euro.

Science Week. Each year an entire week is devoted to the diffusion of scientific culture simultaneously by a great number of institutions. The Ministry of Education, Universities and Scientific and Technological Research co-ordinates all the activities widespread all over Italy, organized by the single participant. In 2004, during the 14th edition of the Science Week, more than 2000 institutions have been involved: universities, research centres, museum and schools, through initiatives like 'open doors', visits to the laboratories, conferences etc. The specific topics for the 2004 edition have been: Climate change, Energy and Society, Ageing: questions and problems of an ageing population.

2. Please describe recent policy changes to enhance the international mobility of scientific and high-skilled personnel, including programmes to attract foreign (and expatriate) talent and encourage students/workers to gain international experience. Consider such policies as:

- Changes in immigration legislation;
- Funding of scholarships, grants for international mobility of students/scholars;
- Creation of special positions at universities or public research centres;
- Fiscal incentives (*e.g.*, income tax breaks) for foreign workers
- Programmes to promote return migration of expatriate students, scientists and engineers
- Other measures:

Please check the boxes above to indicate the types of policies used and provide more detail information here:

Special fellowships for Indian researchers (2005). On the basis of an agreement with the Indian Minister for Science and Technology, the Italian Ministry provided, for the year 2005, 1.5 million euro to fund 100 fellowships reserved for young Indian researchers to be used in Italian universities for one year at 15.000 euro each.

The fellowships have been reserved for topics concerning Information technology, satellite systems, aerospace, electronics, GRID technology and infrastructures, bio and neuro informatics, automation, environment protection, nanosciences and nanotechnology.

The Marco Polo programme has been implemented in 2005 to strengthen the cultural, social and economic links between China and Italy. The programme was created in order to better facilitate academic cooperation between China and Italy, contributing to the consolidation of relations between the two countries. On a voluntary basis, Italian universities and Confindustria – the association of Italian Industry, together with various other interested parties, participate in the Marco Polo programme. Two offices, one in China and the other in Italy, undertake the coordination of undergraduate students, postgraduate

students, researchers and those seeking to develop their skills and experience through a work placement scheme. The Marco Polo programme is aimed at providing information and advice to Chinese students and PhDs wishing to study in Italy about courses and positions available in Italian universities, various forms of assistance in individual institutions, language and culture courses and practical advice on registering at Italian institutions.

As for Chinese researchers and graduates wishing to work in Italy additional possibilities are made available for scientific and technological research in private and public sectors, including the exchange of researchers between the two countries.

3. Please describe recent policy efforts to foster development of specific skills other than S&T skills needed to foster innovation in a knowledge-based economy (e.g., management, communication, legal), notably as relates to the service sector.

Response:

4. Please describe any major shifts or changes in the priorities and mix of instruments used for developing human resources for innovation, e.g., between development of domestic talent versus attraction of foreign talent; between development of S&T skills and non-S&T skills; between stimulation of demand and development of supplies; between support for teaching and support for research; etc.

Response:

5. Looking to the future, what are the main changes anticipated in the supply and demand for human resources, and what are the main policy challenges that policy makers will need to address? Please describe any efforts being made to identify future challenges or develop future policy directions.

Section G: Policy evaluation

1. Please describe recent changes in policies regarding ex-ante or ex-post evaluation of innovation policies and programmes, including new legislation or regulations, methodologies employed, criteria considered and the organisations/institutions that perform the evaluations.

Response:

A major effort has been made in Italy in the area of R&D evaluation by CIVR, the MIUR Committee for R&D Steering and Evaluation (CIVR). In 2005 CIVR evaluated 17.329 “research products” (books, and book chapters, articles in journals, patents and other implemented results, projects, designs, artefacts) produced in the period 2001-2003 by 64,000 researchers (in equivalent full time) working in 77 universities, 12 public research agencies, 13 private research organisations. The exercise, similar to the UK Research Assessment Exercise, was carried out by 20 expert panels composed of 151 panelists. In their turn, panelists identified 6.661 field experts (75% Italian and 25% foreign) who evaluated each “product”(from 2 to 5 referees per product) on the basis of the following parameters: quality, relevance, originality, internationalisation, competitive potential. The cost of the evaluation, which was carried out within one year, was 3.5 million euro.

The results of the evaluation of the products are the following: 30 per cent excellent, 46 per cent good, 19 per cent acceptable, 5 per cent below standard. Overall, the Italian research system looks pretty good in terms of its productivity.

Being the first exercise of this type, the decision was made to analyse only 50% of the total output of all Italian researchers (in equivalent full time). This raises the problem of not considering the

remaining 50%, and to know how the “products” have been sorted out by each individual research organisation (at the outset it was not clear which was the most appropriate mix of products to submit).

A development of this exercise will be an analysis of the scientific and technical results in the context of the resources spent by research organisations.

It is expected that the exercise will have an impact on the allocation of resources from MIUR. However, it is still to be decided the extent to which this policy will be implemented, and on which time span.

In parallel to CIRV, the MUIR National Committee for the Evaluation of the University System (CNVSU) is carrying out a similar exercise focussing on teaching and on the results of university education.

2. Please describe recent changes in policies regarding the evaluation of public research organisations, including legislation or regulations requiring evaluation, methodologies employed, criteria considered and the organisations/institutions that perform the evaluations.

Response:

3. Please outline any significant changes in the priority given to evaluation in innovation policy, including the motivations for such changes and anticipated effects. Please include information about additional resources being invested in evaluation and approaches used to ensure that results of evaluation feed-back into policy making.

Response:

4. Please provide information or web-links, if available, about the outcomes of recent major evaluations of R&D or innovation policies.

Response:

CIVR web site: www.civr.it