STI OUTLOOK 2002 – COUNTRY RESPONSE TO POLICY QUESTIONNAIRE

ITALY

Structure and the organisation of the science system

The reform of the Italian research system has been set up in the late 90's, and the institutional and organisational framework has not changed significantly since the year 2000. The main innovation has been the merging of two former ministries: Public Education (MPI), on one side, and Universities and Research (MURST) on the other, into a single Ministry for Education Universities and Research (MIUR) established in May 2001. This change, being very recent, has been up to now more formal than substantial and its effects are more on the rationalisation of the use of human and financial resources.

At present the main actors in the Italian public research policy are the Ministry for Education Universities and Research (MIUR) and Ministry for Productive activities (MAP). Other actors involved in the financing of public research activities are the Ministries of Health, Defence, of Agriculture and Forestry Policies, and of Environment. The co-ordination of these different actors is guaranteed by the Prime Minister through the central government committee CIPE (Comitato Interministeriale per la Programmazione Economica) that overviews the general policy framework.

The performers of public research activities are the universities and the research institutions.

The most important public research institution is the National Research Council (CNR) operating in all disciplinary fields. All the other relevant public research institutions are grouped around a discipline or a specific mission, such as the National Institute for Nuclear Physics (INFN), the National Institute for Health (ISS), the National Institute for Physics of Matter (INFM), the National Institute for Astrophysics (INAF), the National Institute for Geophysics and Volcanology (INGV), and so on. The Institute for New Technologies, Energy and Environment (ENEA), the Italian Space Agency (ASI), and the Antarctic Programme are the main research agencies.

The role of the National Research Council is evolving. Traditionally it has been one the main funding agency for University, now this role has progressively decreased and taken by the MIUR, its decreased resources are now directed mainly to support its own research institutes and its funding role towards private sector is diminishing.

All universities carry out research and teaching and there is no distinction between research universities and institutions mostly concerned with teaching. The number of private universities is rather limited, no more than 8 out of a total of 77.

At present, as it has been announced in the last Outlook, the teaching activities of university are deeply interested by the reform based on a restructuring of curricula in a first graduate degree of 3 years lenght (Laurea) in which are more stressed the professional skills and are included periods of tutored stage outside university, followed by 2 further years of study (Laurea specialistica) for students more interested in

acquiring a deeper academic knowledge. To enter doctoral studies (3 more years) this kind of degree will be compulsory.

Moreover an interesting phenomenon which is an indicator of the increasing involvement of university in life-long learning activities, is given by the wide offer of Master courses, up to one year length, either for young graduate students or for employed people. Master courses are given both at first level (one year after laurea) or at second level (one year after laurea specialistica). The change from the previous teaching and accreditation system, which has been used for decades mostly unchanged, to this new one, is still in its initial phase.

The main source of financial resources both for universities and public research institutions are the national central authorities and therefore the main research policy directions are given by the Government. Notwithstanding these performing bodies have substantially increased their autonomy in the two last years not only on the administrative side but also on policy choices. One of the effects of the increased autonomy has been the opening towards external sources of financing such as local authorities, European Commission and other international and private ones.

Table 1 R&D Expenditures in Italy 1997-2001

Years	Total Expenditure (millions of Euro) Current prices	Constant 1995 prices	% change over previous year Current price	Constant 1995 price)	% of GDP
1997	10.790	10.000	_	_	1,05
1998	11.431	10.326	5,9	3,3	1,07
1999	11.524	10.244	0,8	-0,8	1,04
2000	_	_	_	_	_
2001	_	_	_	_	_

Source: Istat 2002

Table 2 - R&D Expenditures: in public and private sectors 1997-2001
Current prices (millions of Euro)

SECTORS	EXPENDITURES Intramural	Extramural	TOTAL
		1997	
PUBLIC SECTOR	2.094	192	2.286
Research Institutions	1.675	35	1.710
Other public Institutions	419	157	576
BUSINESS SECTOR	5.377	1.012	6.389
TOTAL EXCLUDING UNIVERSITY	7.471	1.204	8.675
UNIVERSITY	3.319	_	3.319
TOTAL	**10.790**	**1.204**	**11.994**
		1998	
PUBLIC SECTOR	2.303	258	2.561
Research Institutions	1.850	201	2.051
Other public Institutions	453	57	510
BUSINESS SECTOR	5.533	1.124	6.657

TOTAL EXCL. UNIVERSITY	7.836	1.382	9.218
UNIVERSITY	3.595	_	3.595
TOTAL	**11.431**	**1.382**	**12.813**
		1999	
PUBLIC SECTOR	2.213	451	2.664
Research Institutions	1.757	266	2.023
Other public Institutions	456	185	641
BUSINESS SECTOR	5.684	1.062	6.746
TOTAL EXCL. UNIVERSITY	7.897	1.513	9.410
UNIVERSITY	3.627	_	3.627
TOTAL	**11.524**	**1.513**	**13.037**
		2000 (a)	
PUBLIC SECTOR	2.407	377	2.785
Research Institutions	1.927	280	2.208
Other public Institutions	480	97	577
BUSINESS SECTOR	5.926	1.041	6.966
TOTAL EXCL. UNIVERSITY	8.333	1.418	9.751
UNIVERSITY	_	_	_
TOTAL	**–**	**–**	**–**
		2001 (a)	
PUBLIC SECTOR	2.392	448	2.840
Research Institutions	1.959	291	2.250
Other public Institutions	433	157	590
BUSINESS SECTOR	6.442	1.111	7.553
TOTAL EXCL. UNIVERSITY	8.834	1.559	10.393
UNIVERSITY	_	_	_
TOTAL	**–**	**–**	**–**

(a) Provisional data. General total has not been calculated as figures for Universities are not available

Source: Istat 2002

Table 3 - R&D personnel 1997-1999

(number full time equivalent)

YEARS	R&D PERSONNEL		% VARIATIONS ON PREVIOUS YEAR	
	Total	Researchers only	Total	Researchers only
	PUBLIC SECTOR			
1997	31.292	13.685	-2,9	0,4
1998	31.284	12.900	0	-5,7
1999	30.835	13.677	-1,4	6,0
	UNIVERSITY			
1997	_	24.397	_	_
1998	52.862	24.406	_	0,04
1999	52.025	24.997	-1,6	2,4
	BUSINESS SECTOR			
1997	61.414	27.612	0,8	-0,4
1998	61.117	27.333	-0,5	-1,0

1999	59.646	26.192	-2,4	-4,2
	TOTAL			
1997	-	65.694	_	_
1998	145.263	64.639	_	-1,6
1999	142.506	64.866	-1,9	0,4

Source: Istat 2002

Private non-profit organisations have a significant role only in the health sector and carry out mostly basic research. They are generally engaged in specific subject-related research such as cancer, or specific diseases.

Considering the evaluation procedures mechanism at the macro level it relies on the Interministerial Committee for Research Evaluation (CIVR) at the micro level each University and research institution has set up an Evaluation Committee autonomously organised and ruled. Also MIUR has set up its own evaluation committees on duty for specific funding instruments.

All these mechanisms have been set up to be used both *ex ante* and *ex post* with different modalities according to the specific fund or project.

The Committee of experts on research policy, (Comitato di Esperti per la Politica della Ricerca -CEPR) acts as support tool for research and technology policy decisions, and the Committee for steering and evaluation of research policy (Comitato di indirizzo per la valutazione della ricerca -CIVR) sets the general criteria for evaluation policy and practice of public research and verify its application in research institutions.

The work of these two Committees is technically supported by the MIUR.

Two more Committees are still to be set up to complete the co-ordination system of the new institutional setting drawn by the reform, the first one will be the self-government body for the science system, the National Committees for S&T, set up on disciplinary or interdisciplinary basis, and elected among university faculty and researchers in the public sector, the second the National Assembly for S&T. The latter will be made up the for no less than 50% of its members by the members of the National Committees for S&T and for the remaining 50% by appointed experts from public and business sectors, services, civil society.

Breakdown of the policy orienting and priority setting framework

MIUR Ministry of Education, University and Research co-ordination of research policies through the activity of several committees and supporting organisations:

Operating

CEPR Committee of experts on research policy. Nine members chosen among high level representatives of Academia, Research, Industry and Civil society, proposed by the Minister of Education, University and Research and nominated by the Prime Minister

CIVR Interministerial Committee for research evaluation. Seven members proposed by the Minister of Education, University and Research and appointed by the Prime Minister

Technical Secretariat of the Minister of Education, University and Research. 15 members appointed by the Minister. It works also for both the above mentioned Committees

To be set up

National Scientific Committees will be elected by the scientific community among its members

National Assembly for Science and Technology its members will be for 50% the members of the National Scientific Committees and the other 50% nominated experts from public and business sectors, services, civil society.

Science and technology policy

During the year 2000 important renewals of the tools for sustaining and supporting science & technology activities both by private and public subjects have been implemented. In particular, the following legally binding provisions, strictly connected to the reform of the R&D sector already carried out since 1998 (and described in previous Oecd outlook), have been adopted:

- a deep reform of public incentive for supporting industrial research (activities (act 297/1999 and DM 593/2000)
- a renewal of the incentives for improving the relationship between private and public research in specified sectors (act 204/1998 and DM 16/10/2000);
- the approval of the National Research Plan for the period 2001-2003.

One of the main objective of the first instrument is to stream the relationship between public and private subjects in order to improve the capacity of the different R&D actors to act as a "system". The other aim is to rationalise the public financial incentives for industrial research creating a single fund (Fondo per le agevolazioni alla ricerca, FAR) where all financial resources previously connected to different provisions are managed on the basis of unified evaluation procedures and the same administrative rules. This fund is managed by MIUR as far as industrial research projects are concerned and by the Ministry for Productive Activities for projects related to pre-competitive research.

The funds are given after evaluation procedures.

1. The following type of projects have to be evaluated: Projects autonomously presented by the applicants to be financed on national scale for industrial research for innovative processes or products or for the development of existing ones, for pre-competitive research and the realisation of non commercial prototypes and for all activities connected to research and professional training.

Firms, consortia or Science Parks can apply following the MIUR scheme stating intermediate and final aims of the project, the industrial relevance the economic and employment impact.

The research proposals presented by SMEs are evaluated by one or two experts selected by the MIUR. And then approved by a Committee set up by the MIUR made of 11 high level experts nominated by the

Ministry of University and Research, Economy, Productive Activities, Trade, Health, Environment and Agricultural Policies.

The research proposals presented by large firms are also evaluated. By experts first and then again by the above mentioned Committee after a hearing of the applicants.

2. The following type has to be negotiated: Projects presented after the MIUR call for proposals.

Two other specific funds have been established in the year 2000: the Special Fund for research (FISR), and the Fund for investments in basic research (FIRB).

The setting of the incentives for improving the relationship between private and public actors in specified research sectors has been done through the creation of the fund FISR (Fondo Integrativo Speciale per la Ricerca). The research topics to be funded have been expressed by central government on the base of the advice on a Committee of experts set up by MIUR, and in coherence with the strategic guidelines of the National Research Plan and those of the Fifth European Framework Programme. The subject entitled to apply for the resources of this fund are Universities and Public research institutions in co-operation with firms.

The projects that can be financed by the FISR must follow one of the research topics stated by the Ministry:

- Fuel cells 7 Mio Euro
- Nanotechnologies and Microsystems 9 Mio Euro
- Optical and electroptical sensors 1,75 Mio Euro
- Molecular modelling 1,75 Mio Euro
- Studies on Technology transfer and local policies 1 Mio Euro
- Methodologies for the analysis of strategic and innovative policies 0,75 Mio Euro
- Cultural, anthropological; economic and policy studies on Mediterranean population 0,35 Mio Euro

The applicants propose their projects following the criteria given by the Ministry, will be evaluated by a specifically appointed ministerial Committee and will receive 50% of the total cost of the projects. It is strongly incentivated the co-operation between universities, research centres and firms; the joint financing of the projects and the specific care on hiring young researchers and enhancing mobility of personnel between university, research institutions and firms, are of primary importance.

The project that can be financed by the FIRB are aimed at the advancement of basic research should have a high scientific and technological content and assure international relevance. The importance of curiosity oriented and basic research has been recognised and stressed by the reform through the establishing of this specific fund. The fund can also be applied for setting up or enlarge a centre of excellence of high qualification and large research infrastructures. The proposed budget for the Fund has been of 10 Mio Euro in 2001, 12,5 Mio Euro in 2002, 15 Mio Euro in 2003; 70% of the cost of each project is financed through the FIRB and the remaining 30% have to be met by the applicants.

Specific targets and Funds used

Structural actions (medium-long term returns) funded by FISR and FIRB
Basic research
Strategic projects (for multisectiorial and pervasive technologies)
Centres of excellence

Actions with medium short-term returns funded by FAR, FISR and Ordinary budget
Spin-off and enterpreneurship training
Scientific and technical enhancement of the productive system
Scientific and technical services for health and environment

Transversal Actions
Internationalisation
Evaluation, monitoring and management of research
Public understanding of science
Decentralisation of technology transfer and diffusion of innovation

MIUR RESEARCH FUNDS
(2002)

Fund for investments in basic research FIRB
(Fondo per gli Investimenti della Ricerca di Base)

Acts: Legge 388 del 23/12/2000 (Finanancial law 2001) – Art. 104 (creation of the Fund);
Decreto Ministeriale del 30/01/2001 (Procedures for the assignment of FIRB resources)

Decreti Direttoriali 20/08/2001 (Call for proposals and Application forms)

Topics: Middle-long term activities on strategic programmes: Technologies for Knowledge-based Society

Nanotechnologies, Microtecnologies, Development of Materials
New medical engineering
Post genomics
Science and Technology in Knowledge-based Society
Cultural heritage and perspectives in Human Sciences
Neurosciences
Citizens rights and security

Funds 2001 Mio Euro: 390 (15 ordinary budget + 375 UMTS)

Funds 2002 Mio Euro: 14

FAR

Fondo per le Agevolazioni alla Ricerca

Acts: D.L. 297/99

Legge 388, 23/12/2000 (Finanancial law 2001) – Art. 105 (creation of the Fund)

DM 593, Agosto 2000 (Procedures for the assignment of resources)

Topics: Short term activities for industrial research in sectors such as

Manufacturing, Food,

Transport

Cultural Heritage

Environmental Protection

Other activities:

Training of researchers

Public research Spin-off

Employment of researchers

Funds 2001: 650 Mio Euro + 50 UMTS

Funds 2002: 400 Mio Euro

FISR

Fondo Integrativo Speciale per la Ricerca

Special Fund for research

(this fund is managed also by other Ministries)

Acts: Legge 204/98 (creation of the Fund)

D.M. Tesoro del 16/10/2000 (Main themes and Procedures for the assignment of resources)

Topics: Fuel cells

Nanotechnologies and Microtechnologies
Optical and electroptical sensors
Molecular modelling
Studies on Technology transfer and local policies
Methodologies for the analysis of strategic and innovative policies
Cultural, anthropological; economic and policy studies on Mediterranean population

Funds 2001: 30 + 30 Mio Euro UMTS

Funds 2002: 30 Mio Euro

FIRB

Strategic Projects, topics and amount of first fundings (mio Euro)

Post genomics:	75
New medical engineering:	46
Neurosciences:	8,5
Technologies for Knowledge-based Society – ICT -:	75
Nanotechnologies, Microtecnologies, Development of Materials:	44
Cultural heritage and perspectives in Human Sciences:	1,5
Science and Technology in Knowledge-based Society:	1,5
Citizens rights and security:	3

Source: Miur 2002

The overall aim of these instruments and of the whole reform is to concentrate the public R&D engagement on supporting the use of financial resources in framework conditions of efficacy and efficiency under which their could produce an active network among producers and users of knowledge directed toward excellence. Moreover it intends enhancing the role of SME either in terms of making them part of multi-actors research activities promoted and carried out by university and public research subjects, or in terms of receiving an higher rank in the selection processes. Another important innovation of this new setting is related to the implementation of different incentives for supporting spin off of industrial research activities carried out by professors and researchers either employed in the private or public sector.

This new and challenging framework has been set up since February 2001 and is meeting a positive reaction by firms as indicated by a high number of projects presented. The newelty of these instruments, though, is determining same delays in the accomplishment of the process which may reduce their efficacy.

The third major pillar of the new Italian research policy framework is the National Research Plan (PNR), aimed at underlining the central role of science for a sustainable technological development of the Country as well as at identifying selected R&D opportunities, well tailored for the recasting priorities and investments of the National scientific system. Also the Plan asks for closer integration of public and private resources and pushes for deeper collaboration between Industry and Academia. However it pays also a specific attention to basic curiosity oriented research, setting for this purpose a specific amount of funds.

The adoption of the PNR in December 2000 is an important an intensive effort to categorise, analyse and co-ordinate the broad spectrum of public-funded research. Milestones of this effort have been:

- **the PNR's guidelines**, first drafted by MIUR, then approved by the National Committee for the Economic Planning, CIPE;

- **the final text of the PNR itself**, as resulted in December 2000 from the consultation of government and Research Institutions as well as from contributions of business Organisations.

According to the PNR, the Government should continue to provide increased support for basic sciences but further attention should be given to the need for funding the development of enabling and scale-up technologies.

Four macro-objectives have been identified by the Italian PNR: **"**Quality Of Life", "Competitive Sustainable Growth", "Environment and Energy" "Mediterranean Civilizations in The Global System".

Strategic Programmes as well as Large Projects/Targets have been accordingly identified.

For Companies directly involved in R&D activities, the financial support provided by the PNR is getting on top of tax benefits which can be added to those reserved for them.

It should be underlined that the PNR has been implemented and further reinforced in 2001: the Financial Law 2001 has provided new financial resources and an Investment Fund for Basic Research has been created.

Italy is now provided by an adequate structure for managing public resources for research and innovation and there is a large political consensus on the necessity to increase further efforts and financial resources in order to improve the efficacy of the Italian research system. Particular attention is addressed by the central authorities to improve the presence and the performance of the industrial sector and the commitment on these issues by regional and local authorities. Resources for R&D, however, have decreased as a percentage on GDP from 1,5 in 1997 to 1,4 in 1999. Within the general funds given by the financial law each year, health education and research have been constantly diminished.

The policy goal is therefore still to be met with adequate allocations of public resources which, during 2002, have been diminished compared to those of the previous years. A contradictory signal which might lead to a diminishing capacity for Italy in investing in knowledge society as much as its international economic position should request.

NATIONAL RESEARCH PLAN 2001-2003

Strategic choices:

- to bridge the gap between public and private research
- planning and co-ordination of research activities
-

Macro-Objective "QUALITY OF LIFE"

STRATEGIC PROGRAMMES	NUMBER OF LARGE PROJECTS	FUNDING (MIO EURO)
Post-genomic	4	105
New Medical engineering	5	70
Neuroscience	3	18
Food quality & welfare	2	14

NATIONAL RESEARCH PLAN 2001-2003

Macro-Objective "COMPETITIVE SUSTAINABLE GROWTH"

STRATEGIC PROGRAMMES	NUMBER OF LARGE PROJECTS	FUNDING (MIO EURO)
Information and communication technologies (ICT)	6	157
Nanotechnologies,microtechnologies, integrated development of new materials	4	77

NATIONAL RESEARCH PLAN 2001-2003 *Macro-Objective " ENVIRONMENT AND ENERGY* "		
STRATEGIC PROGRAMMES	**NUMBER OF LARGE PROJECTS**	**FUNDING (MIO EURO)**
Sustainable development and climate change	1	14
New systems of production and management of energy	2	42

NATIONAL RESEARCH PLAN 2001-2003 **Macro-Objective " MEDITERRANEAN CIVILIZATIONS IN THE GLOBAL SYSTEM "**		
STRATEGIC PROGRAMMES	**NUMBER OF LARGE PROJECTS**	**FUNDING (MIO EURO)**
Cultural heritage and perspectives in Human Sciences	1	3,5
Science and Technology in Knowledge-based Society	2	8
Security and Rights of Citizens	1	2,5

Source, Miur 2001