Ministry of Education

RESEARCH AND DEVELOPMENT DIVISION

Research and development in Hungary

Budapest, October 2002

Content

Realising that the modern economies in the 21st century will be based on knowledge, Hungary took internationally recognised steps in the foundation of knowledge-based economy. The present material is aimed at providing concise information for interested parties on the Hungarian national innovation system, the performance of this system, the main features of the science and technology policy, and finally present possibilities for international co-operation in science and technology.

1. Main components of the Hungarian national science and technology system

The present Hungarian national innovation system on institutional level consists of three main components such as the governmental organisations, the Hungarian Academy of Sciences and the research and technology institutions.

1.1. National system of governance of innovation policy (Political level, Government level)

On the Government level, the Ministry of Education (MoE) is responsible for designing and implementing the Hungarian science and technology policy, for the competition based research and development programmes and for promoting the international science and technology co-operation of Hungary, including EU-related research matters. The R&D Division of the MoE has therefore the following responsibilities:

- it works out documents concerning the national science and technology policy, runs technology foresight programmes, prepares reports and reviews for promoting the acquisition and dissemination of new knowledge and information serving the government's science and technology strategy in co-operation with social partners, NGOs, industrial and professional associations,
- it represents the government in the international field, in intergovernmental S&T organisations and programmes, organises and co-ordinates the Hungarian participation in such programmes. In this capacity, it is also in charge of the multilateral S&T co-operation and participates in the EU accession process.
- Through the Ministry's Fund Management Directorate, the R&D Division of the MoE is responsible for the implementation of the science and technology policy by managing different R&D support programmes financed from the National Technology Development Fund and the National R&D Programmes.

1.2. The Hungarian Academy of Sciences (HAS)

In accordance with Law XL of 1994, the Hungarian Academy of Sciences (HAS) is an independent public body based on the principle of self-government. It is constituted by the members of the Academy - ordinary and corresponding as well as external and honorary members - and by those active representatives of science who hold a scientific degree (Ph.D. or D.Sc.). At present the number of the ordinary members is 214, while the number of the corresponding members is 86. Ordinary and corresponding members elect academicians. The number of public body-members at present - with academicians - is 7030. They - other than academicians - exercise their rights through representation, electing 200 non-academician representatives to the General Assembly, the main organ of the Academy, for three years.

It is the right and duty of the Academy to

- support the development of sciences, scientific research, and the publication of scientific books and journals;
- regularly evaluate scientific research results as well as encourage and assist publication, dissemination and utilisation thereof;
- represent, within its sphere of responsibilities, Hungarian science in Hungarian public life and at international scientific fora.

To perform these tasks the Academy

- establishes and maintains research institutes for the cultivation of sciences and other institutions: library, archives, information system etc. (at present the number of the research institutes belonging to the Academy is 47, the number of - mainly university-affiliated - research groups, not belonging to but supported by the Academy is 125);
- sets up scientific sections and committees to co-ordinate the activity of researchers working at different institutions, research units and universities (at present the number of scientific sections is 11, the number of scientific committees is 128);

The Academy's share in the Hungarian research capacity in terms of the total number of other Hungarian R&D organisations is about 10%, within this that of R&D institutions is slightly more than 60%. The Academy's share in the number of total R&D personnel is almost 20%. According to the different fields of sciences, this share is the highest in natural sciences (based on the share in R&D expenditures of all R&D units, it is almost 60%), and by phases of research its share is decisive in the field of basic research (also based on the share in R&D expenditures of all R&D units, it is more than 40%).

1.3. Research and technology institutions in Hungary

Number of R&D units				
Year	*R&D institutes and other research institute*	*R&D units of higher education*	*R&D units of enterprises*	*Total*
1992	**118**	**1 071**	**98**	**1 287**
1993	**124**	**1 078**	**178**	**1 380**
1994	**112**	**1 106**	**183**	**1 401**
1995	**107**	**1 109**	**226**	**1 442**
1996	**121**	**1 120**	**220**	**1 461**
1997	**131**	**1 302**	**246**	**1 679**
1998	**132**	**1 335**	**258**	**1 725**
1999	**130**	**1 363**	**394**	**1 887**
2000	**121**	**1 421**	**478**	**2 020**

In the higher education sector the overwhelming proportion of the research units is part of the higher education (1421 units). The R&D budgets of universities are largely dependent on governmental subsidies. There are two main types of subsidies: the normative research support and the various governmental funds and programmes. Besides, the co-operation between universities and private sectors and the participation in multilateral and bilateral scientific programmes are the main income sources of the universities. Although the sources of higher education increased largely in the past few years, the research expenditure of that did not grew significantly. Nevertheless, the R&D sources of the universities will be started to accelerate in 2002; for example, the budget of the Higher Education Research Fund increases approx. threefold (from 884 million HUF to 2.3 billion HUF).

The 38 research institutes of the HAS are dealing with natural sciences and mathematics, life sciences and social sciences including humanities. Several HAS research groups working at universities continue their activities in favourable atmosphere at the new integrated universities.

Non-budgetary research establishments:

The Bay Zoltán Foundation (BZF) and the Collegium Budapest are the most important among the research units of foundations and associations. The BZF is the largest research foundation in Hungary, founded in 1993, comprising three research units: Institute for Biotechnology, Institute for Material Science and Technology and Institute of Logistics and Production Engineering. Following the model of the pioneering Princeton Institute for Advanced Studies and Wissenschaftsholles Berlin the Collegium Budapest (CB) is the first IAS-type institute in Central and Eastern Europe. As an adaptation of the Princeton model, the CB represents a new type of institute, different from both universities and specialised research institutes. Its main attraction is offering its research fellows temporary liberation from their administrative and teaching obligations, allowing them to concentrate fully on their chosen research agenda.

It is important to mention that five research institutes belonging to the HAS as well as the CB were successfully applying for a three-year grant from the European Commission in the programme supporting 'Centres of Excellence' in the region. More than 180 institutes from CEE countries applied, the CB was ranked on the third place.

Research and development in the business sectors:

The innovation activity of the business sector is growing also more and more in importance, which is reflected in the increasing, number of R&D units at enterprises. A number of well-known trans-national companies have set up research laboratories in the country.

The main R&D facilities in Hungary established or overtaken by multinational companies. Some examples:

- Lighting technique (GE-TUNGSRAM)
- Medical equipment (GE-Medicor)
- Pharmaceuticals (Sanofi-Chinoin, Astra, Teva-Biogal, Akzo Nobel/Organon)
- Information and telecommunication (Ericsson, IBM, Compaq, Nokia, Siemens, Motorola, Tata Consultancy, T-Systems/Matáv)
- Machinery (Audi, Volkswagen, TEMIC, Michelin, Knorr-Bremse, Mannesmann-Rexroth, Flextronics)
- Agrifood (Novartis/Sandoz Seeds)
- Household chemicals (Unilever)

- New materials (ZOLTEK, Furukawa)

2. Science and technology policy

Science and technology policy is defined in the 2002 government programme as an increasingly important government tool to promote the development of the society and economy. The further continuous growth of the R&D expenditures will be provided by direct budget allocations and indirect economy and science policy incentives.

Policy targeted to production related innovation has a priority in the government programme. Investments based on advanced technology, highly skilled workforce and co-operation with local development initiatives. The government defines four priority areas:

- innovation conducive legal framework,
- making Hungary attractive as an R&D site,
- enhancing the protection of intellectual property,
- increasing the sources for innovation is SMEs.

The regional co-ordination of innovation has to be strengthened to provide all regions with significantly more domestic and international sources for science and technology.

The Government Programme declares that both the state and the business community have to fulfil their role in ensuring that research, development and industry are brought closer to each other and placed in the service of the country's economic advancement. To achieve this, the country needs co-ordinated education, research, development and innovation policies, as well as measures to stimulate the research and development activities of the private sector. The national programmes formulated in this spirit include the main directions of development, taking into account the economic, social and political changes in the world as well as Hungary's national characteristics.

The National Development Plan places knowledge society and knowledge economy in the middle. Hungary hopes to join the European Union by 1 January 2004, and then will be entitled to receive subsidies from the Structural Funds of the EU. The primary aim of these funds is to, for the sake of strengthening the economic and social cohesion, reduce the development differences between member states and regions. The main strategic objectives of the NDP are in harmony with the future scenario describing the successful establishment of a knowledge-based society in Hungary, although sometimes only indirectly, due to the different time frames. Along the development pathway described in the "**Creative Hungary**" scenario, mainly by efficiently utilising the EU resources, the country will soon successfully step into the development's innovations controlled period from the investment controlled period. This allows to maintain the high growth rate, which is a characteristic of the reconstructing transition period, thus by 2015 Hungary, in several fields, will catch up with the developed member states of the European Union. The continuous improvement of the quality of life is ensured by an ecologically and economically sustainable, regionally balanced development that is based on the competitiveness and profitableness of the knowledge-based economy.

In the frames of the National Development Plan, R&D and innovation are treated in the Economic Competitiveness Operative Programme, along with further important topics like information society, investment incentives, SME promotion and tourism. All existing and planned R&D and innovation actions are organised in three large measures:

- **Strategic and co-operation research and technology development projects**
- **R&D resource and infrastructure development for the research institutions, development of human resources for innovation,**
- **Innovation skills, innovative networks and resources for companies.**

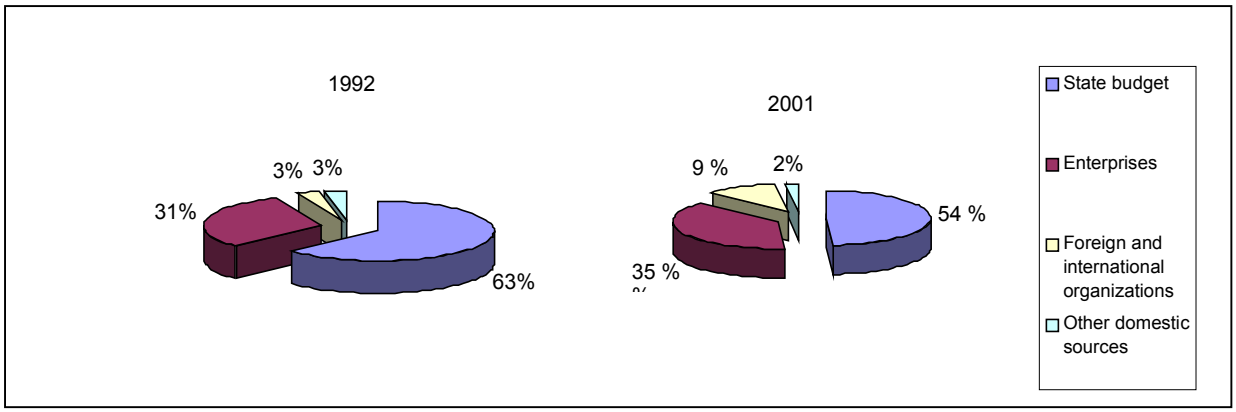
3. Main science and technology indicators

3.1. Principal data of research and development

Year	*Number of R&D units*	*Calculated R&D staff number (person)*	*R&D staff number as percentage of active earners*	*R&D expenditure, total (billion HUF)**	*R&D expenditure as percentage of GDP*
1991	1 257	29 397	0,63	27,1	1,09
1992	1 287	24 192	0,57	31,6	1,08
1993	1 380	22 609	0,58	35,3	1,00
1994		22 008	0,59	40,3	0,93
1995	1 442	1 401	0,54	42,3	0,75
1996	1 461	19 776	0,55	46,0	0,67
1997	1 679	20 758	0,57	63,6	0,74
1998	1 725	20 315	0,56	71,2	0,70
1999	1 887	21 329	0,56	78,2	0,68
2000	2 020	23 534	0,61	105,4	0,82
2001	2 333	22 930	0,59	140,6	0,94

**Including the honorarium, salary complements of scientific degree and the amounts of state scientific scholarship; excluding the costs on other activities and excluding amortisation in 1999-2001.*

3.2. R&D expenditure by financial sources, 2001



*3.3. R&D expenditure by types of activity (billion HUF)**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Basic research	8,6	10,0	13,0	12,4	14,6	18,3	22,1	22,2	30,4	45,0
Applied research	10,7	11,0	13,6	14,8	15,4	18,8	25,5	23,3	32,6	39,6
Experimental development	12,3	14,3	13,7	15,1	16,0	26,5	23,6	30,7	42,4	56,0

**Calculated data*

*3.4. R&D expenditure by types of activity (billion HUF)**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Basic research	8,6	10,0	13,0	12,4	14,6	18,3	22,1	22,2	30,4	45,0
Applied research	10,7	11,0	13,6	14,8	15,4	18,8	25,5	23,3	32,6	39,6
Experimental development	12,3	14,3	13,7	15,1	16,0	26,5	23,6	30,7	42,4	56,0

**Calculated data*

4. International relations in science and technology

Hungarian R&D organisations have an increasing opportunity to participate in multilateral and bilateral scientific programmes. Over the past decades a large number of international science and technology co-operation links has been developed. Hungary has become full member in most European and Euro-Atlantic research organisations and programmes (e.g. EU R&D Framework Programme, COST, EUREKA, CERN, EMBL, ESA/PRODEX and the NATO Science Programme).

4.1. Bilateral S&T relations

Hungary has 33 intergovernmental S&T agreements with other countries of the five continents. The number of bilateral projects is between 500-600 in a year. The primary objective is to promote mobility and international co-operation, organising seminars and workshops in the field of interest of science and technology. As to the international aspects of the responsibility for the R&D policy, the bilateral relations are of primary importance. For example: in Hungarian-French relation the Balaton-Programme, Hungarian-German S&T Agreement, Hungarian-American Joint Fund.

4.2. Science and technology attachés

The international scientific relations of the Hungarian Republic are also managed and developed by delegated Science and Technology attachés. They support the international and European integration of the Hungarian S&T community by acquiring and disseminating information and by building connections between institutions. The current Hungarian S&T attaché network was set up in 1992. The basic tasks for the attachés are:

- to monitor and to analyse the science and technology policy and the international relations of the host country, thereby contributing to the formulation of the Hungarian R&D policy;
- to give information in the host country about the Hungarian R&D policy, its implementation and opportunities for co-operation;
- to assist Hungarian R&D institutions and organisations in establishing contacts;
- to monitor the possibilities of participation of Hungarian researchers and R&D institutions in national or international R&D programmes of the host country.

Currently there are S&T attachés at the following 11 cities: Berlin, Brussels (for the S&T relations with the EU Commission), Helsinki, London, Moscow, Paris, Rome, Tel Aviv, Tokyo, Vienna, Washington.

4.3. Multilateral relations

4.3.1. OECD

Hungary gained first a "partner in transition" status in OECD and in 1996 joined the OECD as a full member. Since that time on the country has been playing an active role in the science and technology policy activity of the OECD as well. The MoE is representing the country in the Committee for Science and Technology Policy (CSTP) and in its subsidiary working groups, which provides excellent fora for S&T co-operation with industrial countries of the OECD.

Beside that, the OECD provides examples and best practices for formulating the S&T policy of the member countries. The activity of the OECD on the field of S&T indicators is a pioneering exercise, which provides comparable data for every national economy. Recently, the study of national innovation systems gave substantial input to understand the broader influencing factors, linkages of the organisations and policies related to S&T.

4.3.2. European Union

Hungary, as an accession country has close working relations with the member countries of the European Union and with the European Commission. In the preparation for full membership, Hungary has started to elaborate the National Development Plan, which will be the basis for

allocation of financial resources from the Structural Funds. In this National Development Plan the MoE is co-ordinating the research and innovation chapter, within the Economical Competitiveness Operative Programme as described above.

Hungary has been taking part in the 5th Research, Technological Development and Demonstration Framework Programme (FP5, 1998-2002) as well as in the EURATOM Framework Programme of the EU, as a fully associated member, enjoying basically the same rights as the Member States of the EU. Being an integral part of the pre-accession strategy, Hungarian association was motivated in particular by science and technology co-operation as a forerunner of, and training ground to, Community membership. The financial and institutional framework of the Hungarian participation is well established. To ensure a successful participation of Hungary in the EU 5 FWP, a network of National Contact Points and R&D liaison offices, operated and supervised by the MoE, was established at the end of 1999. Hungary, like other associated candidate countries, has been granted observer status (since May 2001) in meetings of CREST (Scientific and Technical Research Committee).

As of September 2002, altogether 2661 applications including Hungarian partners were filed, and 611 of them were successful.

Summing up the various components of Hungary's participation in FP5, experience this far has been favourable, and the same can be expected from participation in the next Framework Programme. As well as other candidate countries, Hungary intends to join the 6th Framework Programme (FP6, 2002-2006) as an associated country, although is likely to become a Member State during the period of FP6. Exploratory negotiations with the European Commission for the clarification of the details of Hungarian participation started in September 2001, and the schedule for establishing and concluding a Memorandum of Understanding has been outlined. Building on experience from FP5, the preparation for this Framework Programme will include the following elements:

- Creating the national legal conditions for joining FP6, including pre-legislation work related to the announcement of Hungary's participation;
- Dissemination of information in connection with FP6, such as organising information days, related publications and developing multiplicators' skills;
- Developing the Hungarian system of R&D funding, in line with the new instruments for FP6;
- Renewing and coaching the network of NCP's, according to the structure and requirements of FP6;
- Developing an effective network of consultation offices;
- Backing up the continuous operation of the HunOR office in Brussels. This office was established in order to ensure successful Hungarian participation in FP5, relying on the excellent experience of Member States with similar R&D liaison offices;
- Developing new services related to FP6, including a helpdesk system to for applicants, and an EU terminology vocabulary.

4.3.3. Other multilateral relations

EUREKA

EUREKA is a Europe-wide Network for Industrial R&D with the following goals: strengthening European competitiveness, by promoting 'market-driven' collaborative RTD, involving industry and research institutes across Europe, using advanced technologies, resulting in cost-effective products, processes and services. It is a framework through which industry and research institutes

from 33 countries and the European Union are developing and exploiting the technologies crucial to global competitiveness and a better quality of life.
Hungary was the first of our region to have the opportunity to join the co-operation in 1992. Hungarian participation has dynamically developed up to the present level. In 2002 there were 35 running projects and 50 finished projects with Hungarian participation.

COST (European Co-operation in the field of Science and Technology)

COST is an intergovernmental network-forming co-operation in the field of science and technology, co-ordinating national research on European level for harmonising mainly basic and applied research activities of national research institutes, universities and industrial enterprises. Although investigations are not financed, the expenses of their co-ordination are covered from the budget of the EU framework programmes. COST has 34 member states + 1 co-operating state (Israel). Presently 30 000 researchers are involved in 170 actions. Approximately 600-800 Hungarian scientists of 150 institutes have participated in 236 actions in the last 11 years of our membership.

CERN (European Organisation for Nuclear Research)

CERN is one of the world's largest scientific laboratories. Founded in 1954, its site is situated on the French-Swiss border west of the city of Geneva. 20 European countries finance the Laboratory. More than 7000 scientists, from laboratories and universities all over the world, work there to study the constituents of matter and the nature of fundamental forces. CERN is currently engaged in the realisation of a new accelerator, the Large Hadron Collider (LHC), where high-intensity proton beams will collide head-on at unprecedented energies.
Over the years, CERN has become an important centre for transfer of new technologies to European industry and for training young people in a variety of technical fields. Everybody is now using the most well known spin-off from CERN research, the World Wide Web, which was invented at CERN to improve communication between the international collaborators.
Hungary joined CERN in 1992, since then more than 100 Hungarian researchers have participated in the works at the experiments.

NATO Science Programme

The NATO Science Programme offers support for international collaboration between scientists from countries of the Euro-Atlantic Partnership Council (EAPC). The support for collaboration is channelled through a range of different mechanisms or activities, which are, designed both to create enduring links between researchers in different countries which is essential to progress in science, with the objective of contributing to overall stability and peace. The NATO Science Programme is grouped into four sub-programmes: Science Fellowships, Co-operative Science and Technology, Research Infrastructure Support, Science for Peace. Hungary has been especially successful in Science for Peace sub-programme: 13 Hungarian projects have been supported till September 2002. The Hungarian budget for the Science Fellowships sub-programme is approximately 30 million HUF yearly that provided opportunity for 81 Hungarian scientists, 19 researchers from Partners Countries and 8 scientists from different NATO countries to participate in the sub-programme from the first call in March 2001 to September 2002.

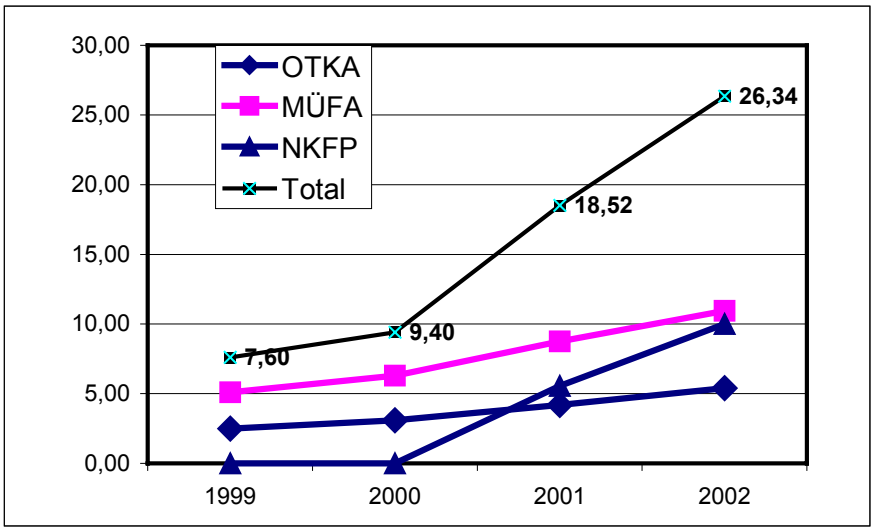
5. Promoting innovation: government policy

The Gross Expenditure on R&D (GERD) as a percentage of GDP is still fairly low in the European context as well as compared to most of the OECD countries. As a result of the substantial economic and financial challenge that accompanied Hungary's transition to a market economy, state subsidies as well as the business spending for R&D and innovation dropped

significantly in the 1990's. Between 1990 and 1996, the rate of expenditures spent on R&D relative to the GDP decreased from 1.6% to 0.7% and stayed at a low level in the second half of the decade. However, with a slight encouraging increase the GERD/GDP percentage reached 0,82 % in 2000 and 0,94 % in 2001.

The next figure shows the growth of the sources of the three major R&D programme allocated by the budget law of the Parliament.

Financing of the 3 large R&D funding system
(1999-2002, in billion HUF, about 250 HUF= 1 EUR)



5.1. Tax incentives for research and technological activities

In Hungary, there exist mainly two types of governmental support for R&D and innovation in the private sector: firstly, the tax incentives and secondly, the direct non-refundable state support through calls for proposals.

From January 2001 on, companies can account for their R&D expenditure at 200%. This option is now also available for extramural (subcontracted) R&D activity not carried out in the companies themselves.

Also form January 2001 on, the amortisation (depreciation) of all R&D investments is flexible, and its rate is depending on the company. From January 2003 further incentives are planned, such as the option for tax-free investment reserves up to 500 M HUF, accelerated amortisation of ICT investments, 70% tax release for R&D donations and faster tax reimbursement etc. making the innovative activities and the overall entrepreneurial conditions more favourable.

5.2. National Scientific Research Fund (NSRF)

It was established in 1986, supervised by the HAS. Since 1991, it has been operating as an independent organisation. The mission of the NSRF is to support basic research, development of R&D infrastructure and scientific work of young researchers. The Laws XXII of 1993 and CXXXVI of 1997 provide the legal base for its operation.

5.3. National R&D Programmes, Call for proposals

In order to support large research, development and innovation projects, the **National R&D Programmes** (NRDPs). The Government has taken a decision in its Resolution 1073/2000 (VIII. 31.) on launching the NRDPs included in the document 'Science and Technology Policy 2000'. The rules of the implementation of the NRDPs are stipulated in the Government Decree 201/2000 (XI. 29.).

The call for proposals in the framework of the NRDPs were launched of in the following five fields:

- Improving the quality of life;
- Information and communication technologies;
- Environmental and materials science;
- Research on agribusiness and biotechnology;
- Research on the national heritage and contemporary social challenges.

The purpose of the NRDPs is to support the implementation of comprehensive research, development and innovation projects. The Programmes are intended to concentrate on financial and intellectual resources, to synchronise basic and applied research with technological development, to strengthen and ensure the efficient utilisation of national research and development capacities and to improve our international scientific competitiveness. The program promotes the R&D projects of consortia leading by HE or R&D institutes and containing the companies taking part in the usage of R&D results.

5.4. Calls for proposal in applied research

The National Technology Development Fund (NTDF) supports the applied research through a competitive call for proposal system. Its goals are defined by the Government Regulations 98/1996 (VII. 10.) and 158/2001. (IX. 12.) as promoting technological innovation, development of R&D infrastructure, and the dissemination and economic application of development results.

The main ongoing call for proposals supporting business R&D are as follows.

5.4.1. Promotion of applied research, calls for proposals in applied research

The objective of the aid is to promote of applied research and technical development based on national and international co-operation creating new, up-to-date, valuable, marketable products, procedures and services as a result. Preference will be given to enterprises, which intend to co-operate with a university, college, public research institute, R&D non-profit organisation in order to implement the development; as well as projects generating a clearly detectable economic result in a short time.

5.4.2. Call for proposals in application of Information and Communication Technologies

The objective of the aid: development and test of marketable, new information and communication procedures, tools and services; establishment of large, information infrastructure with a large band width, based on experimental and modern technology, in the computer network of higher education and research institutions; in addition, promotion of the establishment and dissemination of new digital information systems and services based on image technology, as well as other technologies and skills related to those.

5.4.3. Call for proposals to support biotechnological research activities

The objective of the aid is to improve the competitiveness of Hungarian biotechnology enterprises, and create modern, valuable marketable biotechnological products, procedures and services, in the case of which the advantages can be achieved without constituting a risk to human health or environment, taking into account the ethic requirements. The priorities within the programme include the safety of foodstuffs, biomass utilisation, bio-remediation, bioconversion, fito-technology, biomedicine, biopharmacology. Preference will also be given to projects related to international programmes, and projects, which promote the process of EU accession, as well as enterprises, which engage in the development in co-operation with a university and/or research facility.

5.4.4. Call for proposals to support environmental research activities

The objective of the aid is to develop technologies and products related to the prevention of environmental pollution, and representing a smaller load on the environment. In addition, the objective of the aid is to improve the competitiveness of the environmental protection industry. Preference will be given to projects, which are aimed at the development of "cleaner" products and technologies, recycling of waste, development of combustion equipment with low emission, equipment using renewable energy sources, and purification of communal waste water in small settlements.

5.4.5. Support to the establishment of co-operative research centres (CRCs)

The support is aimed at the establishment of research centres and to support their operation, in which close relations could be developed between Hungarian higher education institutions, other non-profit research facilities and members of the corporate and business innovation sector, and in which the education, research development and knowledge and technology transfer can be integrated for strategic purposes. The co-operative research centres (CRC) can only be established together with business partners. The leading institutions of the consortia may only be an institution offering PhD. training and accredited by the Hungarian Accreditation Committee.

Selected CRCs are so far:

- Budapest University of Technology and Economics - Inter-University Centre for Telecommunication and Informatics (ETI-KKK),
- Semmelweis University - CRC for Rational Drug Design,
- University of Miskolc - CRC of Mechanics and Material Sciences (MeAKKK),
- University of Pécs - South Transdanubian CRC,
- University of Veszprém - CRC of University of Veszprém

5.4.6. Call for proposals to support investments related to applied research development activities in high technology

The support can be used to establish a research facility, either as an individual economic organisation, or a separate organisation unit in an existing business organisation, with which the development and introduction of modern technologies can be achieved. At least HUF 500 million investment is required for the establishment or an extension of a research base, in which, within six months from the completion of the investment and start of operation, the employer will employ at least 30 people in full time, new (extra) jobs. The employees must be researchers, with qualifications from a higher education institution. The established research facility and the new (extra) research development employees must be used and employed in accordance with the original purposes for at least five years.

Some successful examples in this call contributed to the active presence of TNCs in the Hungarian R&D activity:

- GE Lighting TUNGSRAM (Bródy Laboratory: strategic research),
- NOKIA (information technologies)
- Knorr-Bremse, Audi (electronic brake systems).

6. Potential for international science and technology co-operation with Hungary

The strengths of the Hungarian national innovation system make Hungary an attractive partner and also a promising site for international scientific co-operation:

- stable political and economic environment (stable growth rate, decreasing inflation rate and unemployment rate),
- strengths in national innovation system, strong knowledge base (high educational level, outstanding universities, institutions of HAS),
- motivated SMEs,
- strong science areas (IT, biotechnology, agro-economy, chemistry, pharma),
- international embeddedness of Hungarian national innovation system (e.g. EU Framework programme).

Foreign partners are encouraged to co-operate with Hungarian partners in all scientific fields. Most of the Hungarian calls for proposals are open to foreign partners too, provided, they cover their own costs in the research consortia.

7. Relevant information sources

7.1. Ministry of Education, R&D Division

Address:
Ministry of Education, R&D Division,
H-1052 Budapest, Szervita t. 8., Hungary

Website: www.om.hu

Contact persons:	
For R&D strategy:	*Dr. Tamás Balogh*, General Director Department for R&D Strategy Ministry of Education H-1052 Budapest, Szervita t. 8., Hungary Phone: +361-318-4247 Fax. +361-266-2056 Email: tamas.balogh@om.hu
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For international R&D affairs:	*Mr. Ferenc Kleinheincz*, General Director Department for International R&D Affairs Ministry of Education H-1052 Budapest, Szervita t. 8., Hungary Phone: +361-317-0677 Fax. +361-266-0801 Email: ferenc.kleinheincz@om.hu
For multilateral international relations (EUREKA, COST, CERN and NATO Science Programmes):	*Mr. Pál Koncz*, Dep. General Director Multilateral Co-operation Unit Department for International R&D Affairs Ministry of Education H-1052 Budapest, Szervita t. 8., Hungary Phone: +361 317 5782 Fax: +361 266 2055 E-mail: pal.koncz@om.hu
For EU matters, including the Framework Programmes:	*Dr. Sándor Darányi*, Head EU S&T Co-operation Unit, Department for International R&D Affairs Ministry of Education H-1052 Budapest, Hungary Phone: +361 318 4232 Fax: +361 266 2055 E-mail: sandor.daranyi@om.hu
For bilateral aspects of the international S&T cooperation:	*Dr. Béla Kardon*, Head Unit of R&D Bilateral International Relations, Department for International R&D Affairs Ministry of Education H-1052 Budapest, Szervita t. 8., Hungary Phone: +36-1-266-0346 Fax. +36-1-266-0254 Email: bela.kardon@om.hu
For matters concerning S&T attachés and R&D promotion:	*Mrs. Mária Pánczél*, Head Unit of S&T Attachés and Information Department for International R&D Affairs Ministry of Education H-1052 Budapest, Szervita t. 8., Hungary Phone: +36-1-266-0346 Fax. +36-1-266-0254 Email: maria.panczel@om.hu

7.2. Further important S&T websites

Ministry of Economy and Transport www.gkm.hu
Hungarian Academy of Sciences www.mta.hu
Hungarian Scientific Research Fund www.otka.hu
Bay Zoltán Foundation for Applied Research www.bzaka.hu
Collegium Budapest www.colbud.hu
Document of the Science and Technology Policy 2000 www.om.hu/jg.html
National R&D Programmes www.om.hu/j6.html

Hungarian Patent Office www.hpo.hu
Hungarian Competition Office www.gvh.hu
Hungarian Standards Institution www.mszt.hu
Hungarian Central Statistical Office www.ksh.hu

Association of Hungarian Innovation www.innovacio.hu
Association of Hungarian Inventors www.inventor.hu
Association of Hungarian Industrial Parks www.datanet.hu/ipe
Federation of Technical and Scientific Societies www.mtesz.hu
Hungarian Academy of Engineering www.mernokakademia.hu
Hungarian Science and Technology Foundation www.tetalap.hu
National Technical Information Centre and Library www.omikk.bme.hu

GKI Economic Research Co. www.gki.hu
INNOSTART National Business Innovation Centre www.innostart.hu
Institute for Economic Analysis and Informatics www.ecostat.hu
KOPINT-DATORG Economic Research, Marketing and Computing Company Limited www.kopdat.hu

7.3. List of the Hungarian state universities

Budapest University of Economic Sciences and Public Administration (www.bkae.hu)
Budapest University of Technology and Economics (www.bme.hu)
University of Debrecen (www.klte.hu)
Eötvös Loránd University, Budapest (www.elte.hu)
Liszt Ferenc Academy of Music, Budapest (www.liszt.hu)
Hungarian University of Craft and Design, Budapest (www.mie.hu)
University of Miskolc (www.uni-miskolc.hu)
University of Western Hungary, Sopron (www.nyme.hu)
University of Pécs (www.pte.hu)
Semmelweis University, Budapest (www.sote.hu)
University of Szeged (www.u-szeged.hu)
University of Veszprém (www.vein.hu)
Szent István University, Gödöllő (www.szie.hu)
Zrinyi Miklós University of Defense, Budapest (www.zmne.hu)
Academy of Drama and Film, Budapest (www.filmacademy.hu)

7.4. Research and development institutes of the HAS by scientific fields

Natural Sciences And Mathematics	Life Sciences	Social Sciences Including Humanities
• "Rényi Alfréd" Mathematical Institute (www.renyi.hu) • Astronomical Institute (www.konkoly.hu) • Chemical Research Centre (www.chemres.hu) • Computer and Automation Research Institute (www.sztaki.hu) • Institute of Nuclear Research (www.atomki.hu) • KFKI Atomic Energy Research Institute (www.kfki.hu/~aekihp • Research Institute of Solid State Physics and Optics (www.szfki.hu) • KFKI Research Institute For Particle and Nuclear Physics (www.rmki.kfki.hu) • Research Centre for Earth Sciences • Research Institute for Technical Physics and Material Science (www.mfa.kfki.hu) • RCES Geodetical and Geophysical Research Institute (www.ggki.hu) • RCES Geographical Research Institute (www.miwo.hu/partner/mtafki) • RCES Laboratory for Geochemical Research (www.core.hu/geochem/index.htm)	• Agricultural Research Institute (www.mgki.hu) • Balaton Limnological Research Institute (http://tres.blki.hu/) • Institute of Ecology and Botany (www.botanika.hu) • Institute of Experimental Medicine (www.koki.hu) • Plant Protection Institute (www.nki.hu) • Research Institute for Soil Science and Agricultural Chemistry (www.taki.iif.hu) • Biological Research Centre (www.szbk.u-szeged.hu) • Veterinary Medical Research Institute (www.vmri.hu)	• Archeological Institute (www.archeo.mta.hu) • Institute of Ethnology (www.neprajz.mta.hu) • Institute of History (www.tti.hu) • Institute of Legal Studies • Institute for Literary Scholarship (www.iti.mta.hu) • Institute for Musicology (www.zti.hu) • Institute of Philosophy (www.phil-inst.hu) • Institute for Psychology (www.mtapi.hu) • Institute of Sociology • Institute of Art History (www.arthist.mta.hu) • Research Institute for Linguistics (www.nytud.hu) • Centre for Regional Studies (www.rkk.hu) • Institute of Economics (www.econ.core.hu) • Institute for Political Sciences (www.mtapti.hu) • Institute for World Economics (www.vki.hu) • Institute for the Study of Ethnic-National Minorities (www.mtaki.hu) • Research Centre for the Social Sciences

7.5. Science and Technology Attachés

Post - Name of S&T attaché Embassy	**E-mail address**
VIENNA - István Mányi	imanyi@huembvie.at
Embassy of the Republic	
of Hungary	
BERLIN - Judit Bádonfai	JBadonfai@ungarische-botschaft.de
Embassy of the Republic	
of Hungary	
BRUSSELS - István Mezei	imezei@humisbeu.be
Mission of the Republic	
of Hungary to the EU	
HELSINKI - Péter Grosschmid	hunctdhel@attmail.com
Embassy of the Republic	
of Hungary	
LONDON - Ildikó Szalai-Szűcs	ISzalai-Szucs@huemblon.org.uk
Embassy of the Republic	
of Hungary	
MOSCOW - Árpád Erdélyi	aerdelyi@huembmow.macomnet.ru
Embassy of the Republic	
of Hungary	
PARIS - György Pálfi	gypalfi@amb-hongrie.fr
Embassy of the Republic	
of Hungary	
ROME - Tünde Hagymási	thagymasi@huembrom.it
Embassy of the Republic	
of Hungary	
TEL-AVIV - László Dvorszki	ldvorszki@attglobal.net
Embassy of the Republic	
of Hungary	
TOKYO - Gyöngyi Kanyár	huembsta@gol.com
Embassy of the Republic	
of Hungary	
WASHINGTON - István Takács	itakacs@huembwas.org
Embassy of the Republic	
of Hungary	
Other EU S&T representation:	
Post, Name of director, Name of institution	**E-mail address**
BRUSSELS - Attila Zsigmond	attila.zsigmond@skynet.be
HunOR Hungarian Office for Research and Development	