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**Monitoring and analysis of policies
and public financing instruments
conducive to higher levels of R&D investments
The “POLICY MIX” Project**

Country Review Hungary

Submitted by*:

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Introduction and Policy mix concept

The policy mix project

This report is one of the 31 country reviews produced as internal working papers for the research project “Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments” (Contract DG-RTD-2005-M-01-02, signed on 23 December 2005). This project is a research project conducted for DG Research, to serve as support for policy developments in Europe, notably in the framework of CREST activities. It does not form part of the ERAWATCH project, but the working documents are made available on ERAWATCH webpages for the purpose of steering a debate on the policy mix concept.

The “Policy Mix” project is run by a consortium of 7 partners:

- UNU-MERIT (The Netherlands), consortium leader
- Technopolis (The Netherlands)
- PREST – University of Manchester (United Kingdom)
- ZEW (Germany)
- Joanneum Research (Austria)
- Wiseguys Ltd. (United Kingdom)
- INTRASOFT International (Luxembourg).

Each country review is produced by an individual author, and provides expert’s view on the policy mix in the country. This report is not approved by the Commission or national authorities, and is produced under the responsibility of its author.

The role of country reviews is to provide an exploratory analysis of the current policy mixes in place in all countries and detect the most important areas of interactions between instruments as well as new modes of policy governance that are particularly adapted (or detrimental) for the building of policy mixes. They provide analytical material for the analysis of the policy mix concept and its implementation in Europe. This material will be used as background for further reports of the project and for the construction of a tool for policy-makers (to be made available in late 2007 and 2008).

The policy mix concept

The country reviews are based on the methodological framework produced by the consortium to frame the “policy mix” concept. They have been implemented on the basis of expert assessments derived from the analysis of National Innovation Systems characteristics and policy mix settings, using key information sources such as Trendchart and ERAWATCH reports, OECD reviews, and national sources, among which the National Reform Programmes.

In this work, the “policy mix for R&D” is defined by the consortium as: **“the combination of policy instruments, which interact to influence the quantity and quality of R&D investments in public and private sectors.”**

In this definition, policy instruments are: “all programmes, organisations, rules and regulations with an active involvement of the public sector, which intentionally or unintentionally affect R&D investments”. This usually involves some public funding, but not always, as e.g. regulatory changes affect R&D investments without the intervention of public funds.

Interactions refer to: “the fact that the influence of one policy instrument is modified by the co-existence of other policy instruments in the policy mix”.

Influences on R&D investments are: “influences on R&D investments are either direct (in this case we consider instruments from the field of R&D policy) or indirect (in that case we consider all policy instruments from any policy field which indirectly impact on R&D investments)”.

Structure of the report

The report is structured along the following questions.

First, in section 1, and in order to place the policy mix in context, the general challenges faced by the National Innovation System (NIS) are analysed by the expert. The view is here not restricted to the challenges with regard to raising R&D investments, but rather encompasses all the conditions that directly or indirectly affect the functioning of the NIS and R&D expenditures. These context conditions are very important for the discussion of the relevance of the policy mix later on.

Second, the stated main objectives and priorities of R&D policy in the country are spelled out in section 2, as well as their evolution over the last ca. five years. This discussion is based on White Papers and official documents, i.e. on published policy statements. The reality of these objectives compared to actual working of policy instruments will appear in section 5.

The third section provides an expert assessment and critical analysis of a possible gap or convergence between the NIS challenges and the main policy objectives and priorities stated before.

Section 4 presents the policy mix in place, following the above definition, i.e. policy instruments affecting R&D activities in the private and in the public sector, either directly for instruments from the R&D policy domain, but also indirectly for instruments outside the R&D domain which are of particular relevance to R&D activities. A typology of instruments is used, to categorise the R&D-specific and non-R&D specific instruments. A short description of each instrument is provided: aim, nature, target group, budget.

Then, section 5 discusses whether there is a gap between the main policy objectives and priorities stated in section 2, and the instruments in place. This is done by comparing the set of objectives with the set of instruments at work. When individual evaluations of programmes or policy instruments are available, their results are used if they shed light on contribution of these instruments towards the policy objectives.

Section 6 discusses the orientation of the policy mix, indicating priorities amongst various possible routes to increase R&D investments. Policy instruments are categorised under 6 different routes according to their relevance, and this categorisation is followed by a discussion on the range of instruments affecting each route, missing instruments, routes that are not addressed by instruments, possible redundancies or overlaps, etc.

Section 7 provides another view on the policy mix, focusing on the relative importance of each types of instruments. The aim is to get a picture of the policy mix, the balance between (sets of) instruments, and the relative weight between them.

From section 8 onwards, the review turns to the crucial question of policy governance. That section discusses the emergence of the policy mix through examination of the following question: how did the set of R&D policy instruments arrive ? What is the rationale behind them, what were the driving forces behind their establishment, and how is this evolving recently. A crucial question relates to the existence of some consideration of possible interactions when establishing new or suppressing existing instruments. The section tries to establish whether the policy design process is incremental or radical, analytical or non-analytical. From this, that section discusses if the policy mix is a “construct” or an “ex post” reality.

The next section, section 9, focuses on the governance of the system of R&D policy instruments take place. It examines the key question of interactions, i.e. whether there is a form of co-ordination between R&D policy and policy instruments from outside the R&D domain, and the existing mechanisms that favour or hinder such interactions.

The final section, section 10, deals with the core question of the policy mix concept: it endeavours to discuss interactions between policy instruments to affect R&D expenditure. The section discusses possible positive, neutral and negative effects of R&D policy instruments; both within the R&D policy domain, but also with instruments from other policy domains. In most cases, this takes the form of hypotheses rather than hard evidence.

Feedback welcome

Feedback on this report is gladly received. Individual country reports will not be updated but discussion on policy mixes is welcome during the timeframe of the study (2006-2008). Please send your comments to:

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1. National Innovation Systems Challenges

The **fundamental challenge** for Hungary is to enhance competitiveness as a tool for improving quality of life and speed up the cohesion process with the advanced members of the EU.) Macro-economic pressures, notably budget, trade, and balance of payment deficits, also call for a successful, competitive economy. Thus, the national innovation system should be significantly strengthened, both in terms of its elements and the communication and co-operation among the various players.

Based on the review of national studies on the Hungarian STI system, at present the 3 main challenges for the National Innovation System of Hungary with respect to R&D intensity are as follows:

1. **To increase R&D expenditure first of all in the business enterprise sector.**
2. **To strengthen the human resource to support Hungarian innovation and R&D activities**
3. **To enhance the interactions between public R&D and business sector**

A strong, well-functioning NIS requires adequate human resources, too (in terms of quantity and quality). Yet, only a small proportion of young talents opt for STI careers, while experienced researchers leave Hungary, or swap for better paid, more prestigious jobs. These trends, can only be reversed, or at least slowed down, by offering attractive conditions for scientists and research engineers.

Academia-industry co-operation in Hungary is improving, but still insufficient. The bulk of indigenous SMEs are struggling for day-to-day survival, not engaged in innovation activities, and thus their prospects are rather gloomy. Indigenous SMEs often lack sufficient financial resources and managerial skills to engage in RTDI activities, and join international production and innovation networks.

Table 1: SWOT of the Hungarian NIS

Strengths	Weaknesses
<p>fairly developed R&D capacities in academia, intense participation in international research projects</p> <p>a broad range of adequate technology policy tools</p> <p>wide-spread participation in international production networks, strong export-orientation</p>	<p>lack of co-ordination among major policies (macroeconomic, education and HR, STI, investment promotion, regional development, etc.), weak position of STI policy-makers in the decision-making system (dominance of short-term concerns among decision-makers on economic and overall government policies, non-negligible influence of the linear model of innovation)</p> <p>small, weak innovation policy community</p> <p>lack of a comprehensive, sound STI strategy</p> <p>insufficient RTDI management capabilities in academia</p> <p>patchy academia-industry co-operation (archipelago of A-I co-operation)</p> <p>low share of business R&D expenditures in GERD, and low innovation spending, too dual economy: successful, export-oriented large companies – fragile SMEs</p>
Opportunities	Threats
<p>devising and implementing of a sound, context-specific catching-up strategy, with a major role of RTDI in it, following the underlying principles of the Lisbon strategy</p> <p>identifying relevant STI priorities and policy tools to tackle socio-economic problems, improve quality of life, enhance competitiveness</p> <p>efficient use of the EU (cohesion) funds, due to the above two factors</p> <p>deeper and more profitable integration into the international production and innovation systems, due to the increasing share of knowledge-intensive activities of the Hungarian partners (firms, R&D units, others)</p>	<p>mechanistic pursuit of the Barcelona target: focussing on R&D spending as an end in itself, instead of implementing a comprehensive innovation strategy, tackling country-specific socio-economic issues, using RT&D results as a crucial input</p> <p>copy of EU Framework Programme priorities</p> <p>low-cost production site of MNCs (low-value added activities, increasingly obsolete technologies)</p>

Sources: own illustration

As for R&D intensity, it is way below the EU25 average:

- Business expenditures on R&D are very low: 0.37% of GDP (in 2004), that is, less than one third of the EU25 average. Five years earlier that is in 2000 the figure was practically the same: 0.35%.
- The total Hungarian R&D expenditures were 0.89% of the GDP in 2004, slightly higher than in 2000: 0.82%.

Data on human resources for R&D can also be used to characterise R&D intensity, although in a somewhat indirect way:

- The number of total R&D personnel (FTE) decreased from 23,534 in 2000 to 22,826 in 2004.
- The number of researchers (FTE) slightly increased in 2000-2004: from 14,406 to 14,904.
- The number of business researchers (FTE) increased from 3,901 in 2000 to 4309 in 2004.
- The ratio of science and engineering graduates among people aged between 20 and 29 was 4.8‰ in 2003 – 4.5‰ in 2000 –, which leaves Hungary in the 21st position in the EU25.
- The share of the working age population (25-64 years) with third level education was 16.7% in 2003, up from 14.1% in 2000.

In sum, no major changes occurred in that 5-year period for which data are available.

Table 2: Major R&D indicators, Hungary, 1998-2004

	1998	1999	2000	2001	2002	2003	2004
GDP in € million	41.929,8	45.073,6	51.037,9	58.418,3	69.620,6	73.537,2	81.177,8
GERD as % of GDP	0,7	0,7	0,8	0,9	1,0	0,9	0,9
BERD as % of GDP	0,3	0,3	0,4	0,4	0,4	0,4	0,4
Share of BERD in GERD, %	38,4	40,2	44,3	40,1	35,5	36,7	41,1
No of organisations reporting R&D	1.725,0	1.887,0	2.020,0	2.337,0	2.426,0	2.470,0	2.541,0
of which business sector	258,0	394,0	478,0	630,0	670,0	674,0	669,0
Total R&D personnel, FTE	20.315,0	21.329,0	23.534,0	22.942,0	23.703,0	23.311,0	22.826,0
of which researchers	11.731,0	12.579,0	14.406,0	14.666,0	14.965,0	15.180,0	14.904,0
Business R&D personnel, FTE	5.593,0	5.899,0	6.471,0	6.779,0	7.196,0	7.180,0	6.704,0
of which researchers	3.044,0	3.261,0	3.901,0	4.071,0	4.344,0	4.482,0	4.309,0
R&D expenditure by source of finance	-	-	-	-	-	-	-
GERD: total, € million	285,2	309,3	405,3	548,0	705,8	693,1	721,3
GERD: government source, € million	160,4	164,7	200,8	293,8	413,2	402,2	373,7
BERD: total, € million	109,7	124,5	179,6	219,7	250,4	254,6	296,6

Source: Eurostat

Experts estimate that the realistic target for the next 5 years seems to be the increase of R&D expenditure (measured against GDP) by 0.10 - 0.15 percentage points annually, at least 2/3 of which should come from the business sector. This would only be the first step in catching up with the EU15 average (1.98% and 1.3%, respectively), which itself is lagging far behind the Lisbon target (R&D expenditure: 3% of GDP, 2/3 of which should be funded by the business sector). (Báger, Goldperger, Varga, 2005:84)

2. Objectives and priorities of R&D policy

The objectives in the Hungarian NIS have been changed over time. In order to understand the trend of the present priorities, the next paragraphs discuss the development of the Hungarian R&D Policy Objectives in the past five years.

First in 2000, an ambitious science policy document, entitled **Science and Technology Policy – 2000**, was drafted by civil servants of the Ministry of Education and approved by the Science and Technology Policy Council in its first version in March 2000. This document represents a sharp return to the linear model of innovation, indicating the strength – as well as the way of thinking – of the “science” lobby.

The final reports of the first **Hungarian Technology Foresight Programme (TEP)** were published as a series of booklets in 2001. (www.foresight.hu) The Steering Group and the seven thematic panels assessed the current situation, outlined different visions for the future, and devised policy proposals. The thematic panels analysed the key aspects of the following areas: human resources; health and life sciences; information technology, telecommunications and the media; natural and built environments; manufacturing and business processes; agribusiness and the food industry; transport. Their main concern was to identify major tools to improve the quality of life and enhance international competitiveness, and thus they emphasised the significance of both knowledge generation and exploitation. Long-term visions and policy recommendations of the seven panels were also formulated in the broader context of innovation. It was telling that the Steering Group grouped its 22 recommendations under three main headings:

1. an educated, co-operative, flexible and healthy population, adaptable to the ever-changing external conditions, ideas, solutions and value systems;
2. a clean and healthy environment; and
3. an appropriate, strong and effective national system of innovation.

These recommendations did not have any significant effect on the policy framework before May 2002. The first **National Development Plan (NFT) (2004-2006)**, however, heavily relies on the so-called macro visions published in the Steering Group report of TEP.

R&D and innovation were included in the May 2002 government programme, identifying four priority objectives:

- create an innovation-friendly regulation environment
- make Hungary an attractive R&D investment site
- strengthen the protection of intellectual property rights
- increase innovation sources for SMEs.

After joining the European Union, Hungary prepared and submitted the National Development Plan (NFT) for the applicable part (2004-2006) of the 2000-2006 European planning period. The focus of the Hungarian NFT is on convergence with the level of socio-economic development of the EU, which is in line with the primary aim of Structural Funds, namely, strengthening the economic and social cohesion; reduce the development differences between member states and regions.

Convergence is ensured by the main specific objectives of the NFT.

- creating a more competitive economy,
- improving the use of human resources,
- ensuring better environment and basic infrastructure,
- a more balanced regional development.

Five Operative Programmes serve to fulfil these objectives. One of them is the Economic Competitiveness Operative Programme (ECOP), focusing on R&D and innovation along with further important topics like information society, investment incentives and SME promotion. The aim of the ECOP is to broaden and expand the basis of economic development in sectors and regions, and to maintain the high rate of growth, through boosting productivity and the rate of employment, which ensures a gradual convergence between the economic development of the country and the EU. So as to address the above strategic directions, five priorities were specified in the ECOP (ECOP, 2003: 10-11):

- investment promotion,
- development of SMEs,
- R&D, innovation,
- development of the information society and e-economy,
- technical assistance.

A new prime minister took office on 4 October 2004 (supported by the same coalition of parties that has held a parliamentary majority since 2002), and the government was reshuffled. The new government programme indirectly confirmed the STI priorities set in May 2002 by emphasising the importance of competitiveness, and mentioning innovation and new technologies, specifically ICTs, as important factors to enhance competitiveness. (Government Programme [2004])

A new government, comprised of the same two parties that governed in 2002-2006, was formed in June 2006. R&D and innovation are included in the new government programme, stating that the government has “set the objective that more and more Hungarian entrepreneurs can participate in the creation of research and development jobs, so that knowledge is not confined within the walls of universities and research institutes”. Therefore, it will „establish a national innovation system that can respond to the aspects of both international excellence and business efficiency”. (Government Programme [2006], p. 43) Furthermore, the following priorities are identified:

- support for corporate R&D and innovation: establishment of company research sites; promotion of academia-industry co-operation; establishment of innovation-friendly legal and economic environment; setting up development poles;
- co-ordination of the rules and actions of the Research and Technological Innovation Fund and other funds promoting R&D and competitiveness. Funding, tendering and monitoring systems will be adjusted to the needs of interested businesses;
- strengthening advisory, training and educational activities in the regions and the development poles. SMEs and those introducing original Hungarian

products to the international markets are prioritised. Strengthening SMEs' managerial, innovation and entrepreneurial skills.

- support for technological incubator sites in cutting edge industries, promotion of international S&T partnerships and innovation and R&D oriented investments of foreign companies.
- rules and regulations promoting efficient use of intellectual property and simplification of rules on establishing businesses and making capital investments. Supporting technology transfer centres to promote the exploitation of patents.
- launching programmes to support and popularise education and careers in science and engineering, and to form innovative educational methods in co-operation with employers. Vocational and PhD training adjusted to the HR needs of businesses. Promote mobility. Support the co-operation between institutes of higher education, HAS, and the research sites of foundations. Increase the rate of assessment and performance-based financing.

The Law on Research and Technological Innovation stipulates that the government should devise an STI strategy document, which was still being drafted in September 2006 – although the original deadline was May 2005.

As for future policy objectives, two closely interrelated important quantitative goals are put in the focus by the President of the NORT:

1. to increase GERD considerably, i.e. to reach 2.1% of GDP by 2013
2. to raise the share of BERD significantly, at least 2/3 of the R&D expenditure should come from the business sector.

3. Coherence between NIS challenges and R&D objectives and priorities¹

Section 2 has revealed that there is no recent ST(I) policy document approved by the government. Some general objectives are included in the overall government programmes. The most detailed list of STI priorities can be found in the most recent government programme (2006-2010). This document takes a broader perspective: it tackles some RTDI issues, that is, not just R&D intensity in isolation. In one way or another, this document addresses all the major challenges identified in Section 1 (human resources for R&D; academia-industry co-operation; strengthening SMEs' innovation skills). It does not mention, however, R&D intensity specifically.

Another way to assess if there is a gap between challenges and the main objectives and priorities is to consider the existing policy schemes. In other words, the set of policy measures can be regarded as an implicit policy, i.e. what is supported by the existing schemes, can be interpreted as a priority. Section 4 shows that all the identified challenges are tackled by policy measures. In that sense, no major gap is visible between the challenges and the main objectives and priorities of the government.

As policy programmes are not evaluated, the apparent contradiction between the existence of the broad set of appropriate policy measures, on the one hand, and the persistence of the challenges, on the other, cannot be solved. Only hypotheses can be put forward here. This puzzle might be caused by

- it would take a longer period to see the expected outcomes;
- insufficient funding of the otherwise properly identified objectives;
- mismatch between the objectives and the tools employed to achieve them;
- inappropriate selection of the actual project proposals;
- the framework conditions hamper the expected positive outcomes of the existing STI measures.

It should be also added, however, that a number of challenges concern the STI decision-making system itself:

- Policy-making processes are not sufficiently transparent due to the lack of meaningful dialogues and discussions with stakeholders and experts.
- There is a strong tendency to 'reduce' RTDI into research in advanced scientific fields, 'equate' R&D with innovation, and neglect the variety of types and sources of knowledge required for successful innovation processes.
- Public support to RTDI is not efficient and effective because the lack of policy co-ordination, although an apparently appropriate decision-making mechanism has been put in place in Hungary in the form of two high-level bodies and a government agency responsible for R&D and innovation

¹ The answer of this question is based on an interview with PhD Attila Havas, Hungarian Academy of Sciences

programmes. Yet, policy co-ordination is fragmented – or does not exist – in practice. A large set of policies, such as education, investment promotion, industrial, regional development, competition, trade, monetary, fiscal, labour market, and environmental policies, as well as public procurement practices, standards and other regulations have non-negligible bearings on innovation and diffusion, and should thus be co-ordinated to boost competitiveness, speed up regional development. The existing, and potentially adequate co-ordination and decision-making/advisory bodies should fulfil their responsibilities as stipulated in the respective regulations.

- Modern policy-making methods are rarely used; policy schemes are not evaluated. No policy reviews (white papers or parliamentary debates) have been produced so far, in Hungary, nor has a systematic international comparative policy analysis been used to assess RTDI policies. The application of indispensable methods preparing policy decisions (e.g. systematic data collection and analyses of techno-economic issues, technology assessment or technology foresight), however, has not been included in the Law on Research and Technological Innovation – although suggested by independent experts on several occasions when the draft legislation had been discussed. Evaluation of RTDI policy measures has become compulsory since 2005 – but only one policy programme has been evaluated so far. Thus, it cannot be established if public money is spent in an effective and efficient way, to achieve the desired objectives.
- Policy schemes are changed too frequently and similar or the same objectives are supported by several schemes. This causes not only parallel activities and ‘deadweight losses’, but is also confusing for businesses and other potential beneficiaries.

4. Composition of the policy mix for R&D

There is a broad range of STI policy measures in place to enhance competitiveness and speed up the cohesion process. They support the development of new products, services and processes; provide incentives to increase business R&D and innovation expenditures; aim at fostering academia-industry co-operation, improving physical infrastructure at public, private non-profit and business R&D establishments, strengthening innovation capabilities of SMEs, slowing down brain drain, providing human resources for RTDI; developing the national and regional innovation and innovation governance systems, and promoting international co-operation in R&D and innovation.

First of all favourable loans used to be the dominant tools, grants have become the 'rule' since 2003-2004 for all sorts of goals, including not only to support the development of new products, processes and services, and to promote various types of co-operation (e.g. academia-industry links, clusters, international RTDI collaboration), but also for RTDI infrastructure and human resource development. In addition, tax incentives are also in place, as well as measures to promote the employment of PhD, MSc or MBA students, while recent legislations provide an overall legal and financial framework for RTDI activities.

Table 3: Classification of policy instruments

Policy categories	Policy instruments: short description and target group
<p>R&D Domain</p>	<p>Development of the research infrastructure of publicly financed and non-profit research facilities (KMA, GVOP 3.2.1): The aim of this scheme is to support the modernisation of equipment at publicly financed and non-profit R&D units so as to improve efficiency of R&D activities. Eligible activities include:</p> <ul style="list-style-type: none"> • purchasing new R&D instruments and equipment, upgrading existing ones • accreditation of measurement activities <p>Target Groups are: Higher education; institutions research units/centres; Other public and non-profit research organisations (not HEI)</p> <p>Information infrastructure for R&D (KIIF): The aim of this scheme is to provide advanced, high-speed information infrastructure for public and private non-profit organisations conducting R&D activities. Target Groups are: Higher education institutions research units/centres; Other public and non-profit research organisations (not HEI); Technology and innovation centres (non-profit); Other</p> <p>Large international R&D projects (NAP 2005): This measure supports large, interdisciplinary R&D projects, conducted by bi- or multilateral co-operation, including NoEs or IPs financed by the EU RTD FP. These projects should lead to results to be commercialised in short or medium-run; to enhanced international competitiveness of Hungarian R&D activities; to effective technology transfer. Target Group: Higher education institutions research units/centres; Other public and non-profit research organisations (not HEI); Technology and innovation centres (non-profit); Other</p>
<p>R&D policy sectoral</p>	<p>"Jedlik Anyos" Programme: The main goal of this integrated scheme is to promote long-term economic development in Hungary. The direct objective of the programme is to provide funding for projects meeting thematic priorities (see below) and aiming to:</p> <p>improve the competitiveness of the Hungarian economy, achieve S&T breakthrough in certain fields of research, focus financial and intellectual resources, implement task- and exploitation-oriented, focused R&D projects by meeting the appropriate staff requirements, establish coherence among basic and applied research, as well as technological development, strengthen the co-operation of Hungarian public R&D units and businesses, engage young graduates (PhD students and post docs) in research and encourage them to pursue careers in S&T; to promote the mobility of researchers; as well as encourage the return of successful Hungarian researchers living abroad. The thematic priorities are as follows: life sciences; information and communications technologies; environmental protection; agri-food industries and biotechnology; materials sciences; social challenges of technological changes (analyses, concepts).</p> <p>Mobile Communications R&D and Innovation Centre : This scheme is aimed at supporting the establishment of a Mobile Communications R&D and Innovation Centre and tested for future mobile communications technologies (3G, 4G). Target Groups are: All companies; Higher education institutions research units/centres.</p>

	<p>Agri-food RTDI projects (GAK) : The main goals of this scheme are to develop: new, competitive, high-value agri-food products (e.g. health-related and biofood; special Hungarian and niche market products); new plants and production processes to improve competitiveness (plant breeding; decreased seasonal volatility of production; longer production seasons; cost cutting; increased productivity); new agri-food technologies for increased compliance with regulation (e.g. food safety, environment protection, animal welfare), as well as better measurement methods and techniques; new agri-food technologies for sustainable development (utilisation of by-products in environment-friendly ways; more efficient bio-mass production for the energy sector; special agricultural and animal husbandry processes for areas of high ecological value; optimal dosage of chemicals; etc.). Target Groups are: All companies; Higher education institutions research units/centres</p> <p>Establishing a model incubator centre for biotechnology (BIOINKUB) The measure provides support for investments which aim to create incubator centres for small- or medium-sized enterprises in the field of biotechnology. The centres shall be able to operate independently; they must offer favourable conditions for the R&D activities of the hosted enterprises aimed at developing new products, processes and services, and promote their growth. The project consists of two phases. In the first phase, the applicant develops the specified infrastructure using the funds provided by the measure and finishes the investment project within two years. In the second phase, the applicant is obliged to operate the incubator centre according to the original terms defined in the call for five years. The centre must provide services that assist entrepreneurship and innovation activities in the hosted companies. Target Groups are: All companies; Consultancies and other private service providers (for-profit); Technology and innovation centres (non-profit); Business organisations (Chambres of Commerce) ; Other</p>
	<p>"Asboth Oszkar" Innovation Programme for Cutting-edge Industries The overarching objective of the scheme is to accelerate the evolution of the following cutting-edge industries: the health sector, biotechnology, and agriculture-based renewable energy-resources; by promoting the establishment of technology platforms and innovation clusters. The measure supports the setting up of technology platforms and innovation clusters, the activities of the participating organisations and the establishment of Innovation Cluster Centres, along with the execution of R&D and innovation programmes related to the technology platforms.</p>
<p>R&D / Innovation policy – Linkage</p>	<p>Application-oriented co-operative RTD activity (AKF, GVOP-2004-3.1.1) : The main aim of this scheme is to support application-oriented co-operative RTD projects in the following fields: material sciences, nanotechnology and manufacturing technologies; biotechnology; electronics, measurement, control technologies; energy technologies; information and communication technologies; environmental technologies; transport technologies, logistics. Academia-industry co-operation is given a priority, Target Groups are: All companies; Higher education institutions research units/centres; Other public and non-profit research organisations (not HED); Technology and innovation centres (non-profit)</p>

	<p>Co-operative Research Centres (KKK II): The main goal is to support co-operative research activities and technology transfer between companies and higher education institutes : All companies; Higher education institutions research units/centres</p>
	<p>S&T co-operation of businesses and publicly financed research units (CRC, GVOP 3.2.2): This scheme is aimed at promoting: scientific and technological co-operation of the business sector and the publicly financed research units; integration of education, economic and social target-oriented RTD co-operation for strategic purposes; by supporting the establishment of new Co-operative Research Centres.</p>
	<p>Law on Research and Technological Innovation (Act CXXXIV of 2004):</p> <ul style="list-style-type: none"> • to promote sustainable development of the Hungarian economy by improving the conditions to achieve and exploit R&D results and technological innovation, • to enhance the competitiveness of enterprises and facilitate the exploitation of regional R&D and innovation possibilities efficiently • to create jobs with high value added activities • to improve the professional skills of researchers and promote the appreciation of their activities to contribute to the diffusion of advanced technologies to improve defence capabilities of the country <p>Target groups are: All companies; Scientists / researchers (as individuals); Higher education institutions research units/centres; Other public and non-profit research organisations (not HEI); Technology and innovation centres (non-profit); <i>Other</i></p>

	<p>"Pazmany Peter" Programme (Regional Knowledge Centres at Universities) : The overall objective of this programme is to promote the establishment of world leading scientific and technological university innovation centres university named Regional University Knowledge Centres in order to establish professional and regional centres of gravitation that perform outstanding research and development activity and technological innovation, strongly cooperate with the industrial sector, stimulate the technological and economical development of the given region, thereby improving the competitiveness of the country.</p> <p>The main aim of the scheme is to foster the creation of research and technological innovation centres at universities, on a par with the best ones globally. These Regional Knowledge Centres are supposed to closely co-operate with businesses, speed up the given region's technological and economic development, and thus enhance competitiveness both at the regional and national level. Further aims include to: (i) create critical mass of knowledge and professionals in the field of advanced technologies; (ii) involve students in R&D in large numbers, create new jobs, employ young researchers; (iii) speed up knowledge and technology transfer among universities and businesses; (iv) foster exploitation and commercialisation of R&D results; (v) support innovation activities of SMEs in the region, especially knowledge- and technology-intensive start-up and spin-off firms by subsidising R&D projects; (vi) create university innovation centres and cores of regional innovation clusters; (vii) attract high-tech companies, R&D institutes to locate their activities at university campuses, including foreign investors. Target Groups are: All companies ; Higher education institutions research units/centres ;Other public and non-profit research organisations (not HEI)</p> <p>Miksa Deri (EUREKA): This scheme supports international R&D co-operation with the aim of strengthening firm's competitiveness, especially that of SMEs facilitating international innovation co-operation strengthening Hungarian participation in ERA via more intense participation in EUREKA projects improving academia-industry co-operation by promoting R&D projects close to the market improving the chances of Hungarian exploitation of results achieved by participating in EU R&D projects. Target groups are: All companies , Higher education institutions research units/centres, Other public and non-profit research organisations (not HEI), Technology and innovation centres (non-profit), Other</p>
R&D / Innovation policy – IPR	
R&D specific financial and fiscal policy	<p>Research and Technological Innovation Fund : to provides table and reliable financing for innovation and support knowledge intensive companies. Financing: mandatory contribution of companies plus government budget 25 % of the financial resources of the Fund should be used for regional innovation purposes. The Regional Development Committees shall draw up a proposal for the utilisation of these resources through a competitive procedure.</p>

	<p>Support to new, technology and knowledge-intensive micro-enterprises and spin-off companies (GVOP 3.3.1): This scheme supports the RTDI activities of new, start up enterprises that operate in technology and knowledge intensive sectors, and spin-off companies that aim to exploit the results of R&D activities of higher education institutes. The overall aim is to improve competitiveness by strengthened RTDI capabilities of SMEs. Specifically: promote the establishment of innovative, technology-based micro firms; commercialise RTD results by setting up spin-off companies; improve the quality of RTD activities of firms. Target Groups are: SMEs only ; Scientists / researchers (as individuals); Other</p> <p>The Act XC of 2003 on the Research and Technological Innovation Fund" was approved by the Hungarian Parliament on November 10, 2003, creating a stable and reliable financial ground for research, technological development and innovation activities. The Act set up the Research and Technological Innovation Fund (hereafter: Fund). The two most important revenue sources of the Fund are the central budget (as legal successor of the previous Technological Development Programme [KMuFA] and National Research and Development Programmes [NKFP] expenditures), and the contribution paid by enterprises (except of micro-enterprises, with less than 10 employees). The so-called innovation contribution is charged on the basis of the adjusted net revenues of the previous year: medium-sized and large enterprises had to pay 0.2% of that amount in 2004, and the rate is gradually increasing to 0,3% by 2006. Small companies had to pay 0.05% in 2004, and have been exempted from 2005. As an incentive to conduct research and development activities, the contribution to the Fund should be reduced with the amount of direct costs of in-house research and development activities, as well those of commissioned from a public research institution or from a non-profit research organisation, financed by own sources. Target Groups are: All companies , Higher education institutions research units/centres, Other public and non-profit research organisations (not HEI), Technology and innovation centres (non-profit), Other</p> <p>200% of R&D expenditures deductible: Increase rates of expenditure on research and technological innovation in enterprises. Target groups are. All companies, Technology and innovation centres (non-profit) , Business organisations (Chambers of Commerce...)</p> <p>100% of R&D expenditures deductible From January 2001 on, companies can account for their R&D expenditure at 100%. This option is also available for extramural (subcontracted) R&D activity not carried out by the companies themselves, but by public or non-profit research organisation as a subcontract.</p> <p>70% tax release for R&D donations and faster tax reimbursement etc. making the innovative activities and the overall entrepreneurial conditions more favourable.From January 2003 further incentives were introduced such as the option for tax-free investment reserves up to 500 M HUF, accelerated amortisation of ICT investments,</p> <p>In addition to that, the corporate taxation rules have been changed from January 2004. To improve the competitiveness of the domestic enterprises, their corporate tax decreases to 16 % from 18 %.</p> <p>From 2004 300% RTD tax allowance if the company lab is located at university or public research institute</p>
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R&D specific education policy	
R&D specific employment policy	<p>Employment of PhD, MSc or MBA students: To cut costs of R&D, as well as to ease the financial situation of students, the employment of PhD, MSc or MBA students is tax-free in the field of educational and research activities and other services closely related to these activities, up to the level of the official minimum wage. Target Groups are the Higher education institutions research units/centres</p> <p>Development of corporate research infrastructure related to the creation of new RTD jobs (GVOP 3.3.2) : The overall aim of this scheme is to enhance competitiveness of firms, specifically by improving the quality of their RTD activities; developing skills required to commercialise RTD results; supporting technology-intensive SMEs; upgrading their RTD infrastructure. <i>Target Group are:</i> All companies</p>
Finance Domain	
Financial and fiscal policy	
Macroeconomic policy	
Human Capital Domain	
Education policy	<p>Developing the infrastructure of education and training (HEFOP-2004-4): This measure aims to improve the infrastructure of education and training so as to reduce the territorial disparities in this respect, through the development the infrastructure of the integrated regional vocational training centres in order to ensure an appropriate environment for practice-oriented and modular training; higher education organisations to facilitate high quality mass-education in higher education.</p> <p>Its first component enhances the development of infrastructural condition of organisations joining the integrated regional vocational centres (ISCED 2,3,4,5). The objectives will be fulfilled by extension and reconstruction of buildings adequate for theoretical and practical training, as well as by purchase of equipments. The second component aims at higher education organisations, including the development of learning spaces: establishing practice oriented training/learning/teaching spaces and creating individual learning spaces as part of the regional resource centres. Another element is the creation of an accessible environment for the disabled people: new infrastructural establishments and the already existing parts of the HEI have to provide free access for the disabled. To sum up, this priority also contributes to the overarching objective of raising the rate of employment. Target Groups Higher education institutions (education function)</p>

	<p>Strengthening the links between education and the economyThe Projekt was aimed as strengthening the co-operation between the main actors of the economy and education. The programme covered four major education-economic areas:</p> <ul style="list-style-type: none"> • The development of co-operation between higher education and the economy • The creation of new segment in the area o higher vocational training: an accredited schoolbased higher vocational training • The development of distance learning curricula. <p>The project contributed to improving the quality of education and supported educational and vocational training courses to be conducted The Project costs was about 8 Millin Euros</p> <p>Developing entrepreneurial skills in secondary schools and higher education This programm e, to be implemented in secondary education, higher education, teacher training and adult training, intends to contribute to developing entrepreneurial skills and competence based skills necessary for entrepreneurial activities, which, through strengthening the knowledge background of small and middle-size enterprises, helps broaden the opportunities on the labourmarcet and increase employment. Costs are: 3,2 MEUR</p> <p>Promoting life-long learning and adaptability (HEFOP-2004-3): This measure aims at improving the efficiency of the education and training systems through the provision of more effective and responsive initial and continuing vocational training. Through the support for training of employees and entrepreneurs, it seeks to foster skills development in line with the knowledge-based economy, including in particular the development of skills required by the information society. The measure should directly contribute to enhancing the competitiveness of the labour force. It consists of 5 elements, of which 3 are directly relevant to innovation:</p> <ol style="list-style-type: none"> 1. Promoting the development of skills and competences necessary for lifelong learning 2. Developing the content, methodology and structure of vocational training 3. Developing the structure and content of the higher education <p>Target Groups are: Higher education institutions (education function) ; Private institutions for education / lifelong learning</p>
Employment policy	
Innovation Domain	
Innovation policy generic	<p>INNOCSEK: The main goal of this scheme is to promote the demand for innovation services by providing a voucher to micro- and small enterprises that need these services. Target Groups are all companies</p> <p>Innovation and research activities of SMEs (GVOP 3.3.3): The main aims of this measure are as follows: promoting the introduction of new, improved products, technologies and services; supporting the development of absorptive and innovation capabilities of SMEs; supporting RTDI activities of SMEs; promoting academia-industry co-operation. Target Groups are: SMEs only</p>

Innovation policy sectoral	
Other policies - industry	
Other policies - trade	
Other policies - defence	
Other policies – consumer protection	
Other policies – health and safety	
Other policies - environment	
Other policies – regional development	<p>Regional Innovation Agencies (RIA): facilitate regional cohesion; strengthen regions' competitiveness by supporting R&D and innovation project; strengthen firms' competitiveness, especially that of SMEs operating in regions; develop innovation-friendly environment in regions; strengthen regional innovation clusters; provide innovation services in regions by establishing Regional Innovation Agencies. Target Groups are: Consultancies and other private service providers (for-profit); Higher education institutions research units/centres; Technology and innovation centres (non-profit); Other</p> <p>"Baross Gabor" Programme, Supporting regional innovation networks:</p> <p>The overall goal of the Regional Innovation Agencies (RIU) is to enhance the competitiveness of their regions by improving the local innovation potential. Since the RIUs formulated their own programmes according to the specific needs and priorities of their regions, the individual calls under the Baross Gabor Programme differ substantially. Generally, the following main themes are targeted:</p> <ul style="list-style-type: none"> -support for the transfer of technology and knowledge; -support for product and service innovation; -creation of regional innovation clusters; -support for SMEs and spin-off companies; - development of R&D and innovation infrastructure. Target Groups are: All companies ; SMEs only; Higher education institutions research units/centres; Other public and non-profit research organisations (not HEI); Technology and innovation centres (non-profit)
Other policies - competition	
Other policies – social security	

5. Coherence between main policy objectives and priorities, and policy instruments

There are quite a few measures in Hungary addressing the various identified challenges but their impacts cannot be established yet. What remains a huge task is to establish if these schemes are effective, according to this regular external evaluation should be introduced. Generally speaking, there is a gap between R&D and innovation challenges, national objectives and corresponding instruments and their implementation in the practice. The existing policy mix instruments only partly addressed major needs of the national and regional innovation system. In sum, partial lack of data and reliable analyses on innovation performance prevent any sound appraisal of the effectiveness of the process of designing and delivering policies. It cannot be established, either, whether the policy-making processes and mechanisms lead to a coherent and balanced policy mix.

It should be mentioned that the challenges (increase R&D expenditure first of all in the business enterprise sector, strengthen the human resource to support Hungarian innovation and R&D activities, enhance the interactions between between public R&D and business sector pp 4-5.) are all closely inter-related as most of them concern various aspects of the principal challenge Hungary faces, namely enhancing competitiveness for improved quality of life, and a smooth cohesion process in the foreseeable future.

Overcoming the lack of finance as a major barrier to innovation has been the subject of a number of policy measures. Tax incentives have been introduced to stimulate firms spending more on R&D. Another step forward was the creation of the 'Research and Technology Innovation Fund' aimed at creating a stable and reliable financial ground for research, technological development and innovation activities.

Further schemes are designed to contribute to enhancing competitiveness via specifically targeting academia-industry relationships, usually by supporting joint development of new products, services and processes. A few Programmes are explicitly aimed at supporting notably the development and introduction of new products, services or production processes. Scientific and technological co-operation of the business sector and the publicly financed research units is supported by most of the program. There are measures aim at upgrading the infrastructure of publicly financed and non-profit research institutes and the R&D units of companies, and thus to improve the chances of developing new products, services and processes, as well as to provide the necessary background conditions for more intense academia-industry co-operation.

6. Policy mix instruments and target groups

The specifications of the policy instruments are results of the problems recognized in National Innovation Systems. So, any classification may not be sufficient to represent the spectra of aims. Very often the policy measures may target several actors, especially in case of general programmes but also in case of special programmes, when they include several goals. Nevertheless we followed the proposed classification scheme as a background standardisation tool for further analysis. Consequently the mapping may not always be quite precise.

Therefore using the table of the methodological report with six groups of actors, a rough classification of R&D policy instruments is shown in table 4.

In Hungary the greatest number of policy instruments is strictly targeting enterprises, first of all R&D performing enterprises. These programs emphasize the importance of greater R&D investment in business sector and importance of cooperation between business and public sector.

Hence, classified according the ‘broad routes to increase R&D investment’ proposed by the methodological report of the ‘Policy Mix’ programs the Hungarian policy mix focuses strongly on route 2: the stimulation of greater R&D investment in R&D performing firms, and route 5: the increase extramural R&D carried out in cooperation with public sector (see table 4).

Table 4 : Policy instruments and broad routes to increase R&D investments

Policy categories	Policy instruments	ROUTE 1: promote establishment of new indigenous R&D-performing firms	ROUTE 2: stimulate greater R&D investment in R&D-performing firms	ROUTE 3: stimulate R&D investments in firms non-performing R&D	ROUTE 4: attract R&D-performing firms from abroad	ROUTE 5: increasing extramural R&D carried out in cooperation with public sector	ROUTE 6: increase R&D in public sector
R&D Domain							
R&D policy generic	§ Development of the research infrastructure of publicly financed and non-profit research facilities						x
	§ Information infrastructure for R&D						x
	§ Large international R&D projects				x	x	x
R&D policy sectoral	§ "Jedlik Anyos" Programme					x	x
	§ Mobile Communications R&D and Innovation Centre		x			x	x
	§ Agri-food RTDI projects		x			x	x
	§ BIOINKUB		x		x	x	
	§ "Asboth Oszkar" Innovation Programme						
R&D / Innovation policy – Linkage	§ Application-oriented co-operative RTD activity		x			x	x
	§ S&T co-operation of businesses and publicly financed research units		x			x	x

	§ Law on Research and Technological Innovation		x	x			
	§ "Pazmany Peter" Programme		x			x	x
	§ <i>Miksa Deri (EUREKA)</i>		x		x		
	§ Co-operative Research Centres		x		x	x	x
R&D / Innovation policy – IPR							
R&D specific financial and fiscal policy	§ Research and Technological Innovation Fund		x	x			
	§ Support to new, technology and knowledge-intensive micro-enterprises and spin-off companies		x	x		x	
	§ The Act XC of 2003 on the Research and Technological Innovation Fund		x	x			
	§ 200% of R&D expenditures deductible		x	x			
	§ 100% of R&D expenditures deductible.		x	x			
	§ 70% tax release		x	x			
	§ Tax decreases to 16 % from 18 %		x	x			
	§ 300% RTD tax allowance		x	x			
R&D specific education policy							

R&D specific employment policy	§ Employment of PhD, MSc or MBA students		x				
	§ Development of corporate research infrastructure related to the creation of new RTD jobs		x				
Finance Domain							
Financial and fiscal policy							
Macroeconomic policy							
Human Capital Domain							
Education policy	§ Developing the infrastructure of education and training					x	x
	§ Developing entrepreneurial skills in secondary schools and higher education					x	
	§ Promoting life-long learning and adaptability		x				x
	§ Strengthening the links between education and the economy		x			x	x
Employment policy							
Innovation Domain							
Innovation policy generic	§ INNOCSEK		x	x			
	§ Innovation and research activities of SMEs		x	x			
Innovation policy sectoral							

Other policies - industry							
Other policies - trade							
Other policies - defence							
Other policies – consumer protection							
Other policies – health and safety							
Other policies - environment							
Other policies – regional development	§ Regional Innovation Agencies		x	x		x	
	§ Baross Gábor Programm		x	x		x	
Other policies - competition							
Other policies – social security							

7. Balance within R&D policy mix

A number of changes have characterised the policy mix supporting innovation in recent years. First, while previously favourable loans used to be the dominant tools, grants have become the 'rule' since 2003-2004 for all sorts of goals, including not only to support the development of new products, processes and services, and to promote various types of co-operation (e.g. academia-industry links, clusters, international RTDI collaboration), but also for RTDI infrastructure and human resource development. In addition, tax incentives are also in place (e.g. 200% of R&D expenditures deductible). as well as measures to promote the employment of PhD, MSc or MBA students (Employment of PhD, MSc or MBA students).

In Hungary the two most important policy instruments generating increasing R&D expenditure are the Research and Technology Innovation Fund and the various tax incentives. The Research and Technological Innovation Fund is likely to increase GERD and also BERD because it provides automatic government funding to match contributions of companies to research and technological innovation. In Hungary, there also exist tax incentives governmental supports for R&D and innovation in the private sector. As far as tax incentives are concerned, tax schemes are based on the level of R&D expenditures. The most important fiscal measures to stimulate R&D are as follows:

- From January 2001 on, companies can account for their R&D expenditure at 100%. This option is also available for extramural (subcontracted) R&D activity not carried out by the companies themselves, but by public or non-profit research organisation as a subcontract.
- From January 2003 further incentives were introduced 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.
- In addition to that, the corporate taxation rules have been changed from January 2004. To improve the competitiveness of the domestic enterprises, their corporate tax decreases to 16 percent from 18 percent.
- From 2004 300% RTD tax allowance if the company lab is located at university or public research institute.
- Tax free employment of PhD, MSc or MBA students (up to the official minimum wage) in the field of educational and research activities and other services closely related to these activities. (<http://www.nkth.gov.hu/main.php?folderID=891>)

The provisions of the Research and Technological Innovation Fund, as well as the various tax incentives, are expected to induce a higher BERD and GERD.

Joining the EU has had major repercussions on the Hungarian RTDI policy schemes. EU rules on public subsidies have to be followed. One of them is that schemes cannot be "doubled": a given objective/ activity can only be supported by one scheme, either by a purely national one, or by a jointly financed one. Therefore, the ones eligible for

co-funding from the European Regional Development Fund (ERDF) have to be clearly separated from the ones supported by purely national sources.

Since the second half of 2004, a much stronger emphasis has been put on regional RTDI issues with programmes like the "Baross Gabor" Programme, Supporting regional innovation networks, the "Pazmany Peter" Programme (Regional Knowledge Centres at Universities) and the Regional Innovation Agencies, INNOCSEKK (Innovation voucher).

In the past few years the technical infrastructure of universities and R&D units are becoming obsolete quite quickly, given the ever faster technological changes. Thus, a new scheme, called Information infrastructure for R&D, was introduced to remedy at least one part of this problem and to provide advanced, high speed information infrastructure for public and private non-profit organisations conducting R&D activities. A broad-band information infrastructure with a national coverage can facilitate both domestic and international communications, and hence co-operation and group work among researchers.

In order to counter the low rate of academia-industry co-operation, which is an especially weak point of the Hungarian innovation system, a scheme was already launched in the late 1990s to support cooperative research and technology-transfer between companies and higher education (Co-operative Research Centres). This scheme was replaced by a new one S&T co-operation of businesses and publicly financed research units in 2004, when EU co-funding became available – with the same broad aims. The already existing Co-operative Research Centres (CRCs) did not have any opportunity to receive continued funding. A new scheme has therefore been devised for the successful CRCs to support their sustained, extended activities.

Table 5 tries to summarise the importance of the instruments according to the following criteria:

- a) overall contribution to increase of private R&D expenditures
- b) impact on specific aspects of the NIS or R&D performers (when possible)
- c) public attention/attention by policy makers
- d) volume of public funding involved
- e) beneficiary of a shift in public funding

Table 5: Assessment of "importance" of R&D policy instruments

Instruments	Funding (2004-2006)	Criteria				
		a	b	c	d	e
Act XC year 2003 on the Research and Technology Innovation Fund	30.0	XX	XX	X	X	XX
Tax incentives for research and technological activities	n.a.	XX	X	XX	XX	XX
"Baross Gabor" Programme	18.6 MEUR	X	XX	XX	X	X
"Pazmany Peter" Programme	2004: 36 MEUR; 2005: 24 MEUR; 2006: 10 MEUR is available for funding.	XX	XX	XX	XX	XX
Regional Innovation Agencies	5,6 MEUR	X	XX	XX	X	X
INNOCSEKK	20 MEUR	X	X	X	X	X
Information infrastructure for R&D	5,6 MEUR	X	X	X	XX	X
Co-operative Research Centres	8 MEUR	XX	XX	XX	XX	XX

X= relevant XX= very relevant

8. Emergence of R&D policy mix

The Hungarian R&D and innovation policy was influenced by the general internationalisation processes and especially by joining the EU and participating increasingly in EU Framework programmes. At the present time in Hungary the Policy measures are designed mainly by governmental officials, sometimes with the advice of external experts and the business sector. The Hungarian's EU membership plays also a significant role in developing the set of R&D instruments.

Joining the EU and implementing the competition regime of the integrated market technology policy have grown up in importance in the Hungarian policy landscape. Several programmes can also be seen as the result of the specific governance structure of the Hungarian R&D policy mix, where at least two ministries have their responsibilities in this policy field. "In 2004 the focus of the R&D programs shifted from the academically to the industrial sector. During the past 5 years decisions by the Ministry of Education were mostly in favour of the higher education sector. "As of 2006, the National Office for Research and Technology is supervised by the Minister of Economy and Transport – replacing the Minister of Education – on behalf of the government". Therefore an increasing amount of industrial actors are becoming more active in R&D by spending both more time and more money on R&D. Also, cooperation between the academic and industrial sector has improved significantly."(Interview with Tamás Balogh; Ministry of Industry and Transport, 2006)

Having the legal competences and only a very loose coordination process working between governmental officials, they all came up with initiatives and a range of new instruments, often focused on similar goals and targets (e.g. Co-operative Research Centres (KKK) or industry-science linkage programmes like Regional Knowledge Centres at Universities).

The general trends in direct measures of RTI policy can be summarized with following statement:

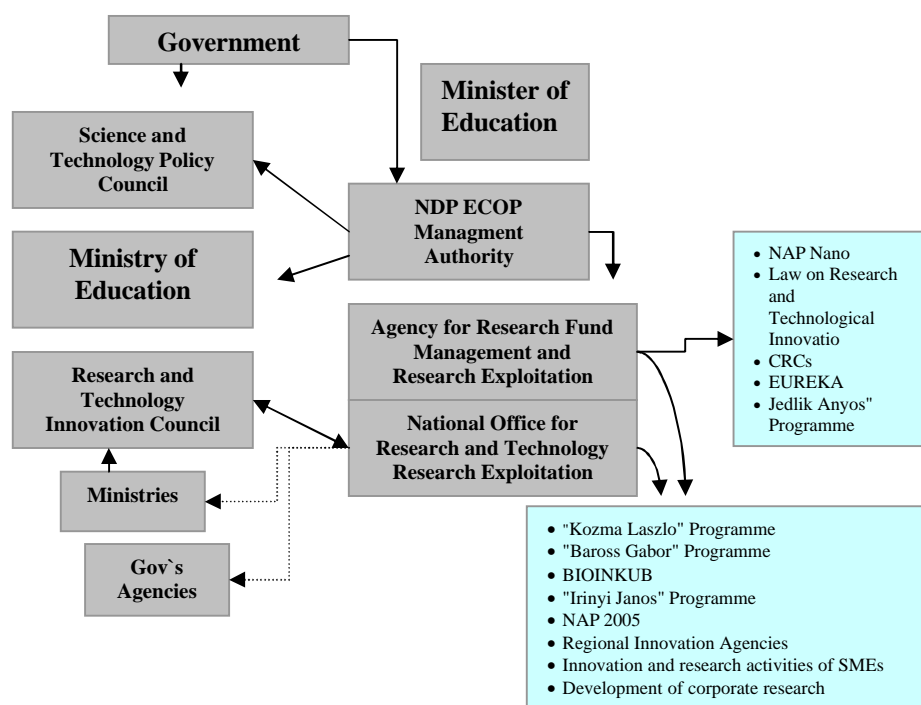
- (1) consisting instruments are not substituted by new ones but supplemented and
- (2) there is a trend of programme orientation during last 3 years.

9. Governance of the policy mix

At the present time in Hungary the Policy measures are designed mainly by governmental officials, by the Agency for Research Fund Management and by the National Office for Research and Technology Research Exploitation, sometimes with the advice of external experts and the business sector. From 2000 to 2003, on the Government level, the R&D Division of the Ministry of Education (MoE) was responsible for planning 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 government was reshuffled in June-July 2006 and the transition process can easily take several months at the level of RTDI agencies and other relevant organisations. The organisational structure might change as the result of the potential re-organisation of certain bodies and re-allocation of responsibilities.

Figure 1: Organisational chart of the innovation governance system in Hungary



Source: own illustration

In Hungary the highest government level consulting body of science and technology policy is the Science and Technology Policy Board (TTPK). It is headed by the Prime Minister, and the Vice-Chairs are the Ministers responsible for Education, for Economy and Transport, respectively and the President of the Hungarian Academy of Sciences. The TTPK and its advisory body, the Science and Technology Advisory

Committee (TTTT), have been established by the government decree in April 2003. The TTTT is composed of eleven highly distinguished scientists and R&D experts. The Council's mandate is

- to discuss preparatory documents on policy decisions prepared for the Government on STI policy issues;
- to co-ordinate Government STI policy measures;
- to discuss current STI policy issues and facilitate their solution.

The TTPK could be an appropriate forum for a high-level policy co-ordination: – however, it rarely meets (about one session per year), and thus cannot perform its co-ordination role. (For further details, see a recent interview with the President of the [Science and Technology Policy, Competitiveness Advisory Board](#) [the advisory body of the TTPK]: Népszabadság, June 30, 2006)

The Ministry of Education and Culture (OKM) plays a key role in the formation and implementation of science and education policies. The minister (not the ministry) was responsible on behalf of the government to supervise the activities of the National Office for Research and Technology until June 2006, and hence had the opportunity influence technology and innovation policies, too.

[Ministry of Economy and Transport](#) (GKM) operates a number of innovation policy measures and supervises the government offices responsible for quality management, intellectual property, standardisation, metrology, energy and consumer protection. The Research and Technology Innovation Council (KTIT) makes strategic decisions concerning the use of Research and Technological Innovation Fund. The Council, a 15-strong body, consisted of 7 high-ranking government officials (secretaries or under-secretaries of state) nominated by various ministers, and 8 members representing the business and STI communities (at least 4 of these should be business people). The Council should meet at least 4 times a year.

All ministries have some role in science, technology and innovation in their remit, financing R&D institutes, RTDI programmes, or education and training projects. A number of ministries (FVM – Ministry of Agriculture and Rural Development, KVM – Ministry of Environment Protection and Water Management, EüM – Ministry of Health) also carry out R&D and innovation tasks. Some ministries supervise their own research institutes.

Since the 1st of January, 2004, the [National Office for Research and Technology](#) (NORT; or NKTH) is responsible for the government's technology policy, as a successor of the R&D Division of the Ministry of Education (2000-2003), which in turn was a legal successor of the National Committee for Technological Development. The NKTH devises R&D and innovation programmes, manages international R&D co-operation in bilateral and multilateral relations as well as supervises the network of Hungarian science and technology attachés. The NKTH was responsible for developing the Hungarian National Development Plans, including STI priorities. National Development Plan is needed to be eligible for EU Structural Funds and therefore contains development objectives and priorities.

In sum, the reason for insufficient policy co-ordination is not the lack of relevant organisations; it can be found in the inadequate practices of the existing bodies, especially that of the Science and Technology Policy Council, as well as the Research and Technology Innovation Council.

10 Interactions between policy objectives and instruments

It is fairly difficult to describe the exact interaction among the Hungarian R&D instruments, since the focus areas in the Hungarian NIS are often determined rather arbitrarily without consideration of the macroeconomic framework conditions.

First, Monitoring has not been a widely used practice in Hungary, as no indicators had been set in advance, against which projects and programmes could have been monitored.

Second, the methods of the government are based on a hierarchical system; this is further complicated by the fact that over the past 12 years governments have frequently stayed in office for only four years. The political system interferes with the practice of a systematic and long-time balanced R&D policy. There no long-time experience with establishing policy-mix instruments exists the programs often tend to follow foreign examples. Even if there are interactions among the political objectives and the actual instruments, they are rather accidental than planned.

In Hungary indirect instruments may outweigh direct instruments, because they are easier to administrate. These are the Research and Technological Innovation Fund , tax allowances like the 200% of R&D expenditures deductible, 100% of R&D expenditures deductible, 70% tax release for R&D donations and 300% RTD tax allowance if the company lab. These indirect instruments target companies with R&D potential and lead to so called windfall gains. That means that SMEs that have not yet performed R&D, are not being addressed directly in these programs for future R&D activities.

Many top-down-instruments follow the same principle. The top-down-programs always contain a specific theme and goal. Usually these programs support a specific structural area of a country. In Hungary, many of the new sector programs that target for example biotechnology or nanotechnology need to be mentioned as examples of top-down-instruments. SMEs that are not part of one of these sectors cannot participate in the programs. Another problem is that the instruments are mainly demand-driven, thus the companies are not encouraged to define and pursue their own research topics.

Biotechnology and nanotechnology are deemed to be a promising field again (already in the late 80s and 90s important investments were made in this sector), but the appropriate infrastructure is missing. The first Program in the biotechnological sector was the Teller Ede Program to establish and operate an internationally recognized biotechnology research laboratory. After that the establishing a model incubator centre for biotechnology (BIOINKUB) provides support for investments which aim to create incubator centres for small- or medium-sized enterprises in the field of biotechnology. In North Hungary was also setting up a Nanotechnology Research Laboratory (NAP Nano).

There are many interactions among functional instruments, which are programs that strongly support cooperation between universities and companies. Accordingly two new functional instruments have been introduced since September 2004, supporting academia-industry co-operation. One of them is designed for the successful Co-operative Research Centres; the other one is called “Regional Knowledge Centres at Universities” and aims at fostering the creation of research and technological innovation centres at universities in close co-operation with businesses.

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