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# Public Funding of Research in CEEC

## CZECH REPUBLIC

*Karel Sima*



National Report on Public Funding

The logo for Prime, featuring a stylized orange and yellow circle above the word "Prime" in a bold, black, sans-serif font.

funded by the European Commission



# Public Research Funding in Central and Eastern European Countries

## Czech Republic Country Report

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## The Author

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The *Centre for Higher Education Studies (CHES)* was established in 1991 by the Ministry of Education, Youth and Sports. The main activities are the research in the area of tertiary education and the processing and distribution of information for this area, conducting analytical and strategic studies, implementing the educational programs of European Union in the Czech Republic, providing guidance in the matters resulting from the international conventions on the recognition of educational diplomas and also coordinating the activities concerning the implementation and development of distance education in the Czech Republic.

For the period 2005-2011, the new Research Plan *Tertiary Education in Knowledge Society* determines the basic areas of research of CHES in the following research fields: dynamics of the development of higher education systems; quantitative aspects and tendencies of development; quality of higher education; structure and content of the curriculum and infrastructure of the research

In some of the research fields, the Research Plan is complemented by research projects commissioned by the Ministry of Education, Youth and Sports. They enable to broaden the area of research, to collaborate with external experts, to include the financially demanding methodologies and they support the international collaboration. CHES participated in many international research projects including *Changes in University Incomes: Their Impact on University-Based Research and Innovation (CHINC, 2006)* commissioned the Institute for Prospective Technological Studies, *EUROSTUDENT III: socio-economic living conditions of students within Europe* (still running, partially funded also by the European Commission (Socrates) and the OECD Thematic Review of Tertiary Education 2006: CHES was responsible for coordination of writing of the Background report.

**List of abbreviations**

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CR	Czech Republic
AS	Academy of Sciences of Czech Republic
COSMC	Czech Office fo Surveying, Mapping and Cadastre
CSF	Czech Science Foundation
CSO	Czech Statistical Office
FTE	full time equivalent
HEI	higher education institution
MA	Ministry of Agriculture
MEYS	Ministry of Education, Youth and Sports
MFA	Ministry of Foreign Affairs
MH	Ministry of Health
MI	Ministry of Interior
Minf	Ministry of informatics
MIT	Ministry of Industry and Trade
MJ	Ministry of Justice
MLSA	Ministry of Labour nad Social Affairs
MRD	Ministry of Regional Development
MT	Ministry of Trade
NRP (I, II)	National Research Programme (I, II)
PRI	public research institution

## 1 Introduction

This report has been produced in the framework of the project on “Changing of Public Funding of Research in Central and Eastern European Countries” (CEEC – funding) realised and financed by the European Network of Excellence on Policies for Research and Innovation in the Move towards and European Research Area (PRIME) of the 7<sup>th</sup> Framework Programme of the European Union. The project covered three countries in Central and European Countries, namely Czech Republic, Estonia and Poland; it has been coordinated by the Observatoire des Sciences et Techniques in Paris and realised by the Centre for Higher Education Studies in Prague, the Institute of Economics of the University of Tartu (Estonia) and the Centre for Science Policy and Higher Education Studies of the University of Warsaw (Poland).

The project followed a large effort inside PRIME to develop indicators to characterize public funding of research in Western European countries and, more specifically, so-called project funding. Using a similar approach based on collection of information and funding data from national sources, including policy reports, state budgets, reports of funding agencies, the aim of the project has been to reconstruct a quantitative picture of public research and higher education funding in these countries, as well as of the main changes in the last ten years, comparing them also with other European countries. The rationale of this analysis is the profound restructuring of research policy and research funding which took place in CEEC after the end of the communist regime from one side, but also the open policy questions on the future development and priorities of research policy in these countries, faced with the access to the European union and the need to strengthen their economic basis.

National reports like this are the first output of the project: they contain a detailed description of national funding systems and of the different funding channels, which are a valuable reference source for future work in the field; moreover, they include also detailed data at national level taken from different sources, providing a measure of the importance of the different funding channels. While they are different following national specificities, there has been a true attempt in the project to use some rather common terminology (like the distinction between institutional and project funding), as well as some common schemes and description tables.

The national reports will constitute the basis for a more in-depth work comparing the national policies and understanding the (cultural, historical, institutional) reasons of their differences. Thus a set of academic papers focusing on comparative analysis and understanding the institutional framework of the funding system and its evolution across time is in preparation and will be presented at the PRIME-ENID indicators conference in Oslo (May 2008).

Moreover, a policy report summarizing the main projects results and implications both for national and European policies concerning Central and Eastern European countries is in preparation. All project results will be made available on the website of the European Network of Indicators Designers ([www.enid-europe.org](http://www.enid-europe.org)).

### 1.1 This report

Although R&D expenditures in CR have significantly risen in recent years, the public funding system is being criticized for the structural disparity, low effectiveness and administrative overload. This report should especially provide an overall view of the system on three levels. Section 2 shows the basic principles of research policy in CR and in its trends since 1989. The role of main decision-making bodies is described and the present legal background is summarized. For the present situation in research policy should lead to a deep reform in next years, perspectives of the future development could be only sketched in short. Next section provides a description of principal funding bodies in Czech system and main funding channels respectively. Coming from this approach the quantitative analysis of overall volume and structure of funding flows is given in section 4. Data are analysed according to the Czech legal and administrative definitions, then aggregated on the level of the administrative or intermediary body. Specific categories are constructed according to the allocation mechanism, institutional characteristics and thematic orientation showing some important features of the Czech funding system. Also the project/institutional differentiation divided among categories of beneficiaries is calculated. Section 5 offers some critical remarks on the present situation and issues concerning the future reform of Czech R&D system. Methodological discussion and detailed description of main instruments is added in appendix section.

## **1.2 Acknowledgments**

The members of the project team would like to thank for advice and support Slavo Radosevic (UCL London), Philippe Larédo (ENPC, Paris and University of Manchester) and Ghislaine Filliatreau (OST Paris). We would like also to thank Jean Theves (OST, Paris) for help in preparing these reports.

Author of the Czech Republic country report would like thank to Frantisek Hronek and Dagmar Korbelova (Research and Development Council of the government of CR) for the initial ideas, support and provision of useful data.

*Benedetto Lepori, coordinator of the CEEC-funding project.*

## 2 Research Policy

Recent policy debate about R&D system in Czech Republic involves a large part of criticism on some particular funding mechanisms as well as on the structure of the whole policy process. In the end of 2007 the R&D Council proposed extensive agenda for transformation of the system. The crucial issue of the reform became well-known slogan: Science transforms money into knowledge; innovation transforms knowledge out of money. The innovation as policy rationale is not completely new in CR, however, this time it should be a driver for transformation of the whole system. For this purpose the proposal set 7 principles: 1. transparent R&D funding, 2. clear and simple administration of R&D funding, 3. excellence and innovation, 4. project funding for applied research – only share of private and public sources, 5. flexible organizational structure, 6. human resources, 7. intensify internationalization. All of these goals should bring the most extensive changes in R&D system since the fall of communist regime. Criticism is concentrated into three problems: low level of commercialization; complicated, ineffective and heterogeneous public funding system; lack of real priority setting and excellence. Policy makers consider organisation of public funding as a central policy instrument for transformation towards effective knowledge production.

### 2.1 Organisation of R&D policy

Research and development is qualified in CR as public goods, thus the public funding of R&D is stipulated by the separate R&D Act (adopted in 2002). This Act describes the conceptual framework of public funding in detail and sets the general financial mechanisms. In addition it regulates some of the funding instruments, general mechanisms for R&D assessment and the organisation of R&D policy. The basic concepts of the Act are in correspondence with Frascati manual.

There are two main governmental bodies responsible for negotiating the R&D policy - R&D Council and Ministry of Education – but several other Ministries have their own departmental R&D policies. The government approves principal R&D policy documents.

**R&D Council** has 15 members. Chairman of the Council is one of the ministers or prime minister (from 2006 prime minister); the members are other ministers and experts from research institutions (AS, CSF, HEIs). It has 4 advisory boards (Life Sciences, Technical Sciences and Engineering, Humanities and Social Sciences, Bioethical Commission) that provide expert positions to national policy documents. Council's responsibilities are not only the setting of specific priorities for R&D policy, but also negotiation of state budget on R&D. In fact, the annual drafts of the R&D budget are submitted by Council and it prepares also strategic prospects for future system development.

The role of **Ministry of Education** is far less important in formulation of national R&D policy, though it manages 1/3 of the overall public funds going to the R&D.

It should be mentioned that in 2007, debate on transformation of public R&D organization has started, while one of the issues raised during the discussion is establishment of Ministry of Higher Education and Research.

The overall view of the R&D policy-making process is demonstrated in the Figure 1. Next figure shows main policy documents, dependencies and responsible governing bodies **on governmental level**.

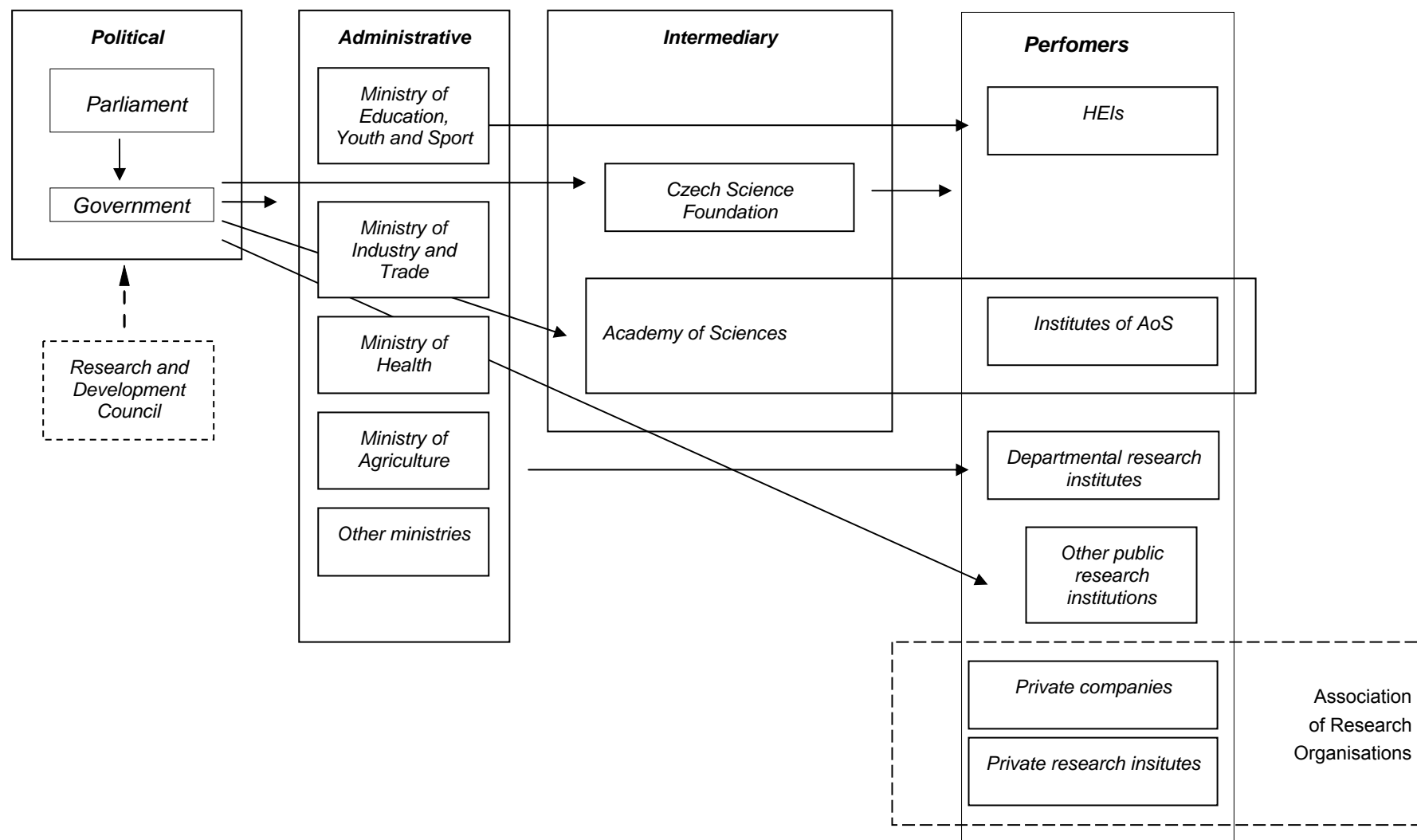
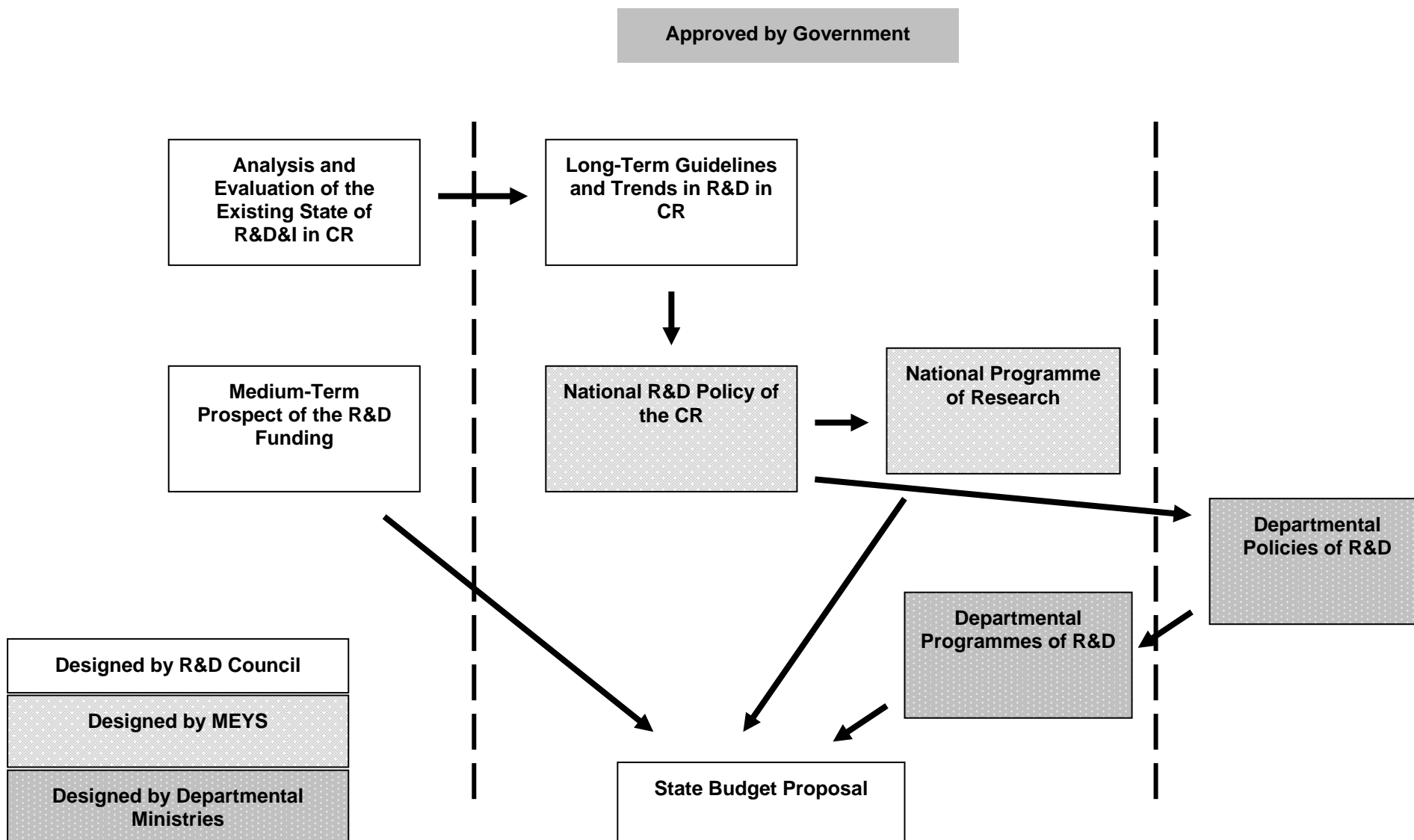


Figure 1. Organisation of Czech R&D research policy

Figure 2. Policy-making process of R&D public funding in Czech Republic



The most important documents are:

*National Research Policy of the Czech Republic*

- states the general principles and priorities for R&D funding and address main challenges in course of 4-6 years
- is designed by Ministry of Education, Youth and Sports (hereinafter Ministry of Education) and approved by government

*Analysis of the Existing State of R&D in the Czech Republic and Comparison with the situation abroad*

- contains a number of relevant data on inputs (financial and human resources) as well on outputs (publications, citations, patents and innovations most recently) of R&D
- is elaborated by R&D Council and submitted to the government

*Long-Term Guidelines and Trends in R&D in CR*

- sets perspective guidelines for research with the aim of concentrating the financial, personal and other resources in the fields of priority (e.g. sustainable development, information society, energy resources)
- is designed by R&D Council (its working groups respectively) in cooperation with Ministry of Education and approved by government

*National Programme of Research*

- is one of the policy instruments, a set of funding programmes focused on the priorities of the National Policy
- is submitted by Ministry of Education and approved by government

*Departmental Programmes of Research*

- almost every Ministry has its own research policy and programmes
- are approved by government

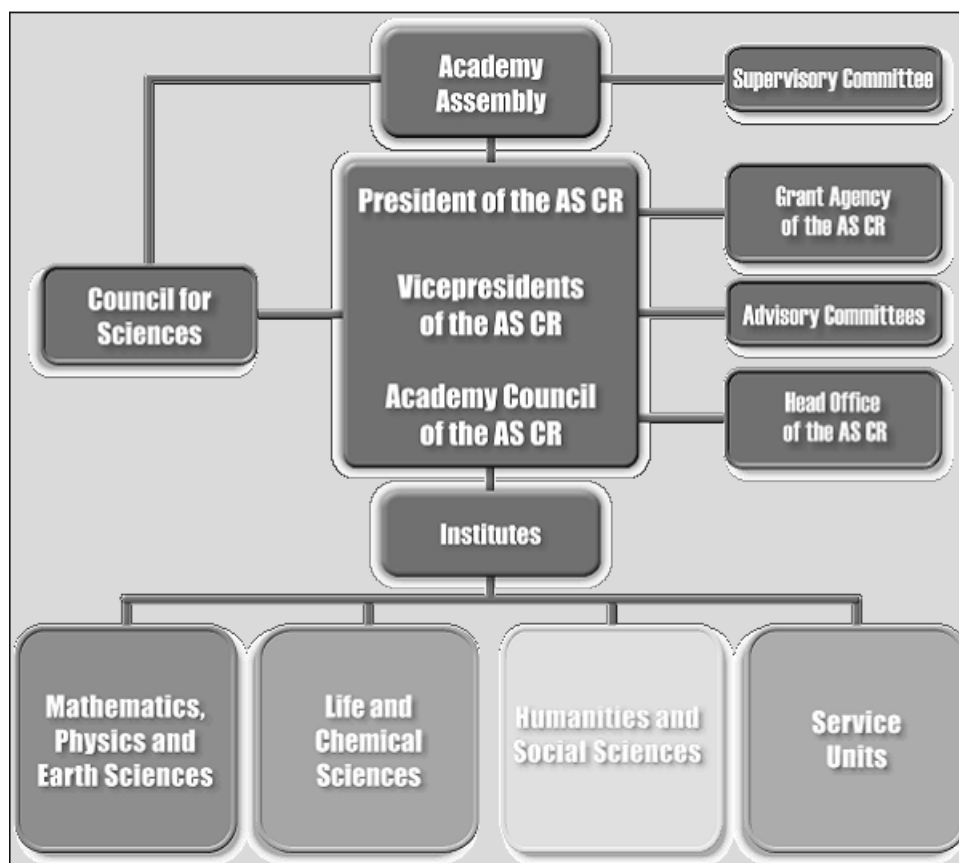
The process of negotiating the R&D expenditures from state budget is than revised according to the Mid-Term Prospect of the R&D Funding designed by R&D Council.

Czech R&D policy is also partly designed by the Czech Science Foundation and The Academy of Sciences, which are independent bodies, both having their own R&D policies and categories of state budget.

*The Czech Science Foundation* (Grantová agentura ČR) was established in April 1993 (the Act No. 300/1992 (amendment No. 130/2002) as an independent institution for promotion and funding of research (not development or innovation) in all scientific disciplines. On the basis of public competition it provides several types of funding instruments – “grants”, which are attainable for public as well as for private institutions and individuals. Executive board of the CSF is Presidium that is appointed by the government and has five members representing five scientific fields (technical, natural, medical, social and agricultural). The Presidium is authorized to organize tenders and to award grants. The assessment of project applications is provided by the five Discipline Committees based on peer review evaluation. The external Supervisory Board (appointed by the Czech parliament) is responsible for monitoring of activities of the CSF.

*The Academy of Sciences* (Akademie věd České republiky) is non-university scientific institution encompassing some 50 research institutes engaged primarily in basic research. The role of the AS is stipulated by the Act No. 283/1992 and also most recently by the Act No. 341/2005 on public research institutions. The structure of AS is described on the Figure 3.

**Figure 3. Institutional Structure of Academy of Sciences**



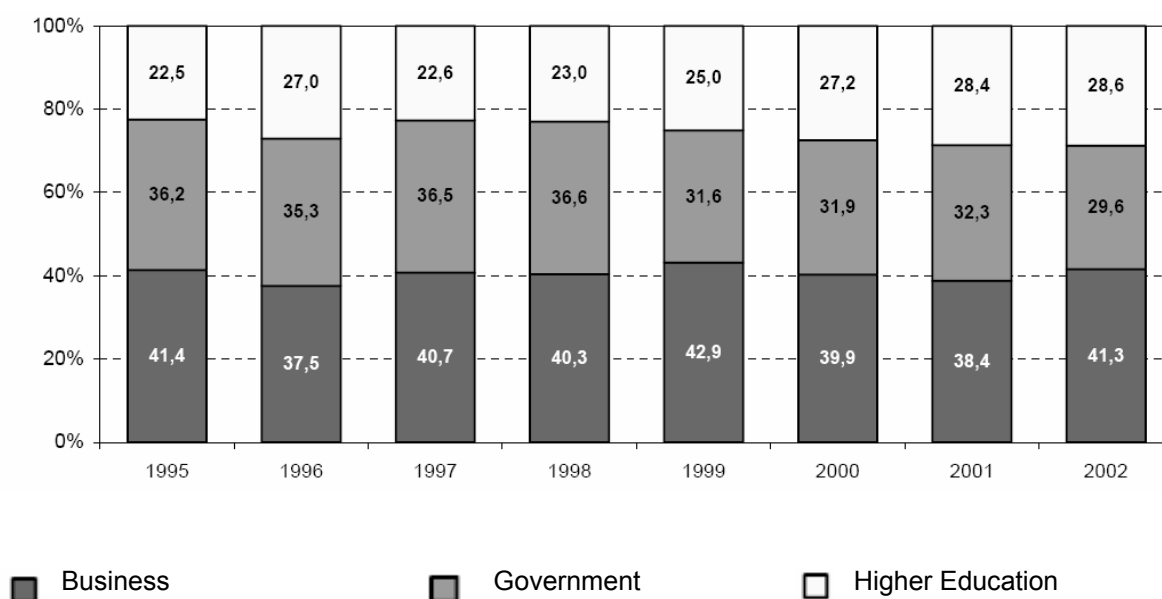
All of the institutes of Academy of Sciences are public research institutions since 2007. This legal status gives them more autonomy while the body of AS plays a role of “a founder” for them. In general, they are financed by „research plans“ that function in this case as core funding, but AS runs also its science foundation („Grant Agency of the AS CR“) and several project competitions.

In 1990 the *Association of Research Organisations* was established as an independent representative body of business oriented research institutes or departments of companies, which consists of cca 70 members. It provides advisory and consultancy and advisory service both for public decision-making sphere (R&D Council, MEYS) and private research and innovative firms. Activities of AVO are oriented only towards applied research and development.

## 2.2 The evolution of the Czech research system in the past years

As in other eastern European countries the Czech research system has undergone substantial changes since 1990 (for short account of the state of research in the Czechoslovakia before 1990 see Muller, 1995) Before 1990, research was conducted at the Czechoslovak Academy of Sciences and many non-university public research institutions. The number of research institutions and research personnel was very high, but effectiveness of the organization was very low. In 1993 the Czech Science Foundation and Research and Development Council (with responsibility to formulate the state research policy, design the state funding system of research, establish and set the rules for running the Czech Science Foundation) were established. The major research institution, Czechoslovak Academy of Sciences, was renamed to the Academy of Sciences and reduced considerably in size. Similarly, the public research funding had fallen dramatically in the early 1990ties to 0,4 % of GDP in 1994.

The research capacity of the higher education institutions is still lower then the research capacity of the governmental sector (e.g. number of FTE researchers in HE 4274 in comparison to 4661 in governmental sector in 2004). Before 1990 higher education institutions were not expected to conduct any R & D activity, and no financial mechanisms to support R & D thus existed. However, the role of higher education institutions in R & D has been growing since mid '90.

**Figure 4. Researchers in CR by sector – Business, Government, Higher Education (FTE)**

Source: CSO 2004

Until the end of 90s the R&D policy had been relatively underdeveloped. The legal framework was based on the 1992 Act on “state support for scientific activities and technological development” and on the “Plan of the Government in R&D Policy (1991, 1994, 1997). Strong motivation to formulate systematic research policy came from the accession of the country to the European Union. Since 1997 the governments tried to harmonize the research administration and funding with the European standards. In 1998, “The Principles of the Science Policy for the 21. century” were approved, which preceded the first National Research Policy for the 2000-2004 period. In 2004 the second national policy followed for the years 2004-2008 with corresponding National Research Programme (I.). In this time the first policy document focused on innovation policy was prepared in coordination of several public bodies. After the approval of the National Innovation Policy 2005-2010 by the government in 2005, need for harmonizing the R&D policy and innovation policy was formulated in a special document, approved by government in 2006. However, these rather political formulations have been superseded by the discussion about in-depth reform of the whole R&D system in 2007 (see next section).

The institutional landscape of research in CR has not changed a lot in recent 10 years. The relative position of Academy of Sciences and Czech Science Foundation remained the same and also the ministries have kept their R&D infrastructure in similar size. The new Act on public research institutions, being in effect since 2007, gives a number of R&D institutions (all institutes of AS and some of the governmental research institutions) more autonomy (in fiscal as well as in sense of governance). This could signify some minor changes, as some smaller institutes have announced intention of mergers with higher education institutions because of raising exigencies of administration and management.

In 2005, the indirect support of R&D was introduced in form of remission of taxes. According to the data from R&D Council, 900 enterprises took use of the remission in 2005, representing the amount cca 1,8 billion CZK (cca 65 mil. EUR).

### 2.3 Perspectives

The Lisbon strategy and especially the Barcelona goals of 1 % of GDP of public funds for R&D seem to be quite far away in the national research policy in 2004 –2008, as stated in the National research and development policy plan for these years. As the innovation policy became a part of government’s policy and because of a need of harmonizing the national funding schemes with new budget of the EU (2007-2013, e.g. Structural Funds), new government (in 2006) set the R&D policy as one of the main priorities for next years. There are two Operational programmes that are being negotiated in 2007 –

Research and Development for Innovation and Education for Competitiveness. The first one will have three priority axis: R&D Capacity Development, Development of Capacities for Cooperation between Public and Private Sectors in R&D, Reinforcement of University Capacities for Tertiary Education. This program should allocate from 257 mil EUR (2007) to 335 mil EUR (2013) per year (including Czech contribution), which could make up to one third of the whole state budget for R&D. The programme designed for education activities will subsume a part covering human resources in R&D and in higher education that should comprise 737 mil EUR for 2007-2013 period. All of these funds are intended to be primarily infrastructure investments while the discussion is being held about way how to maintain these infrastructures in future.

In May 2007, Prime Minister - as a head of R&D Council – formulated new R&D policy called “The 7+1 agenda” setting new priorities for future development. First of all the allocation mechanisms should be simplified and concentrated. The innovation systems should be strengthened and the cooperation between R&D performers and users should be stimulated. Another goals leading to the efficiency of the system should be flexibility of the institutional structure, support for early-stage researchers and enhancement of participation in international programmes. This agenda consists also of several particular steps (“establishing of research university segment of HE”, transformation of institutes of AS to graduate schools, international criteria for R&D assessment, etc), which are not very clear yet and will be a subject of discussion of the different actors in R&D (AS, HEIs, associations of private enterprises etc.).

### 3 Organisation of R&D public funding

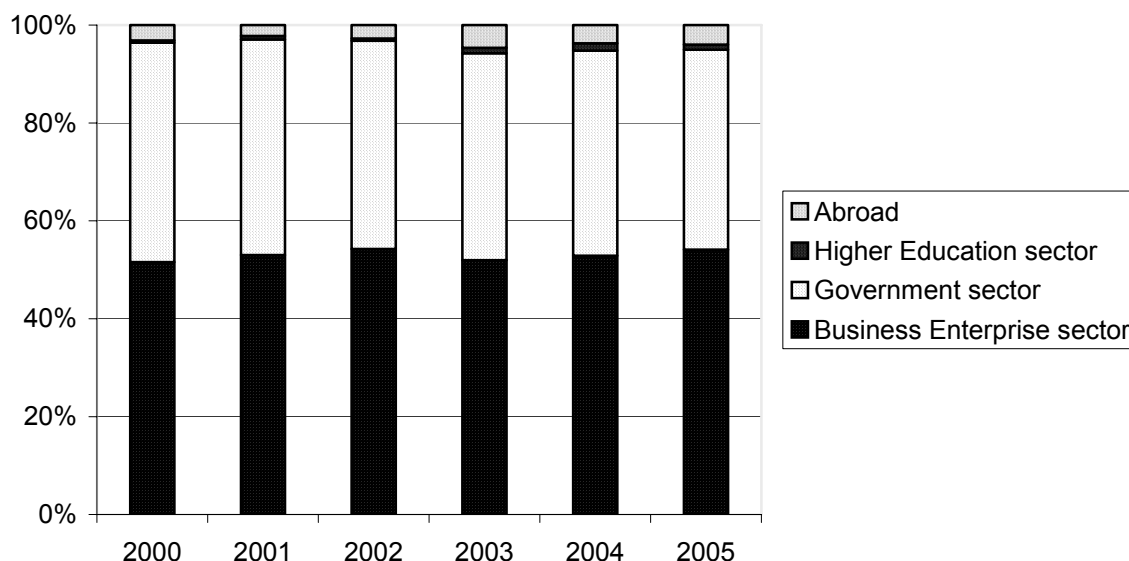
#### 3.1 Overall view of R&D funding in the Czech Republic

Public funding of R&D in CR comprises some 22 budgetary items and a number of administrative bodies. Ministry of Education, which is legally stated as a central public body for funding of R&D activities, plays important role, but the position of Academy of Sciences, Czech Science Foundation and other ministries is still significantly strong. On the other hand, Czech R&D Council functions as a principle governmental advisory board for policy-making and information collection and the Czech Statistical Office provides the detailed performer-based data on R&D activities in CR. This first draft should give a general view of funding mechanisms, resulting from analysis of these data. The figures describe organisation of R&D policy, main flows with corresponding providers, instruments and beneficiaries, basic quantitative data and trends in last 10 years. However, as this is the first attempt to map the public R&D funding in CR this could be only the first step and further detailed analysis of particular allocation mechanisms should be added.

The following figures show the basic R&D indicators that identify some specific characteristics of the Czech R&D funding system based on official R&D statistics.

The international funding plays still an insignificant role in CR. Survey of the Czech Statistical Office signifies 4 % (i.e. 60 mil EUR) of the whole R&D expenditures for the year 2005, while 73% of these funds were performed in business sector. Significant part of the amount could come from EU Framework Programmes, as, according to the Annual report on R&D in EU, the EC financial contribution to the Czech participation in FP (contracts signed in 2005) was 35 mil EUR in 2005.

**Figure 5. R&D Expenditures according to the source of funds**



Source: CSO 2006

On the other hand, the relatively high expenditures from business enterprise are performed in industry sector while the other sectors get only limited private sources (cca 1% higher education; cca 10% governmental sector; for detailed information see section 4.3).

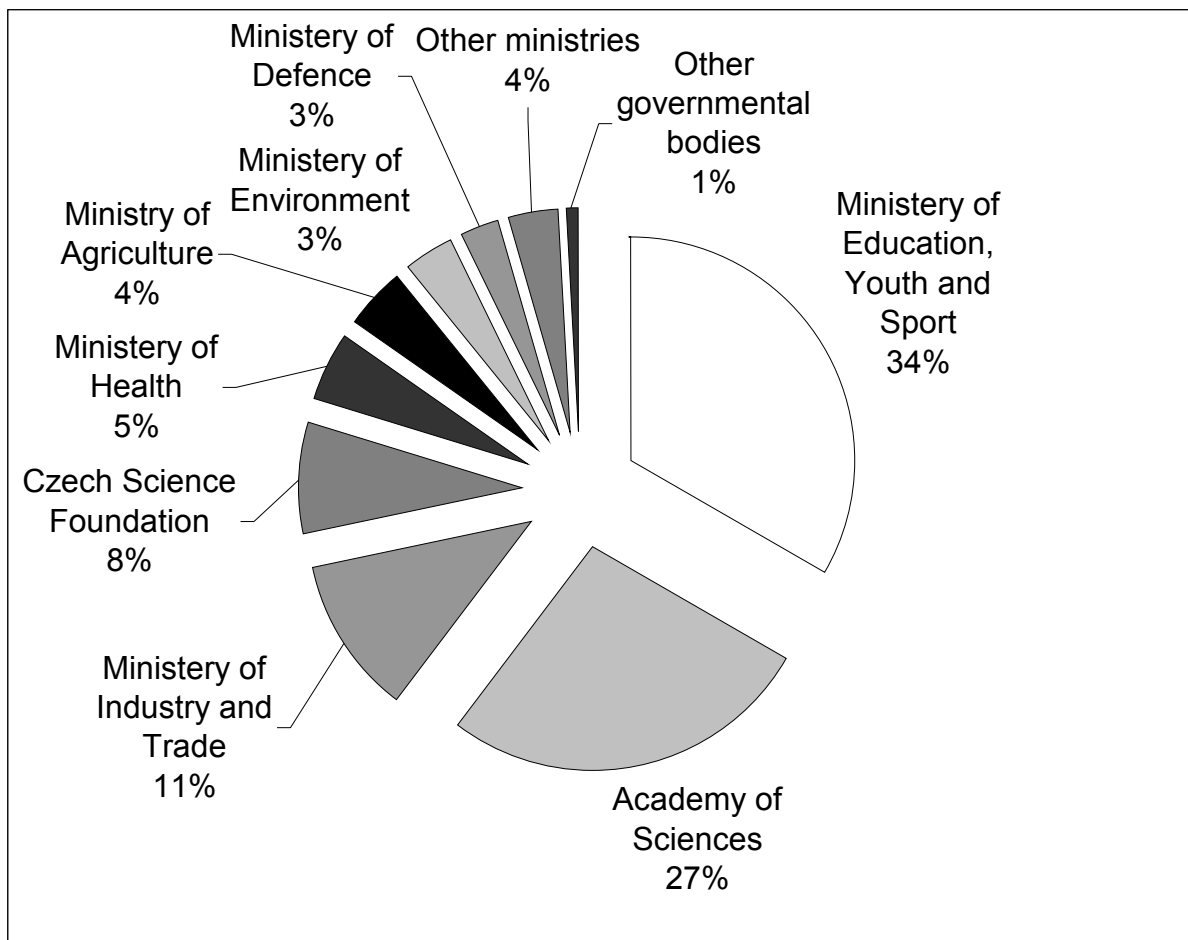
The role of the HEIs in the R&D activities has been very rapidly growing since 1989. However, the growth has come almost exclusively from the public sources. The estimated average ratio of research/teaching financial support for the whole higher education system is 0,32. As far as higher education is concerned, it should be noted that the typology of the HEIs defined in 1998 Higher Education Act determines that only the universities are supposed to perform R&D, while the HEIs of "non-university type" should provide only teaching and training. As the private HE sector was allowed

only after the 1998 Act, nearly all of the private HEIs are of non-university type and have very low R&D capacity.

### 3.2 Public funding of R&D

Public funding of R&D is included in 22 chapters of the state budget. The biggest share of R&D money is traditionally distributed through the chapters of the Ministry of Education, Youth and Sports and special chapter of Academy of Sciences (see Figure 6). Other budgetary items are comparatively smaller, largest being the Czech Science Foundation chapter and then chapters of the Ministry of Industry and Trade and the Ministry of Health. The overall financing from public sources had stabilized at 42 % of all expenditures on R & D in recent years.

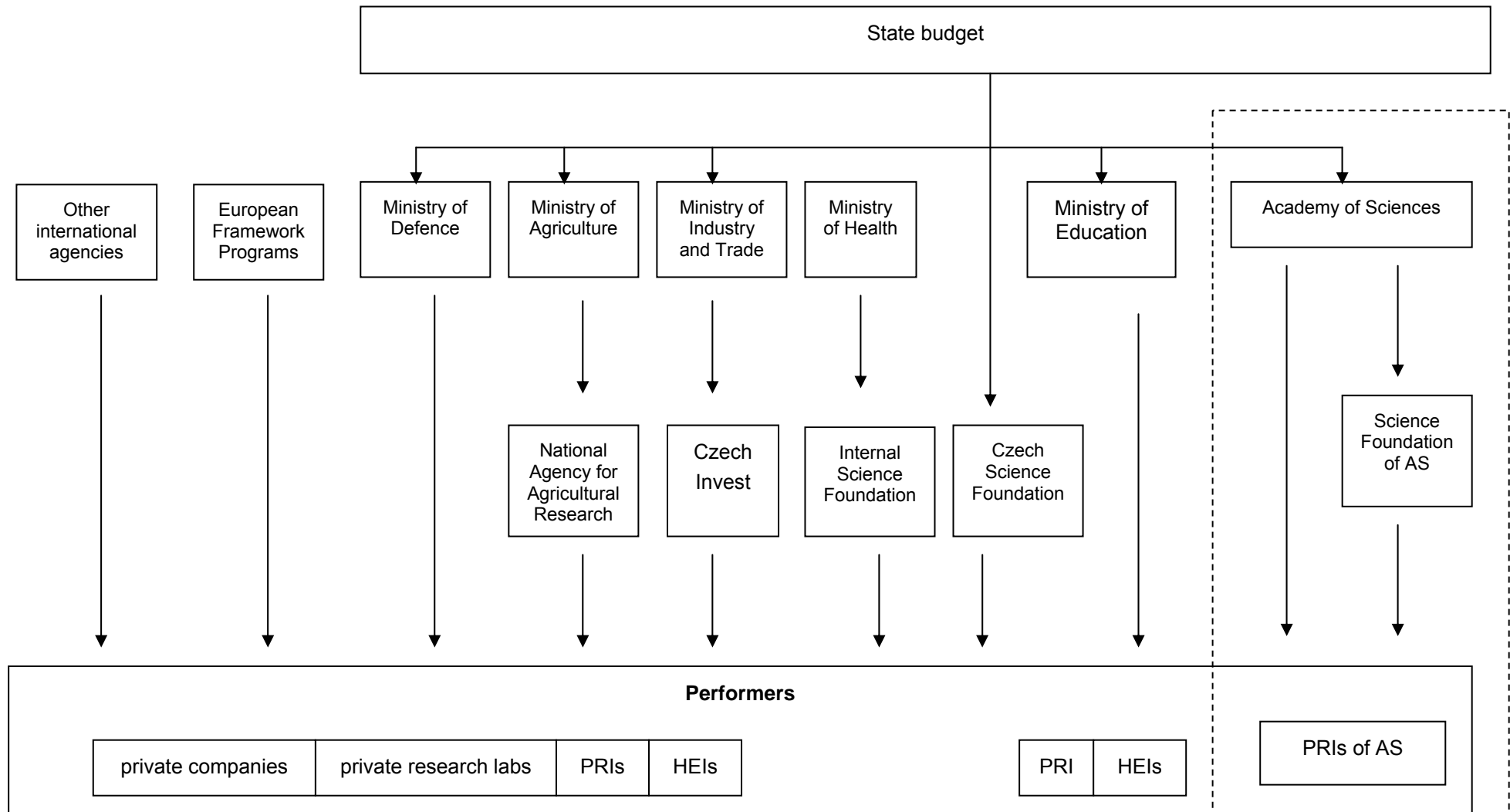
**Figure 6. Public R&D funding by main providers (agencies) 2005**



Source: R&D Council 2005

The highly diversified funding system corresponds also to the several other intermediary bodies (“of second order”) and a wide range of instruments used to allocate funds. The Figure 7 shows the main bodies responsible for the particular funding channels.

**Figure 7. Funding Channels of public R&D support in CR**



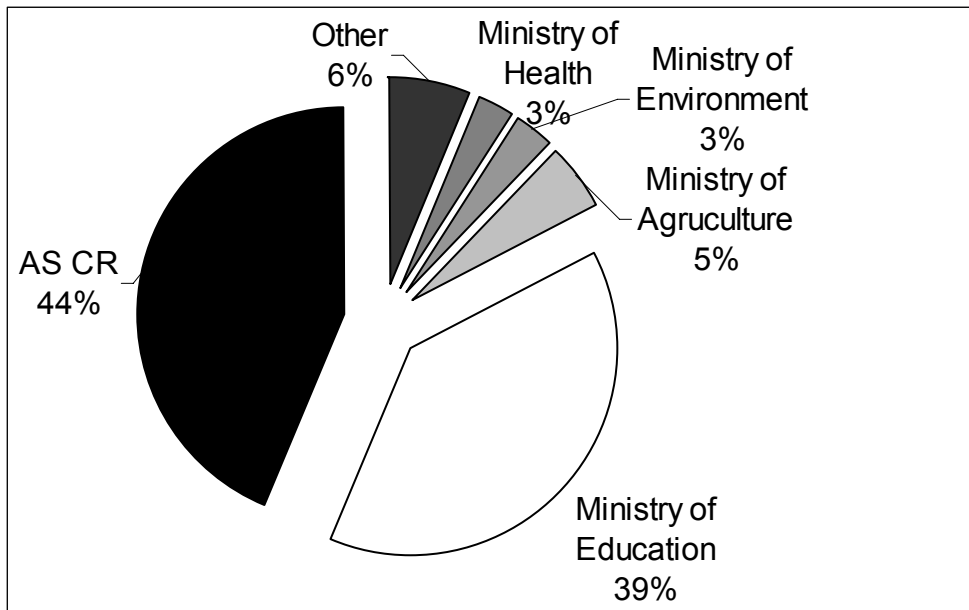
### 3.3 Institutional and target funding

The Czech public R&D funding policy differentiates between “institutional” and “targeted” funding. Institutional as well as targeted support is defined by the 2002 Act according to the beneficiaries to whom it is appointed and according to the instruments used:

	Institutional	Targeted
Beneficiaries	Public research institutions	Individuals or companies Public or private
	Non-profit organisations	
	HEIs	
	Private companies with condition that all profit is re-invested in R&D	
Instruments	“Research plans”	“Grant projects”
	“Specific research” (formula funding for HEIs)	R&D projects of National Research Programme or departmental programmes
	International activities (co-financing of Framework Programmes, EURATOM)	Public tenders (including “Research for public administration”)

In general, the “targeted” funding can be explained as project funding with purpose-oriented expenses (personnel, overheads, travel costs etc.). The problem with targeted/institutional differentiation is that some instruments defined as “institutional” have also this and other characteristics of project funding. For example “research plans” are managed by 14 intermediary bodies (AS, 10 Ministries, 3 other governmental research institutions; see Figure 8) and each of them has slightly different allocation criteria (see section 3.2). AS went through its own internal institutional assessment as it was mentioned above, Ministry of Education organised for HEIs highly selective competition and majority of Ministries negotiated research plans with their research institutes in different (partly informal) ways. Furthermore, the legal framework for research plans involves some features of project funding instrument as selection procedure or limitation in scope, budget (also the purpose-oriented delimitation of funds) and time.

**Figure 8. Expenditures on “Research Plans” according to the provider 2005**

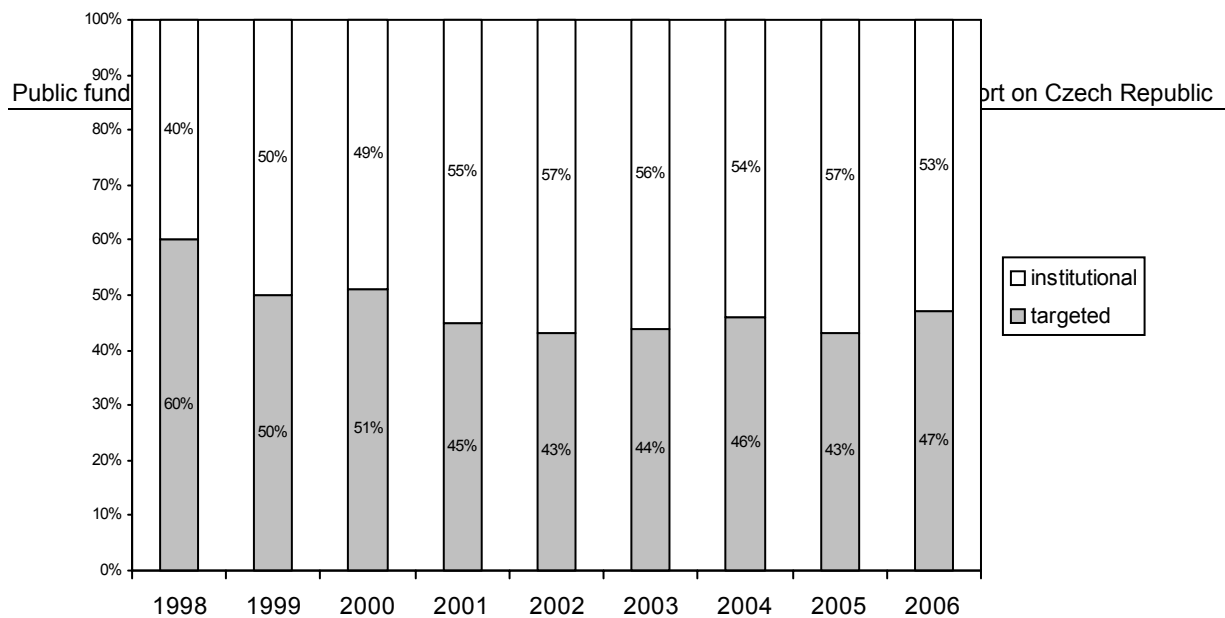


Source: R&D Council 2006

This terminology is being widely discussed, while some of the instruments of institutional funding (especially some sorts of research plans) have become a confusing matter mixing up the competitive project funding and core funding. The institutional/targeted differentiation has been the issue of policy debate as early as in 1998, when this definition was introduced. Though this legal framework have been set as an internationally comparable one, different "implementation gaps" have complicated the real form of funding instruments. As far as research plans are concerned, the nature of general funding has been so much confusing, that the new reform policy is planning to abandon this instrument (after 2010) on behalf of institutional assessment based on publication and patent criteria. Next figure should illustrate the policy debate and its problematic value according to the aggregation of the data on public funding.

The ratio of targeted funding is very variable in various budget items of R&D providers from public sources and is particularly high in the budgets of the Czech Science Foundation and Ministry of Trade and Industry and some other Ministries. On the other hand, relative growth of "institutional" funding in 1999 and 2001 was caused by the start of research plans for HEIs whose "institutional" nature is most doubtful.

**Figure 9. Institutional/Targeted public funding**



Source: R&D Council 2006

### 3.4 Main funding channels and bodies

#### 3.4.1 The Ministry of Education, Youth and Sports

**MEYS** is main the legal body responsible for R&D funding and allocates the largest proportion of funds. Almost two thirds of the R&D budget of MEYS is distributed directly to HEIs by two significant instruments:

*Specific research* is a type of core funding based on formula that is constructed on the number of post-graduate students, number of research degrees awarded/graduates, number of academic staff, level of qualifications of academic staff and external research income:

$$Q_{ri} = c_i^g \cdot [H_i^q (s_i \cdot w_s + a_i \cdot w_a)^{(1-q)}]^{(1-g)} ;$$

- $c_i$  is share of i-HEI on the whole R&D funds for HE sector in the preceding year, corrected by number comprising the research output registered in *Information Registry of R&D Results* (publication, patents, technologies)
- $H_i$  is share of professors and associate professors on the whole number of academic employees
- $s_i \cdot w_s + a_i \cdot w_a$  is share of PhD students and master graduates on the whole number of PhD students and master graduates in CR
- $q$  and  $g$  are weighers determinate annually by MEYS

$Q_{ri}$  is further recalculated by the share of particular HEI on specific research in preceding year and by the amount of available funds:

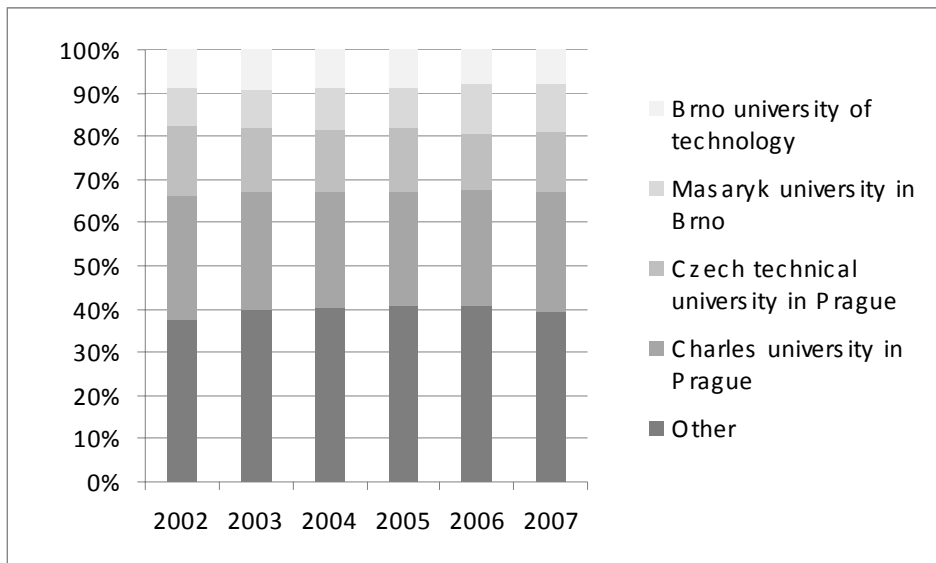
$$I_i = I_{SV} \cdot (w_r \cdot Q_{ri} + w_m \cdot Q_{mi})$$

- $I_{SV}$  is available funds for specific research for particular year
- $Q_{mi}$  is funds from specific research for HEIs in preceding year
- $w_r$  and  $w_m$  are weighers determinate annually by MEYS

Despite comprising different indicators of research and teaching output, this formula is highly dependent on the weighers set by MEYS. They were calculated not to cause bigger changes between years and to respect the relative size of HEIs. This concludes in a relative stability in recent

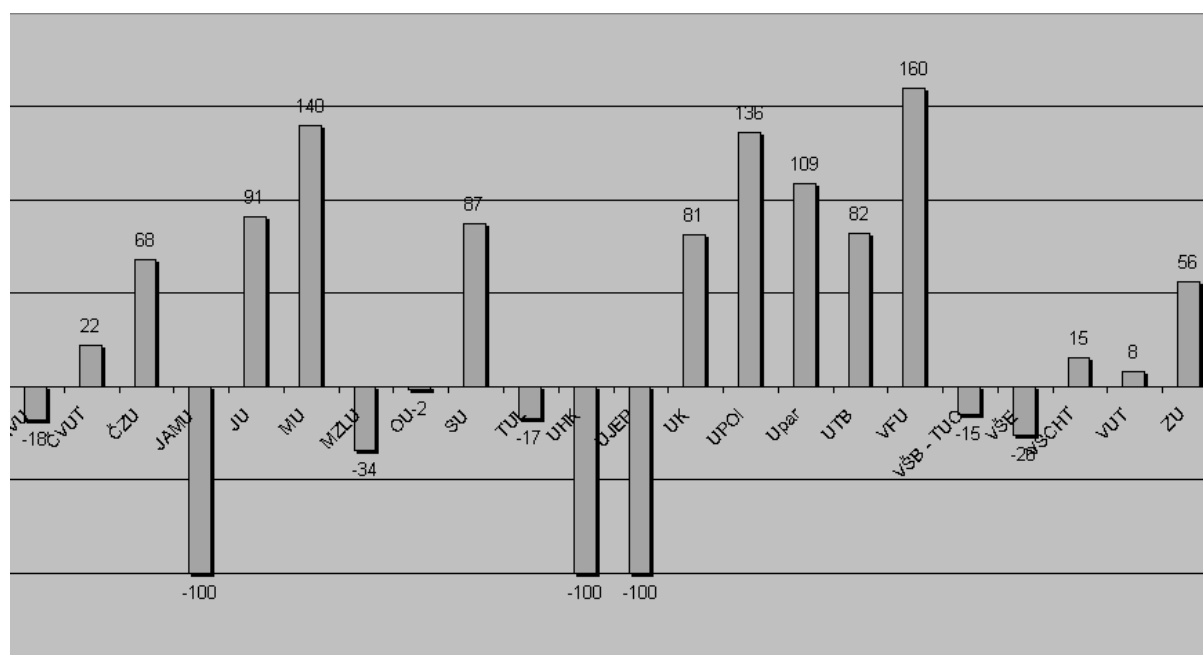
years. This illustrated by the next figure with 4 leading universities comprising more than 60% of the amount.

**Figure 10. “Specific research” funding by HEIs**



**Research plans** allocated by MEYS are indicated as “institutional support”. However, this instrument has characteristics both of project funding and base funding. Majority of performers are HEIs, but there are also several state organisations, private companies and one public research institution (Centre for Higher Education Studies) that are eligible for this sort of funding scheme. Nearly all of the research plans have been selected in a public competition, based on project proposal. Last call for proposals in 2005 had three types of criteria used for selection: data on HEI/faculty/department/team or other organisation (organizational structure, disciplinary specialization, budget, research outcome, international cooperation, individuals and their academic activities), project proposal (scientific contribution, goals, methods, feasibility, strategy and time plan), 2 reviews from extra-institutional scientists. The MEYS specially announced that the assessment should “not primarily” evaluate the institution or the team. The approved proposals were divided into 2 groups according to the share of public funding of the applied expenditures (100% or 90%). Result of this allocation mechanism in comparison to the one used for the period 1999-2004 could be illustrated on the next figure. It shows that the differentiation of allocated funds was much higher while three HEIs lost the support completely.

**Figure 11. Changes in “research plan” funding in % by individual HEI 2004/2005**



In 2007 all research plans were reassessed with a result of further differentiation. Nevertheless, the Ministry has expressed an intention to change this mechanism to more outcome-oriented allocation based on the R&D assessment system being tested since 2005.

In the base year 2005 the budget of the Ministry of Education consisted of number of other project-based programmes, which were shaped for:

**International cooperation** – national support for participation in international projects from programmes EUREKA, COST, KONTAKT, INGO, EUPRO.

For the future the funds for international cooperation will subsume also co-financing of the EU programmes (e.g. 7<sup>th</sup> Framework Programme, Structural Funds)<sup>1</sup>. For the years 2008, 2009, 2010 the funds detached for co-financing of Structural Fund in the budget of Ministry of Education should be 1377 mil CZK (47,5 mil EUR), 1522 mil CZK (52,5 mil EUR), 2046 mil CZK (70 mil EUR) respectively.

**National Research Programme (II)** – consists of 5 thematic and 3 cross-sectional programmes:

1. Quality of Life	1. Human Recourses in R&D
2. Information Society	2. Integrated R&D
3. Competitiveness with Sustainable Growth	3. Regional and International Cooperation in R&D
4. Energy for Economy and Society	
5. Modern Society and its Changes	

NRP II (2004-2008) should concentrate all departmental programmes into 2 intermediary ministries – MEYS and MIT, however, other ministries did adherence to their particular programmes. The result is complicated structure of thematic programmes – almost every ministry has its departmental programmes and also some other thematic programmes that are part of the NRP II. Both types of funding schemes are very similar in scope, allocation mechanisms, criteria and conditions, so there could not be a meaningful reason to distinguish between them.

<sup>1</sup> Until 2007 there was almost no possibility of co-financing of international projects with national contribution condition from public funding.

**Centres of Excellence** – two programmes with annual public competition: Centres of basic research, research centres (funded from the NRP II).

*Centre of basic research* is type of project funding aiming at cooperation of different types of institutions. One of the applicants must be HEIs and the project should comprise also PhD and master students. Scientific excellence is based on the academic reputation of guarantees, researchers involved and international cooperation of the institutions. The eligible costs are personnel assets with exception of small amount for amortisation of institutional infrastructure.

*Research centres* were introduced in 2000 and from 2005 they are part of NRP II. The aims of this funding instrument are concentration of capacity and means into the selected spheres of research and into the limited number of centres, research oriented to the long-term requirements of the application sphere and regional development, early-stage researchers support and cooperation between different types of institutions. For the 2005-2009 there were 35 centres established with budget ranging from 80 to 300 mil CZK (2.8-10.7 EUR).

### 3.4.2 General funding of HEIs

The main funding channel of Czech public HEIs comes from “state subsidy”, which comprises cca 85% of their budget in average (13 210 mil CZK, i.e. 452 mil EUR in 2005). The amount of money allocated is derived from the volume of teaching activity. The total sum for each HEI is calculated as a sum of the number of students and the financial assessment of each accredited programme. Recently, the number of graduates has also been included in the formula, thus enhancing the output orientation of the funding system. The financial assessment of a study programme is the product of the normative base and a coefficient reflecting the relative cost of the programme. The coefficients for different fields of study and the normative basis are set annually by the ministry, the latter being 33 320 CZK (1 150 EUR) in 2005 and the former varying from 1,0 (humanities, social sciences) to 5,9 (arts). The annual increase in the overall number of students is negotiated between ministry and representative body of HEIs.

HEIs have also possibility to attain several additional financial subsidies from ministry aiming at funding of PhD students (659 mil CZK, 22,7 mil EUR in 2005), development programmes (Educational Policy Fund – 102 mil CZK, 3,5 mil EUR in 2005, Higher Education Development Fund – 320 mil CZK, 11 mil EUR in 2005, Development Programmes – 1 430 mil CZK, 49 mil EUR in 2005) and infrastructure investments (508 mil CZK, 17,5 mil EUR in 2005) that are negotiated according to the ministry’s long-term plan with particular HEIs.



**Figure 12. Funding channels through Ministry of Education, Youth and Sports**

Type of programmes	R&D in HE		International Cooperation	National Research Programme I, II	Centres of Excellence
	Specific Research	Research Plans	EUREKA, COST, KONTAKT, INGO, EUPRO	5 thematic and 3 cross-sectional programmes	Centres of basic research Research centres
Type of funding	Core	Mixed	Project funding	Project funding	Project funding
Time Coverage	1993-	1999-2004 2005-	1995-, 1997-, 1999-2006	2004-2008, 2006-2011	2005-, 2000-
Budget (2005) mil. of CZK	1044	3031	235	393	1545
Purpose	Core funding for HEIs	"Institutional" funding for different institutions in the specific field of research (project)	Institutional international cooperation mobility	General instrument for R&D national policy IT infrastructure Support for early-stage researchers	National and international cooperation of research institutions
Eligibility criteria	All HEIs (incl. private) doing research	HEIs, private companies, state organisation with research as a mission	Different	Public or private institutions	Public and private research institutions with relevant scientific activities (international cooperation, R&D projects, PhD students etc.)
Allocation criteria	Formula (number of post-graduate students, number of research degrees awarded/graduates, number of academic staff, level of qualifications of academic staff and external research income)	Scientific relevance Qualification of researchers involved Peer review	Peer review Selection committees different	Peer review Selection committees different	R&D activities of the institutions and their R&D institutional assessment Level of cooperation Feasibility Scientific outcomes Peer review Selection committee

Figure 13. Funding channels through Academy of Sciences

Type of programmes	Institutional funding	Internal Science Foundationa			National Research Programme (I, II)
Programmes	Research plans	Standard grant projects	Junior grant projects	Additional grants for publication	Nanotechnology for Society Projects of targeted research Information society
Type of funding	Core	Project funding	Project funding	Project funding	Project funding
Time Coverage	2005-2010, 2007-2013	1990	2003-	2002-	2006-, 2005-2009, 2004-2009
Budget (2005) mil. of CZK	3428	160	58	1	0, 139, 60
Purpose	Core funding for institutes of AS	Disciplinary and interdisciplinary projects in all fields of study Basic research	Young project leaders (<35y) Basic research	Publication of important scientific monographs	Different
Eligibility criteria	institutes of AS	No specific criteria	Early-stage researchers with small teams Permanent position in R&D institution obligatory	Individuals or teams of co-authors	Project in specific fields of study
Allocation criteria	Peer review Intra-AS assessment (advisory committees)	Scientific relevance Qualification of researchers involved Peer review Feasibility Research infrastructure of the institution	Scientific relevance Originality Research strategy Scientific qualification (publications) Feasibility Peer review	Scientific relevance Peer review	Peer review Committees of the programmes

### 3.4.3 The Academy of Sciences

AS has not fully lost its dominant role in research in CR, although the transformation in early 90s involved some considerable changes and the new Act on public research institutions brought the AS further more away from Soviet-type centralised institution. New legal status has brought the institutes of AS more autonomy in financial as well as in administrative way. The administrative costs compose 15% of the AS budget. In general, the money allocated to AS is distributed through three channels. For the base funding of research institutes there are the “*research plans*” that are allocated according to the assessment of the institutional strategic plans by the advisory committees and by the Ministry of Education. The institutes went through an assessment in 2004, when there was new mechanism employed. The expert boards (with majority of scientists from abroad) assessed nearly all institutes and they divided them into three groups according to the academic quality of their activities (A, B, C). Institutional funds were then lowered, increased or they stayed on the level of preceding year. Majority of institutes have their projects accepted for the years 2005-2010. The extraordinary autonomy of AS can be also illustrated by the controversy about the 2004 assessment. MEYS made its own assessment of AS institutes which was legally not obligatory, but recommended. Academy Council, which is the executive body of AS<sup>2</sup>, criticised results of ministerial assessment and decided not to use them for allocation of funds.

Apart from this, the AS has also three project-based programmes - Nanotechnology for Society, Projects of targeted research and Information society, the last one being part of NRP II. On the other side the first is the only Czech programme for funding of nanotechnology research and in this respect it reaches very low allocation of 5-10 mil EUR per year.

AS has also its *internal science foundation*, which manages another three competitive programmes: Standard grant projects, junior grant projects, additional grants for publication. While the “publication grants” are planned to be abandoned in 2008, the ration between standard and junior grant allocation varies between 3:1 and 4:1. These competitions are open also for external applicants; however, the finances going out of the AS are in fact very low (app. 10%).

### 3.4.4 The Czech Science Foundation

The grant system of CSF was established in early 90s inspired by the anglo-american type of foundations. The first and primary funding instrument of CSF is *standard grant project* that are annually announced and can have duration of 1-5 years. These funds could be used for staff costs, costs of material and consumables as well as for capital investment. The application is assessed by the expert commission that assigns three reviewers per application, one of them should be from abroad. The System of CSF sets 9 criteria for evaluation: scientific contribution, societal significance<sup>3</sup>, building of infrastructure, clarity and strategy of the project, scientific and expert qualification of the applying individual(s) or teams as well as of the institutions, appropriateness of the personnel and of the financial requirements, international cooperation, former cooperation with CSF. The same criteria are implemented for the doctoral and postdoctoral grants, which are allocated for teams of PhD students (inspired by German Graduiertenkollegs) and individual postdocs respectively (see Figure 14).

### 3.4.5 Other ministries

Among other Ministries, the **Ministry of Industry and Trade** is the largest “agency” allocating 1 850 mil CZK. All of the funds of MIT are distributed through programmes based on public competition, i.e. project funding. The MIT designed its R&D strategy in 2003 and now (2007) operates two principle programmes – IMPULS and TANDEM (for detailed information see Figure 15). Third programme which is funded by MIT but administrated by CzechInvest agency<sup>4</sup> - Trvalá prosperita (“Permanent welfare”) – is a part of National research programme (I, II). The POKROK (“Progress”) programme was opened only once in 2004, but funding of the accepted projects will continue until 2009. For the

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<sup>2</sup> Academy Council is appointed by Academy Assembly which is elected by representatives of the institutes. In this respect, the AS can not be considered as a intermediary body for decisions about funding etc are made by negotiation between institutes’ representatives.

<sup>3</sup> „Social significance“ is defined as „progress in solving problems in other disciplines ... or whether the research outcome can help to solve problems of society as a whole“.

<sup>4</sup> CzechInvest is the „Investment and Business Development Agency“ established by Ministry of Industry and Trade in 1993 primarily to attract foreign investment activities in CR and to organize the funding channels from EU structural funds. The allocation of the R&D programmes is only its subsidiary mission.

base year 2005, it should be also added that this year was the last funding year of Project consortia programme that had been in operation since 2001.

The **Ministry of Health** allocates 5% of overall public funds. These funds are channelled through one programme included in National Research Programme (“Health of the population”) and through the departmental programmes with a wide range of thematic definition. These programmes (as all of the programmes operated by ministries) are usually announced annually according to the Act on public competitions (No. 40/2004) and R&D Act (No. 130/2002). In 1991 the ministry established the „Internal science foundation“, which operates and administrates its departmental programmes. It is organised analogous to the CSF with stress on the scientific peer review evaluation, but unless the CSF or ISF of AS its programmes are announced for detailed and highly specified objectives.

The **Ministry of Agriculture**, in comparison to other ministries, has kept relatively large research infrastructure under its provision. In 2005, eight public research institutes (at that time directly administered state organisations) received 54% of ministry’s budget, i.e. 414 mil. CZK. These institutions are based mainly on core funding called “research plans”, but having more characteristics of core funding than the above mentioned instruments of the same name. Apart from this, the ministry operates three programmes of the National research programme and several thematic oriented departmental programmes that are usually approved biannually with duration of 5 years.

Also the **Ministry of Environment** established four public research institutions and provides them with corresponding core funds via “research plans”. Three programmes of the National Research Programme in the field of environmental studies were financed only at the beginning of funding scheme (2004-5). Before 2006 the ministry operated rather systematically defined departmental programmes – biosphere, geosphere, hydrosphere, atmosphere, waste materials, whereas - since 2007 - there is only one programme for project funding with four subprogrammes aiming at climate change, sustainable using of sources, technology for observation and assessment.

The R&D budget of the **Ministry of Defence** is the last one reaching more than 1% (500 mil. CZK in 2005) of all public expenditures. The structure of the budget consists of research plans (cca 17%) and specific research (cca 10%), allocated mainly for the University of Defence (one of the two “state universities”), and the departmental programmes, specified for the modernisation and development of Czech army and for the cooperation within NATO.

The international funding is considered to be rather low in CR, but there are no detailed data approving it. There are two main flows from EU that should be mentioned. Before launching new EU budget 2007-2013 structural funds played practically no role for R&D funding in CR. For the next period it should – on the contrary – play principal role for funding of infrastructure investments, but also for building of new capacities in human resources reaching almost the same amount as the funds from state budget. Data on Czech participation in Framework programmes shows that despite relatively low share on whole volume funds allocated for Czech teams constitutes growing part of public funding in CR (8% of total volume in 2006).

Apart from these funds coming to Czech system from European Commission, there are several minor international agencies that provide scholarships or project-based funding for Czech citizens as Visegrad fund, Fulbright Foundation, Deutsche Akademischer Austausch Dienst etc.

There are several programmes in Czech funding system that allocate funding for Czech participation in international programmes. This category comprises 5 European programmes (EUREKA, COST, KONTAKT, INGO, EUPRO) managed by MEYS, Eurocores programme (CSF) and Czech fees to international research organization as for example CERN.

**Figure 14 Funding channels through Czech Science Foundation**

<b>Programmes</b>	<b>Standard grant projects</b>	<b>Postdoctoral grant projects</b>	<b>Doctoral grant projects</b>
Type of funding	Project funding	Project funding	Project funding
Time Coverage	1993	1998-	2003, 2005, 2007
Budget (2005) mil. of CZK	1012	100	180
Purpose	Disciplinary and interdisciplinary projects in all fields of study Basic research	Attractiveness of career in research for early-stage researchers	Coordination and cooperation between PhD students and their institutions Attractiveness of the PhD studies Mobility Motivation for graduation after normal length of study
Eligibility criteria	Scientific qualification No debts to state budget	PhD holders Permanent position in R&D institution obligatory Project task in relation to the research orientation of the institution	Teams of PhD students (5 or more) 2 or more institutions Steering committee of senior researchers Specific field of one or more disciplines
Allocation criteria	Scientific contribution Societal embeddedness Building of infrastructure Clarity and strategy of the project Scientific and expert qualification of the applying individual(s) or teams as well as of the institutions Appropriateness of the personnel and of the financial requirements International cooperation Former cooperation with CSF Peer review Expert commissions		

**Figure 15. Funding channels through Ministry of Industry and Trade**

Programmes	IMPULS	TANDEM	Permanent welfare (NRP II)	PROGRESS (NRP I, II)	Project consortia
Type of funding	Project funding	Project funding	Project funding	Project funding	Project funding
Time Coverage	2004-	2004-	2006-	2002-2006, 2004-2009	2001-2006
Budget (2005) mil. of CZK	686	506	0	223, 143	252
Purpose	R&D in industry, materials, technology Enhancing productivity of enterprises (esp. small and middle-size), modern technologies, better competitiveness in EU market etc.	Transfer of the R&D results to the industry, from basic to applied research Cooperation between R&D institutions and enterprises (small and mid-size) Competitiveness in EU	24 thematic areas (majority in energy and materials)	2 thematic programmes (energy and competitiveness with sustainable growth)	Cooperation of researcher institutions and enterprises on one particular project Technology transfer
Eligibility criteria	PRIs, HEIs, private companies that have R&D as a official part of their activities	Consortia of R&D institutions and companies (i.d. teams)	R&D institutions, HEIs, companies that have R&D as a official part of their activities	R&D institutions, HEIs, companies that have R&D as a official part of their activities	R&D institutions, HEIs, companies that have R&D as a official part of their activities
Allocation criteria	Correspondence with programme priorities Technical and economic strategy Usefulness of a new product or technology Etc. Peer review Expert commission	Correspondence with programme priorities Technical and economic strategy Enhancing productivity High-tech technologies Etc. Peer review Expert commission	Technical and economic level and complexity of the proposed solution Topicality and relevance of the intention Comparability with the world standard Environment-friendly Technical, economic, professional ability	Technical and economic level and complexity of the proposed solution Topicality and relevance of the intention Environment-friendly Technical, economic, professional ability	Goals of the declared programme Need of the product or technology Demonstrated by a marketing inquiry, study or a concrete requirement Environment-friendly Technical, economic, professional ability

**Figure 16. Funding channels through other Ministries**

	<b>Ministry of Agriculture</b>	<b>Ministry of Health</b>	<b>Ministry of Environment</b>	<b>Ministry of Defence</b>
<b>Programmes</b>	Research plans, 3 programmes of NRP II, Departmental programmes	Research plans 1 programme of NRP II "Programme projects"	Research plans 2 programmes of NRP II Departmental programmes	Research plans Specific research Departmental programmes
Type of funding	Core/project funding	Project funding	Core/project funding	Core/project funding
Time Coverage	1999-, 2004-2009, 2000-2005, 2003-2007, 2005-2009	1999-, 2004-2009, 1998-2005	1999-, 2004-2009 1997-2005, 2003-2008	1999-, 1993-, 2001-
Budget (2005) mil. of CZK	725 (Σ)	220 (RP) 629 (programmes)	230 (RP) 331 (programmes)	80 (RP), 52 (SR), 352
Purpose	Thematic programmes: Quality and safety of nourishment, Landscape and residence of future, Utilization of natural sources (NRP II) 20 thematic priorities (DP)	Thematic priorities: Health of the population (NRP II)	Thematic priorities: Environment and natural resources management	Thematic programmes: Professionalization of Czech army Technologies Cooperation within NATO
Eligibility criteria	8 PRIs, HEIs, private or public companies Professional qualification	Hospitals and other medical establishments, medical research institutes, HEIs	R&D institutions, 4 PRIs, HEIs, companies that have R&D as a official part of their activities	University of Defence private or public companies with R&D outcomes and qualified personnel
Allocation criteria	Basic research – max 95% Applied research – max 50% Innovations – max 25% (EU Framework) Utility of outcomes, Technical and economic strategy, Institutional assessment Expert commission	Scientific quality Qualification of the team and impact factor of it's publications Adequacy of the budget Research infrastructure of the institution	Correspondence with programme priorities Utility and quality of outcomes Feasibility Qualification of the team	Utility and quality of outcomes Feasibility Implementation

## 4 Quantitative data on R&D public funding

### 4.1 Basic data for the year 2005

**Table 1. Basic data**

	CZK (mil)	EUR (mil) app.	USD/PPP (mil)
GDP	2 970 300	99 700	208955
GERD	42 198	1 416	2968
GBAORD	17 248	579	1213
% of GERD financed by government	42		
GERD as % of GDP	1,42		

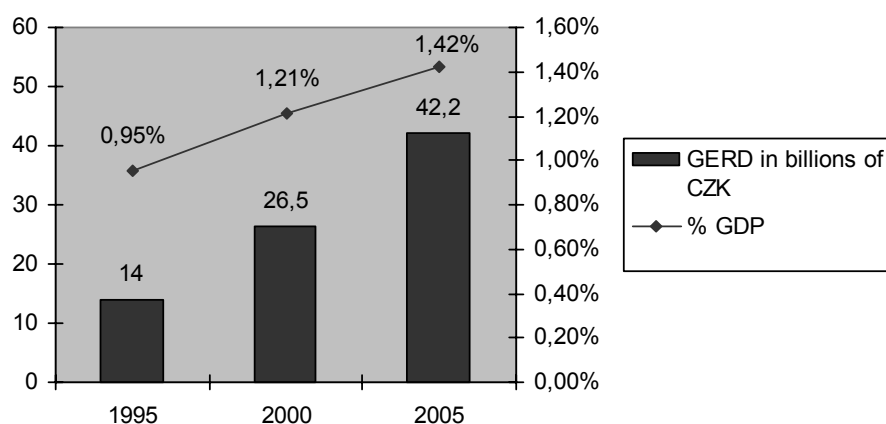
Source: CSO 2006

### 4.2 Trends in R&D funding at national level

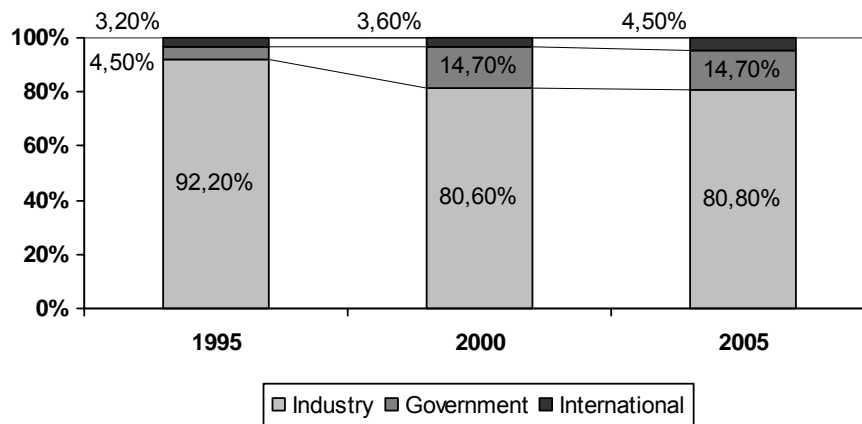
Next figures show the basic trends of the R&D funding in CR in the last 10 years. These are some general remarks for discussion:

- Overall R&D funding has grown rapidly since 1995
- In the late 90s the growth was driven more by public sources, while after 2000 private sources have been rising faster than public sources
- Higher education and government sectors are almost exclusively financed by public sources

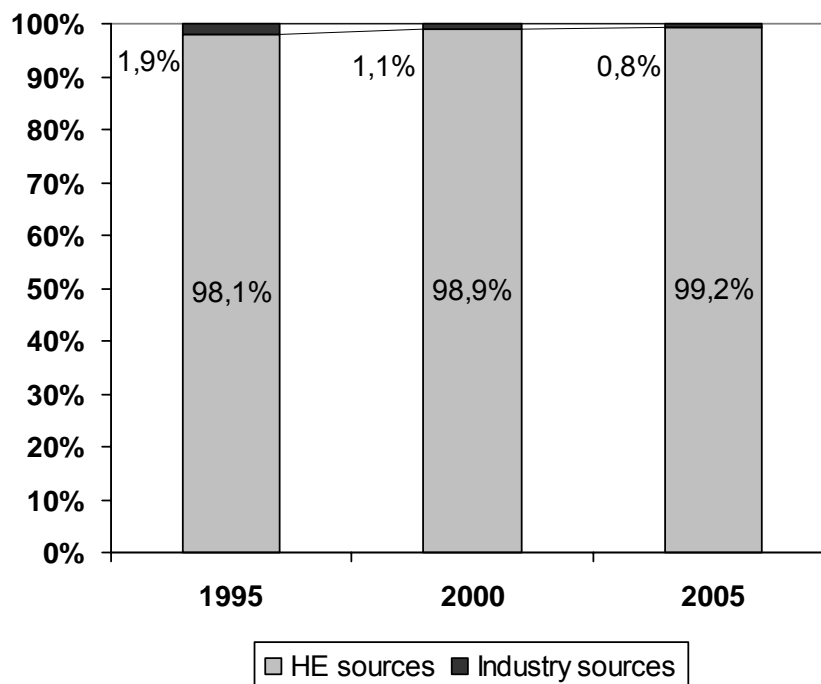
**Figure 17. Total Expenditures in R&D**



Source: CSO 2006

**Figure 18. R&D Expenditures Performed in Industry Sector**

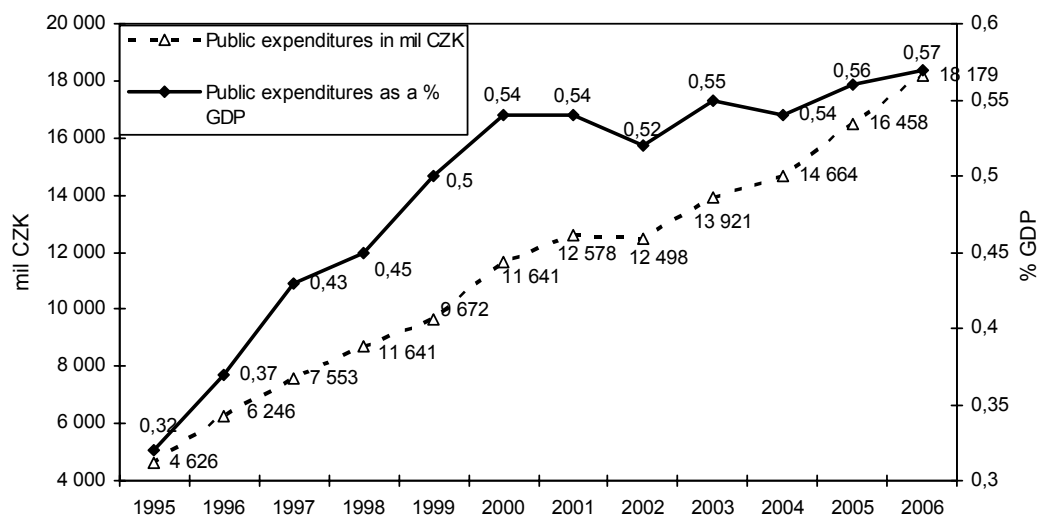
Source: CSO 2006

**Figure 19. R&D Expenditures Performed in Higher Education Sector**

Source: CSO 2006

### 4.3 Public R&D funding

**Figure 20. Public R&D funding (mil CZK and % GDP)**



Source: R&D Council 2006; funding from abroad not included

In Figure 20 the continual, almost linear growth of public expenditures to R&D is shown; the average annual nominal growth has been 9.5 % in 1999-2006 period (before 1999 inflation was running 10% or more). Regarding percentage of GDP, government set a goal of 0.7% in national policy documents already several years ago. However, the fluctuation of this figure depends almost entirely on the evolution of GDP growth. After a growth in late 90s which was merely result of lower GDP growth, the trend changed in 2000 when GDP started to grow more rapidly reaching 6.5% in 2005.

#### 4.4 Composition of public R&D funding

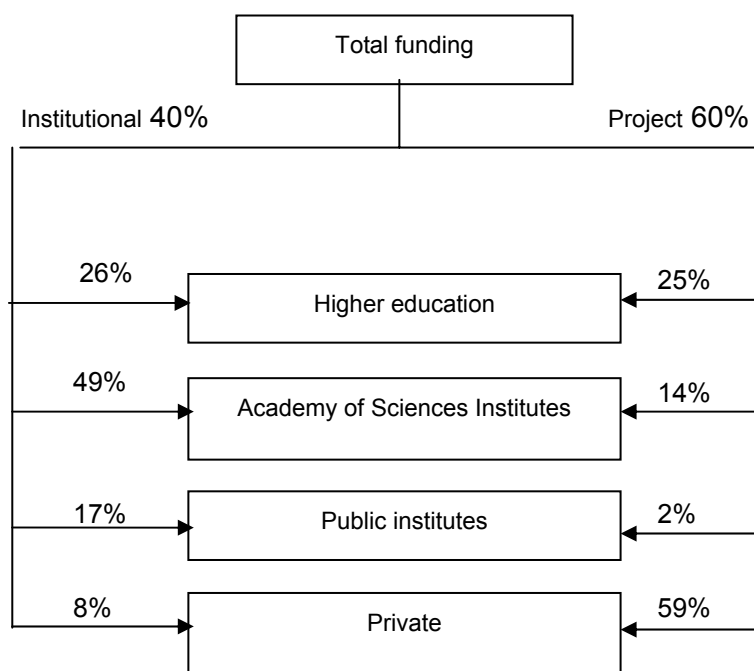
The data used in this section are mainly based on the State budget for R&D, which consists of figures provided by all funding agencies (ministries, AS, CSF, other). These data were aggregated according to the funding agency, instruments, type of instruments and beneficiaries. Next figure shows the overall volume of public funding in 2005 differentiated by project/institutional funding and by beneficiaries. Classification is made following the discussion of particular instrument in section 3 as follows:

*Institutional* – specific research for HEIs, research plans for institutes of AS, research plans for governmental research institutes, research plans for several private research organisations and PhD scholarships

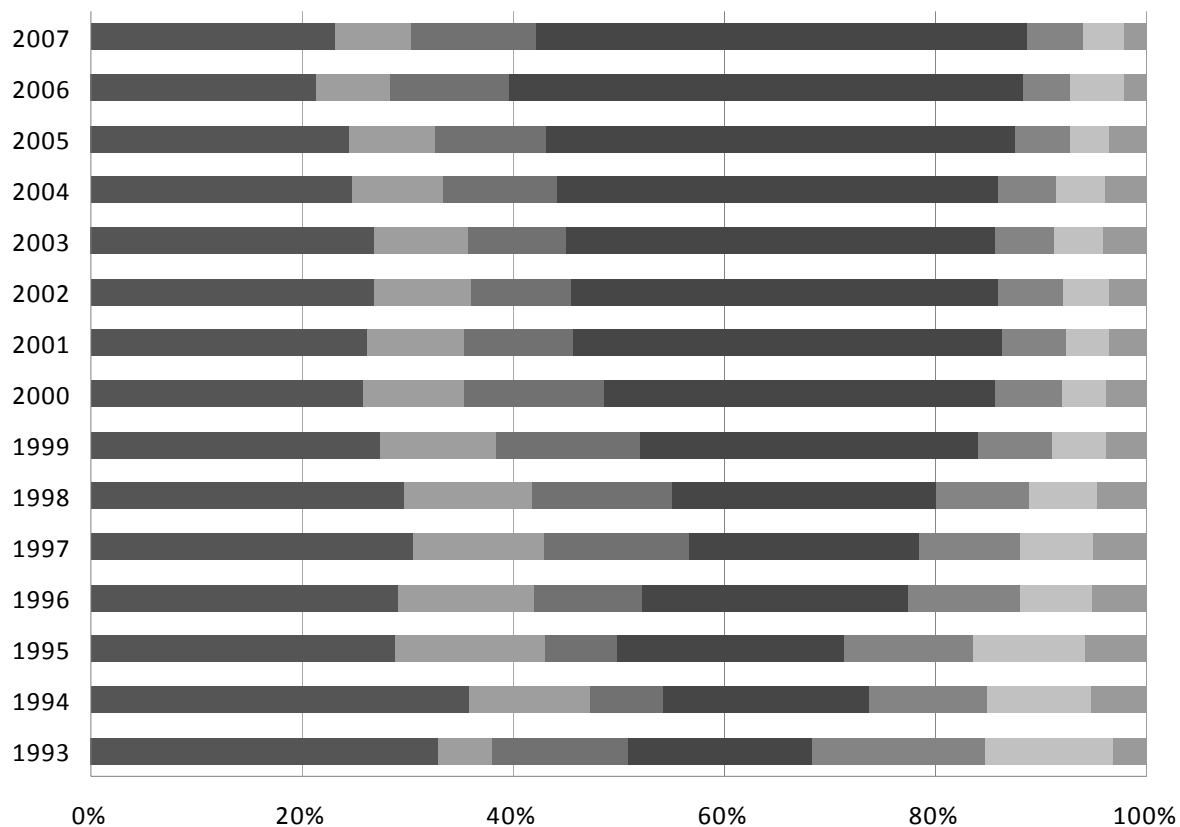
*Project* funding comprises research plans for HEIs, departmental programmes, grant schemes of CSF and AS, research centres, EU Framework programmes and direct contracts of ministries.

The only disputable borderline case of research plans for HEIs is discussed in section 3.4.1.

Division by beneficiaries is reliably calculated for institutional funding while figures for project funding are only estimates based on data from Registry of R&D Tenders/public competition (R&D Council). The most biased ratio would be the one concerning public institutes and private sector, because data about departmental programmes that are the most important instrument affecting governmental and business sector are least developed in database.

**Figure 21. Channels of public research funding in 2005**

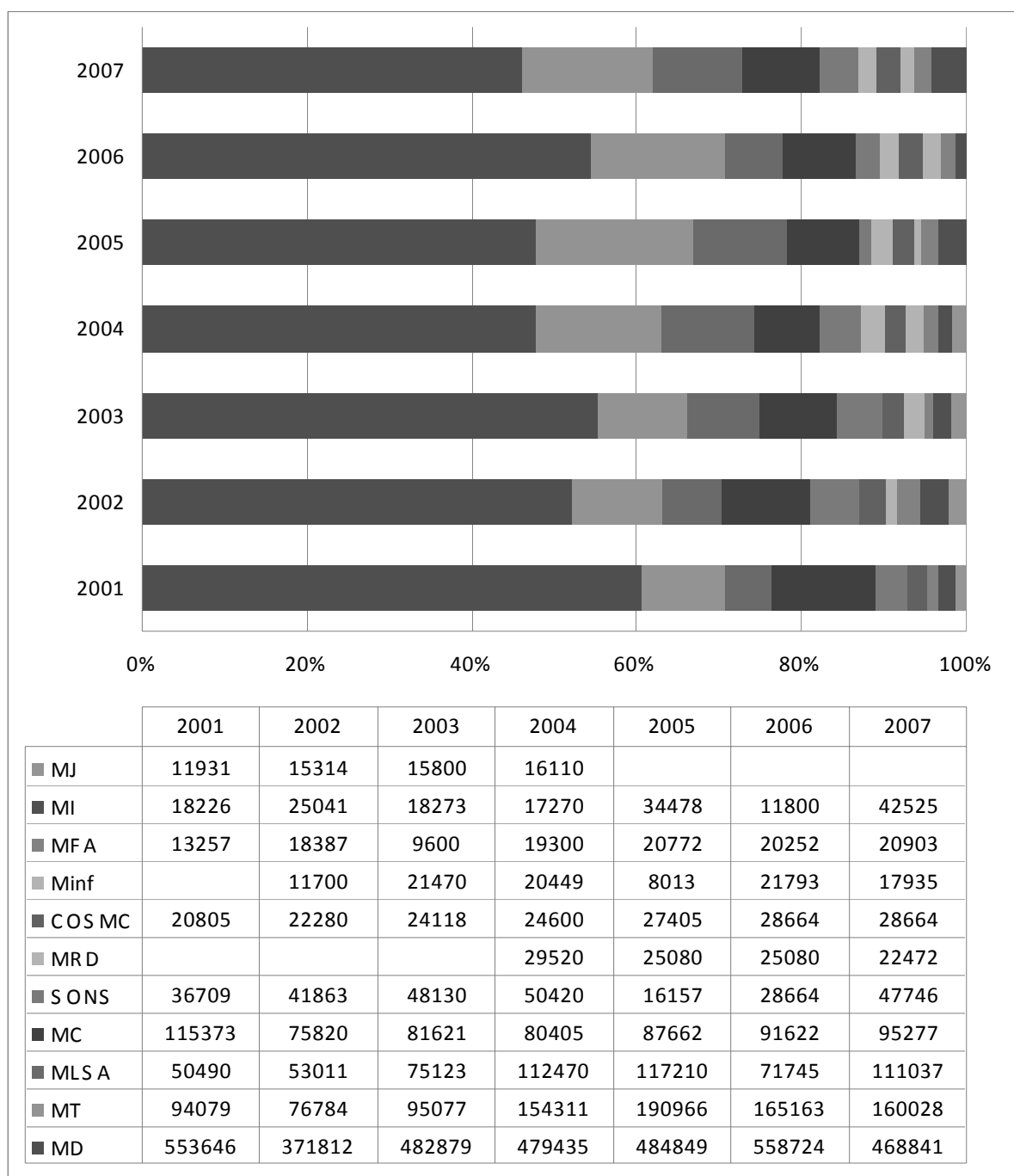
Evolution of public funding by agency is shown in Figure 22. The most significant trend in 90s is the rising role of MEYS at the expense of other ministries that – especially in the beginning of 90s – have been losing their R&D institutional infrastructure. On the other hand, there has been almost no shift in the categories in recent 7 years with exception of small growth within MEYS. This trend was a result of growing expenditures for research plans in HE sector. Apart of this, also the division among “small” agencies, i.e. other ministries, shows rare stability from the beginning of 2000s.



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
■ Ministry of Environment	129	216	257	305	329	341	341	412	412	412	523	563	561	410	445
■ Ministry of Agriculture	499	403	469	411	446	464	442	442	475	515	588	667	587	999	825
■ Ministry of Health	670	456	541	627	614	638	619	678	712	712	704	784	833	851	1 117
■ Ministry of Education	709	797	951	1 498	1 410	1 804	2 806	3 937	4 733	4 730	5 116	5 981	7 071	9 431	9 784
■ Ministry of Industry	528	286	301	607	884	964	1 198	1 420	1 200	1 100	1 178	1 556	1 670	2 182	2 503
■ Czech Science Foundation	212	466	626	766	807	871	965	1 013	1 073	1 074	1 131	1 233	1 299	1 370	1 500
■ Academy of Sciences	1 345	1 466	1 276	1 732	1 967	2 147	2 410	2 754	3 048	3 140	3 384	3 543	3 891	4 127	4 883

**Figure 22. Public R&D funding by “agency” (in mil CZK)**

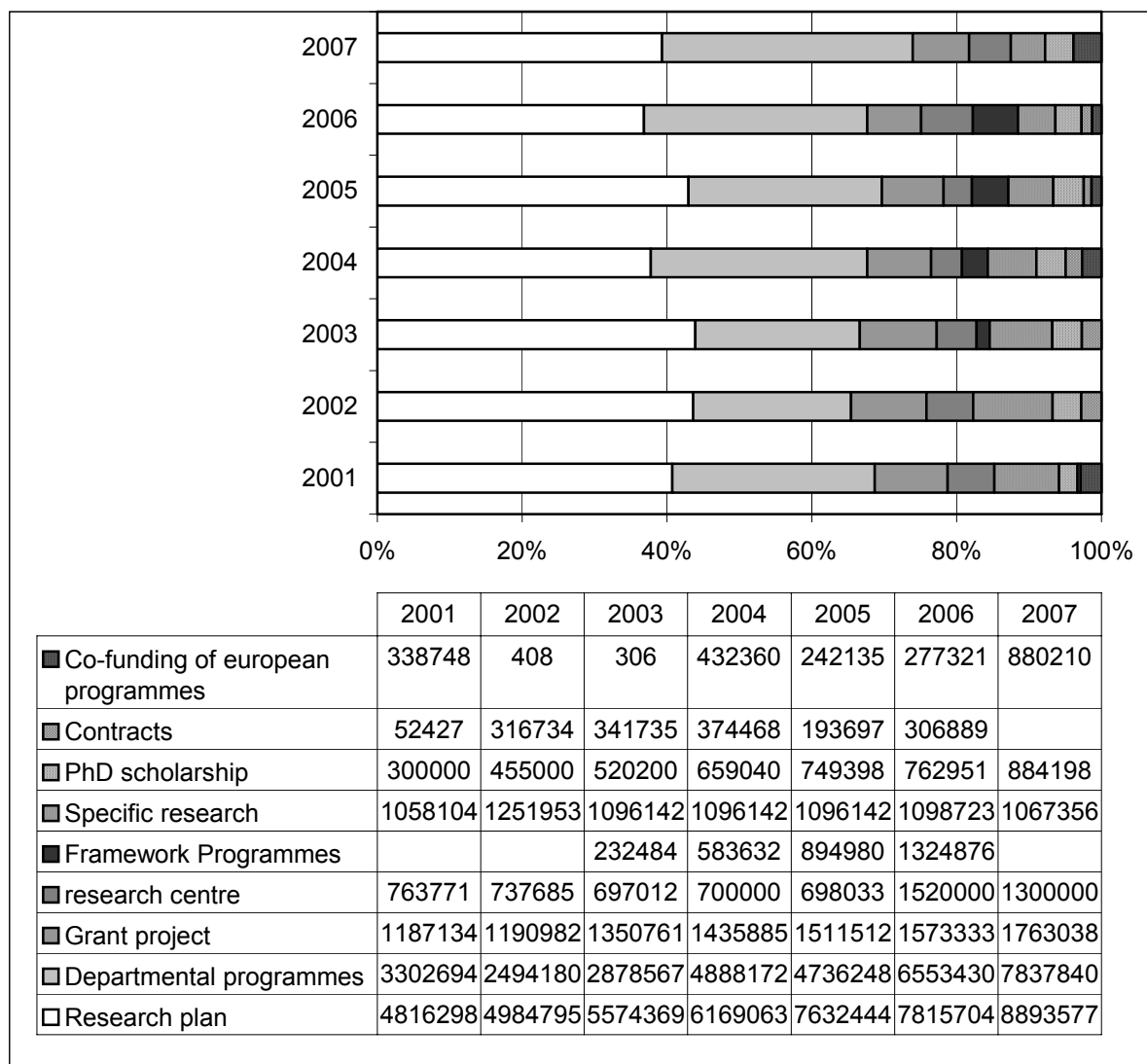
Data for 1993-2000 are taken from *Analysis of the Existing State of R&D in the Czech Republic* published by R&D Council using slightly different methodology (see Methodological annex).

**Figure 23. Public R&D funding by “small agency” (in thousands CZK)**

Next figure shows the differentiation according to the Czech terminology (legally defined) that does not in all cases corresponds with differences between real allocation mechanisms. The instruments are grouped according to the legal and administrative definition. This could be useful for comparing the data with next figure with data aggregated according to the above-described mechanisms. The share of particular groups of instruments illustrates that the two main categories are research plans and departmental programmes, the first being considered as main Czech institutional funding and the latter being dominant for project funding. The growth of funding for departmental programmes was caused by start of NRP II in 2004 while other ministerial programmes stayed almost unchanged. Traditional bottom-up grants play relatively minor role being allocated by CSF and partially by AS. Approximately the same amount of money was allocated for specific research in HE in 2001; despite

continual pressure of representatives of HEIs on its growth its nominal stability has had result in relatively smaller share in 2007.

**Figure 24. Public funding by national categories (in thousands CZK)**



For further analysis of the data the funding channels were differentiated according to the type of allocation mechanism and character of the instrument (Figure 25) what gives a comprehensive view Czech public funding system.

The AS funding comprises institutional funding of institutes of AS, its internal science foundation and several minor thematic programmes.

The *departmental programmes* consists of highly fragmented set of more than 50 programmes (58 in 2005) divided not only by managing bodies and their different strategies, but also by only formal implementation of NRP I and II. The inefficiency could also be illustrated by the fact that  $\frac{1}{4}$  of all programmes are small or very small (only 4 of them had more than 10 mil EUR in 2005). This issue is considered as another goal for reform of R&D funding system. All of them are allocated on a basis of competition among project proposals and they are strongly priority oriented.

CSF provides three grant schemes – *grants* – for individuals and team, postdocs and teams of PhD students.

A border-line case of research plans for HEIs is put to separate category – *research plans (HEIs)* - because its characteristics are - according to the usual terminology – considered to be rather project funding type. The confusion is caused heavily by the separation of allocation mechanism construction between R&D Council and MEYS (or other agencies). While the legal framework elaborated by R&D Council strictly differentiate between “institutional” and “targeted” as an analogy to institutional/project difference, MEYS (and other intermediaries) set conditions according their actual priorities and

administrative frameworks. The controversies that came from this tension especially after the last call in 2004 had a result in call for radical change of institutional funding using only simple bibliometric and patent data.

On the other hand *research centres* (of both types, allocated by MEYS) are considered as a quite successful instrument of project funding, which meets the goal of cooperation between different types of R&D organisations, though private sector has still a minor role here.

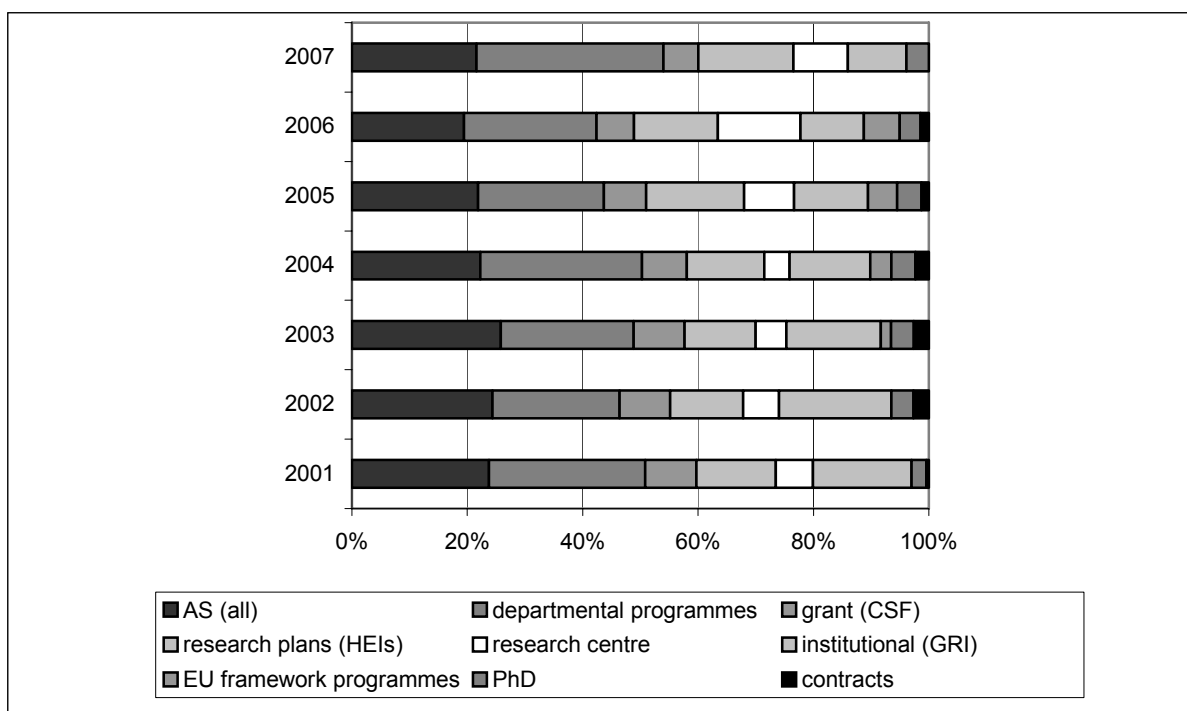
Category *institutional (GRI)* comprises funding of governmental research institutes (via research plans). Although these instruments (managed by different ministries and agencies) decreased their share in recent years, they still keep their significance.

For the period 2003-2006 the estimated level (see Methodological annex) of funding of Czech participation in *framework programmes* is available. The amount has risen steeply in recent years reaching 6% of total volume in 2006.

*PhD scholarships* are included in a budget of HE sector for teaching activities in Czech system. This channel is the only one funding PhD studies in CR and therefore comprises all over the funds for postgraduate students. These scholarships are very low (1/3 of average income), but every full-time PhD student is eligible for them. PhD funds are allocated similar to the block grant for teaching activities, i.e. as institutional funding.

Rather small part of funding is covered by category *contracts* that subsume mainly direct contracts negotiated by ministries.

**Figure 25. Public R&D funding by category of instruments (in thousands CZK)**



## 5 Conclusions

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Figure 25 shows the main features of Czech R&D funding system and trends in recent years. Czech Academy of Sciences is still the leading player though its role has diminished step by step since the end of 90s. In particular, in the field of research policy its expert and also advisory position is significant. As far as financing of AS is concerned, the far largest funding channel is research plans that are allocated by internal procedures and by decision of representative bodies of AS (partly with participation of international experts). Project-based funding from outside the AS constitutes only app. 10%. AS has strong legal, financial and governance autonomy that can be also illustrated by the elected institutional hierarchy of its decisive bodies.

Various ministries manage high number of rather small departmental programmes. This is the least effective part of research administration in CR as almost every programme has its own criteria and mechanisms of allocation. Effect of these programmes could be illustrated also by the low innovation performance of Czech system in general as the departmental programmes are mostly allocated for thematic oriented applied research and innovation. An attempt to harmonize and concentrate these programmes by introducing the National Research Programme I and II was unsuccessful and ministries managed to hold their own ministerial programmes to the full. This part of research system is considered to be the priority for upcoming reforms. Ministries' research institutes underwent significant reduction in early 90s and in 2000s they have been gradually losing their share on public funding. In future their administration should be concentrated under three or four ministries and incentives for better research performance should be introduced.

Research capacity of HE sector was relatively low in the beginning of 90s. On the other hand the constantly rising capability of acquiring research funding in last 10 years has shown the dynamic potential of the leading universities to foster their role in research. Allocation of the "institutional support" based on strict competition in 2005 should differentiate rather flat institutional structure of Czech HEIs. Almost all research funding in HE comes from public sources.

Czech Science Foundation that supports only basic research manages traditional bottom-up projects. As the funds for CSF has stagnated since 1990, its share has dropped to only 7% of total volume in 2007.

Since 1999 research centre programmes has been running and gained important role for funding of cooperation between HE sector, AS institutes and governmental research institutions, but much less joint action with private companies. In general, it seems that a great deal of project funding is received by private sector although the data in this field are only estimated.

The international funding is considered to be rather low in CR, but there are no detailed data approving it. There are two main flows from EU. Structural funds (i.e. ESF) should play significant role only after launching new EU budget for 2007-2013. Funds from Framework programmes for Czech teams constitute growing part of public funding in CR (8% of total volume in 2006).

There are several general trends to be recognised in the post-1989 period. In course of 90s the concentration of administration was increasing leading to cca 40% share of total volume allocated by Ministry of Education in 2001. As the research funding for HE sector has markedly grown since 1989, the relative share of AS and governmental sector decreased in the same period more than twice. The structure of funding instruments shows that after setting new legislation in the beginning of 2000s the evolution has been rather slow and stable. However, growing Czech participation in EU Framework programmes and new schemes from structural funds should not only rapidly increase total volume of public funding but also (together with reform in preparing) bring radical changes to the composition of funding instruments and organisation of R&D in CR in next years.

## 6 Methodological annex

On the national level, there are 3 sources of data for public funding of R&D activities in CR:

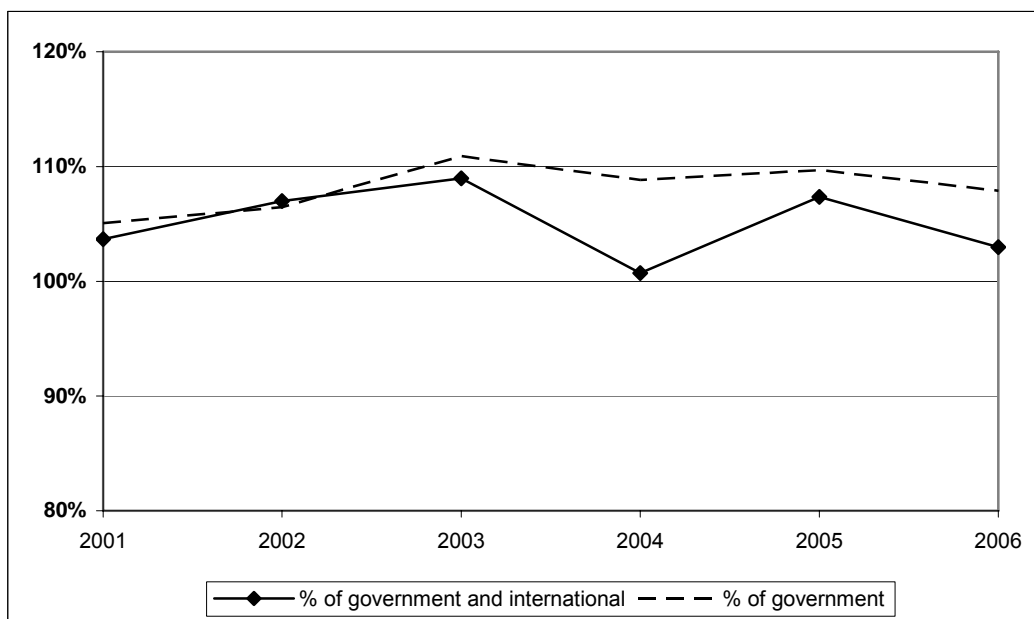
- **State Budget for R&D**
  - annually constructed by R&D Council
  - published for the first time in 2007, available from 2000
- **Czech Statistical Office**
  - is central public statistical office for statistical data collection in CR
  - provides performer-based surveys in accordance with Frascati manual
  - since 1995 publishes annual reports based on survey of cca 2000 statistical units
  - till 2000 the data were mis-represented by the relatively high non-response rate, since 2001 figures are estimated by (not exactly specified) mathematical methods
  - publishes three main reports: Indicators on R&D for the year ... (every year), Annual report Science and technology 2006 (international comparison for 1995-2002), Innovations in CR 2005 (for 2003-2005)
- **R&D Council**
  - as a governmental advisory board, collects the source-based data about public R&D funding
  - operates the Information system on R&D in CR, which includes four specific registers:
    - *The Central Registry of R&D Projects*
    - *Central Registry of Research Plans*
    - *Information Registry of R&D Results*
    - *Registry of R&D Tenders/public competition*
  - operation and administration of these registers are for all R&D public funding legally stipulated and their credibility is relatively high
  - data on individual programmes and projects are available and published on the web pages of R&D Council ([www.vyzkum.cz](http://www.vyzkum.cz))
  - basic publication is annual *Analysis of the Existing State of R&D in the Czech Republic and Comparison with the situation abroad*

For the purposes of this study the basic data source was state budget on R&D, which is available on the aggregation level of instrument for 2001-2007. The differentiation according to the agency was added by the available data from R&D Council that are calculated on slightly different methodology (excluding international funding, including administrative assets etc.), but it is satisfactory source for estimation of share of agencies in 90s. In some cases, the data were reconciled with information provided by ministries, CSF and AS (e.g. annual reports on their web side). Information on Framework Programmes is added from Eurostat database, the funds for PhD scholarships are taken up from annual report of MEYS on funding HE sector.

Neither of these sources includes data aggregated by beneficiaries. For project funding, neither ministries in departmental programmes or NRP, neither CSF and AS calculates figures according the type recipient of instrument. As far as institutional funding is concerned, division was made according to the characteristics of the instrument and in case of research plans for private institutions, their share was estimated according to individual data in the registry of research plans. For these reasons the aggregation by beneficiary can not be calculated in complete and the results are only partial.

Reconciliation with R&D data provided by CSO shows differences from 3% to 8% in total volume. Comparison is based on total volume in database as a share of total expenditures from government and international sources and from government sources.

### Figure 26. Reconciliation of database with R&D from CSO



Almost complete data (except international funding) from 2000 could provide databases collected by R&D Council from all agencies in Information system on R&D in CR. These data are unfortunately publicly available only in individual cases of projects or programmes in a limited way (see <http://aplikace.isvav.cvut.cz/>). Complete access to the database was for the purpose of this denied.

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### 7.2 Data sources and policy documents

- Analysis of Previous Trends and Existing Stage of Research and Development in the Czech Republic and a Comparison with the Situation Abroad – 1999. Prague: Office of the Government of CR, Research and Development Council, 1999.
- Analysis of the Existing State of Research and Development in the Czech Republic and a Comparison with the Situation Abroad – 2005. Prague: Office of the Government of CR, Research and Development Council, 2004.
- Inovace v ČR v roce 2005. Prague: Czech statistical Office, 2006.
- Národní politika výzkumu a vývoje České republiky na léta 2004-2008 (National Research & Development Policy in the Czech Republic 2004-2008). <<http://www.vyzkum.cz/FrontClanek.aspx?idsekce=5580>>.
- Národní program výzkumu I, II (National Research Programme I, II). <<http://www.vyzkum.cz/FrontClanek.aspx?idsekce=613>>.
- National Innovation Policy of the Czech Republic for 2005-2010. <<http://www.vyzkum.cz/FrontClanek.aspx?idsekce=14438>>.
- Státní rozpočtové výdaje a dotace na výzkum a vývoj (GBAORD) v ČR v roce 2005. Prague: Czech statistical Office, 2006.
- Ukazatele výzkumu a vývoje v ČR za rok 2005. Prague: Czech statistical Office, 2006.
- [www.vyzkum.cz](http://www.vyzkum.cz)
- [http://www.czso.cz/csu/redakce.nsf/i/veda\\_a\\_vyzkum\\_veda](http://www.czso.cz/csu/redakce.nsf/i/veda_a_vyzkum_veda)

## 8 Detailed description of main instruments

Name of instrument	<u>Research Plan (HEI+Private)</u>
Time coverage	1999-
Budget (2005)	3017 mil CZK
Performers	Higher education institutions, private profit-oriented and non-profit organizations
Scientific domain	All areas
Type of funding	Mixed. Considered as “institutional support” for HEIs and private institutions in a specific disciplinary field. However, due to the selection procedure used in 2005 has characteristics of project funding. Covers personnel and maintenance costs. Money as a block with limits for different types of assets. Constructed as percentage (90, 100) of applied and assigned expenditures.
Selection procedures	Selection procedures based on different criteria about institutional profile and personnel, scientific quality of the proposal and peer review process: - information about HEI (organizational structure, disciplinary specialization), faculty/department (budget, research outcome, international cooperation), team (individuals and their academic activities) - scientific contribution, goals, methods, feasibility, strategy and time plan - 2 reviews from extra-institutional scientists Assessment “not primarily” of the institution or the team
Selection committee	Ad hoc Committees in 6 scientific fields (social sciences and art, defence, informatics and industry, physics and mathematics, biosciences and chemistry, agriculture, medicine) consisting of highly qualified scientists from HEIs, AS
Availability of data	From 2001; aggregated on the level of individual HEIs (2005)
Sources	State budget on R&D (2001-); MEYS web
Discussion	

Name of instrument	<u>Research Plan (AS)</u>
Time coverage	2005-
Budget (2005)	3428 mil CZK
Performers	Institutes of AS
Scientific domain	All areas
Type of funding	Core
Selection procedures	Internal institutional assessment 4 reviewers (3 from abroad) Evaluation committees Criteria: outcomes (publication, international cooperation, patents etc.), academic qualification, research goals and their scientific relevance
Selection committee	3 evaluation committees (mathematics, physics, engineering, natural sciences; chemistry and life sciences; humanities and social sciences) – more than half members - outside AS
Availability of data	On individual institutes - from 2004; aggregated from 1998
Sources	State budget on R&D (2001-); annual reports of AS (web)
Discussion	

Name of instrument	<u>Grant project</u>
Time coverage	1993-
Budget (2005)	1292 mil CZK
Performers	Individuals, mainly public institutions
Scientific domain	All areas; basic research only
Type of funding	Fully bottom-up projects
Selection procedures	3 reviewers for proposal, decision in expert commission; 4 basic selection criteria: contribution for disciplinary field, social significance, building of infrastructure (incl. human resources), international cooperation; additional criteria: clarity and strategy of the project, scientific and expert qualification of the applying individual(s) or teams as well as of the institutions, appropriateness of the personnel and of the financial requirements, international cooperation, former cooperation with CSF
Selection committee	5 expert committees (engineering, natural sciences, medicine, social sciences, agricultural sciences) – decision; 33 subcommittees for every discipline – advising and briefing
Availability of data	non-aggregated data from 1993; aggregated on level of disciplinary field 1999-
Sources	State budget on R&D (2001-); annual reports on CSF web

Name of instrument	<u>NRP I, II</u>
Time coverage	2004-2008, 2006-2011
Budget (2005)	1 828 mil CZK
Performers	HEIs, PRIs, companies
Scientific domain	All, applied research, thematically defined (NPV I: quality of life, information society, competitiveness and sustainability, energetics, modern society; human resources for R&D, integrated R&D programme, regional and international cooperation)
Type of funding	Project; priority oriented
Selection procedures	Different agencies (AS + 8 ministries in 2005), MEYS coordinates; common guidelines (selection committee for every programme)
Selection committee	Council of programme; common criteria: correspondence with goals of the programme, appropriateness and quality of outcomes, opportunities and risks, availability of equipment and other facilities, scientific and methodological qualification of applicants
Availability of data	Aggregated on programme level 2004-
Sources	State budget on R&D (2001-); web pages of other ministries

Name of instrument	<u>Departmental programmes</u>
Time coverage	1990-
Budget (2005)	3138 mil CZK
Performers	HEIs, PRIs, companies
Scientific domain	All
Type of funding	Project; priority oriented
Selection	Managed by all ministries, AS and other agencies (13) – 28 programmes (2005);

procedures	different procedures
Selection committee	different
Availability of data	Aggregated on programme level 2001-
Sources	State budget on R&D (2001-); web pages of other ministries

Name of instrument	<u>Specific research</u>
Time coverage	1993-
Budget (2005)	1044 mil CZK
Performers	HEIs
Scientific domain	All
Type of funding	Core; block amount for R&D with participation of students
Selection procedures	Formula; criteria: number of post-graduate students, number of research degrees awarded/graduates, number of academic staff, level of qualifications of academic staff and external research income
Selection committee	-
Availability of data	Aggregated on level of HEIs 2002-
Sources	State budget on R&D (2001-); MEYS web

Name of instrument	<u>Research centre/Centre of basic research</u>
Time coverage	2000-, 2005-
Budget (2005)	1545 mil CZK
Performers	HEIs, PRIs, companies
Scientific domain	All
Type of funding	Project; research centre for applied/basic research; mainly human resources
Selection procedures	2 reviewers, expert panel; criteria: cooperation of excellent R&D institutions, international cooperation, participation of early-stage researchers
Selection committee	Expert panel appointed by MEYS for all disciplinary fields
Availability of data	Aggregated on programme level 2001-
Sources	State budget on R&D (2001-); MEYS web

Inside the European Network of Excellence on Research and Innovation Policies (PRIME), the specific task of the European Network of Indicators Designers (ENID) was to create a network of S&T Indicators Producers, based on the experience of recognised institutions, labs or groups, and to develop the capacity for the interpretation of existing indicators and for the development of new ones. The ENID project is producing a comparison analysis between a significant number of European countries, identify European partners where action is needed and areas of further action. Moreover, ENID is promoting a biannual conference series to favour networking and exchange of knowledge among academics and practitioners in the field, as well as a doctoral school to train new researchers in the field.

Inside ENID, the exploratory action on public funding aims to develop innovative methodologies to produce indicators on public funding or research activities, answering to specific research and policy questions. In its first phase, this action focused on a quantitative analysis of public funding in six European countries (Austria, Italy, the Netherlands, Portugal, France and Switzerland).

The extension of the project to Central and Eastern European Countries aims to depict the structure of the public funding system in these countries after the transition and to identify main policy issue to the future. This part of projects matches qualitative descriptions of the national systems with the systematic collection of data from public budgets and funding agencies. Following reports are being published :

- Czech Republic, Karel Sima;
- Estonia, Jaan Masso and Kadri Ukrainski;
- Poland, Julita Jablecka.

A final report as well as a number of academic paper will be published during 2008 summarizing the main project results.

[www.enid-europe.org](http://www.enid-europe.org)

