

ENID

European Network of
Indicators Designers

Public Funding of Research in CEEC

ESTONIA

Jaan Masso, Kadri Ukrainski



National Report on Public Funding


Prime

funded by the European Commission



Public Research Funding in Central and Eastern European Countries

Estonian Country Report

Person responsible: Jaan Masso, Kadri Ukrainski

Institution: University of Tartu, Faculty of Economics and Business Administration, Narva Rd.4-110, Tartu,
51009, Estonia.

Tel : +372 737 6395

Fax: +372 737 6312

Email : Jaan.Masso@mtk.ut.ee; Kadri.Ukrainski@mtk.ut.ee

Date : 31 January 2008

Table of Contents

Table of Contents	2
Authors	3
Abbreviations	4
1 Introduction	5
1.1 The Project of CEEC Funding	5
1.2 This report	5
1.3 Acknowledgements	6
2 The organization of research policy in Estonia	7
2.1 The organization of research policy in 2005	7
2.2 Historical development and perspectives of research and higher education policy organization in Estonia	9
2.3 Changes and perspectives of research policy orientation in Estonia	11
3 The organization of research and higher education funding	13
3.1 The organization of research and higher education funding in 2005	13
3.1.1 Public funding of research through the budget of the Ministry of Education and Research (MER)	15
3.1.2 Public funding of higher education	21
3.1.3 Public funding of research through the budget of the Ministry of Economic Affairs and Communications (MEAC)	22
3.1.4 Public funding of research channelled through other ministries and local authorities	27
3.2 Historical development of research and higher education funding schemes in Estonia	27
3.3 Perspectives of research and higher education funding schemes in Estonia	28
4 Dynamics of R&D funding in Estonia	31
4.1 Trends in R&D Funding at the aggregate level	31
4.2 Composition of public research funding in Estonia by instruments	33
4.3 Comparison with other Baltic countries	41
5 Conclusions	44
6 Review of data sources	45
7 References	53
8 APPENDICES	56
8.1 APPENDIX 1 Detailed Description of Instruments of MEAC	56
8.2 APPENDIX 2 Detailed Descriptions of Instruments of MER	61
8.3 APPENDIX 3 Detailed description of instruments of ESF	67

Authors

Jaan Masso is a Senior Research Fellow at the Faculty of Economics and Business Administration at the University of Tartu. He holds a PhD degree from University of Tartu in economics since 2005. His main research areas include labour economics, foreign direct investments, innovations. Jaan Masso has participated in several international research projects financed by the EU, World Bank, ILO. Currently he is involved in international co-operation through the EU 6th Framework Project „Understanding the Relationship between Knowledge and Competitiveness in the Enlarging European Union“, coordinated by IWH, Germany. The joint research has been done also with the Corvinus University of Budapest, IKU Innovation Research Centre „Private Sector Interaction in the Decision Making Process of Public Research: Country Profile of Estonia“.

Kadri Ukrainski is a Research Fellow and PhD Student at the Faculty of Economics and Business Administration at the University of Tartu. She holds MA degree in economics from the same university. Main areas of interest are innovation and technological change in traditional industries. She is involved in international co-operation through the EU 6th Framework Project „Understanding the Relationship between Knowledge and Competitiveness in the Enlarging European Union“, coordinated by IWH, Germany, but the joint research has been done also with the Corvinus University of Budapest, IKU Innovation Research Centre „Private Sector Interaction in the Decision Making Process of Public Research: Country Profile of Estonia“ and SPRU, University of Sussex “Wood Industry and Public Research in Estonia and Finland“ in „ERAWATCH base load inventory: Feasibility study on R&D specialisation“.

The *Institute of Economics at the University of Tartu*, directed by Prof. Raul Eamets, is located at the Faculty of Economics and Business Administration. The institute includes the chairs of the following subjects: Economic Theory, Economic Policy, Economic Modelling, and Public and International Economy. With regard to research activities, the Institute of Economics covers the following sectors: labour economics, regional economics (in particular, Baltic Sea area studies), applied econometrics, international economics and innovation studies. It has been or is currently involved in various research projects funded by the European Union and in a large number of projects and grants funded by the Estonian Science Fund and by the Estonian Ministry of Education and Research. The number of staff is currently about 30, including 6 full professors, 4 associate professors, 5 research fellows etc. The number of PhD students is currently around 20. Some of them are also working as researchers or assistants for the institute.

Abbreviations

EAS	Estonian Academy of Sciences
EE	Enterprise Estonia
EIC	Environmental Investments Centre
EIF	Estonian Innovation Foundation
EITSA	Estonian Information Technology Foundation
ESF	Estonian Science Foundation
ESTAG	Estonian Technology Agency
ERC	Estonian Rectors' Conference
IPC	Innovation Policy Committee
MEAC	Ministry of Economic Affairs and Communications
MER	Ministry of Education and Research
MoA	Ministry of Agriculture
MoC	Ministry of Culture
RDC	Research and Development Council
RDTI	Research, Development, Technology, Innovation
RPC	Research Policy Committee
SCC	Science Competence Council

1 Introduction

1.1 The Project of CEEC Funding

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 an European Research Area (PRIME) of the 7th 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 rationales 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).

1.2 This report

The expenditures on research and development (hereinafter also R&D) activities are seen as the key to innovativeness and more broadly, competitiveness. Such perception is reflected for instance in the targets set on R&D expenditures in different national strategies. For instance in Estonia the R&D strategy Knowledge-Based Estonia for 2002-2006 set the target for 2013/2014 at the level of 3% of GDP. Thus the level of expenditures both by private and public sector receives a lot of attention. For public research organizations like universities and research institutes, public funding is the prevalent source of resources. While the aggregate statistics on public R&D funding flows is available in different countries, much less is known about the organization of such funding: how that is distributed between different funding instruments, or between the funding towards research institutions and to specific research projects. Still, a few studies have been made in this subject for Western European countries, including Lepori (2006) and Lepori et al. (2007a).

The aim of the current report is to analyze the role of different funding mechanisms (instruments and intermediary bodies) of public research funding system in Estonia. The other thorough analysis of the Estonian public research and innovation funding system are the study by Nedeva and Georgiou (2003)

and the comparative study of Baltic research systems by Kristapsons et al. (2003). On the one hand, it could be a time for a new study as the Estonian R&D system has changed over the last 5 years. On the other hand, this report is different in its goals, for instance, we do not put much emphasis on policy suggestions, but we are rather trying to analyze the current system. We first provide an overview of the organization of research policy in Estonia, the organization of research and higher education funding in Estonia and the analysis of the R&D funding by individual instruments. For instance, we aim at providing information about the proportions of funding directed to research projects and institutions, how has changed the portfolio of project funding instruments (like the proportion of instruments with academic orientation and those with policy or innovation orientation), what is the dynamics in the shares of different beneficiaries, like higher education sector, public research institutes, private firms et cetera.

The quantitative analysis part is based on the data gathered by authors on public R&D funding flows. The data has been gathered for a period 1993-2005 and is disaggregated both by funding instruments and by individual beneficiaries, like universities, research institutes etc. The data covers for most years more than 90% of total public R&D funding flows, hence we have data on all major public research funding instruments. It seems that so far no one has tried to analyze the Estonian research funding system quantitatively at such a level of disaggregation. Also, while the reports of Estonian R&D system have included data on typical instruments of R&D funding, like Estonian Science Foundation grants, targeted funding of the Ministry of Education and Research etc., less is known about the amount of funding from some other sources, like the direct contracts of ministries and other state agencies, funding from charities, funding from programmes, that are not exclusively focused on R&D but finance inter alia also research activities. During the recent years several new funding instruments have become available, these developments are also connected to the opening of EU structural funds in 2004 after Estonia became the member of European Union. Aside to this report, the mentioned database will be used for further articles on the comparative analysis of the public research funding in CEE countries and the analysis of competition in the Estonian research system.

The rest of the report is structured as follows. Section 2 describes the organization of research policy in Estonia. Section 3 describes the organization of research and higher education funding in Estonia in year 2005 with some retrospect of the previous years since the middle of 90s; the information on the main funding instruments is provided here, while more detailed data on the funding instruments can be found in the appendices. Section 4 analyzes dynamics of R&D funding in Estonia, firstly at the aggregate level by using mostly the data from the Statistical Office of Estonia, then by instruments using the data gathered by authors and thereafter we compare Estonia with the two other Baltic States, Latvia and Lithuania. Section 5 gives information about the various sources from which the data on funding flows has been extracted; the notes on methodological issues are also provided in this section.

1.3 Acknowledgements

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. We are grateful also to a number of other people and institutions for their assistance, in particular Joel Peetersoo and Indrek Reimand from the Republic of Estonia Ministry of Education and Research; Juta Tarvis from Estonian Science Foundation; Kalle Hein and Mare Ainsaar from University of Tartu; Krista Ragel from University of Tallinn; Katrin Kiisler and Margit Lehis from Archimedes Foundation; Open Estonia Foundation; Hanna Kanep from the Estonian Rectors' Conference; Kristo Reinsalu from the Republic of Estonia Ministry of Economic Affairs and Communications; Sten Hansson and Anna Laido from the Estonian State Chancellery; Katrin Pükke from Estonian Information Technology Foundation; Heiko Põdersalu from Environmental Investment Centre; Jaan Vinnal from the Ministry of Social Affairs; Helen Ojamaa from the Ministry of Finance; Anton Pärn from the Ministry of Culture; Andres Oopkaup from the Ministry of Agriculture. Without their assistance with necessary data it would have been impossible to undertake this study. We also thank Aavo Heinlo from Statistical Office of Estonia and Tea Danilov from the Ministry of Economic Affairs and Communications for comments on Estonian R&D statistics and data. We are grateful to Kerly Krillo for excellent research assistance. Naturally, all errors are the responsibility of the authors.

Benedetto Lepori, coordinator of the CEEC-funding project.

2 The organization of research policy in Estonia

2.1 The organization of research policy in 2005

The main policy document currently regulating the functioning of Estonian research and development is the Organization of Research and Development Act first agreed in 1997, but substantially amended in 2001¹. It determines the main institutions, their functions and financing schemes of current research policy. In the Estonian public research policy decision-making process, the following actors must be considered²: *Estonian Parliament*, and the *Government* with its advisory body, *Research and Development Council (RDC)*. The highest level of political decisions of RDTI funding is made by the Government and agreed by the Parliament. The Government develops national R&D policy, decides the procedure for the formulation of the Scientific Competence Council, establishes its action plans, and approves its membership. The Prime Minister yearly presents to the parliament an overview of the R&D situation and of the government policy in this field. The Research and Development Council³ has 12 members that include 4 ministers, 4 academicians and 4 representatives of private sector (industry); the representations of different groups should be thus balanced. It is purely an advisory body (the decisions are made thereafter by the government of Estonia), whose list of targets has included advising the government on R&D strategy, expressing opinions on the national R&D programs, annual reporting on the R&D in Estonia, advising government in the process of preparation of the draft state budget. According to the strategy document "Eesti edu 2014" (The Success of Estonia 2014) RDC should achieve the consensus and coordinated actions of state, entrepreneurs and the scientists.

Research policy preparation and management functions are the main responsibility of the *Ministry of Education and Research (MER)*, but also through the innovation policy measures fulfilled by the *Ministry of Economic Affairs and Communications (MEAC)*. MER has the following advisory bodies – the *Science Competence Council (SCC)* and *Research Policy Committee (RPC)*. SCC consists of 9 members⁴ of scientific community and is responsible for suggesting the R&D fields at research and development institutions, organizing research evaluations, coordinating international collaboration, advising MER by distribution of infrastructure funds etc. The members of SCC are appointed for 3 years by the government following the proposal of the minister of education and research. Although the Science Competence Council is an advisory body, factually its decisions on research funding are final and the minister only ratifies these⁵. Research Policy Committee⁶ includes 19 members from ministries and different advisory bodies (11), universities (7) and private sector (1) and is advising MER by designing the research policy and strategies. In addition to afore described bodies, one additional supervisory body (actually not typically considered as advisory body) must be considered advising MER. This is Estonian Rectors' Conference (registered in 2000 as non-profit organisation), consisting of rectors of six public universities, which is also supervising MER with regard of research funding, quality control etc. Even more, the

¹ Teadus- ja arendustegevuse korralduse seadus, 26.03.1997.

² The summarizing chart of the organisation of the research policy with all the institutions involved is presented on the Figure 1. It has to be noted, that on Figure 1, ESF and EE could be also considered as intermediary organisations, however they can be considered more administrative bodies by their authority to apply control mechanisms and design rules for funding procedures compared to the list of intermediary bodies shown on the figure.

³ Its current staff is established by government's regulation from 7.12.2004 no 854 "Teadus- ja Arendusnõukogu koosseisu kinnitamine" [<https://www.riigiteataja.ee/ert/act.jsp?id=824510&replstring=33>]

⁴ Established by the government's regulation from the 15.06.2006. No.56 "Teaduskompetentsi Nõukogu moodustamine ja koosseisu kinnitamine". [<https://www.riigiteataja.ee/ert/act.jsp?id=1039807>]

⁵ An exception was the decision making process on one financing instrument, targeted research funding, in 2003 when the rectors of 3 universities challenged the allocation of research funding as it was decided by SCC. Due to that pressure from the universities, the minister decided to ask the SCC to change the initial allocation. Several themes left without financing according to the initial decision were granted funding.

⁶ The current staff is established by government's regulation from 25.03.2005 no 162 "Teaduspoliitika komisjoni moodustamine ja selle koosseisu kinnitamine" [<https://www.riigiteataja.ee/ert/act.jsp?id=1039974>]

Rectors' Conference is negotiating from behalf of universities, participating in funding strategy preparation, but also exchanging information with MER in all aspects concerning the science and education policy (for example, there are institutional cooperation agreement, and memorandums between MER and Rectors' Conference with regard to the funding principles of public universities, but also funding of libraries.⁷

MEAC has the following expert bodies: the *Estonian Academy of Sciences (EAS)* (consists of 57 academicians) and the *Innovation Policy Committee (IPC)*, which includes 20 members from ministries and their advisory bodies (6), universities (8) and private sector (6); and is advising MEAC by designing the RTDI policy and strategies. On the other hand, MEAC is also implementing the innovation policy, organizing the financing of applied research, development and innovation (through its foundation *Enterprise Estonia*), coordinates and organizes the international cooperation in the field of technology. Additionally, the *Ministry of Finance* as a financial authority and other ministries depending on the area of research are involved in preparation and management functions of research policy.

Research policy financing functions are in main part fulfilled by the Estonian Science Foundation (ESF) and Enterprise Estonia (EE). *Estonian Science Foundation (ESF)* provides support for planning and developing research activities in Estonia. It was established by the Estonian Government in 1990 and it is an expert research-funding organization. It awards peer-reviewed research grants to individuals and research groups on a competitive basis. The highest decision making body, the council, is made up of 15 scientists (there are no representatives of the private sector); 8 expert commissions on different areas of science rank the applications in their areas. ESF is funding predominantly the basic research, whereby the funding criteria are purely academic (publications, especially in reputable journals, novelty and originality of the proposed research, involvement of graduate students etc.).

Enterprise Estonia was created in 2000 for advancing the business environment and increasing the competitiveness of firms. This organization incorporated the *Estonian Technology Agency – ESTAG*, formerly and until 2001 known as the *Estonian Innovation Foundation (EIF)*. The creation of ESTAG has been recognized as a good example of international policy learning as it has been founded following recommendations of international experts (Tiits et al. 2003). Although it is created for managing and distributing the national and international funds dedicated to the development of enterprises⁸, it has currently through various research-related programs also channeled research supporting funds to the universities and other research institutions.

The financing of higher education is channeled through the MER. There are two independent foundations relevant for research policy created under the administration of MER: Archimedes Foundation and Foundation Innove. The aim of Archimedes Foundation has been to advance the Estonian education and research systems for the cooperation with European research organizations. It serves as an intermediary for EU research, innovation, educational programs, supports the mobility of students, researchers and lecturers. The Foundation Innove is aimed to support lifelong learning using EU and national programs. By MER, The Tiger Leap Foundation and The Estonian Information Technology Foundation support ICT development in educational system, Foundation AHHA is for popularizing science in general and Estonian Qualification Authority is for developing the professional qualifications system.

Additional group of intermediary organizations consists of science parks, development centres and institutes of technology, which are in most cases fully or partly owned by the universities (Tartu University Institute of Technology, Tartu University's Centre of Strategic Competence, Tartu Science Park, TTU Innovation Centre, TTU Development Centre and Tallinn Technology Park). These organizations are not acting as research performers, but rather as intermediary organizations for private firms (their main functions consist in supporting the innovative companies, reducing risks of start-up companies, providing infrastructure etc.).

Research is performed by the universities, their subsidiary research institutions and research institutions un-associated with the universities. There are altogether 111 R&D institutions currently registered in Estonia in the Register of Research and Development Institutions, including 8 corporate bodies (6 public universities, Estonian Academy of Sciences and one research institute). It has to be noted, however, that Estonian Academy of Sciences does not undertake research itself, though some research institutions are associated with the Estonian Academy of Sciences. Most research performing institutions are institutes of other establishments of universities (34). 40 research institutions are registered under private law (including spin-off firms, foundations, etc), 18 of the research performing institutions are belonging to the

⁷ Available at [<http://www.ut.ee/erc/dokumendid/>]

⁸ See the statute of EAS [<http://www.eas.ee/?id=409>]

ministries (7 to MER, 1 to MEAC, 5 to Ministry of Agriculture, 3 to Ministry of Social Affairs, and 2 to Ministry of Culture). There is only one research institution belonging to the local municipality (Tallinna Botaanikaäed, Tallinn Botanical Garden). The report of the National Audit Office of Estonia criticized the Register for R&D institutions from the point that it included several private firms that are not engaged with research activities (Teaduse sihtfinantseerimise riskid... 2003).

In sum, the Estonian research policy organization model can be considered as rather western-style: the Estonian Academy of Sciences does not undertake any research itself nor operates it as a funding agency (aside to some very limited sums), funding is distributed either through the independent funding agencies (Estonian Science Foundation, Enterprise Estonia) or ministries.

2.2 Historical development and perspectives of research and higher education policy organization in Estonia

The historical development of Estonian R&D system can be considered back to 1990, when in the process of reorganisation of entire R&D and higher education system, the legal base for decision mechanisms and institutional structures of R&D activities was created. In 1994, in Riigikogu, the Research Organization Act was agreed, which was changed to the Organization of Research and Development Act in 1997 (later the act has been modified several times). The acts have fixed the respective changes in structure, organization, financing and audit of research and development systems described below.

In 1990, the Estonian Research Council was created for advising government in R&D field. In addition, three foundations were created – Estonian Science Foundation for financing basic research; Estonian Innovation Foundation for financing applied research and development activities, and Estonian Informatics Foundation for managing the IT-related development funds of state budget. The last one from above-mentioned foundations was in 1996 reorganised to Estonian Informatics Centre and in 2004 for Development Centre for the State Information Systems.

In 1993, the Estonian Research Council was reorganised and renamed to Estonian Research and Development Council. Till 2000 the institution failed very much to fulfill its aims as it became rather a forum for scientist to argue for increased state funding of public research (see e.g. Nedeva and Georghiou 2003). To overcome these difficulties in 19th of May 2000 the council was reorganized (including cutting the number of members) for more effective operation.

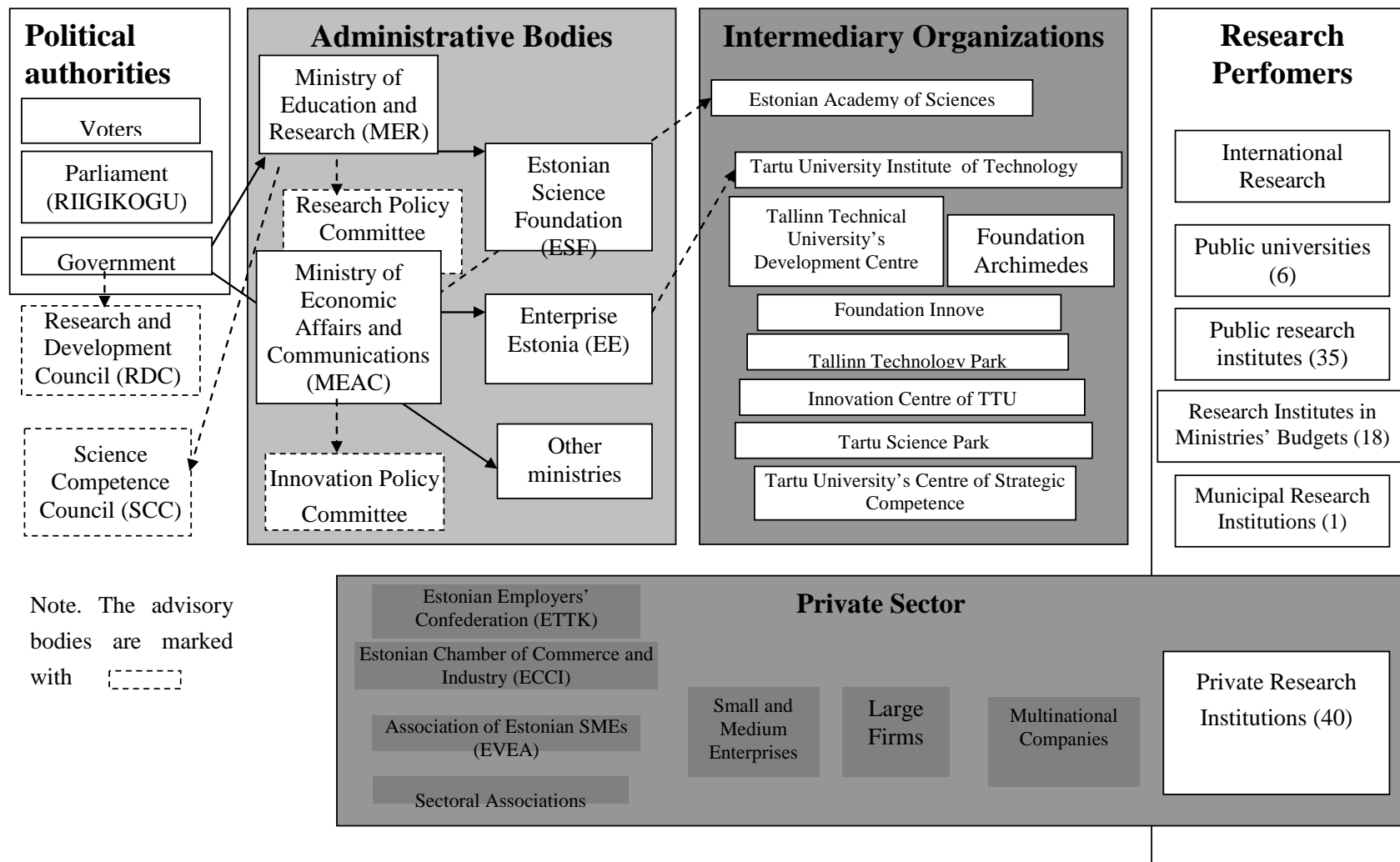


Figure 1 Estonian Research Policy Organisation in 2005

In 1997, the Estonian Science Foundation and Estonian Innovation Foundation were reorganized for operation under private law, whereby the role of Innovation Foundation was not changed. The task for Estonian Science Foundation was set to distribute research funds through organizing open competition rounds, i.e. grant financing. The allocation of the general funding (in Estonian case that is targeted funding) was removed from the Estonian Science Foundation to the Ministry of Economic Affairs and Communications; since 1998 targeted funding was given to research themes instead of institutions (factually the institutional funding was transformed into project funding). In 1997, the Science Competence Council for advising MER was created and it has to be noted that the basic functions of this council have remained the same till today (see also section 1.1). In the same year, the Foundation Archimedes was created with the responsibility of organizing the evaluation of science and higher education of Estonia, coordinating the creation of R&D information system, but also serving as a national contact point of 5th Framework Programs, and coordinating international programs (Marie Curie, ERASMUS).

In the period of 1996-1998, most of the research institutes of Estonian Academy of Sciences were merged to the universities with the aim of integrating the basic research more effectively. It has to be noted here, that today, only one research institute has remained under the Estonian Academy of Sciences (Under and Tuglas Literature Centre).

Enterprise Estonia (Ettevõtlike Arendamise Sihtasutus) was founded in 2000 through the merger of five previously independent agencies: Estonian Trade Promotion Agency, Estonian Technology Agency (formerly Estonian Innovation Foundation), Estonian Tourist Board, Estonian Regional Development Agency. There was a short period of parallel functioning in 2000 and 2001 (and also financing) of merging organisations. For example, the Estonian Innovation Foundation was actively financing research until 2001 when it was reorganized to Estonian Technology Agency, which in turn smoothly integrated its functions with Enterprise Estonia. Currently the Enterprise Estonia is the main agency intermediating EU Structural Funds and national R&D funds for innovation to business enterprises, but also for R&D institutions. It has mainly been recognized as a successful implementation of international policy learning, but here have been three different barriers at the policy level identified that are to be dealt with in the future:

1. The qualification of project evaluators and experts is generally very diverse and sometimes not responding to the field of technology or sector. In some cases, the evaluation criteria for applications are differently understood and not supporting the selection of best projects for funding;
 2. Too small support budgets as compared to the demand in some programmes;
 3. The beneficiaries are not satisfied with the complicated reporting schemes and bureaucracy.
- (Source: Eesti Riikliku Arengukava..., 2005)

The largest recent change, concerning more the development, but possibly with some future impact on research financing, has been the creation of Estonian Development Fund⁹ (a state venture capital fund). This fund aims at stimulating the economic development through monitoring the economic development, investing in knowledge and technology intensive firms and encouraging respective national and international cooperation.

2.3 Changes and perspectives of research policy orientation in Estonia

There are some changes also in the R&D and innovation section of the Estonian National Development Plan for the implementation of the EU Structural Funds SPD 2007-2013 compared to the document that covered 2004-2006 (Estonian National Development Plan for the implementation of the EU Structural Funds SPD 2004-2006). Particularly, the new document views R&D and innovation more broadly than just R&D activities, the measures of R&D and innovation part are better harmonized with the ones of the entrepreneurship, the policy document has also come closer to the other documents covering information society and human resource development. There have been also some changes in the particular target indicators. The Knowledge-based Estonia 2007-2013 includes much more quantitative targets and elements of a systemic approach to innovation compared to the Knowledge-based Estonia, 2002-2006, which is clearly in line with linear approach. The latter document is also in the full an input for the National Development Plan for the implementation of the EU Structural Funds SPD 2007-2013 (see also Table 1).

⁹ Governments' regulation from 15.11.2006 „Eesti arengufondi seadus.“
<https://www.riigiteataja.ee/ert/act.jsp?id=12754238>

Table 1 Changes in strategy documents of research policy

Indicator	Knowledge-based Estonia, 2002-2006: target for 2006	Knowledge-based Estonia, 2007-2013: target for 2013/2014	Actual level in 2004
Share of GERD in GDP	1.5%	3.0%	0.88 %
Share of BERD in GDP	0.45%	1.6 %	0.34 %
Number of scientists and engineers per 1000 employees	Not specified	8	5
Balance of public funding	To arrive a better balance of public funding between research and experimental development	To improve the organisation of financing applied research.	Trend in the shift towards the higher share of development (Reid et al. 2006)
Share of firms innovation investments in turnover	Not specified	2.5	1.6 % (2004)
Firms' productivity as the percentage of EU25 average	Not specified	80 %	52.4%
European Patent Office patents per 1 million inhabitants	Not specified	5 times the current level	8.9
ISI Web of Science publications	Not specified	1200	796
The share of sales from new products and services in the total revenues of enterprises	Not specified	15 %	7.6%

Source: Knowledge-based Estonia. Estonian Research and Development Strategy 2002-2006. Tallinn, 2002. (Teadmistepõhine Eesti 2007-2013 (TE II) Eesti teadus- ja arendustegevuse ning innovatsiooni strateegia. Tööversioon 30. mai. 2006.)

As recognised in the strategy of "Knowledge-based Estonia 2007-2013", Estonia has not fulfilled the long term financing goals stated in the earlier version of the strategy for 2002-2006, whereby the public financing of research and development has remained significantly below the planned level and the EU Structural Funds have replaced rather than complemented national public funding of research. As positive development, the private sector investments have increased more rapidly as public one however remained at the low level in international comparison. Therefore, in the strategy for 2007-2013, the volume and organisation of public funding has received more attention. It states three main challenges in R&D organisation that are needed to be solved:

1. Attracting qualified scientists and engineers to work in Estonian universities and increasing the number of graduates in natural and engineering sciences.
2. Improving existing and creating the necessary research infrastructure.
3. Solving the problems of public financing applied research as it is currently financed under other schemes.

3 The organization of research and higher education funding

3.1 The organization of research and higher education funding in 2005

The main channels of public funding in 2005 are summarized on the figure 2. Currently, there can be identified two principal streams of public financing – through MER following the education and research policy goals and through MEAC following innovation policy goals.

According to the Organization of Research and Development Act, research and development Estonia is financed either from state budget, a city or rural municipality budget, endowments, income from the economic activities of the research and development institutions' research grants and other sources (*Teadus- ja arendustegevuse korraldamise seadus*). The act specifies also that the funding of research and development from state budget takes place through the following channels:

- 1) Targeted financing. That is provided through the Ministry of Education and Research. In each year the sum of funding is approved by the Minister of Education and Research on the proposal of the Science Competence Council.
- 2) Base financing. That is allocated through the budget of the Ministry of Education and Research; the annual amount is approved by the order of the minister for education and research after hearing through the position of the Research and Development Council.
- 3) National research and development programmes. In the state budget the money is assigned to the ministry that is responsible for the completion of the programme.
- 4) Research and development grants. The funds earmarked in the state budget for the support of research activities are allocated through the budget of the Ministry of Education and Research to the Estonian Science Foundation. Funds for development activities are allocated through the budget of Ministry of Economy and Communication to the respective foundation (Enterprise Estonia).
- 5) Infrastructure expenses. These include additional funds for current expenditure (water, electricity, heating etc.) that have been linked with the allocation of targeted financing (Nedeva and Georghiou 2003).

In addition to these, the budget for R&D of the Ministry of Education and Research has included the financing of the following:

- 6) Estonian Academy of Science.
- 7) The co-financing of EU programmes (6th framework programme¹⁰).
- 8) Scientific libraries.

¹⁰ The participation fee was paid during the duration of the 6th FP 2002-2006 according to the memorandum between the Estonia and EU.

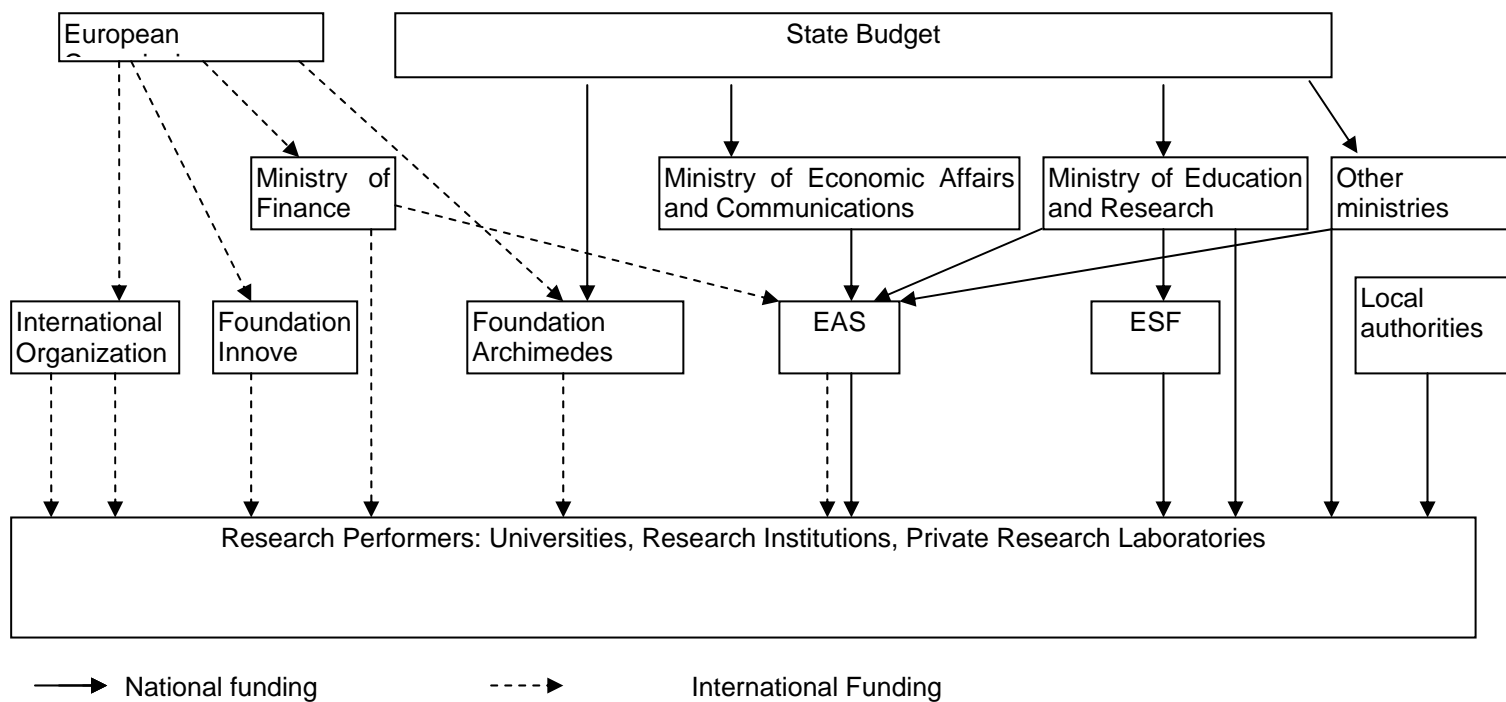


Figure 2 Channels of research funding in Estonia in 2005

3.1.1 Public funding of research through the budget of the Ministry of Education and Research (MER)

Generally, the number of different funding mechanisms that are funded through the budget of the Ministry of Education and Research is not very large. Below is provided a more detailed description of these funding mechanisms. A comparison of the main characteristics of the funding instruments can be found at Table 2.

Targeted financing (*Sihtfinantseerimine*). The targeted financing in the current form started in 1997 as the result of the adoption of the Organization of Research and Development Act in March 26, 1997, and the creation of the Science Competence Council. In this stage the creation of such system has been estimated to be rather significant as it explained the nature of the targeted financing of the R&D institutions (Heinaru 2000). Before that, the funds were distributed by the Estonian Science Foundation between the research institutions (not to the scientific topics or research groups). Several institutes were left without targeted financing as the result of the reform, as these were more oriented to applied science.

The target financing occurs according to the scientific topics, as laid down in the decree of the minister for education and research¹¹. The target financing can be applied by the research – and development institutions, that have been evaluated and recorded in the register for research – and development institutions. The aim of the targeted financing is to insure the high level and continuity of the research activities (Teaduskompetentsi Nõukogu tegevuse aruanne 2003-2006 (2006)). In the financing of a new topic, SCC takes into account the topicality of the theme and the capabilities of and conditions in the applicant for implementing the applied theme. The financing is granted for up to 6 years. Certain requirements are applied to the leader and the performers of the projects, like the presence of academic degree (MA or PhD) and publications (leader – at least 5, principal investigator at least 3 peer-reviewed publications as defined in the ministerial decree). The project must have at least 5 principal investigators, of which at least 2 are working full time for the project.

The sum of the financing is calculated directly from the number of researchers involved in the project, the sum per researcher is formed according to the financing received from the state budget. For instance, in 2005 the wage costs for researchers with MA¹² degree were financed in the sum of 120 thousand kroons, for research fellows with PhD degree in the sum of 160 thousand kroons and for senior research fellows in the sum of 200 thousand kroons. In 2006, the sum was per all kinds of researchers 180 thousand kroons. In 2006, the accounted cost per researcher for the scientific work was 71 thousand kroons in case of experimental topics and 22 thousand kroons in case of theoretical topics¹³.

The applications are first estimated by a team of experts (that includes also international experts) for different fields of science. The following criteria are considered: 1) scientific relevance of the topic; 2) the qualification of the principal investigators; 3) the relevance of the scientific topic for science in general and the Estonian economy and culture, 4) the conditions of the research environment. SCC makes proposals to the minister of research and education on the financing of the applications. The report by Nedeva and Georgiou (2003) stressed the problems like that in some cases the members of SCC need not to have necessary capacity to evaluate all applications, the evaluation criteria are unclear and the feedback on the application is insufficient and given too slowly. Thus the starting of the use of experts was influenced by that report.

All financed topics are evaluated each year. The financing is prolonged based on the evaluation of the Science Competence Council on the results of the scientific work. The target financing is used to finance the research groups of research institutions. Since 2001, one kind of target financing is the financing of the Centres of Excellence (that is described in section 2.1.2).

Research grants (*uurimistoetused, grandid*). Research grants are allocated by the Estonian Science Foundation in open competition for the implementation of specific research project either in basic or

¹¹ Teadus- ja arendusasutuste teadusteemade sihtfinantseerimise tingimused ja kord. Haridus- ja teadusministri 9.04.2002 määrus nr. 31, jõustus 20.04.2002.

¹² In Estonia the Master of Arts degree assumes 4 year of studies at the baccalaureate program and 2 years at the MA programme (that is the nominal length of study, of course). In addition to the PhD degree, also the MA degree is considered to a scientific degree.

¹³ Haridus- ja Teadusministeeriumi Teaduskompetentsi Nõukogu 2006.a. märgukiri. <http://www.hm.ee/index.php?popup=download&id=4212>

applied research¹⁴. The implementation of grant financing meant the start-up of financing based on competition (Heinaru 2000). It is estimated that this was rather positive for the development of science in Estonia.

The grant projects are implemented either by a single researcher or a research group. The grants are allocated for the projects lasting up to 4 years. The priority is given to the 1) absorption of new scientific ideas, prospecting research works; 2) increasing the inflow of youth and women to the science, support of graduate studies; 3) the development of the scientists international cooperation, e.g. through the participation in the programmes of the European Science Foundation. The research grants are financed from the state budget as part of the budget of the Ministry of Education and Research. The grant holder is required to have PhD; the principal investigators should have academic degree (MA or PhD). The applications are evaluated according to the following criteria:

- the novelty and originality of the raised research task;
- the clearness and justification of the planned research task;
- orderliness of the appearance;
- the contemporariness of the research method, concordance with research goals; the availability of equipment and other facilities;
- the scientific qualification of the principal investigators; the participation of graduate and undergraduate students in the research;
- the complexity of research, interdisciplinary cooperation, cooperation with other institutions in Estonia and abroad;
- the forecasted importance of the research for science, Estonia, its economy, social sphere, environment and national culture; the application possibilities of the research results.

The grant applications are evaluated by the expert commissions and reviewers (both local and foreign). The number of expert commissions have been reduced from 8 to 4, these are in the following fields: 1) environment and nature; 2) society and culture; 3) health; 3) real and technical sciences. A special competition, titled as My First Grant (*Minu esimene grant*), is organized for young researchers who have recently defended PhD. That is meant for encouraging the young researchers to start independent research activities. The motivation is the rather unfavourable age structure of research personnel in Estonia, including among the recipients of ESF grants.

Table 2 Overview of the different publicly funded measures and programmes for financing research in Estonia

¹⁴ Source: homepage of ESF, www.etf.ee.

Name	Target financing	ESF grants	Base financing	Infrastructure costs
Origin of funds	State budget	State budget	State budget	State budget
Type of funding	Project funding	Project funding	General funding	General funding
Starting year	1998	1993	2005	1996
Managing organization	Science Competence Council (SCC)	Estonian Science Fund	Ministry of Education and Research	Ministry of Education and Research
Beneficiaries	Research groups (projects)	Research groups (projects), individual researchers	Universities and research institutes	Universities and research institutes
Field of application / purpose	Provision of long-term financing to research groups	Project financing to single researchers or research teams for applied or fundamental research; support of graduate studies, development of international cooperation	Realization of strategic research goals, primarily the co-financing of projects, opening of new fields	The coverage of infrastructure costs of public and state R&D institutions
Eligibility criteria	Positive evaluation of the R&D institution At least 5 principal investigators per project Presence of high-level publications	Holder of grant: PhD, publications Principal investigator: academic degree (PhD or MA)	The R&D institution's R&D activities have received positive evaluation	Public and state R&D institutions
Allocation criteria	1) scientific relevance of the topic; 2) the qualification of principal investigators; 3) relevance of the scientific topic for science in general and the Estonian economy and culture, 4) the conditions of the research environment	The novelty and originality of the research task; the clearness and justification of the research task; the contemporariness of the research method; the availability of equipment and other facilities; the scientific qualification of the principal investigators; the participation of graduate and undergraduate students in the research; the complexity of research; the forecasted importance of the research for science, Estonia, its economy etc..	95 %: number of ISI publications, high-level monographs, patents, past revenues, PhD thesis defences; 5 % to national sciences	Public R&D institutions: 2/3 proportionally to the budget of the targeted financed research projects and 1/3 proportionally to the institution's infrastructure costs budget in the last year; state R&D institutions: the budget has changed in each year in proportion to the general increase of the budget of the state infrastructure costs in the state budget
Decision making procedure	Evaluation of applications by national and international experts, SCC makes the proposals for funding to minister for education and research	Each application evaluated by two experts (from Estonia or abroad), expert commissions in different scientific fields make funding decisions	Decision of the minister of education and research; R&D council advices on the support of national sciences	Decision of the minister of education and research based on the proposal made by SCC
Duration of financing	Up to 6 years (till 2004 up to 5 years)	Up to 4 years	Funding is decided in each year	Funding is decided in each year
Budget 2005, Mio. of EUR	14.7	5.4	4.1	4.9

Source: authors' compilation based on data from the following sources: Ministry of Education and Research, Estonian Science Foundation

Aside to research grants, ESF provides the following support to research:

- *Grants for the post-doctoral studies (since 2005)*. The grants are supplied besides the targeted financed research project or other contractual research that is financed annually at least in the sum of 0.5 million EEK. The grants cover the wage costs in the sum of 210 thousand EEK and the costs of research work (90 thousand in experimental sciences, 50 thousand in non-experimental sciences). The number of post-doctoral grants is however rather low (for 2005-2006 only 9 in all fields of science together).
- *The cooperation programme PARROT in science and technology between Estonia and France (since 2004)*. The programme is financed on parity basis, its aim is to facilitate and develop the scientific cooperation between the two countries' scientists. The programme finances the travel grants.
- *Travel grants to USA (since 2004, financed by the US embassy in Estonia)*.
- The participation fees of the European Science Foundation a la carte programmes.

In sum, the target financing and research grants schemes have many similarities, e.g. in the allocation criteria. Nedeva and Georghiou (2003) point out that in case of both schemes the practice has been that the most important criterion is rather the past achievements than future developments. Number of publications in high-level journals (primarily those indexed in ISI or Current Contents) has been used by both as the most important indicator of competence to carry out the proposed research as well as criterion to assess the work undertaken within the project. Concerning targeted financing, since 2005 also patents are taken into account in addition to publications when evaluating researchers' past performance. SCC takes into account also the size of the research group to ensure the presence of a critical mass of researchers. Recently, the SCC has started to favour even larger research groups. The Nedeva and Georghiou (2003) pointed out also the following problems:

- the criteria used to allocate funding include no mechanisms to promote interaction with economy and society but rather discourage researchers from creating links with industry or society, researchers do not have much interest in researching practical issues;
- the uni-dimensional criteria linked to academic excellence disfavours certain disciplines like social sciences and engineering;

The back-ward looking funding criteria based on past performance have caused the research to be locked in established trajectories and new research areas are hard to open.

The target financing has been evaluated by the National Audit Office of Estonia (*Riigikontroll*) in 2003 (Teaduse sihtfinantseerimise riskid 2003). The report stated that although the targeted financing has been organized by the Ministry of Economy and Research at a satisfactory level, several risks were emphasized concerning the existing funding.

- The financing has not been based on actual needs of the research groups, in a number of cases the allocated financing has been adequate to finance single researcher than a research team, the actual funding is often much lower than the applied sum and the reduction is not based on any transparent criteria.
- The current system favours the prolonging of the ongoing research themes and disfavours the opening of new research themes and the involvement of young researchers.
- The financing of infrastructure costs has not increased in line with the targeted financing, thus the leaders of institutions have used the targeted financing to cover also the infrastructure costs. However, the targeted financing is not meant to cover these expenses.
- The register for R&D institutions includes also commercial organizations that in fact are oriented to development instead of research and did not have the necessary capacity to undertake research, thus the criteria for the inclusion in the register and the borderline between the research and development should be specified more clearly.

Base financing (baasfinantseerimine). That is a relatively new financing instrument (the first assignments were made for 2005). Base financing is meant for the realization of the research- and development institutions' strategic development goals, primarily for the co-financing of national and international research projects and the opening of new fields of research. The instrument was introduced as the lack of institutional financing (if we do not consider the funding of infrastructure costs) was indicated to be one of the most important factors that inhibited the development of research- and development institutions (as indicated also in the international report on the financing system of Estonian research and development system – Nedeva and Georghiou 2003). The base financing is expected to increase the stability of financing.

Base financing is granted to R&D institutions whose scientific activities have received positive evaluation. The sums assigned in the state budget are allocated as follows: 95 % of the sum is allocated according to the results of the R&D activities of the 3 previous years and 5 % is allocated to

the supplementary support of the national sciences. That 95 % is allocated as follows:

- 50 % is allocated between R&D institutions in proportion to the high-level scientific output that includes: 1) number of articles in journals indexed in ISI Web of Science; 2) the number of high-level scientific monographs; 3) number of patents and patent applications.
- 40 % is allocated proportionally to the accrued incomes recorded in the financial reports that are due to R&D activities (grants, R&D contracts, sales of licences and patents).
- 10 % is allocated proportionally to the number of defended PhD dissertations
- The R&D institutions present the data necessary for the funding decisions to the Ministry of Education and Research that makes the funding decisions.

Infrastructure costs (infrastruktuuri kulud). The infrastructure costs of state's R&D institutions are covered from state budget through the respective ministries budget. The costs of public R&D institutions are covered from state budget through the budget of the Ministry of Education and Research. R&D institution established according to private law should cover their infrastructure costs themselves or with finances from other private institutions, however, they may receive earmarked support from state budget or the budget of local government (Research and Development Organization Act). SCC has allocated the infrastructure costs of public R&D institutions according to the following principle: 2/3 are assigned proportionally the budget of the targeted financed research projects and 1/3 proportionally to the institution's infrastructure costs budget in the last year; at that it is avoided that the infrastructure budget of any particular institution is reduced. In case of state R&D institutions, the budget has changed in each year in proportion to the general increase of the budget of the state infrastructure costs in the state budget (Teaduskompetentsi Nõukogu Tegevuse Aruanne 2003-2006). The report of the National Audit Office of Estonia (Teaduse sihtfinantseerimise riskid 2003) emphasized that the financing of infrastructure costs does not consider the actual needs of the R&D institutions, the sums are allocated based on the funding level of the previous year; the basis for the planning of the infrastructure costs have not been worked out.

National programmes (Riiklikud programmid). The funds are earmarked in the state budget to the ministry that is responsible for the programme. The R&D activities necessary to realize the programme are ordered with public contest. In the beginning of each year public contests are announced for projects. At the moment there are 4 national R&D programmes, 3 under the Ministry of Education and Research and 1 under the Ministry of Agriculture. The strategy document Knowledge-based Estonia suggested the start-up of national programmes in the key areas (information technology, biomedicine, material technologies); however these have not started yet.

- **Language Technology Support of the Estonian Language** (*Eesti keele keeletehnoloogiline tugi*). The programme's aim is to develop the language technology support of the Estonian language to the level where it enables the Estonian language to successfully perform in the modern information technology environment. The programme has developed itself out of the programme "Estonian language and the national memory" that included the language technology module. The programme finances the R&D activities in the field of language technology since the creation of resources till the creation of language technology applications (resources). The sub-goals of the programme are connected to both the development of language software and language technology resources (electronic data collections). The estimated financing need grows from 7.45 million kroons in 2006 to 17 million kroons in 2008-2010¹⁵.
- **National programme "Collections for the Humanities and Natural Sciences"** (*Riiklik programm humanitaar- ja loodusteaduslikud kogud*). The aim of the programme is to support the R&D and teaching activities through the preservation, development, modernization of utilization possibilities and arrangement of various collections for Humanities and natural sciences (archaeological, Estonian language, numismatics, folklore, botanic, geology and soil science, medicine and veterinary, microbiology, mycology, zoology). The success of the programme's realization is measured *inter alia* also by the number and level of publications prepared with the help of the collections and their use in graduate studies. The budget of the program increases from 4 million kroons in 2004 to 56 million kroons in 2008.
- **National programme "Estonian language and the national memory"** (*Eesti keel ja rahvuslik mälu*). The programme is for the years 2004-2008, the forerunner of the programme is the national programme "Estonian language and national culture" (*Eesti keel ja rahvuskultuur*) during 1999-2003. The programme consists of three modules: 1) Estonian language (preparation of

¹⁵Eesti keele keeletehnoloogiline tugi (2006-2010). Riiklik programm (2006).

dictionaries, publications on the history on the Estonian formal language, publication of dialects, popularization of the Estonian language); 2) language technology (developing the technological support of the Estonian language); 3) national memory and identity (publication of chrestomathic volumes of national importance). The language technology module was there before the start-up of the national programme "Language Technology Support of the Estonian Language". The estimated financing need grows from 6.7 million kroons in 2004 to 16 million kroons in 2008¹⁶.

- **National programme "Agricultural applied studies and development activities in 2004-2008"** (*Põllumajanduslikud rakendusuringud ja arendustegevus aastatel 2004-2008*). The main aim of the programme is to increase the competitiveness and to ensure the sustainability of agricultural production and the processing of agriculture products, to analyze the risks arising to consumers and environment from the agricultural production, develop the solutions for the reduction of these risks in the whole chain of production and processing. The programme's priority is to integrate the Estonian agricultural science the international science and to apply positive research results quickly into the practice. Thereby Estonian producers should be supplied with new environmentally friendly production technologies suitable in the Estonian circumstances and the competitiveness of the Estonian agriculture will be increased. It is estimated that during 2005-2008 the financing of the programme should grow up to the 44 million kroons annually (about 2.8 million euros)¹⁷.

The Estonian Academy of Sciences (*Eesti Teaduste Akadeemia*) has a rather negligible role in the financing of the research in Estonia. Its share in the total funding of research, development, technology and innovation has been just in the range of 2-3 per cents. The funding is used to finance the reward to the member of academia (academicians), the compensations to the research professors (3 positions for the period of 3 years, the first contest was in 2002), publication of the proceedings of the Estonian Academy of Sciences, awards to the students' research papers, academic exchange with foreign partner academies. The only R&D institution of the Estonian Academy of Sciences is currently the Under and Tuglas Literature Centre, it is financed from the Ministry of Education and Research through the aforementioned programmes (like targeted financing). The academies role is thus not the financing of research, but rather to participate in the making of research policy, popularization of science, provision of suggestion and expert advice. The annual budget was in 2005 23.1 million Estonian kroons (1.5 million euros).

Archimedes Foundation (*Sihtasutus Archimedes*) has been established by the Ministry of Education and Research in order to prepare the Estonian education and research systems and youth organizations for the cooperation with the EU agencies. The foundation undertakes the following activities: 1) prepares the participation in the EU programmes; 2) consults various institutions about participation in programmes and the application of projects; 3) intermediates the EU science, innovation, education and youth programmes; 4) arranges the financing of EU education and youth projects; 5) supports the mobility of students, instructors and researchers. Currently, the following contests have been arranged:

- Scholarship for PhD studies for non-resident students;
- Financing of PhD studies of Estonian students in foreign universities;
- Scholarships of Kristjan Jaak to finance short-term missions of graduate students and instructors to abroad, and the studies of graduate students in abroad for up to 1 year.
- The competitions of students' research papers.
- The award for the popularization of science in Estonia.

The total budget of Archimedes Foundation was in 2005 93 million kroons (6 million euros).

Scientific and archive libraries (*Teadus- ja arhiiviraamatukogud*). According to the Research and Development Organization Act, the Ministry for Education and Research organizes the financing of the purchase of scientific information for scientific libraries and the purchase of items for archive libraries. Up to the 2007 there have been 6 scientific libraries and 3 archive libraries (the lists are overlapping and are fixed with the decree of the Minister of Education and Research). The financing is allocated according to applications that include the plan of completion and the justification of the costs. In 2006, the total financing was 122 thousand euros to archive libraries and 1.644 million euros to scientific libraries. In addition to that, also the common procurements of electronic scientific information can be financed (in 2006 in the sum of 1.177 million euros).

¹⁶ Riiklik programm „Eesti keel ja rahvuslik mälu (2004-2008)“ (2003).

¹⁷ Riiklik programm „Põllumajanduslikud rakendusuringud ja arendustegevus aastatel 2004-2008“ (2004).

3.1.2 Public funding of higher education

State order of schooling (*riiklik koolitustellimus*). The public funding of higher education takes place primarily through the state order of schooling (*riiklik koolitustellimus*). That is regulated by the Law of Universities (*Ülikooliseadus*). According to the latter, the Ministry of Education and Research gives the order to the universities. The state order is based on the forecasted need of specialists with higher education in the labour market, the proposals of various stakeholders and the funds foreseen for state order in the state budget. The ministry orders the number of graduates. The prime rate of the student vacancy is determined with the governmental decree separately for each budget year, the coefficients of educational fields are determined by a separate governmental decree as well. The universities form student vacancies for the fulfilment of state order based on the study programmes that have received positive accreditation. The student vacancies are financed in general according to the number of graduates with master degree determined in the contract of state order, but the law specifies also some other possibilities. Concerning the financing of doctoral studies, 60 % is allocated according to the number of graduates ordered and 40 % according to the actual number of graduates. In 2006, the total sum of state order of schooling to public universities was 59 million euros.

The EU structural funds to higher education are managed by the Foundation Innove (Foundation for Lifelong Learning Development). The foundation has been established with the objective to promote initiatives of lifelong learning through Estonian and EU Programmes in the field of human resources development. During the programming period 2004-2006 there were two measures that included the financing of higher education projects (the table below includes also short information about these programmes):

- The Estonian National Development Plan measure 1.1. "Educational System Supporting the Flexibility and Employability of the Labour Force and Providing Opportunities of Lifelong Learning for All". The aim of the measure is the development of human resources and the increase of its competitiveness in the labour market through the upgrading of the education and schooling system, the creation of environment necessary for life-long learning and the supply of schooling.
- The Estonian National Development Plan measure 4.3. "Modernisation of Infrastructure for Vocational and Higher education". The aim of the measure is to create material conditions for the vocational and higher education that corresponds to the needs of the labour market and is internationally competitive.

Table 3 Programmes financed from EU structural targeted to higher education

Name of Programme	Educational System Supporting the Flexibility and Employability of the Labour Force and Providing Opportunities of Lifelong Learning for All	Modernisation of Infrastructure for Vocational and Higher education".
Origin of Funds	Structural funds; no financing from national budget	Structural funds, national budget
Type of funding	Project funding	Project funding
Co-financing	Yes, 25 %	No co-funding required
Field of application / purpose	The development of human resources and the increase of its competitiveness in the labour market through the upgrading of the education and schooling system, the creation of environment necessary for life-long learning and the supply of schooling	Creation of material conditions for the vocational and higher education that corresponds to the needs of the labour market and is internationally competitive.
Duration of financing	The measure was opened for applications in 16.08.2004. The concluding date for the activities of the programme is June 30, 2008.	The duration of funding is project specific, however the application of the programme takes place between 1 st of January 2004 and 31 st of December 2008.
Budget of funding mechanism, 2004-2006, Mio. of EUR	40.2	27.9

Source: www.struktuurifondid.ee

3.1.3 Public funding of research through the budget of the Ministry of Economic Affairs and Communications (MEAC)

Concerning the main changes in the funding of the R&D activities through MEAC, the total budget increased considerably since 2004 related to the opening of EU structural funds; the total budget was about 120 million Estonian kroons in 2002, 263 in 2004 and 214 in 2006 (Reid et al. 2006).

The current funding is not targeted to any specific sectors, as the planned national technology programmes in the key sectors (user-friendly information technologies, biomedicine, materials' technologies - Knowledge Based Estonia, 2002) have not been launched (Reid et al. 2006). There can be several project-based financing programmes identified that are designed to enhance research activities in industry and in academia and the cooperation between them. Here are summarized only those programmes that have directly been targeted towards research activities or improvement of research infrastructure, the programs with more indirect impact (e.g. export promotion, counselling etc.) are not described (see also Table 5).

Centre of Excellences Programme¹⁸

This programme is a response to the need to create research synergy between Estonian research institutions for intensified participation in international R&D networks and cooperative projects. There are two decision making bodies (Research Policy Council and Innovation Policy Council), who give advice by setting priorities for this programme; however the final decision remains under ministries (MEAC and MER). It has to be noted that a Centre of Excellence comprises the research groups of one or several research institutions and high-quality individual researchers working under the leadership of one research body and in the name of a common research target. The target is to finance infrastructure, costs directly related to performing research and development activities, providing relevant services or ongoing regular maintenance of the infrastructure already existing at the moment of application are not supported.

The maximum public budget for each individual Centre of Excellences project is 30 Mill. EEK (1.917 million EUR) and the total budget of the R&D programme for 2005-2007: 100 million EEK (6.391 million EUR). Payments in 2005 have been: 9.2 million EEK (0.588 million EUR) and in 2006 26.8 million EEK (1.713 Mill. EUR). From the total funds in programme financing in 2005 comprised 9.2% and in 2006 26.8%; 64% of payments have been left for 2007. As noted above, infrastructure projects (improving the infrastructure of research) have been funded predominantly. Institutions that have received funding are the following: University of Tartu (80.6% of funds), Tallinn Technical University (6.4% of funds), Research Institutes (10.6% of funds) and one museum (2.4% of funds). Part of the funding of the centres of excellence, namely the direct funding of research, takes place through the budget of MER; that funding is one kind of targeted research funding.

Competence Centres Programme¹⁹

The general objective of this to improve the competitiveness of enterprises through strategic cooperation between the science and industry sectors in Estonia. Competence centres are small R&D institutions established and operated together by number of companies and universities. Main characteristic of such centres is strong focus on applied research, which is needed for the product development of the founders of these centres. In a longer perspective, the centres should concentrate on industrial research, which must encompass over 50% of their total R&D activities. The share of public funding for a competence centre is determined by the type of R&D activity and by the type beneficiary:

1) Fundamental research is supported up to 100%.

¹⁸ Ministers regulation no 58 (30.05.2005) Terms and conditions for providing structural support for section "The Centre of Excellence of the Estonian Science Programme" of measure No. 2.3 "Promotion of research and development activities and innovation" of the "Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004-2006.

[<http://www.eas.ee/?id=2271>]

The evaluation of Centres of Excellence: <http://www.ekak.archimedes.ee/tippkeskuste-ervalvatsioon.html>

Centres of Excellence on the MER web-page: <http://www.hm.ee/index.php?044740>

¹⁹ «Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teadus- ja arendustegevuse ning innovatsiooni edendamise» osa «Tehnoloogia arenduskeskused» tingimused. Majandus- ja kommunikatsiooniministri 25. augusti 2005. a määrus nr 97.

2) SME: applied research projects are financed up to 70%, but the share of state financing can be increased to 75% in the following cases – the research conforms to the aims of a specific project or program within a current or designed EU R&D framework program; the project combines effective cross-border cooperation between two independent science or industry partners from EU member countries (in case non of the industry partners covers more than 70% of the total eligible costs); the project involves effective cooperation between at least one firm and at least one R&D institution; the results of the project that are not covered with IPR are disseminated to the public via technical or academic conferences or international peer reviewed journals.

3) SME: product development activities are financed up to 45%, but the share of state financing can be increased to 75% in the cases brought out in 2).

4) Large firms: applied research activities are financed up to 60%, but the share of financing can be increased to the 75% if the research conforms to the aims of a specific project or program within a current or designed EU R&D framework program.

5) Large firms: applied research activities are financed by 60%, but the share of financing can be increased to the 70% in following cases – the project combines effective cross-border cooperation between two independent science or industry partners from EU member countries; the project involves effective cooperation between at least one firm and at least one R&D institution; the results of the project that are not covered with IPR are disseminated to the public via technical or academic conferences or international peer reviewed journals.

6) Large firms: product development activities are financed up to 35%, but the share of state financing can be increased to 50% if the research conforms to the aims of a specific project or program within a current or designed EU R&D framework program.

7) Large firms: product development activities are financed up to 35%, but the share of state financing can be increased to 45% in following cases – the project combines effective cross-border cooperation between two independent science or industry partners from EU member countries; the project involves effective cooperation between at least one firm and at least one R&D institution; the results of the project that are not covered with IPR are disseminated to the public via technical or academic conferences or international peer reviewed journals.

Total budget of the program for 2005-2008 is 100 million EEK (6.391 million EUR). Private co-funding is depending from the type of activities:

1) Fundamental research – no private funding is required;

2) Applied research – at least 50% of private funding is required;

3) Product development – at least 25% of private funding is required.

The first call for Competence Centre proposals was announced in February 2003. In 14 applications there participated 70 firms, 50 institutes or other research institutions and 10 other organisations (12 from outside Estonia). As a result of the competition in February 2004 the negotiations were started with 6 centres, one of which was withdrawn from financing. The financing contracts were concluded with 5 centres.

The SPINNO Programme is targeted towards shaping the supply side, i.e. research services to universities and public sector research institutes for aligning more to industry needs. Additionally, R&D Financing Programme (described below) is supporting the applied research projects in R&D institutes and universities that are growing out from the research ideas supported from the SPINNO Programme. The following fields of activity are supported within the framework of the program:

1. creation of an environment in the R&D institutions and institutions of professional higher education favourable for the transfer of knowledge and commercialisation of the results of research and development activities, which may include, inter alia, the following: creation and development of a set of administrative rules necessary for regulating the business activities and intellectual property of the members; creation and development of motivational systems for the members; and development of competence, structures and networks related to knowledge and technology transfer;
2. increasing the awareness and developing the knowledge and skills of the members with regard to the commercialisation of the ideas based on research and development activities and the opportunities for cooperating with the business sector, which may include, inter alia, the following: organising competitions, seminars, forums and conferences with the aim of raising awareness and enhancing entrepreneurial abilities; organising training for the development of knowledge necessary for engaging in enterprise; distributing general information on business support services and financing possibilities;
3. offering support services to the members for commercialising specific knowledge-based business ideas, which may include, inter alia, the following: counselling on identifying and assessing ideas, testing concepts and finding the best way of commercialisation; preparing project plans and

financing applications; finding a suitable financing source; preparing business plans of spin-off businesses; preparing contracts; finding cooperation partners and entering into cooperation contracts; organising or carrying out surveys to support the counselling activities referred to in this clause;

4. active introduction of the competence, services, cooperation possibilities and intellectual property of R&D institutions and institutions of professional higher education, which may include, inter alia, the following: defining the competence, services and cooperation possibilities of the R&D institutions and institutions of professional higher education on the basis of the needs of the business sector and society; visiting enterprises; preparing and distributing informative and promotional materials and publications; organising partnership events;
5. sharing experience acquired in supporting knowledge and technology transfer and cooperating in this field with both local and foreign partners, which may include, inter alia, the following: participating in international networks or initiating corresponding networks; sharing experience and introducing the best practise both at the local and international level and practising in other organisations that support knowledge and technology transfer in Estonia and abroad.

The maximum amount of assistance applied for is 15 million EEK (0.959 million EUR) per application. Total Budget of the Program for 2004-2007 is 65 million EEK (4.154 million EUR). Second round applications were satisfied in amount of: 60.367 million EEK (3.858 million EUR). The decision was made in 15.12.2004 for financing 7 full applications. It is foreseen 35% of self-financing for public R&D institutions, however, it can consist also of co-funded resources (not only self-financing).

R&D Financing Programme is designed to develop the critical mass of firms in industry who are able to conduct R&D projects and communicate with the research institutions, but also to help research institutions to finance feasibility studies, applied research, or product development projects. R&D Financing Program is foreseen for supporting the shorter cooperation of 1-3 years, whereas the Competence Centre Program is supporting for more long-term cooperation (3-5 years).

Table 4 The share of public and private funding by the type of beneficiary and project in the R&D financing programme

Beneficiary	Project type	Maximum share of public funding	Minimum share of private funding
Company	Feasibility study (applied research)	75%	25%
Company	Feasibility study (product development)	50%	50%
SME	Applied research	70-75%	25-30%
SME	Product development	45-50%	50-55%
Large firm	Applied research	60-75%	25-40%
Large firm	Product development	35-50%	50-65%
R&D Institution	Feasibility study (applied research)	75%	25%
R&D Institution	Applied research	60-100%	0-40%

The share (see Table 4) and volume of public financing of individual projects is specified by type of the project and by type of beneficiary. Applied research projects are financed in SME-s in range of 300 thousand–10 million EEK (19 thousand–639 thousand EUR), in large firms in range of 1 mill.–10 million EEK (64–639 thousand EUR) and in R&D Institutions in the range of 500 thousand–10 million EEK (32–639 thousand EUR). The feasibility study projects are financed up to 200 thousand EEK (13 thousand EUR).

The total budget of the R&D programme (public support funds) has been in 2004 86.9 million EEK (5.6 million EUR), in 2005 126.8 million EEK (8.1 million EUR) and for 2006 74.9 million EEK (4.8 million EUR) (first 10 months).

R&D Infrastructure Development Programme

The general objective of this program is to increase the capability of R&D activities and innovation in Estonia by developing an internationally competitive research and development infrastructure system providing comprehensive support to higher education, R&D activities and innovation in strong and strategically important areas of R&D. The more specific task is to support large-scale research and development infrastructure investment projects so that these would:

- Stimulate the strategic planning of research and development activities, including establishing priorities and making financially sustainable investment decisions in research and development

institutions.

- Increase the efficiency of the research and development system as a whole through improved inter-relatedness between higher education, research and development activities and innovation, through concentration of resources and enhancing cooperation inside and between research and development institutions, between different disciplines, research and development institutions and enterprises and on the international level.
- Increase the human resources used in research and development activities and ensure the sustainable development thereof by increasing the number and quality of scientists and engineers involved.

The volume of public funding is pre-determined to occur in the range of 1.90– 6.40 mill. EUR and it can be financed up to 100% from the public support funds. The total budget of the R&D infrastructure development programme is 14.59 million EUR as decided in 25.04.2006 for financing 5 accepted full applications.

Table 5 Overview of the different publicly funded programmes for financing research through the EE

Name of programme	Centre of Excellences Programme	Competence Centres Programme	The SPINNO Programme	R&D Infrastructure Development Programme	R&D Financing Programme
Origin of funds	EU Structural Funds, State budget	EU Structural Funds, State budget, Private funding (co-funding is required)	EU Structural Funds, State budget	EU Structural Funds, State budget	EU Structural Funds, State budget
Type of funding	Project funding	Project funding	Project funding	Project funding	Project funding
Managing organization/ responsible ministry	Enterprise Estonia/MEAC, MER	Enterprise Estonia/MEAC	Enterprise Estonia/MEAC	Enterprise Estonia/MEAC	Enterprise Estonia/MEAC
Field of application / purpose	Assembling the top level research potential into large, competitive units and realization of bigger, strategically-oriented research projects	Facilitation and concentration of R&D and cooperation activities in a specific field of technology or on the basis of different fields.	Creation of a favourable business environment in public R&D institutions, developing the ability to respond more effectively to the needs of businesses and society; and to increase the revenues from R&D.	To increase the capability of research, and development activities and innovation by developing an internationally competitive research and development infrastructure.	To finance feasibility studies, applied research, or product development projects of firms and research organisations.
Eligibility criteria	Public and private research organizations.	Public and private research organizations, firms, non-profit associations, foundations.	Public research organisations.	Public research organisations	Public and private research organizations, firms.
Budget of funding mechanism, 2005, Mio. of EUR	0.588	3.790	3.858 (funds of accepted projects for 04-06)	14.59 (funds of accepted projects for 06-08)	8.105

Source: authors' compilation based on data from the following sources: Enterprise Estonia [www.eas.ee]

3.1.4 Public funding of research channelled through other ministries and local authorities

As a rule, all ministries are financing research through covering the operation costs of their budgetary research institutes. In addition, they finance specialised research targeted to specific policy problems in their fields. There are also specific EU funds distributed through ministries of respective field. The funding of research through ministries has grown considerably in past years.

Ministry of Finance is funding research for example through its Environmental Investments Centre (EIC) (*Keskkonnainvesteeringute Keskus*)²⁰ created in 1999 and distributing the budgetary funds of government's environmental programmes (**Ministry of the Environment**), but also intermediates funds from European Regional Development Fund (ERDF) and European Cohesion Fund. The supported fields include recycling, environmental protection, water protection, forestry, fishing etc. The fund is deciding the distribution of funds three times a year, in 2005 the yearly total earmarked national public funding through this foundation was about 446 million EEK (about 28.5 million EUR). The funds dedicated on research activities are not specified, however the funding extended to the research institutions comprised 42.9 million EEK in 2005, 28.1 millions EEK in 2006 and 41.2 millions EEK in 2007. Additionally the Estonian Statistical Office is belonging to the administration of Ministry of Finance.

Ministry of Agriculture is financing the research activities of 5 research institutes under its administration. Additionally, the research and development of respective fields is financed through a national programme for 2004-2008 (see also section 2.1.1.) (*Põllumajanduslikud rakendusuringud ja arendustegevus aastatel 2004-2008*). In 2004, the funding was 20.5 million EEK (1.3 mill EUR) and in subsequent years it was planned to be 44 mill EEK (2.8 mill EUR) annually; however the research related funds in the annual reporting documents for 2005 are 15.9 million EEK (1 mill EUR) only.

Through **Ministry of Culture** the funds are channelled mainly to the projects related to the research and popularization of Estonian language (or dialects) and culture (*Setomaa Riiklik Kultuuriprogramm 2006-2009, Lõuna-Eesti keel ja kultuur 2005-2009*). However, most of the projects supported are not research-oriented. Additionally, there are two research institutes in the budget of the ministry.

Ministry of the Interior is supporting R&D only through financing some specialized research from research institutions (from national programmes, but also international Phare CBC, EMI (103.8 million EEK in 2005, where research funding is included but the exact amount not known), INTERREG etc.

Ministry of Defence has spent in 2000 about 1.7 millions EEK for R&D activities. However, by 2006, the volume has increased to about 15.3 millions (altogether 10 research projects with 51 researchers).

Ministry of Social Affairs is financing research activities through three research institutes under its administration. Additionally, for example in 2005 the ministry has financed specific research projects of mainly national, but also international research institutions, and scientific conferences in amount of 0.173 Mill EUR.

Local authorities: There is only one research organisation in budget of Tallinn. Local governments are financing research and education mainly through specific projects or training activities; however the amounts are relatively minor.

3.2 Historical development of research and higher education funding schemes in Estonia

The distribution of public research funds since 1990 was mainly the responsibility of ESF; the innovation-related funds were channeled through Estonian Innovation Fund since 1991. The funding for 1991 was allocated as a key money or base money (*baasraha*) to institutions, the ESF decided to start the planning of the grant financing system. The funding for 1992 was allocated as follows: 75 % as the base financing of research institutions, 25 % as grants and one-time supports. In 1994, the proportions were as follows: 71 % for base financing, 24 % as grants, 4 as one-time supports. In 1994, one percent of the ESF financing was allocated to the U-fund in order to co-finance the maintenance

²⁰ This foundation is formally belonging to the administration of Ministry of Finance; however, the Chairman of the Council of this foundation is the Minister of the Environment and has formal cooperation agreement with the Ministry of the Environment.

and the renewal of scientific equipment based on applications and competition.

The principles of public financing of research changed in 1996. In the state budget for 1996 was for the first time sums foreseen for the infrastructure costs of state R&D institutions (34 million kroons), these costs were earlier covered from the budget of the respective ministries. In 1997 the base financing was renamed to targeted financing (*sihtraha*), as it was allocated according to the quality and performance of the institutions research activities, the decisions of the SSC on the science reform and the science priorities of Estonia. One of the allocation criteria was the allocation of grant financing in 1997 between R&D institutions. As a result, 8 R&D institutions were left without targeted financing. Since 1998, the infrastructure costs of research institutions remained the responsibility of the founder of the institution.

Estonian Innovation Fund distributed R&D support funds mostly by the co-financing principle, where the main financing remained by the applicant. The support was given in following ways – non-repayable support (50% of the sum of the project), non-commercial loan (75% of the sum of the project), loan guarantee or capital investment (Teaduskompetentsi Nõukogu aruanne 2001-2003). The allocations from the national budget have been decreasing in years 1993-1996 and again increasing in 1996-1999 up to a 30 mill EEK, have been not sufficient for encouraging the R&D activities of firms. In 2000, the fund decreased again to slightly over 15 million EEK.

In 2000, there were 67 R&D institutions in Estonia that were registered in the Register of the Research and Development institutions (including 16 public institutions under ministries, 7 corporate bodies, institutes of other establishments of universities (22). 21 research institutions are registered under private law (including spin-off firms, foundations, etc), There was only one research institution belonging to the local municipality (*Tallinna Botaanikaead*, Tallinn Botanical Garden).

As the funds allocated through Estonian Innovation Fund remained not sufficient for encouraging the R&D and innovation activities of firms, this part of financing system was reorganised and EAS and ESTAG were created in 2000 and 2001. In years 2000-2001 these institutions existed separately, and ESTAG was incorporated into EAS later (from 2002).

3.3 Perspectives of research and higher education funding schemes in Estonia

There can be foreseen some more structured division of functions between MEAC and MER in project financing of research. As currently Enterprise Estonia (under the governance of MEAC) has launched in cooperation with MER several programs financed from EU Structural Funds directly targeted at R&D institutions since it has the competence needed for governing such programmes. In the future, however, it is foreseen that the programmes related to the financing of infrastructure of R&D institutions are going to be governed by MER (like the Centres of Excellence Programme and R&D Infrastructure Development Programme) (Source: MEAC).

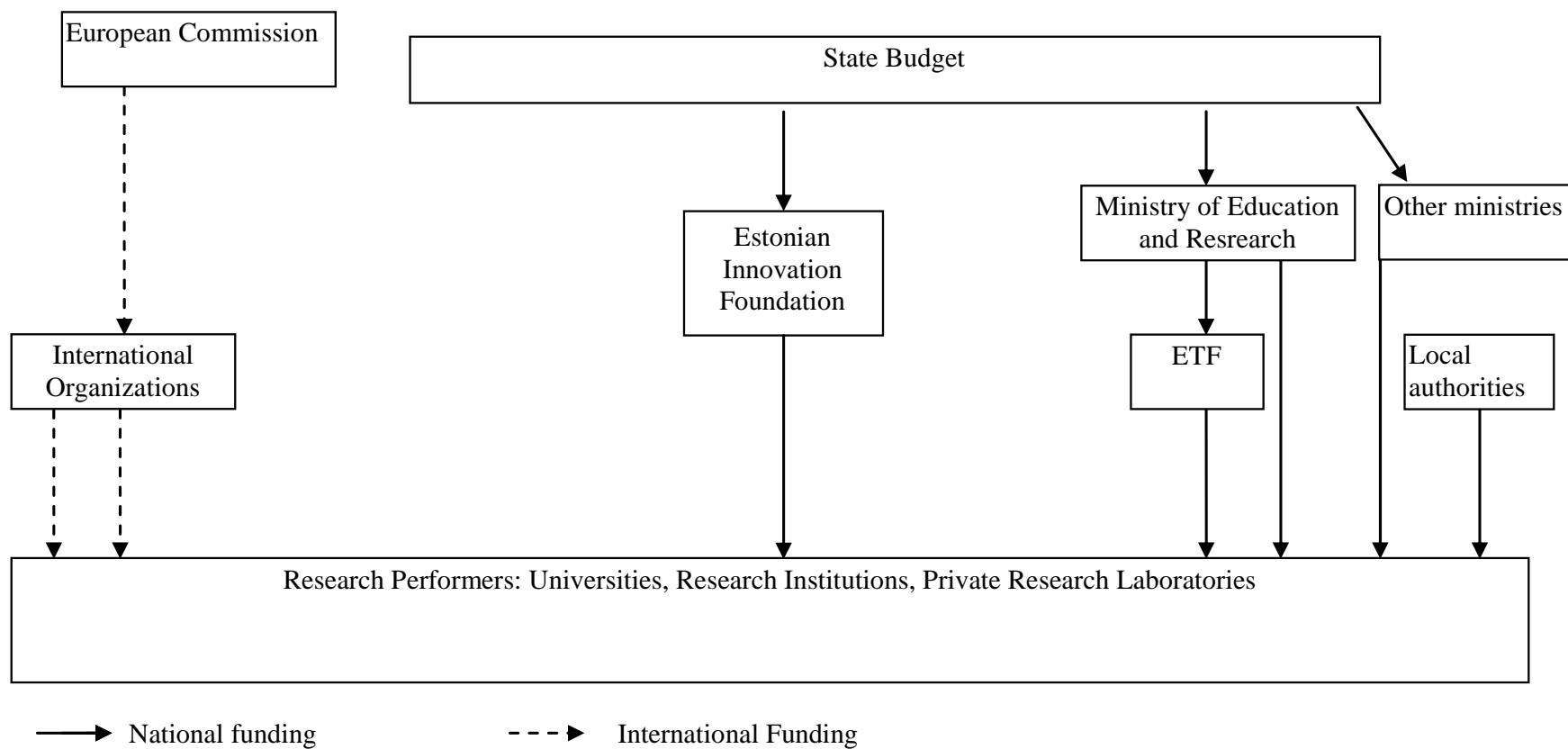


Figure 3 Channels of research funding in Estonia in 1995

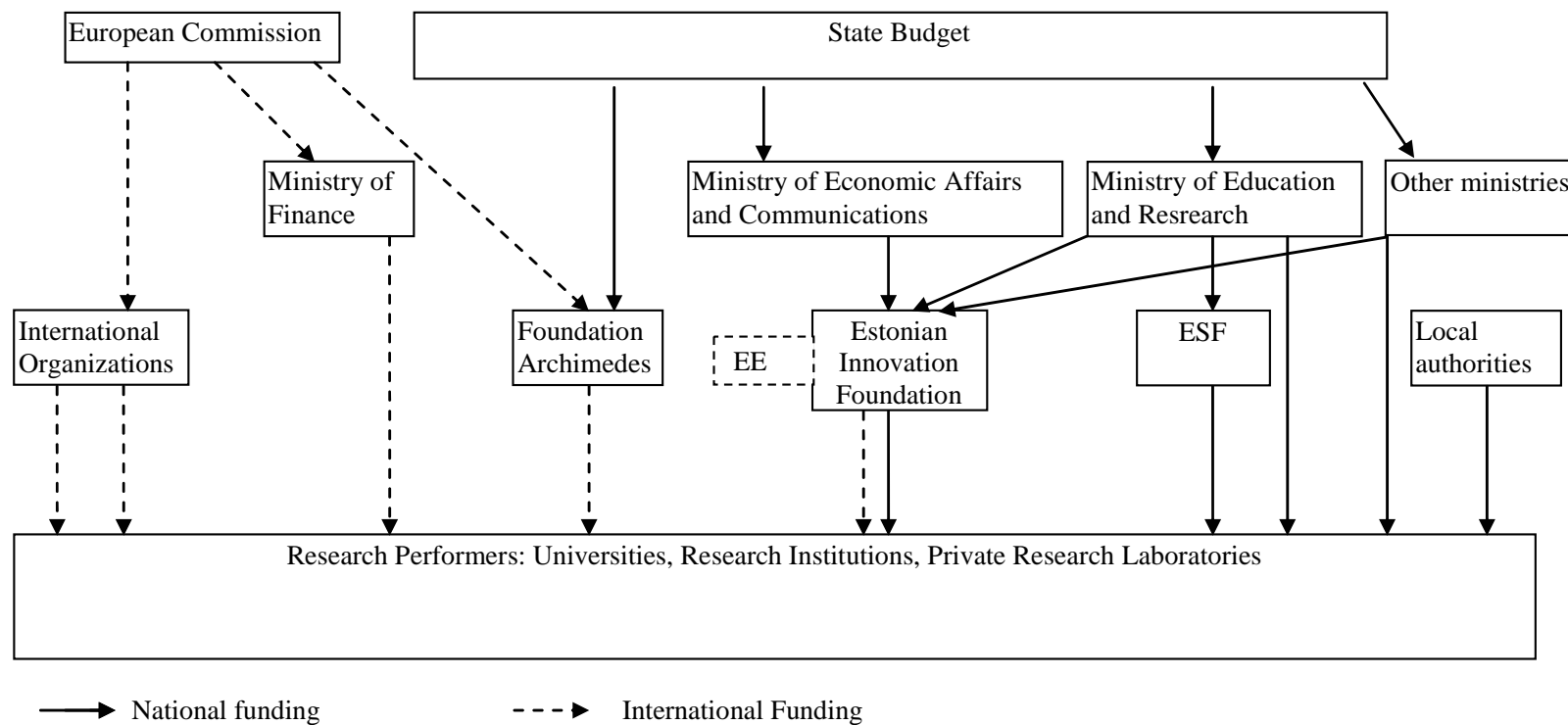


Figure 4 Channels of research funding in Estonia in 2000

4 Dynamics of R&D funding in Estonia

4.1 Trends in R&D Funding at the aggregate level

The total R&D expenditure has grown during the previous years in Estonia from 0.6 % in 1998 to 0.94 % in 2005 (see Table 6). Despite that development, the total R&D expenditure is in Estonia, as well as in the two other Baltic States Latvia (0.57 %) and Lithuania (0.76 %), below the average of EU15 (1.91%) and also some other CEE countries like Czech Republic (1.42 % of GDP) and Slovenia (1.22 % of GDP - Eurostat). In Estonia the expenditures are still somewhat higher than in its Baltic counterparts Lithuania and Latvia. The total budget increased considerably since 2004 related to the opening of EU structural funds; that applies especially to the funding of development and innovation (Reid et al. 2006). Though the structural funds have made a considerable contribution to the financing of R&D policies, there are also problems connected to them: 1) there is a long delay in the application of structural funds due to bureaucracy, 2) not in all cases the additionality of structural funds to national funds has been insured, but rather funds replaced the financing from the state budget (Knowledge Based Estonia 2007-2013).

Business expenditure constitutes a significantly smaller (though raising) share of total R&D expenditure in Estonia than in EU15: in Estonia the share of business R&D in total R&D expenditure raised from 20 % in 1998 to 45 % in 2005 (see Table 6), while in EU15 that was in 2005 64 %; the share is also below of a few CEE countries like Czech republic (65%) and Slovenia (71 %) (Source: Eurostat). One reason might be that while R&D spending is undertaken mainly by large firms owning trade-marks and producing finished products, in Estonia these firms are lacking and small subcontracting firms will not incur R&D spending. Another reason is that quite often the firms rely on technologies provided by foreign parent companies or other foreign partners (under a subcontracting agreement) (Kurik et al. 2002). The traditional firms dominant in Estonia do not innovate through R&D but through other means. Still, recently the private sectors R&D expenditures have grown faster than the R&D expenditures of the public sector thanks to the firms' stronger cooperation with R&D institutions and the state's support to enterprises' R&D projects (Knowledge Based Estonia 2007-2013). According to the strategy document "Eesti edu 2014" (The Success of Estonia 2014) the investments into R&D should increase up to 3 % of GDP, of which at least 50 % constitute investments made by the private sector.

The current public funding is not targeted to any specific sectors, as the planned national technology programmes in the key sectors (user-friendly information technologies, biomedicine, materials' technologies - Knowledge Based Estonia, 2002) have not been launched (Reid et al. 2006).

Table 6 R&D expenditure and its financing

Year	1998	1999	2000	2001	2002	2003	2004	2005
GERD, current prices, millions of EUR	29	37	37	49	56	67	83	104
GERD as % of GDP	0.58%	0.70%	0.61%	0.71%	0.72%	0.79%	0.88%	0.94%
R&D financing of public sector, million EUR	23	28	29	32	39	44	50	57
Share of public sector in %	80%	76%	77%	66%	69%	66%	61%	55%
BERD, million EUR	5.7	8.8	8.3	16.4	17.1	22.7	32.2	46.9
Share of private sector in%	20%	24%	23%	34%	31%	34%	39%	45%
BERD as % of GDP	0.11%	0.17%	0.14%	0.24%	0.22%	0.27%	0.34%	0.42%

Source: Statistical Office of Estonia, own calculations

Table 7 shortly describes distribution of R&D expenditures in non-profit institutions by fields of science. Generally the shares have been rather stable across the years; some increase in the size of 3-4 percentage points can be seen in social sciences and humanities. There are some differences across the different funding instruments. For instance, in the targeted financing relatively higher share is allocated to exact sciences, chemistry, molecular biology, technical sciences, biology and geography, while in the ESF grants relatively higher share goes to medicine, agricultural sciences, social sciences and humanities. Similarly to many other European countries, in targeted financing the distribution of

the total funding between different disciplines is not determined, financing decisions are made only based on the quality of the project proposals. The proportions of different fields by ESF grants are determined by preceding political decision (Teaduskompetentsi nõukogu tegevuse aruanne ... 2006).

Table 7 Expenditures on R&D among non-profit institutional sectors by operating area

	Total, '000 EUR	Natural sciences	Technical sciences	Medicine	Agricultural sciences	Social sciences	Humanities
1998	19 081	37%	26%	11%	8%	9%	9%
1999	23 121	31%	25%	17%	10%	8%	9%
2000	23 149	37%	21%	10%	13%	9%	10%
2001	27 852	37%	19%	11%	12%	9%	11%
2002	28 695	37%	20%	12%	11%	9%	11%
2003	32 386	37%	18%	10%	14%	11%	11%
2004	38 623	36%	18%	11%	9%	11%	14%
2005	44 210	34%	21%	11%	9%	12%	13%

Source: Statistical Office of Estonia, authors' calculations

Note. The exchange rate of the Estonian national currency, kroon, is fixed to the euro at the rate 1 EUR = 15.6466 EEK.

Table 8 gives an overview of the targets set for R&D funding in the national policy documents. In fact, only a rather short list of quantitative targets has been specified either in the strategy Knowledge Based Estonia or in the Single Programming Document 2004-2006. Concerning the fulfilment of targets set in Knowledge Based Estonia (2002), the overall target of total R&D funding has exceeded, however due to the fact that growth of GDP has been rather high the proportion of total R&D expenditures in the GDP is still significantly below the target. As we mentioned already, share of business sector in funding has increased, however its proportion to GDP is still significantly below that of developed countries.

Table 8 The targets set for R&D financing in national policy documents

	Knowledge-based Estonia, 2002-2006: target for 2006	Knowledge-based Estonia, 2007-2013: target for 2013/2014	Actual level in 2005
Share of GERD in GDP	1.5%	3.0%	0.95 %
Share of BERD in GDP	0.65%	1.6 %	0.45 %
Balance of public funding	To arrive a better balance of public funding between research and experimental development: 60 % to research, 40 % to development		Trend in the shift towards the higher share of development (Reid et al. 2006)

Source: Knowledge-based Estonia. Estonian Research and Development Strategy 2002-2006. Tallinn, 2002; Teadmistepõhine Eesti 2007-2013 (TE II) Eesti teadus- ja arendustegevuse ning innovatsiooni strateegia. Tööversioon 30. mai. 2006.

Another objective specified in Knowledge-based Estonia was to achieve a better balance between of public R&D funding between research and development expenditures. While in 2000 approximately 90 % of public expenditure was allocated to research and only 10 % to development, then the strategy document set the target that in 2006 the proportions should be 60 % and 40 % (Knowledge-Based Estonia). Indeed, there has been trend towards a higher share of experimental development both in the public expenditure as well as in the total expenditure (Reid et al. 2006). That can be seen also from figure 5: the share of basic research in total R&D expenditures has constantly decreased at the expense of development expenditures.

The more general financing strategy of R&D expenditures (the prognosis of public funding, but also

expected private funding) is shown in **Table 9**; however, it has to be noted that the strategy document of 2007-2013 is more detailed with regards to the funds dedicated to specific measures and showing the concordance with the national budgeting strategy. As revealed in the Table 11, the increasing role of MER in public part of R&D funding is planned. However, the relative importance of public funding is decreasing.

Table 9 R&D expenditures in 2002-2010, millions of EUR

R&D Expenditures	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total expenditure	52.1	64.2	85.8	110.9	139.7	175.8	230.8	315.6	351.8
Total expenditure, % of GDP	0.8	0.9	1.1	1.3	1.5	na	1.5	na	1.9
Public sector expenditure	41.7	51.4	64.4	83.2	97.8	83.0	118.4	192.2	213.5
Share of public sector, %	80.0	80.0	75.0	75.0	70.0	47	51	61	61
State budget allocations	31.8	39.2	45.6	56.5	64.8	83.0	118.4	192.2	213.5
Of which MER	26.4	27.5	29.4	35.2	38.3	49.6	72.3	139.6	155.4
Of which MEAC	4.5	10.9	15.3	20.5	25.6	26.3	39.9	46.3	51.9
Of which other ministries	0.9	0.9	0.9	0.9	0.9	7.0	6.1	6.2	6.2

Source: Knowledge-based Estonia 2002-2006 p. 32; Knowledge-based Estonia 2007-2013, p.35

Notes: Author's calculations based on presented data are shown in italic. The years 2011-2013 are not added to the table, because are not specified on detailed level in respective strategies.

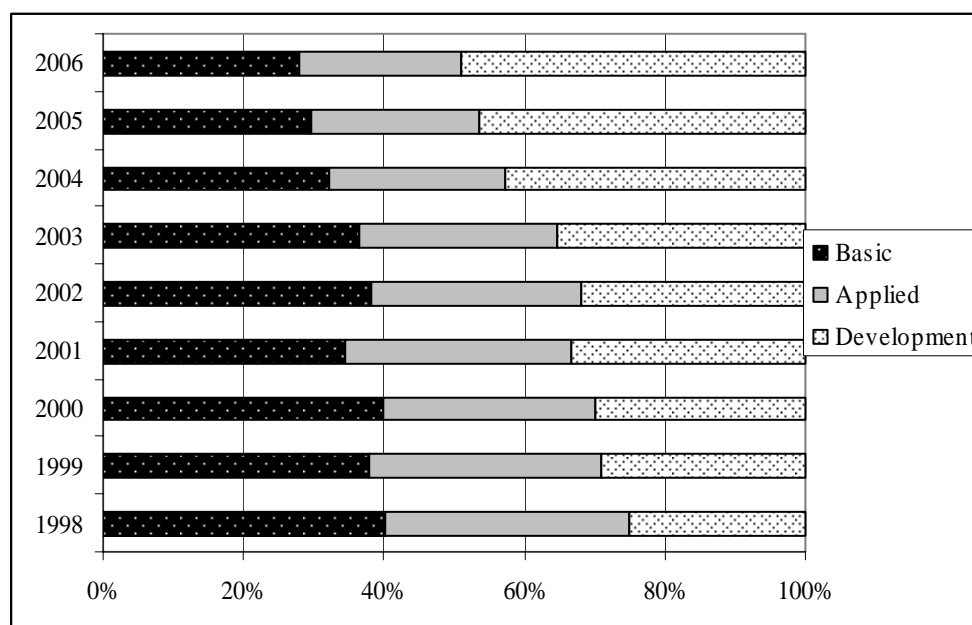


Figure 5 Total R&D expenditure by the category of R&D

Source: Statistical Office of Estonia, own calculations

4.2 Composition of public research funding in Estonia by instruments

The analysis in this section is based on the data that has been gathered by the authors of this report on the individual funding instruments used for research funding in Estonia during 1993-2005. The methodology used is similar to that employed in comparative analysis of public project funding in

Western European countries (Lepori et al. 2007b). The data is disaggregated both by the funding instruments and by individual beneficiaries, like universities, research institutes, private firms etc. Also the international funding sources (primarily the funding from the European Union) have been included. The database includes all major research funding instruments; the missing data includes mostly the direct contracts from some of the ministries and other state agencies. The exclusion of the latter funding sources can be considered not a major issue since these are not subject to science policy decisions. From research funding, we have excluded the administrative costs of funding agencies (ESF, EAS), the funding to scientific libraries and science premiums. On the other hand, we have included under research funding the schemes related to PhD students, like stipends to PhD students, support of the academic mobility of PhD students etc.

Figure 6 shows that the number of distinct funding instruments in our database has grown over the course of time and reaches more than 30 by 2005²¹. On the one hand that reflects the developments in the research policy: while in the 1st half of 90's there existed basically 3 national instruments (ESF grants, ESF base-line funding, and ESF targeted grants), then later quite many new instruments have been introduced (national programmes in specific areas, centres of excellence programme etc.). On the other hand, it is naturally easier to obtain information for the more recent years. The growing number of instruments is in line with the growing number of different funding agencies. Despite of Estonia being a rather small country (e.g. with only 6 public universities) the number of individual beneficiaries is relatively high, as this number includes also some private firms, libraries, museums etc. We will see soon that a handful of the beneficiaries accounts for the vast majority of the funding volumes.

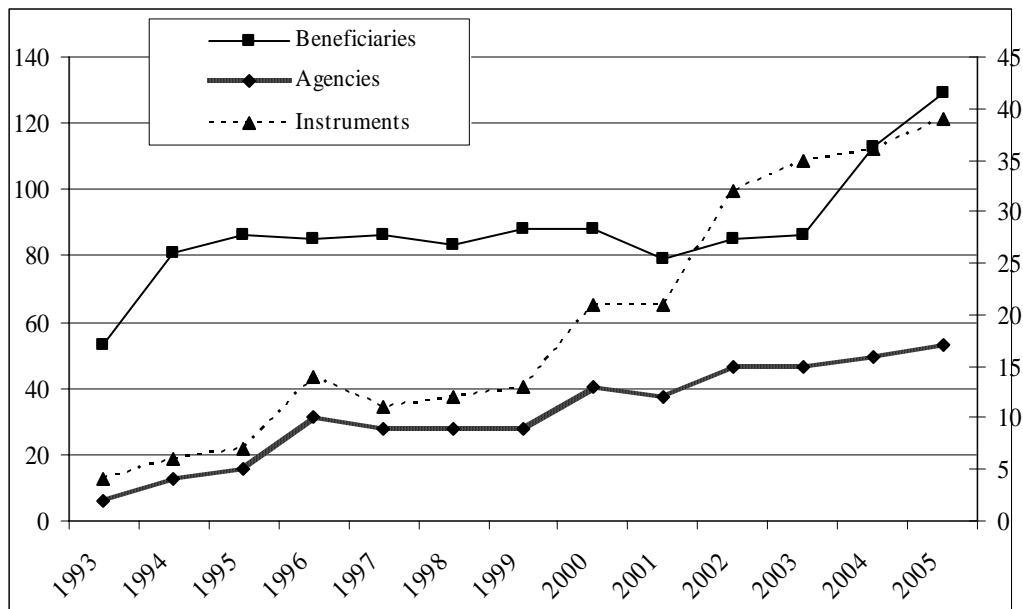


Figure 6 Overview of the database: number of beneficiaries (left axis), agencies and instruments (right axis).

Source: data from various sources as described in section 4, own calculations

The coverage of the database is rather good, for 1993- 2003 the coverage of the database varies from about 87% in 1997 up to 105% in 1996 of the total public funding flows towards research, for 2004-2006 the coverage is nearly complete; see also Figure 7 being basically within the range of measurement error of R&D statistics. One concern is that in 2005 the funding flows we have identified constitute almost 130 % of the public R&D funding reported by the Estonian Statistical Office. In 2004 the EU structural funds opened for Estonia, however these funding flows should be considered as part of the national public funding flows, thus the more than the complete coverage of the database remains a puzzle. In sum, we can point out the following reasons for the differences between the total

²¹ Note that we have hereby aggregated some small programmes into one, for instance, the various programmes for the support of mobility of researchers and students by Archimedes Foundation. Thus, the number of funding instruments is to some extent provisional. However, we have not aggregated the larger funding instruments. See also section 4 for more details.

R&D funding according to our data and the Statistical Office of Estonia²²:

1. We may have included in the database instruments that in reality fund innovation, or more generally, there might be differences between what is considered research funding in our database and research expenditures' reports;
2. The funds assigned for R&D might be used for some other purpose, or for the purposes not considered as R&D by the beneficiary;
3. European structural funds could also be considered as funding from abroad in the R&D statistics if research performers identify them as European funds;
4. Differences between funding allocations and expenditures leading thus to some shifts between years – that may cause the spikes in 90's where for some programmes (like Phare HESR, EU framework programmes) we have only available the total funding volume over several years;
5. Imprecision in R&D statistics due to data collection by performers - the exclusion of some research performers from the R&D statistics gathering process may underestimate the total R&D expenditure – according to information from Estonian Statistical Office, that problem is not there as all research performers have been identified by the beneficiaries of research funding;
6. If the public funding moves through other institutions to the actual research performer, then that may influence the R&D statistics. For instance, if EE allocates funds to enterprises, and enterprises use these funds to order R&D from universities, then universities may report that funding as private not public one.

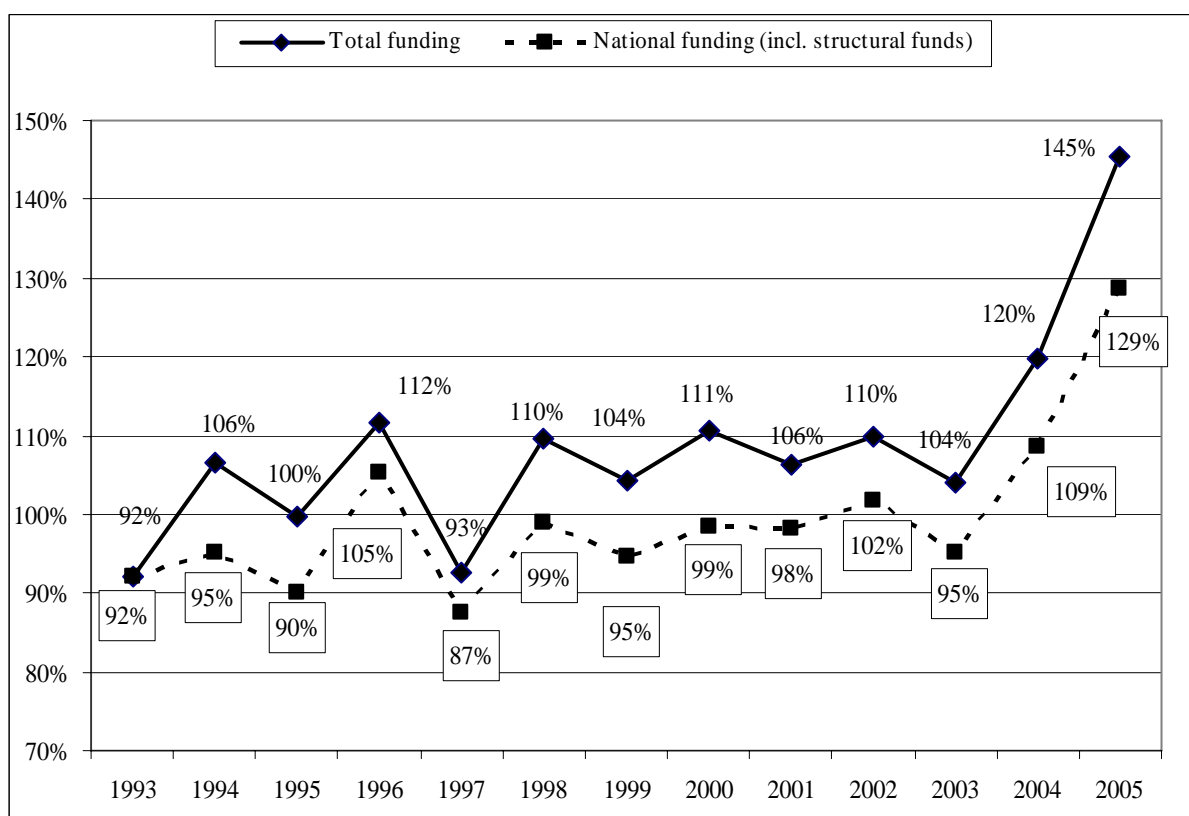


Figure 7 Total funding in the database as a % of total public R&D funding

Source: Statistical Office of Estonia, data from various sources as described in section 4, own calculations

Figure 8 below gives the most general picture of the share of public research funding allocated through different types of funding instruments (institutional and project funding) in 2005²³. Here we

²² These explanations are based on discussions with and information from Benedetto Lepori (University of Lugano) and Aavo Heinlo (Statistical Office of Estonia).

²³ Project funding is defined here as funds attributed for a limited time and scope, to research teams and not whole organizations, and normally from a funding agency outside the performing institution.

consider only research expenditures and exclude the funding directed to educational activities²⁴. First striking fact is the rather high share of the project funding in total funding flows (77% in 2005). That is a number much higher than in most other countries. One explanation could be that while in the Soviet Union most of the research funding was allocated institutionally, during the reform of the science funding system the purpose was to replace the institutional funding with the funding of research projects (Eesti Teadusfond 2006b). Concerning historical developments, the share of project funding increased from 37% in 1995 to 82% in 2000 (caused, for instance, by the transformation of ESF base-line funding to targeted funding to research groups) and then declined to 77 % in 2005 (base-line funding being re-introduced in 2005). The terms and conditions for the use of EU structural funds allow these to be used only for project funding (except perhaps some border-line cases), that contributes to the high share of project funding since 2004. The share of higher education is quite high, 69% of general and 47% of project funding; with their research institutes, the shares increase to 77 and 54 %. In 1995 these numbers were respectively 37% and 40%. This development reflects the transformation of the R&D system from the one where most research was done in the institutes of the Academy of Science to the one where universities are the most important research performers. Other research performers (for instance private firms, museums etc.) receive a smaller share of funding; however they receive also about 10% of the institutional funding. The role of Academy of Sciences is negligible; it includes the research funding to the one and only research institute that has remained under the Estonian Academy of Sciences (that is Under and Tuglas Literature Centre).

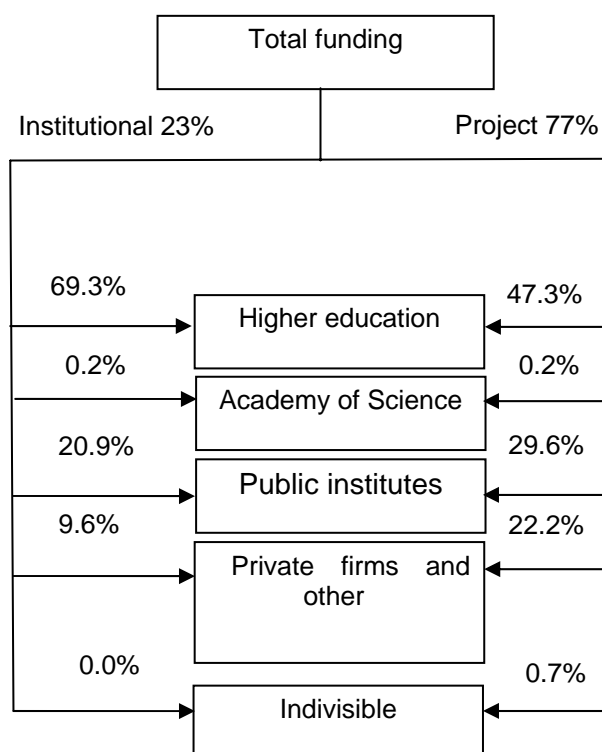


Figure 8 Distribution of funds across beneficiaries in 2005

Source: various sources as listed in section 4, own calculations

Table 10 presents the numbers on total national funding (excluding the programmes funded from structural funds) and EU funding (framework programmes and structural funds); let us note that

Similar definition has been used by (Lepori et al. 2006). In case of Estonia, in 2005 the institutional funding instruments were the coverage of infrastructure costs of R&D institutions, the base-line funding by MER and the funding of PhD students' stipends by MER. The most borderline case is perhaps the centres of excellence programme; however, we have classified that instrument also as the one of project funding.

²⁴ In case of Estonia, that consists mostly of state order of schooling (*riiklik koolitustellimus*). In principle, some of this funding is used factually for research. For instance, university professors have the obligation to undertake research. However, we have excluded this from our data as we are unable to separate the part of this funding going to research.

usually structural funds are considered under national funding. Funding from European Union constituted in 2005 about 33% of the total funding flows (national plus EU funding). About 30% of that is from the framework programmes and 70% from the structural funds. Most of the funding that is directed to private firms comes from the EU sources.

Table 10 Public research funding 1995-2005

Year	Total national funding, MEUR	Type of funding, %		Share of beneficiaries, %			Total EU funding, MEUR	Source of funding, %	
		General	Project	HE	Research institutes,	Other		FP	Structural funds
1995	10	62	38	41	48	4	1	100	0
1996	15	60	40	39	45	6	1	100	0
1997	15	59	41	37	35	5	1	100	0
1998	18	17	83	42	32	4	2	100	0
1999	22	16	84	41	35	3	2	100	0
2000	22	20	80	45	36	3	3	100	0
2001	22	21	79	45	36	3	5	40	60
2002	25	19	81	46	36	5	8	26	74
2003	29	22	78	57	36	6	4	46	54
2004	33	20	80	59	34	5	9	34	66
2005	43	34	66	62	31	5	22	30	70

Source: own calculations

Concerning the distribution of research funding across research and development institutions, the concentration is very high with the University of Tartu leading: together with its institutes the share in total funding was in 2005 42% in targeted funding, 49% in base-financing, 50% in ESF grants and even 73% in centres of excellence (also Table 11). The high level of concentration of research funding was noted also by Nedeva and Georghiou (2003). Without its research institutes, the share declines to 34 % in targeted financing, 42 % in base financing and 43% in the Estonian Science Foundation grants. This degree of concentration is not unprecedented and has been noted elsewhere; it is to certain extent justified by the stronger performance of University of Tartu on the common measures of academic outcome (number of articles in peer reviewed journals). There is lots of anecdotal evidence on the dissatisfaction with such distribution in other institutions. This may be also a sign of biases in the funding system like the bias against more applied research areas (Nedeva and Georghiou 2003). The 2nd and 3rd place are held, respectively, by the Tallinn University of Technology and the Estonian Agricultural University. University of Tallinn has only a relatively low share in all instruments. The share of research institutes is relatively stable across various funding instruments.

Table 11 The allocation of various funding instruments of MER and ESF across beneficiaries in 2005

Institution	Base financing	Infrastructure funds	Targeted finance	ESF grants	Centres of Excellence
University of Tartu	49.3%	44.1%	41.9%	49.6%	73.1%
Tallinn University of Technology	20.5%	23.5%	23.9%	18.9%	11.0%
University of Tallinn	4.3%	2.3%	2.3%	2.4%	
Estonian Agricultural University	7.3%	9.5%	7.2%	10.7%	
Estonian Academy of Music and Theatre	0.2%	0.2%	0.2%	0.2%	
Estonian Academy of Arts	0.1%	0.2%	0.2%		
Research institutes	14.9%	15.8%	18.7%	12.7%	16.0%
Other	3.3%	4.4%	5.6%	5.5%	
Total, '000 kroons	74463	77400	230450	85945	21700

Source: Ministry of Education and Research, Estonian Science Foundation, own calculations

Note. The funding of the research institutes of the universities have been included under the respective universities.

The graph below depicts the distribution of project funding by instruments. The three largest instruments or (groups of instruments) are targeted financing (29% of total funding flows), Enterprise

Estonia programmes (27%) and EU Framework Programs (13%). Besides to these, quite many relatively small instruments exist. Relatively large share belongs also to the programmes of EIC. That is surprisingly not so important funding source for the Estonian University of Life Sciences (3% of their funding of the instruments for which we have data comes from that source).

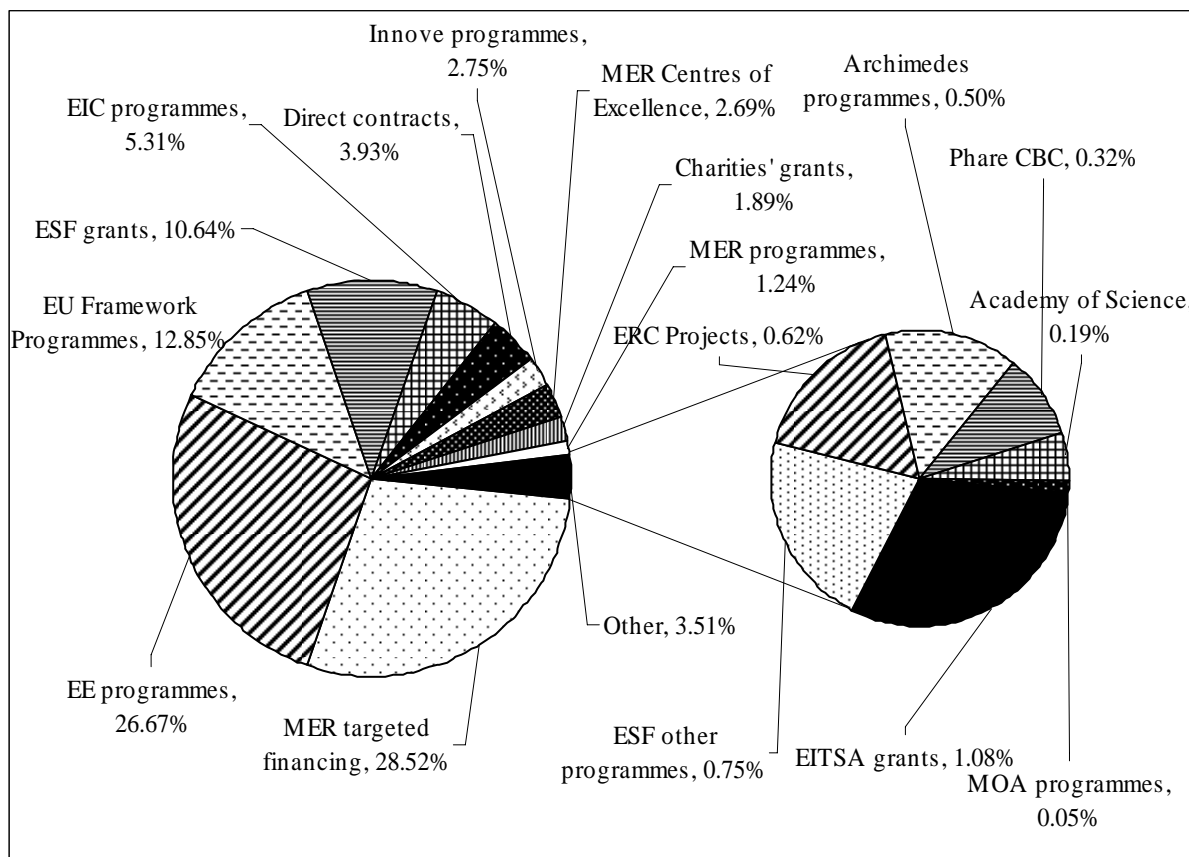


Figure 9 Project funding in 2005: share by instruments

Source: various sources as listed in section 4, own calculations

The share of direct research contracts from state institutions is relatively low (3.9%; in Lepori (2006) the share of federal administration contracts was 11%). On the one hand, we lack data for the direct contracts from many of the ministries (for instance MER). On the other hand, that may reflect also the inability of the research performers to meet the demands of the public sector. For instance, in an interview one representative of the ministry claimed that the universities are not eager to perform the applied research that is of interest for the ministries and the ministries do not have any means how to direct the universities research activities in this direction. The feature of the Estonian R&D system is the rather negligible role of the Estonian Academy of Sciences, 0.2% of total funding flows, that includes funding to research professors. The other small funding instruments are the national programmes on key areas (under MER and MoA), mobility programmes of Archimedes, charities grants²⁵, Innove programmes, ERC grants, EITSA grants, some small programmes of ESF etc.

In the graph below we present information on the share of various general funding (institutional funding) instruments in 2005. The biggest shares are the funding of infrastructure costs by MER and the base-line funding by MER. Concerning other ministries, the infrastructure costs financed by them constitute about 10% of the total institutional funding. The category "Other" includes the infrastructure costs financed by the Ministry of Social Affairs and the charities²⁶.

²⁵ Charities have been included as the research funding from charities is rather near to public research funding. In our data we have included the funding from the Open Estonia Foundation, Wellcome Trust, International Science Foundation. In principle, Estonian R&D institutions have received funding also from some other international charities (e.g. Volkswagen Foundation).

²⁶ It has to be noted here that since the data collected from the ministries concerning the research contracts, but also the infrastructure costs are far from being complete, their share might be somewhat

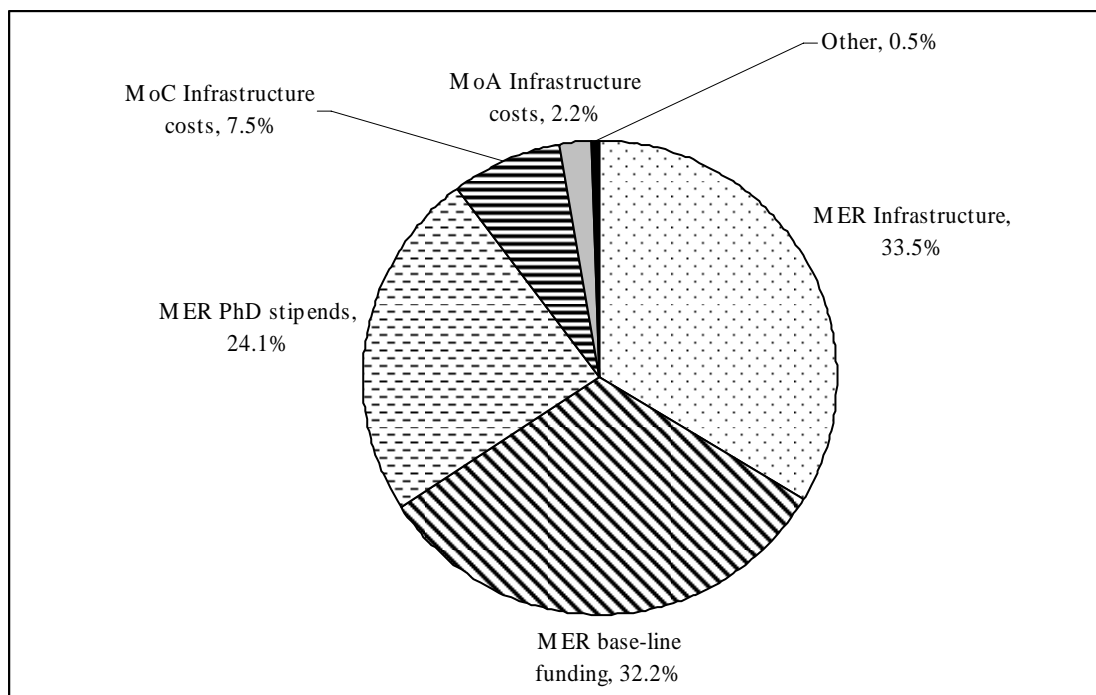


Figure 10 General funding in 2005: share by instruments

Source: various sources as listed in section 4, own calculations

In the literature it has been well documented that among project funding instruments there is in many countries a shift away from academic-oriented instruments, where the choice of project and research themes is left to academic community, to more policy-oriented or innovation-oriented instruments where the state has more influence on the choice of research themes and the selection of beneficiaries (Lepori 2006). For 2002, the share of academic-oriented instruments²⁷ in total project funding varied from more than 40% in Switzerland to less than 20 % in Norway and France (Lepori et al. 2007a). In Estonia, the share of academic-oriented instruments in total funding flows increased from 75% in 1996 to 78% in 2000, and thereafter decreased to 48% in 2005. The rather high share of academic instruments and low share of priority-oriented academic or innovation oriented instruments reflects the fact that large portion of funding towards academic and basic research are distributed to beneficiaries in the form of project-funding. The recent increase in the share of priority-oriented instruments is due to the introduction of national programmes in key areas (see section 4) and the various programmes of EE. The share of priority-oriented projects may increase further in the future if additional national programmes in key areas will be introduced (as foreseen in R&D strategy).

Another fact observed in many countries is the growing increase in the distinct project funding instruments. Lepori et al. (2007b) showed that while in 1970s there were in most countries just 2-3 instruments with at least a 5 % share in total project funding, then in 2002 this number was 8-9 in most countries. In Estonia, while the total number of project funding instruments has increased greatly from 3 in 1993 and 8 in 1996 to 31 in 2005, the number of significant instruments has been rather stable since the middle of 90's – 3 in 1993, 5 in 1996, 3 in 2000, 6 in 2005. The relatively smaller number of significant instruments shows the rather high fragmentation of the system (many quite small instruments); that can be observed also from Figure 9. Thus the number of significant instruments is in Estonia smaller than in other countries that might be simply related also to the smaller size of the research sector and smaller number of research areas. Finally, concerning the share of international programs (in the Estonian case that comprises EU Framework Programmes), that was 12.9 % in 1996, 13.5% in 2000 and 12.3% in 2005. That number is comparable to other countries reviewed in Lepori et al. (2007a).

The figure below depicts the distribution of funding by agencies for 1995, 2000 and 2005. In the 1st

larger.

²⁷ Hereby the project funding instruments have been divided into the following groups: academic-oriented instruments, EU framework programmes, thematic national, innovation-oriented instruments.

half of the 90's Estonian Science Fund was a much important player as the general funding (base-line funding) was also allocated through it. The very high importance of ESF and relatively low importance of MER reflected in our opinion the desire of the research community that the funding decisions should be made by the scientists, not the state bureaucrats (Martinson 1995). By 2000, MER had grown in importance, 62 % of funding flows went through the MER while the share of ESF funding decreased down to 19%. In 2005, much more different funding agencies can be identified. The flows going through MER constitute for less than a half of the total funding flows, EE 21%, ESF 9%, European Commission 10% (framework programmes). The total share of 5 other ministries (Ministry of Interior, Ministry of Social Affairs, Ministry of Culture, Ministry of Agriculture, Ministry of Defence) is 4.7% (in the graphs some of these are under the category "other"). The share of funding from the European Commission has increased from 6 % in 1996 to 11% in 2000 and 10% to 2005.

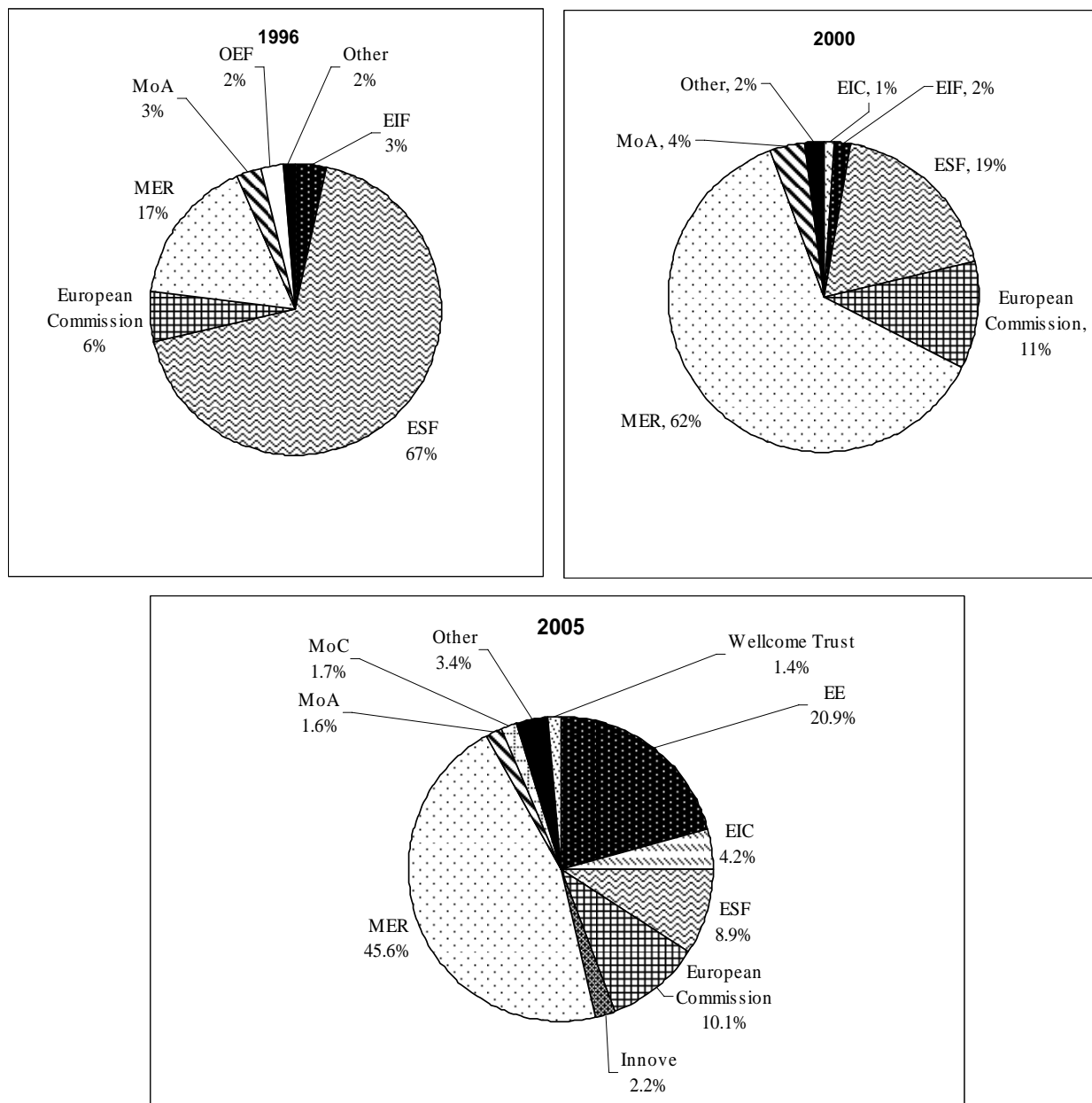


Figure 11 The distribution of total funding across funding agencies in 1996, 2000 and 2005.

Source: various sources as listed in section 4, own calculations

4.3 Comparison with other Baltic countries²⁸

As all the Baltic countries share similar history of belonging to the Soviet Union, it may be presumed that the starting point for the transition was quite similar for all three countries. During the transition, the educational systems were changed significantly and the re-structuring is still not finished. As argued in Purju et al. (2005), the research policy has turned out to be different in Baltic countries mostly because of the differences in political culture (e.g. the extreme liberalism in Estonia).

The re-structuring of tertiary education started in 1990s and was accompanied by far-reaching reform of the whole higher education system (the respective legislations were adopted in 1995 in Latvia and Estonia and 2000 in Lithuania (Kristapsons et al. 2003)). In all three countries, the number of higher education institutions has grown rapidly including also the rapid growth in number of private universities. At somewhat different times in all countries the R&D systems were changed – science councils and foundations were created and spin-offs and other firms created on the basis of former branch institutes (Kristapsons, et al. 2003). The role of Academy of Sciences which was dominant in soviet system, diminished in all three countries, because the research institutes were separated from that institution. In Latvia and Estonia, the research is mostly performed by the universities and smaller number of non-profit research organizations, whereas in Lithuania, the split between public and private research performers is more equal (Purju et al. 2005). In addition, one special feature of the Lithuanian research system is the existence of thematically specialized research institutions (Purju et al. 2005).

The most principal change considering the funding mechanisms of research in all three countries has been associated with the introduction of two flows of funding (institutional and project) and connecting the funding system to the scientific merit. There are differences between the three countries with regard to those instruments referred in Kristapsons et al. (2003). Estonia is held being too much relying on project funding (because of short-term time horizons and instability), Latvian system suffers most from the internal contradiction of the process design (the system of grants for individual researchers and institutions; the institutional funding is quite limited and infrastructure costs are financed from overheads of grants) and Lithuanian project funding is the weakest that would exist only in theory.

As in the beginning of transition, the expenditures of research decreased considerably in all three countries, in 1997 24.0 mill EUR, in Lithuania 48.0 and Latvia 21.1 mill EUR (being per capita highest in Estonia and lowest in Latvia) (Kristapsons, et al. 2003). These expenditures have grown in the period of 1997-2001 most rapidly in Latvia (60%), but 52% also in Estonia, in Lithuania somewhat less (39%) (OST 2006).

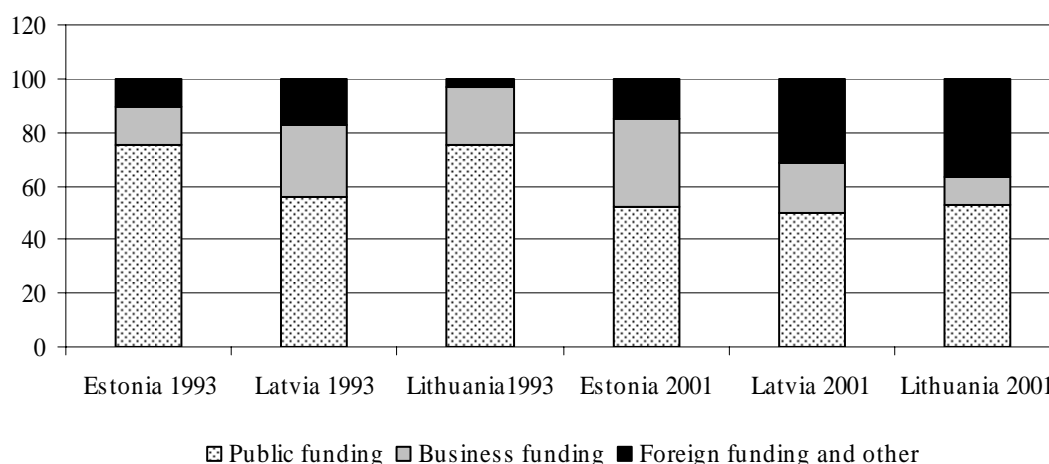


Figure 12 Share of public, business and other funding in 1993 and 2001

Source: Kristapsons et al. (2003), own calculations.

As in other Soviet bloc countries, in the beginning of transition, most of the R&D funding was received

²⁸ This section draws mostly on Kristapsons et al. (2003).

from public sources (see Figure 12), however the relative importance of business and other sources has been constantly increasing. It has to be noted that in the beginning of transition, Estonia had smallest share of business funding of R&D (14.3%), however it has grown rapidly and in 2001, the share was the largest among all three Baltic states (32.9%). At the same time, Lithuania and Latvia have significantly smaller shares, thereby smallest in Lithuania (9.8%). Still the role of public funding in all countries remains at relative similar share -- about 50-60% of total funding.

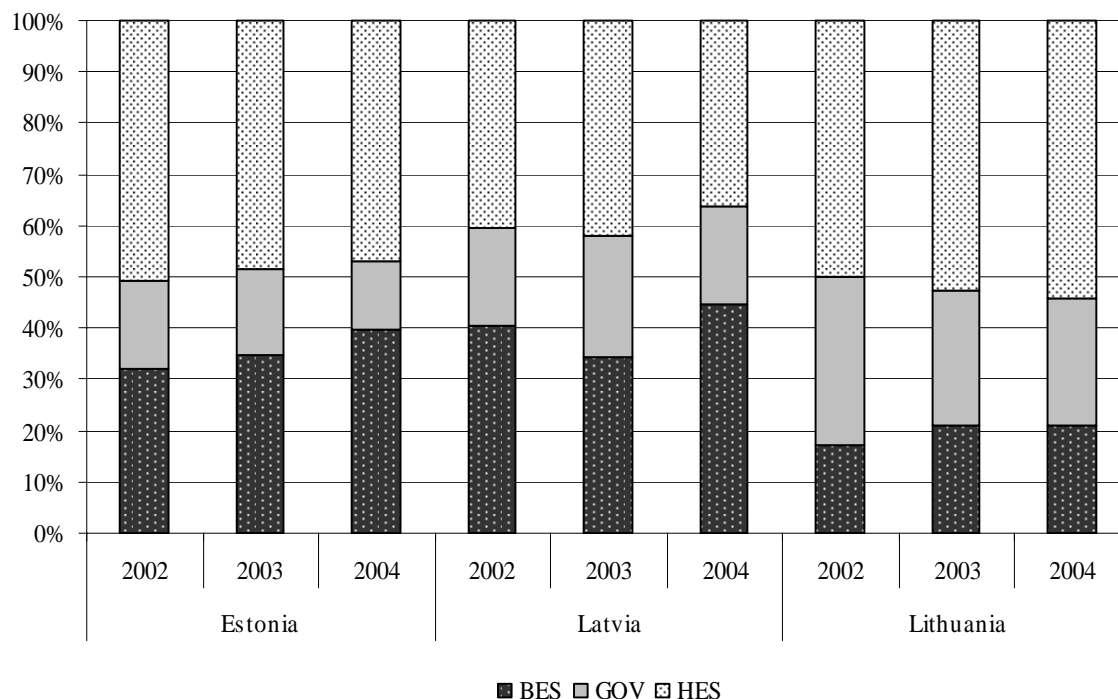


Figure 13 Shares of R&D expenditures by institutional sector

Source: Eurostat

As seen from the Figure 13, the trends in R&D expenditures are in broader sense quite similar in all three countries – the business enterprise sector (BES) carries about 30-40% of R&D expenditures being the lowest in Lithuania (17-21%). Most R&D expenditures are concentrated to the higher education and research institutions (36-54% in different years and countries). This difference of higher education and government sector shares in expenditures is caused by the difference in institutional reforms – while in Latvia and Estonia, the changes have occurred towards the western type of institutional organization of the R&D system (with minor role of Academy of Sciences, whose research institutes were merged to the universities), in Lithuania, this is not the case.

By looking at the indicators of Table 12, one can see the similar level in input as well as output indicators in comparison with the average of EU-15. Some differences do exist – in Estonia, the number of researchers, scientific publications, participation in EU FP-s and number of internet users is the largest. In Lithuania, funding of R&D is the highest and in Latvia, the innovative capacity has been the highest. The largest differences can be found in three output indicators (scientific publications, participation in EU FP-s and number of internet users), where Estonian numbers exceed 2-4 times the ones of other Baltic countries.

Table 12 Summary of indicators of R&D inputs and outputs per million of inhabitants

Country	Input		Output				
	Mill EUR for R&D (2001)	Researchers as FTE (2001)	Science	Technologies	Innovations		
			Scientific publications (SCI, 2001)	Patent applications (PCT, 1997- 2002)	Participation in EU FP-s (# of projects)	# of internet users (2001)	Innovative Capacity Rank (of 75)
Estonia	23.1	2,150	423	51	122	301,000	27
Latvia	15.7	1,100	139	31	56	72,000	41
Lithuania	25.0	2,100	150	10	34	68,000	37
EU-15	437.7	2,563	818	900	41	314,000	

Source: Kristapsons et al. (2003), Eurostat

5 Conclusions

The aim of the present paper was to analyze the Estonian research funding system at the level of individual funding instruments. The analysis was based on the database that included the public research funding flows since the mid 90's disaggregated by funding instruments and beneficiaries, mostly until the level of research units. Given our results, we can summarize the main features of the Estonian public research funding system as follows:

- The number of distinct research funding instruments has grown greatly over the time. That reflects the developments in the organization of the research funding system in Estonia.
- The total funding volume summed over different instruments is for most years close to the total public R&D reported in official statistics, however since 2004 the total funding according to our data exceeds by up to 30% the official numbers; the list of possible explanations includes, inter alia, the possibility that European structural funds could be considered as funding from abroad in R&D statistics or that public funding may move to actual research performers through other institutions.
- The share of project funding in total funding flows is rather high, 77 % in 2005. That is a number much higher than in most other countries.
- Within the project funding, there is a rather high share of the academic-oriented instruments (48% in 2005) and a relatively low share of the more policy-oriented or innovation oriented instruments. That is because a large portion of the funding towards academic and basic research is distributed to beneficiaries in the form of project-funding.
- While the total number of distinct project funding instruments is rather high, in 2005 only 6 of them had at least a 5 % share in total project funding. That is less than in other countries.
- The concentration of funding across institutions is very high, with University of Tartu leading, and the 2nd and 3rd place are held, respectively, by the Tallinn University of Technology and the Estonian Agricultural University. The shares of different institutions are relatively stable across various funding instruments.
- The share of ministerial contracts in total funding is rather low. That may reflect the inability of the research performers to meet the demands of the public sector, but also the inability of ministries to report such activities;
- The share higher education sector among the beneficiaries is rather high and growing, in 2005 69% of general and 47% of project funding. This development reflects the transformation of the R&D system from the one where most research was done in the institutes of the Academy of Science to the one where universities are important research performers.
- In project funding, the share of funding from the European Commission through framework programmes was 13% in 1996, to 14% in 2000 and 12% in 2005. The total funding from the European Union (structural funds and framework programmes) constituted in 2005 approximately 34% of the total funding flows (institutional and project funding).

The future research based on the data of this report could for instance include the analysis of competition in the Estonian public research funding system. While the analysis of competition within the research funding system (either the competition between individual researchers, between research units within an institution, competition between institutions or competition in the system) has attracted the attention in the science policy literature already before, the small number of competitors and the possible domination of a single (University of Tartu) or a few (in addition, Tallinn University of Technology and Estonian University of Life Sciences can be considered) players makes the issue of competition quite relevant.

6 Review of data sources

Data on funds channelled through MER:

1. Targeted financing (1998-)

Source: the distribution of funds between R&D institutions and research themes is available at the homepage of MER.

*Data available: 1998-2007, no missing data*²⁹

2. Base financing (2005-)

Source: the distribution of funds between R&D institutions is available at the homepage of MER.

Data available: 2005-2006, no missing data

3. Infrastructure costs of public research institutes and state research institutes on the governance area of MER (1996-2007)

Source: 2003-2007: the distribution of funds between public R&D institutions and R&D institutions at the governance area of MER are available at the homepage of MER. 1996: Eesti Teadusfond (1996b). For other years, only the aggregate data is available, that originates from the budget of the MER.

Data available: 1996 and 2003-2007 by institutions, 1997-2002 only aggregate data.

4. National programme “Language Technology Support of the Estonian Language” (2006-2010)

Source: The distribution of funds between beneficiaries and projects is available at the homepage of MER. Minister’s Regulation from 26.09.06 no 784 concerning the Funding from the budget of the project ‘Language Technology Support of the Estonian Language’.

Data available: 2006, no missing data

5. National programme “Estonian Language and the National Memory” (2004-2008)

The distribution of funds between beneficiaries and projects is available at the homepage of MER.

Data available: 2004-2006, no missing data

6. National programme “Estonian Language and the National Culture” (1999-2003)

The distribution of funds between beneficiaries has been obtained directly from the MER.

Data available: 1993-2003, no missing data

7. Centres of Excellence (2001-2007)

The distribution by the centres of excellence has been obtained directly from MER.

Data available: 2001-2007, no missing data

8. State order of schooling (1996-)

The information available in the homepage of MER includes the number of student vacancies financed by disciplines, and study levels (bachelor, master, doctor). The total funding levels by universities or disciplines are not published, but can be probably obtained from MER or calculated from the number of student vacancies financed.

Data available: 1996-2006, no missing data

9. PhD Scheme (1998-2004)

That scheme was part of the targeted research funding. Data for 1998-2004 has been obtained directly from MER.

Data available: 1998-2004, no missing data

²⁹ If not stated otherwise, the data on funding flows is available by beneficiaries. „No missing data “ means that the data is available for all years till 2005, i.e. the availability since 2006 is not important.

10. PhD Stipends and Educational Grants (1993-2003; 2004-)

The aggregate data for PhD educational grants has been obtained for 2004-2006 directly from the MER. The data for individual universities has been obtained directly from the following universities: University of Tartu (2000-2006 was calculated as follows: the number of PhD students in state-funded positions at Tallinn University \times Annual stipend per PhD student at University of Tartu \times 1.22. The latter coefficient reflects that during 2003-2006, the average annual stipend was in Tallinn University 22% higher than in University of Tartu, for instance because there were smaller percentage of PhD students not receiving the stipends.).

For the other universities, the funding volumes have been calculated as follows: the number of PhD students in state-funded positions at the university \times Annual stipend per PhD student at University of Tartu \times 1.39. The latter coefficient reflects that during 2004-2006, the average annual stipend was in other universities 39% higher than in University of Tartu, for instance because there were smaller percentage of PhD students not receiving the stipends.

Data available: 2000-2006 for University of Tartu, 2003-2006 for Tallinn University, 2004-2006 aggregate data, sums for other universities during 2000-2006 are derived.

11. PHARE National Higher Education and Research Reform Project (1996-1999)

Data is from the following source: Eesti Teadus- ja Arendustegevuse Ülevaade 1996-1999 (2000). The approximate total funding flow is equally divided between 4 years.

Data available: only approximate total funding for 1996-1999 is available, no breakdown by beneficiaries.

Data on funds channelled through ESF:

1. ESF grants (1991-2005)

2001-2005: the data by the beneficiaries is available at the homepage of ESF.

1993-2000: the data has been obtained directly from the ESF.

The allocation of funding between projects is available for the projects that started since 2002. The allocation between scientific fields is available since 2000.

Data available: 1993-2005, missing data for 1991-1992.

2. ESF Post-doctoral research grants (2005-)

2005: the data by the beneficiaries is available at the homepage of ESF.

Data available: 2005, no missing data.

3. ESF Targeted grants (1991-1995)

1995: the aggregate sum is taken from Eesti Teadusfond (1996a). For 1992-2004 and 2006: the aggregate funding is derived from total ESF funding and the proportion assigned to targeted grants.

Data available: 1992-1996, missing data for 1991.

4. ESF base-line funding (1993-1997)

1996-1997: The numbers have been obtained from the archive of ESF.

1995: the numbers are taken from Eesti Teadusfond (1996a).

1993-1994: the numbers have been calculated based on following sources: 1) Eesti Teadusfond (1996a). 2) Eesti Teaduste Akadeemia aastaaruanne 1993 (1994), Eesti Teaduste Akadeemia aastaaruanne 1994 (1995).

Data available: 1993-1997, aggregate data for 1992, missing data for 1991.

5. PARROT (2003-2005)

2003: The sums are derived from the amount applied by the applicant, assuming that the actual funding is for all institutions the same proportion of the applied funding

2004: The sums are derived from the proportions of institutions in 2003

2005: Actual funding is derived from aggregate numbers and proportion of assigned funds.

Data available: 2003-2005, no missing data.

6. US travel grants (2003-2004)

2003-2004: the funding amounts by individual grants are available in the annual reports of ESF (www.esf.ee)

Data available: 2003-2004, no missing data.

Data on funds channelled through Estonian Academy of Sciences.

1. Research professors (2002-)

2002-2006: the Estonian Academy of Science Yearbooks published since 2001 in the home page of the Estonian Academy of Sciences.

Data available: 2002-2006, no missing data.

2. EAS scholarships (1996-2001)

1996-2001: the Estonian Academy of Science Yearbooks.

Data available: 1996-2001, no missing data.

Data on funds channelled through Archimedes Foundation

Mobility programmes (2003-)

The following programmes are included:

- scholarships of Kristjan Jaak to finance the studies of graduate students in abroad for up to 1 year (Kristjan Jaagu tasemeõpe, 1 aasta välismaal), 2004-;
- scholarships of Kristjan Jaak to finance short-term studies of graduate students in abroad for 1 semester (Kristjan Jaagu osaline õpe, 1 semester välismaal), 2003-;
- scholarships of Kristjan Jaak to finance short-term missions of graduate students and instructors to abroad for up to 3 weeks (Kristjan Jaagu välissõit, kuni 3 nädalat välismaal), 2003-;
- Scholarships for PhD studies for non-resident students (Eestis täisajaga õppivad välisdoktorandid, Külalisdoktorandid), 2006-.

Among the mobility schemes, we have excluded the funding of Estonian students' full-length PhD studies in foreign universities (Riiklik koolitustellimus välismaal - doktorantuur välismaal riigi raha eest) as that can be considered rather the funding of foreign, not Estonian universities.

All the data has been obtained directly from the Archimedes Foundation. Only stipends to PhD students and university instructors have been included; the stipends to master students have been excluded. Total amount for academic year is allocated equally between 2 years (e.g. concerning the sum of academic year 2004/2005, 50% of it is assigned to 2004 and 50% to 2005).

Data available: 2003-2006, no missing data.

Data on funds channelled through Foundation Innove

1. Programme "Educational System Supporting the Flexibility and Employability of the Labour Force and Providing Opportunities of Lifelong Learning for All".

2. Programme "Modernisation of Infrastructure for Vocational and Higher Education".

Only the funding to universities for research and PhD studies (e.g. the funding of doctoral schools) has been included. Total sum has been divided over the years 2005-2008 as follows: 1/6 for 2005, 1/3 for 2006, 1/3 for 2007, and 1/6 for 2008.

Data available: 2004-2006, no missing data.

Estonian Rectors' Conference: Projects of Estonian Rectors' Conference (2004-2006; 1-2 projects will be funded also after 2006)

Data has been obtained directly from the Ministry of Education and Research.

Data available: 2004-2006, no missing data.

Wellcome Trust: Wellcome Trust Grants (2000-)

Data is available by projects from the homepage of The Wellcome Trust (<http://www.wellcome.ac.uk/>). Estonian reserachers received funding from the following programmes: History of Medicine Travel Grants, Senior Central European Research Fellow, Symposia. The total funding of projects is equally

divided over the years of their duration.

Data available: 2000-2006, no missing data.

Open Estonia Foundation (1990-)

The data has been received directly from Open Estonia Foundation, but some of it is available also in the web-page of Open Estonia Foundation (www.oef.org.ee). Only the grants to research and development institutions have been included. The grants have been assigned within the following programmes: European Program (Euroopa Programm), East-East (Ida-Ida Programm), Good Governance (Hea valitsemine), Women's Program (Võrdõiguslikkuse programm). For the purpose of analysis, the funds have been divided into two instruments, "OEF grants" and "OEF base-line funding".

Data available: 1995-2006, no data available before 1995.

European Commission: Framework Programmes

- 3rd and 4th FP: data by beneficiaries have been taken from INNOVAATIKA 71-72 (104-105), 2007. The total sum for 1994-1998 is equally divided between years. These numbers do not include the funding received from the last round of FP 4 in 1997 (about 1 million ECU), that is added separately to database with no breakdown by beneficiaries.
- 5th FP: aggregate data is taken from INNOVAATIKA 71-72 (104-105). The total sum for 1998-2002 is equally divided between years. No breakdown by beneficiaries.
- 6th FP: data is from the statistical annexes of the annual reports on research and technological development activities of the European Union (http://ec.europa.eu/research/reports/index_en.html). Data is broken down by 4 categories: higher education, industry, research institutes, other.
- By assuming that the average duration of funded projects is 3 years, we have divided all funding flows over 3 years (e.g. in case of contracts signed in 2005, 1/3 for 2005, 1/3 for 2006, 1/3 for 2007).

Data available: 1993-2006, data by beneficiaries is available only for FP 3 and 4.

International Science Foundation: 2-year research projects (1994-1995)

The approximate total funding flow is available from Eesti Teadusfond (1996b). Total funding for 1994-1995 is equally divided between 2 years.

Data available: 1994-2005, only total funding.

Data on funds channelled through MEAC

Enterprise Estonia

1. R&D Financing Programme

As the aim of the programme is to finance feasibility studies, applied research, or product development projects of firms and research organisations (see also Table 5 in Appendix 1), the financing volumes were included in full amounts.

R&D institutions (in the register): source in all years MEAC

Industry:

2004-2006: source EE homepage, funding volumes available by beneficiaries

2001-2003: total funding volumes of the programme were obtained from the state control report³⁰ (2004: 6) and the volumes of research institutions were subtracted, data are indivisible between beneficiaries.

Data available: 2001-2006, no missing data

2. SPINNO Projects

As the aim of the programme was to create a favourable business environment; to develop the ability to respond more effectively to the needs of businesses and society; and to increase the revenues received from the implementation of knowledge and research and development results in R&D institutions and institutions of professional higher education, the funding volumes were included in full amounts (although the programme is more development oriented than research oriented) (see also Table 3 in Appendix 1).

³⁰ EV Riigikontrolli Kontrollaruanne Nr 2-5/04/109, 11.10.2004 „ Ettevõtlike Arendamise Sihtasutuse toetatud tootearendusprojektide tulemused”, Tallinn, 2004.

2002: source MEAC

2003-2006: sources EE homepage, MEAC

Note: Typically the projects last for more than one year, therefore total volume of financing for the project period is divided proportionally to the full project months. In period of 2002-2004, the actual project duration is considered, however, the projects that started in 2005 and have not ended yet, the 01.07.2007 is considered to be the end date of the project as this was stated as the final deadline in the government regulation.³¹

Data available: 2002-2006, no missing data

3. Centres of Excellence Projects

The aim of the programme was to assemble the top level research potential into large, competitive units thereby supporting the relation between various disciplines and realization of bigger, strategically-oriented research projects; ensure the presence of high-potential researchers which enables the capacity to be increased in enterprises which are essential for economic and social development; create better preconditions for the participation of Estonian R&D enterprises and entrepreneurs in the international R&D cooperation (see also Table 1 in Appendix 1). As it is directly targeted for supporting research activities, the funding volumes were included in full amounts.

As typically the projects last for more than one year, total volume of financing for the project period is divided proportionally to the full project months. The financing volume is based on the financing decision by EE for the period of 2005-2007, therefore the financing until 30.06.2007 is considered³².

Data available: 2005-2007, no missing data

4. R&D Infrastructure Development Programme

The general objective of the programme was to increase the capability of research, and development activities and innovation in Estonia by developing an internationally competitive research and development infrastructure system providing comprehensive support to higher education, research and development activities and innovation in strong and strategically important areas of research and development. The programme was motivated by the rather poor situation of research infrastructure in Estonian R&D institutions (see Table 4 in Appendix 1). Therefore full funding volumes were included.

2005: source MEAC

2006: source EE

As typically the projects lasted longer than one year, the total volume of financing for the project period is divided proportionally to the full project months. The financing volume is based on the financing decision by EE for the period of 2006-2008, therefore the financing until 30.06.2008 (deadline by the regulation) is considered.³³

Data available: 2006-2008, no missing data

5. Competence Centre Programme

The aim of the program is the facilitation and concentration of R&D in a specific field of technology or on the basis of different fields; enhancement of mid-term R&D planning and management capabilities

³¹ Conditions of the part "Spinno Programme" of measure No 2.3 "Promotion of Research and Development Activities and Innovation" of the "Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004 - 2006" The regulation is established pursuant to subsection 16 (1) of the Structural Assistance Act (RT I 2003, 82, 552). [<http://www.eas.ee/?id=2271>]

³² Ministers regulation no 58 (30.05.2005) Terms and conditions for providing structural support for section "The Centre of Excellence of the Estonian Science Programme" of measure No. 2.3 "Promotion of research and development activities and innovation" of the "Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004-2006. [<http://www.eas.ee/?id=2271>]

³³ Terms and conditions of section "Research and development infrastructure development programme" of measure No. 2.3 "Promotion of research and development activities and innovation" of the "Estonian National Development Plan for the Implementation of the European Union Structural Funds – Single Programme Document for Years 2004-2006" [http://www.eas.ee/vfs/2174/0804_maarus_EN_ED.doc]

in the science and industry sectors; increasing the number of R&D specialists oriented to industry needs and increased mobility between science and industry sectors; increased internationalization of R&D (see Table 2 in Appendix 1). The funding volumes were fully included (again, this is more directed towards development activities).

The funding volume for the first year of activity (2005) has been decided separately. The funding volumes for the rest of the period (2006-2008) are decided as total sums, therefore they are divided proportionally to the full project months; the projects have to be completed until June 30, 2008.³⁴

Data available: 2005-2008, no missing data

ESTAG:

R&D Support: 2001 and 2002 first six months, when the agency operated, are included on financed Product development, applied research and feasibility study grants (although indivisible by beneficiaries). Loans are not included. The data are from Reid, A., Kurik, S. (2003) p. 34.

Data available: 2001 and 2002, no missing data

EITSA:

Data are available for all grants indivisible by programme type (ICT infrastructure support grants for universities, R&D projects, mobility of academic staff and PhD students, support for labs, student grants, grants for software and literature procurement, ICT application projects). Therefore the data include also some programs more connected with teaching activities. However, the share of such programs remains about a third of the financed project volumes. Source: EISTA.

Data available: 2002-2007, no missing data

EIF:

The funding volumes were included in case of registered R&D institutions, because the support was given to the research activities.

Sources: TAN report 1993-1996 (p.8); TAN report 1996-1999 (p.19), R&D Support: up to 50% and R&D Loan up to 75% of the project amount with the interest rate of 8-12%. The loans are not considered (although some data exist on general volumes), because the interest rate has varied across contracts and its precise amount is not known. In addition, there is little information about the conditions by which the loans were returned. The availability of detailed data is complicated because of the merger of EIF to ESTAG and thereafter to EE.

1999: Indivisible by following beneficiaries: University of Tartu, Quattrommed, Estonian Biocentre, Asper. University of Tartu received: 1998: 10.2 mill, 1999: 7.6 mill; 2000: 6.76 mill.

Data available: 1995-2000, missing data: 1990-1992, 2000

Data on funds channelled by other ministries and local governments:

Generally by collecting the data by ministries, the aim was to identify:

- a) The financing volumes (operational costs and investments) for research institutes under ministries;
- b) The contracted research volumes by the ministries (applied research projects etc.)

The data collection process revealed that mostly the ministries do have the data concerning a), but do not collect data on b) and therefore b) is very weakly represented in the database.

MoF (MINISTRY OF FINANCE):

EIC:

Only the funding of the projects carried out by R&D institutions were included mostly applied research projects in the environmental sciences.

Source: Data are included from 2000–2007 based on the information available on the homepage,

³⁴ «Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teadus- ja arendustegevuse ning innovatsiooni edendamise» osa «Tehnoloogia arenduskeskused» tingimused. Majandus- ja kommunikatsiooniministri 25. augusti 2005. a määrus nr 97. [<https://www.riigiteataja.ee/ert/act.jsp?id=935058>]

available by beneficiaries. Only the contracts with research institutions or firms in respective register are included.

Data available: 2000-2007, no missing data.

Direct Contracts: Source: Ministry of Finance

Generally, the research direct research contracts are not available, because the ministry has not collected these data so far..

Data available: 2005 and 2006 are available by beneficiaries, missing data 1992-2004.

MINISTRY OF DEFENCE

Expenditures on research and development (2000-)

Aggregate data for 2000 and 2006 is available from media (Eesti Päevaleht, 14.03.2007). Aggregate data for 2007 is available from the homepage of the Ministry of Defence. For the rest of the years, the data has been derived from the share of defence R&D in total R&D from EUROSTAT.

Data available: aggregate data for 2000-2007.

ESTONIAN MINISTRY OF THE INTERIOR

1. EU Phare Cross-border Co-operation programme in Estonia.

Data is available from the homepage of the Estonian Ministry of the Interior (www.siseministeerium.ee). Data on individual projects is available. Equal allocation of funds across projects duration years assumed. Only projects of R&D institutions (incl. universities) have been included.

Data available: 2001-2006, no missing data.

MoA (MINISTRY OF AGRICULTURE)

Operating expenses are available for 2 institutes (out of five) under ministry. For Estonian Institute of Agrarian Economics are available for 1999-2000, and for Estonian Agrobiocenter for 1996-2000 (Source: MoA). The data are derived from the annual budgets of ministry.

Notes: Estonian Institute of Agricultural Engineering was merged on 01.01.2002 with Estonian Research Institute of Agriculture. Estonian Institute of Agrarian Economics was merged in 01.01.2001 with Jäneda Teaching and Consulting Centre (not official translation of Jäneda Öppe- ja Nõuandekeskus).

Data available: partially for 1996-2000, missing data 1992-1995; 2001-2007

Direct research contracts: Generally, the research projects ordered by ministry are not available, because the ministry has not collected these data so far.

Data are available for 2 institutes for 1996-2007 missing data 1992-1995. (Source: MoA)

Data on national programmes:

National Programme "Preservation of genetic resource" for 2 institutes is available for 2002-2007. These data are included, because are given to the R&D institutes for certain assignment, however these funds are weakly related to the research activities.

National Programme "Applied Studies and Development Activities in Agriculture" is available for 2006-2007 (2 institutes), *missing data 2004-2005*. These data are included in full amounts, because are directly related to the applied research projects.

MoC (MINISTRY OF CULTURE)

Data on 2003-2007 of financing **infrastructure costs and investments** of Estonian National Museum and Võru Institute are based on the annual budget of the ministry. (Source: MoC)

Missing data: Võru Institute 1995-2002, Estonian National Museum 1992-2002, data on purchased studies from behalf of the ministry. Generally, the research projects ordered by ministry are not available, because the ministry has not collected these data so far.

MoS (MINISTRY OF SOCIAL AFFAIRS)

Data on 1999–2005 of **infrastructure costs** of Estonian Institute of Cardiology; Institute of Experimental and Clinical Medicine and National Institute of Health Development (it was created in 2003, before there were two centres Rahvatervise ja Sotsiaalkoolituse Keskus and Tervisekasvatuse Keskus) are based on the annual budget of the ministry. *Missing data 1992-1998*. The data are based on the annual budget of the ministry.

Direct research contracts purchased by the ministry (MoS) or other institutions (other ministries, state agencies etc) available only for National Institute of Health Development in 2005-2007 and for 2006, the research purchased by MoS (beneficiaries cannot be separated).

Missing data: 1992-2005 (except for National Institute for Health Development in 2005-2007). Generally, the research projects ordered by ministry are not available, because the ministry has not collected these data so far.

Local governments

In the Electronic Database of Estonian Statistical Office, the expenses of **local governments** on education are shown and these are indivisible for higher education and research, however, since it is not the direct responsibility of local governments, the volume of such funds remains incremental.

7 References

«Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teadus- ja arendustegevuse ning innovatsiooni edendamise» osa «Teadus- ja arendustegevuse infrastruktuuri arendamise programm» tingimused. Majandus- ja kommunikatsiooniministri 18. märtsi 2005. a määrus nr 34. [In Estonian: <http://www.eas.ee/?id=2101>] Terms and conditions of section «Research and development infrastructure development programme» of measure No. 2.3 «Promotion of research and development activities and innovation» of the «Estonian National Development Plan for the Implementation of the EU Structural Funds in Estonia – Single Programming Document 2004–2006». Regulation of the Minister for Economic Affairs and Communications, March 18, 2005. No. 34. [In English: <http://www.eas.ee/?id=2156>]

«Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teaduse tippkeskuste programm - ja arendustegevuse ning innovatsiooni edendamise» osa «Teaduse tippkeskuste programm» tingimused. [In Estonian: <http://www.eas.ee/?id=2271>] Majandus- ja kommunikatsiooniministri 30. mai 2005. a määrus nr 58. Terms and conditions for providing structural support for section “The Centre of Excellence of the Estonian Science Programme” of measure No. 2.3 “Promotion of research and development activities and innovation” of the “Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004-2006. Regulation of the Minister for Economic Affairs and Communications, 30.05.2005 no 58 [In English: <http://www.eas.ee/?id=2271>]

«Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teadus- ja arendustegevuse ning innovatsiooni edendamise» osa «Teadus- ja arendustegevuse projektide toetamine» tingimused. Majandus- ja kommunikatsiooniministri 9. mai 2005. a määrus nr 51. Terms and conditions for providing structural support for section “R&D Financing Programme” of measure No. 2.3 “Promotion of research and development activities and innovation” of the “Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004-2006. Regulation of the Minister for Economic Affairs and Communications, 09.05.2005 no 58 [In Estonian: <http://www.eas.ee/?id=2271>]

«Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teadus- ja arendustegevuse ning innovatsiooni edendamise» osa «Tehnoloogia arenduskeskused» tingimused. Majandus- ja kommunikatsiooniministri 25. augusti 2005. a määrus nr 97. Terms and conditions for providing structural support for section “Competence Centre Programme” of measure No. 2.3 “Promotion of research and development activities and innovation” of the “Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004-2006. Regulation of the Minister for Economic Affairs and Communications, 25.08.2005 no 97 [In Estonian: <https://www.riigiteataja.ee/ert/act.jsp?id=935058>]

«Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtne programmdokument aastateks 2004–2006» meetme nr 2.3 «Teadus- ja arendustegevuse ning innovatsiooni edendamise» osa «Spinno programm» tingimused. Majandus- ja kommunikatsiooniministri 13. mai 2004. a määrus nr 122. Conditions of the part “Spinno Programme” of measure No 2.3 “Promotion of Research and Development Activities and Innovation” of the “Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document for 2004 - 2006”. Regulation of the Minister for Economic Affairs and Communications, 13.05.2004 no 122. [In Estonian and English: <http://www.eas.ee/?id=912>]

Eesti keele keeletehnoloogiline tugi (2006-1010). Riiklik programm. (2006). <http://www.hm.ee/index.php?popup=download&id=4964>

Eesti riikliku arengukava Euroopa Liidu struktuurifondide kasutuselevõtuks – ühtse programmdokumendi 2004-2006 seirearuanne prioriteedi tasandil. Seirearuanne nr. PR 2/2005/4, 01.01.2004-31.12.2005. [<http://www.mkm.ee/index.php?otsi=seirearuanne>]

Eesti Teadusfond (1996a). Baasfinantseeritavate teadusasutuste 1995.a. teadustegevuse koondaruanne. Tallinn: Eesti Teadusfond.

- Eesti Teadusfond (1996b). Ülevaade Eesti Teadusfondi tegevusest 1990-96. Tallinn: Eesti Teadusfond
- Eesti Teaduste Akadeemia aastaaruanne 1993 (1994) Tallinn: Eesti teaduste Akadeemia.
- Eesti Teaduste Akadeemia aastaaruanne 1994 (1995) Tallinn: Eesti teaduste Akadeemia.
- Estonian Academy of Sciences Yearbook Annales Academiae Scientiarum Estonicae XI (38) 2005. Estonian Academy of Sciences, Tallinn, 2006, 163 pp. [http://www.akadeemia.ee/_repository/File/PUBLIKATSIOONID/YearBook2005.pdf]
- Estonian National Development Plan for the Implementation of the EU Structural Funds in Estonia – Single Programming Document 2004–2006. [in English: <http://www.struktuurifondid.ee/?id=1984>]
- Euroopa Liidu Struktuurifondid [<http://www.struktuurifondid.ee/>]
- European Commission. European TrendChart on Innovation. Annual Innovation Policy Trends and Appraisal Report Estonia 2004-2005. Available at http://trendchart.cordis.lu/reports/documents/Country_Report_Estonia_2005.pdf
- Eurostat (2007). Science, Technology and Innovation in Europe, Luxembourg, Office for Official Publications of the European Communities.
- Governments' regulation from 15.06.2006. No.56 "Teaduskompetentsi Nõukogu moodustamine ja koosseisu kinnitamine". [<https://www.riigiteataja.ee/ert/act.jsp?id=1039807>]
- Governments' regulation from 25.03.2005 no 162 "Teaduspoliitika komisjoni moodustamine ja selle koosseisu kinnitamine" [<https://www.riigiteataja.ee/ert/act.jsp?id=1039974>]
- Governments' regulation from 7.12.2004 no 854 "Teadus- ja Arendusnõukogu koosseisu kinnitamine" [<https://www.riigiteataja.ee/ert/act.jsp?id=824510&replstring=33>]
- Heinaru, A. (2000). Teadus- ja arendustegevuse seadusandlusest Eestis. Teadus- ja arendustegevus 2000, Statistikaamet, lk. 30-33.
- Humanitaar- ja loodusteaduslikud kogud (2004-2008). Riiklik programm valdkonna arengukava eesmärkidega aastateks 2004-2008. (2003) <https://www.riigiteataja.ee/ert/act.jsp?id=691345>
- INNOVAATIKA 71-72 (2007). Sihtasutus ARCHIMEDES.
- Interview with Ms. Tea Danilov, Deputy Head of the Department of Economic Development, Ministry of Economic Affairs and Communications, 7th of December 2007.
- Juhend ja vormid grandi taotlemiseks 2006. aastaks. (2005). Eesti Teadusfond [In Estonian: http://www.etf.ee/files/13/Juhend_2006_.pdf]
- Järel doktorite grandi taotlemise eeskirjad. Kinnitatud SA Eesti Teadusfond nõukogu poolt 17. aprillil 2006 protokoll nr. 55. http://www.etf.ee/files/9/JD_2007.pdf
- Knowledge-based Estonia. Estonian Research and Development Strategy 2002-2006. (2002). Tallinn. [www.akadeemia.ee/_repository/File/ALUSDOKUD/Knowledge-basedEstonia.pdf]
- Kristapsons, J., Martinson, H., Dageyte, I. (2003), "Baltic R and D systems in transition". Riga: Zinatne.
- Kurik, S., Lumiste, R., Terk, E. and A. Heinlo (2002), "Innovation in Estonian Enterprises", Enterprise Estonia, Innovation Studies 2, 99 pp.
- Lepori, B., van den Besselaar, P., Dinges M., van der Meulen, B., Potì, B., Reale, E., Slipersaeter, S., Theves, J. (2007a), "Indicators for Comparative Analysis of Public Project Funding", Research Evaluation, 16 (4), 243-255.
- Lepori, B., van den Besselaar, P., Dinges, M., Potì, B., Reale, E., Slipersaeter, S., Theves, J., van der Meulen B. (2007b), "Comparing the evolution of national research policies: what patterns of change?", Science and Public Policy, Vol. 34, Number 6, pp. 372-388.
- Lepori, B. (2006), "Public research funding and reserach policy: a long-term analysis for the Swiss case", Science and Public Policy, Vol. 33, No. 3, pp. 205-216.
- Martinson, H. (1995), "The reform of R&D system in Estonia". Tallinn: Estonian Science Foundation.
- Nedeva, M, Georghiu, L. (2003), "Assessment of Estonian R&D and Innovation Funding System", PREST, The Victoria University of Manchester, UK, 64 pp.

OST (2006). Key Figures on Science and Technology. Paris: OST.

Purju, A., Pädam, S., Müür, M., Vanags, A., Alasheyeva, J., Kalnins, V., Vitola, K., Chandler, M., Kvedraras, V. (2005), „Research policy linkages in the Baltic States: comparative analysis of a natural experiment“. Baltic International Centre for Economic Policy Studies, final report.

Reid, A., Kurik, S., (2003). Optimising the Design and Delivery of Innovation Policy in Estonia: an Evaluation of Policy Instruments for Intensifying Business Innovation, Final report, Ministry of Economic Affairs and Communications, Innovation Studies 4.

Reid, A., Walendowski, J. (2006), “Evaluation of the design and implementation of Estonian RTDI policy: implications for policy planning. Final report”, Technopolis Consulting Group Belgium SPRL, Innovation Studies 6.

Riiklik programm „Eesti keel ja rahvuslik mälu (2004-2008)“. (2003). Haridus- ja teadusminister Toivo Maimets. <http://www.hm.ee/index.php?popup=download&id=4246>

Riiklik programm „Põllumajanduslikud rakendusuringud ja arendustegevus aastatel 2004-2008“. (2004). Kinnitatud Vabariigi Valitsuse 21.12.2004. korraldusega nr. 885. <http://www.agri.ee/index.php/15501/>

Strategy of Estonian Government “Eesti edu 2014” [<http://www.riigikantselei.ee/failid/EE2014.doc.pdf>]

Structural Assistance Act. Passed 10.12.2003, entered into force 1.01.2004 [In English: <http://www.struktuurifondid.ee/?id=3268>]

Teadmistepõhine Eesti 2007-2013 (TE II) Eesti teadus- ja arendustegevuse ning innovatsiooni strateegia. Tööversioon 30. mai. 2006. [In Estonian: www.hm.ee/index.php?popup=download&id=4808]

Teadus- ja arendusasutuste baasfinantseerimise määramise tingimused ja kord. Haridus- ja teadusministri 21. märtsi 2005. a määrus nr 11. [<http://www.riigiteataja.ee/ert/act.jsp?id=870516>]

Teadus- ja arendusasutuste teadusteemade sihtfinantseerimise tingimused ja kord. Haridus- ja teadusministri 9.04.2002 määrus nr. 31, jõustus 20.04.2002. <https://www.riigiteataja.ee/ert/act.jsp?id=1052474>.

Teadus- ja arendustegevuse finantseerimise programm. Metoodika raporti tööversioon. Aprill 2006. (Research and development financing programme. The preliminary version of the methodology report. April 2006, mimeo.)

Teaduse sihtfinantseerimise riskid. Kontrollaruanne. (2003) Tallinn: Riigikontroll.

Teaduskomptentsi Nõukogu tegevuse aruanne 2003-2006 (2006). Haridus- ja Teadusministeerium. <http://www.hm.ee/index.php?045153>

Tiits, M., Kattel, R., Kalvet, T., Kaarli, R. (2003), “Overview of Research, Technology Development and Innovation (RTDI) Policy in Estonia”. Tallinn: Ministry of Economic Affairs and Communications.

8 APPENDICES

8.1 APPENDIX 1 Detailed Description of Instruments of MEAC

Table 1 Centre of Excellences Program

Name of programme	Centre of Excellences Programme
Origin of funds	EU structural funds, state budget
Type of funding	Project funding
Managing organization/ responsible ministry	Enterprise Estonia/MEAC, MER
Field of application / purpose	Assemble the top level research potential into large, competitive units thereby supporting the relation between various disciplines and realization of bigger, strategically-oriented research projects; ensure the presence of high-potential researchers which enables the capacity to be increased in enterprises which are essential for economic and social development; create better preconditions for the participation of Estonian R&D enterprises and entrepreneurs in the international R&D cooperation.
Eligibility criteria	Public and private research organizations. The international recognition of the research group is assumed (by the application, the approval from the Centre of Excellence Competition by Ministry of Education and Research in 2000 and 2001 has to be presented). The list of Centres of Excellence is established by the Minister of Education and Research (by the results of the competition).
Project selection criteria	1. The output of the project (40% of the overall grade); 2. Quality of the project (30% of the overall grade); 3. The applicant's capability of achieving the established aims (30% of the overall grade).
Decision making procedure	The first calls were made outside this program by MER and only after acceptance the applicant has the right to apply for the current program. The selection is made by the panel of international and national academic experts.
Duration of financing	The period of funding is project-specific and stage-based, whereby the stage duration and proportion of financing is decided by negotiations between beneficiary and Enterprise Estonia. However, the projects have to be completed until June 30, 2007.
Budget of funding mechanism, 2005, Mio. of EUR	0.588

Table 2 Competence Centres Programme

Name of programme	Competence Centres Programme
Origin of funds	EU structural funds, state budget, private funding (co-funding is required)
Type of funding	Project funding
Managing organization/ responsible ministry	Enterprise Estonia/MEAC
Field of application / purpose	Facilitation and concentration of R&D in a specific field of technology or on the basis of different fields; enhancement of mid-term R&D planning and management capabilities in the science and industry sectors; increasing the number of R&D specialists oriented to industry needs and increased mobility between science and industry sectors; increased internationalization of R&D.
Eligibility criteria	Public and private research organizations, firms, non-profit associations, foundations. The consortium has to include at least one science partner registered in Estonia and three industry partners registered in Estonia during the application procedure and co-financing of the state. For at least half of the R&D projects implemented within the program, it is necessary to involve at least one science partner and two industry partners registered in Estonia.
Project selection criteria	1. The research plan (50% of the overall grade); 2. The financing plan (25% of the overall grade); 3. Prior activities as a Competence Centre (25% of the overall grade).
Decision making procedure	The staff of Enterprise Estonia is evaluating the potential projects from the aspect of project management; international panel of experts from academia and industry is evaluating the projects' research aspects.
Duration of financing	The period of funding is project-specific. However, the projects have to be completed until June 30, 2008.
Budget of funding mechanism, 2005, Mio. of EUR	3.790

Table 3 The SPINNO Programme

Name of programme	The SPINNO Programme
Origin of funds	EU structural funds, state budget
Type of funding	Project funding
Managing organization/ responsible ministry	Enterprise Estonia/MEAC
Field of application / purpose	In R&D institutions and institutions of professional higher education to create a favourable business environment; to develop the ability to respond more effectively to the needs of businesses and society; and to increase the revenues received from the implementation of knowledge and research and development results.
Eligibility criteria	Public research organisations.
Project selection criteria	<ol style="list-style-type: none"> 1. Project output (15%): 2. Quality of the project (20%): 3. Sustainability of the project (20%): 4. Applicant's capability to achieve the objectives set (20%); 5. Ratio of costs to total net gain (25%).
Decision making procedure	The applications were called in two subsequent calls, in first round the deadline was 15.06.2004, when the pre-applications were presented and the second round with the deadline of 15.09.2004, the full applications were handed in. The possibility to give in the full application was only open to those applicants, whose pre-application was evaluated to be satisfactory. Pre-applications have been processed by 2 months and full applications by 3 months,
Duration of financing	The period of funding is project-specific and stage-based, whereby the stage duration and proportion of financing is decided by negotiations between beneficiary and Enterprise Estonia. However, the projects have to be completed until July 1, 2007.
Budget of funding mechanism, 2005, Mio. of EUR	3.858 (funds of accepted projects for 04-06)

Table 4 R&D Infrastructure Development Programme

Name of programme	R&D Infrastructure Development Programme
Origin of funds	EU structural funds, state budget
Type of funding	Project funding
Managing organization/ responsible ministry	Enterprise Estonia/MEAC
Field of application / purpose	The general objective of the programme is to increase the capability of research, and development activities and innovation in Estonia. This is by developing an internationally competitive research and development infrastructure system providing comprehensive support to higher education, research and development activities and innovation in strong and strategically important areas of research and development. The programme was motivated by the rather poor situation of research infrastructure in Estonian R&D institutions.
Eligibility criteria	Public research organisations
Project selection criteria	<p>Preliminary application: 1. The quality of the strategic planning of the applicant's R&D activities and the impact of the project on achieving the strategic objectives (30%);</p> <p>The level of R&D related cooperation (10%);</p> <p>The scientific and technological competence of the applicants (35%);</p> <p>The impact of R&D activities on PhD studies and innovation (25%)</p> <p>Full application: The quality of the R&D programme(s) the project is based on, incl. taking into consideration the recommendations given in the decision to grant the preliminary application or the reasons for not accepting the recommendations. The technical preparation quality of the application (incl. budget).</p>
Decision making procedure	EAS treats the proposals submitted to the programme, makes the decision about the approval, disapproval or partial approval of the proposal, and make the proposition to the pay-office for the disbursement.
Duration of financing	The period of funding is project-specific. However, the funding is provided for the subsidised project until 30 June 2008.
Budget of funding mechanism, 2005, Mio. of EUR	14.59 (funds of accepted projects for 06-08)

Table 5 R&D Financing Programme

Name of programme	R&D Financing Programme
Origin of funds	EU structural funds, state budget
Type of funding	Project funding
Managing organization/ responsible ministry	Enterprise Estonia/MEAC
Field of application / purpose	<p>To finance feasibility studies, applied research, or product development projects of firms and research organisations. The motivation of the program is threefold:</p> <ol style="list-style-type: none"> 1. R&D Financing Programme provides opportunities to launch new or improved products and services; 2. The programme creates premises for the advancement of business competitiveness by introducing new and improved products and services to the market and implementing new technologies; 3. The Government participates by offering financial support through the programme and sharing in the technological and marketing risks related to the projects.
Eligibility criteria	Public and private research organizations, firms.
Project selection criteria	<p>A. Applied research and product development project of a company: product and technology (20%), organization and management (20%), market (20%), financing (20%), economic impact of the project (20%).</p> <p>B. Applied research project of a R&D institution: product and technology (25%); organization and management (25%); Financing (25%); Economic impact of the project (25%);</p> <p>C. Feasibility study project of a company: The problem specification, aim and plan of action (40%); The qualification and experience of the project team (30%); Availability of required funds for self-financing (30%);</p> <p>D. Feasibility study project of a R&D institution: The problem specification, aim and plan of action (40%); the qualification and experience of the project team (30%); orientation towards co-operation and economic impacts (30%).</p>
Decision making procedure	The staffs of Enterprise Estonia are evaluating the potential projects from the aspect of project management; international panel of experts from academia and industry is evaluating the projects' research aspects.
Duration of financing	The period of funding is project-specific and stage-based, whereby the stage duration and proportion of financing is decided by negotiations between beneficiary and Enterprise Estonia. For applied research projects and for feasibility study of product development the minimum duration of 1 month is foreseen. For applied research projects and for feasibility study of product development maximal duration of 6 months is foreseen. Applied research and product development projects for companies and applied research projects in R&D institutions have to be completed by the 30.06.2008.
Budget, 2005, Mio. of EUR	8.105

8.2 APPENDIX 2 Detailed Descriptions of Instruments of MER

Table 1 Targeted financing

Name of programme	Targeted financing
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	MER, SCC
Field of application / purpose	Provision of long-term financing to research groups
Eligibility criteria	Positive evaluation of the R&D institution At least 5 principal investigators per project Presence of high-level publications
Project selection criteria	1) scientific relevance of the topic; 2) the qualification of principal investigators; 3) relevance of the scientific topic for science in general and the Estonian economy and culture, 4) the conditions of the research environment
Decision making procedure	Evaluation of applications by national and international experts, SCC makes the proposals for funding to minister for education and research
Duration of financing	Up to 6 years (till 2004 up to 5 years)
Budget of funding mechanism, 2005, Mio. of EUR	14.7

Table 2 Base financing

Name of programme	Base financing
Origin of funds	State budget
Type of funding	General funding
Managing organization/ responsible ministry	MER, SCC
Field of application / purpose	Realization of strategic research goals, primarily the co-financing of projects, opening of new fields
Allocation criteria	The R&D institution's R&D activities have received positive evaluation
Project selection criteria	95 %: number of ISI publications, high-level monographs, patents, past revenues, PhD thesis defences; 5 % to national sciences
Decision making procedure	Decision of the minister of education and research; R&D council advices on the support of national sciences
Duration of financing	Funding is decided in each year
Budget of funding mechanism, 2005, Mio. of EUR	4.1

Table 3 Infrastructure costs of public research institutes and state research institutes on the governance area of MER

Name of programme	Infrastructure costs
Origin of funds	State budget
Type of funding	General funding
Managing organization/ responsible ministry	MER, SCC
Field of application / purpose	The coverage of infrastructure costs of public and state R&D institutions
Eligibility criteria	Public and state R&D institutions
Allocation criteria	Public R&D institutions: 2/3 proportionally to the budget of the targeted financed research projects and 1/3 proportionally to the institution's infrastructure costs budget in the last year; state R&D institutions: the budget has changed in each year in proportion to the general increase of the budget of the state infrastructure costs in the state budget
Decision making procedure	Decision of the minister of education and research based on the proposal made by SCC
Duration of financing	Funding is decided in each year
Budget of funding mechanism, 2005, Mio. of EUR	4.9

Table 4 National programme “Language Technology Support of the Estonian Language”

Name of programme	Language Technology Support of the Estonian Language
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	MER
Field of application / purpose	Develop specific technology for language support
Eligibility criteria	Public research organisations (e.g., universities, public research institutes), private research organisations, applicants with a certain track record (e.g., previous experience), spin-offs
Allocation criteria	There are no formal selection criteria other than the project should follow the specific tasks of the project (certain linguistic resources and software). The tasks are: 1) to create the following language-technological applications: • automatic speech recognition; • speech synthesis; • grammar checker; • machine-translation programs; • information-search programs; • abstracting and summarizing programs; • interactive language teaching programs; • programs for compiling web-based dictionaries; • an intelligent enquiry system for using dictionaries and linguistic • software as an aid in language learning and translation; 2) to develop the following linguistic resources: • general corpus of Standard Estonian; in order to work out linguistic • software, there is a need for manually tagged test and training corpora; • corpus of spoken Estonian, which is required for working out • speech recognition and telephone-based information systems; • multilingual parallel corpora for the elaboration translation software; • specialized corpora, first of all a dialogue corpus and a syntactically • tagged corpus for the elaboration of communication programs
Decision making procedure	The projects are evaluated by expert panel with academic members and internal staff (regarding project management). Decisions are made by the programme’s managing committee that consists of scientists and the representatives of ministries. The committee’s funding decision is approved by the minister’s order.
Duration of financing	Up to 5 years.
Budget of funding mechanism, 2005, Mio. of EUR	First funding was given in 2006, total budget 0.5 Mio .of EUR.

Table 5 National programme “Estonian Language and the National Memory” (2004-2008)

Name of programme	Estonian Language and the National Memory
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	MER
Field of application / purpose	The programme consists of three modules: 1) Estonian language (preparation of dictionaries, publications on the history on the Estonian formal language, publication of dialects, popularization of the Estonian language); 2) language technology (developing the technological support of the Estonian language); 3) national memory and identity (publication of chrestomathic volumes of national importance). The language technology module was there before the start-up of the national programme “Language Technology Support of the Estonian Language”. The aim is to finance the research infrastructure, not research itself.
Eligibility criteria	The programme’s description does not mention any eligibility criteria, but gives the lists of the institutions that are likely to implement the various modules of the programme. The other allocation criteria are decided by the programme’s managing committee.
Allocation criteria	The programme’s description mentions specific modules of the programme, and within each module, the specific objectives (see above). The other allocation criteria are decided by the programme’s managing committee.
Decision making procedure	Decisions are made by the programme’s managing committee that consists of scientists and the representatives of MER and Ministry of Culture. The committee is approved by the decree of the minister. The committee’s funding decision is approved by the minister’s order.
Duration of financing	Up to 5 years.
Budget of funding mechanism, 2005, Mio. of EUR	0.6

Table 7 Centres of Excellence (2001-2007)

Name of programme	Centres of Excellence
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	MER, SCC
Field of application / purpose	High-level scientific research, promotion of cooperation between research teams and the generation of innovations in order to involve Estonian science in the European research area
Eligibility criteria	Research centres that in 2001 were qualified as potential centres of excellence. Centre of excellence consists of at least 1 high-level research team, has connection to doctoral studies, international recognition in its scientific domain and clearly defined common research goal.
Allocation criteria	<p>According to minister's decree, there are 10 centres of excellence. The criteria are as follows:</p> <ul style="list-style-type: none"> • The results' scientific value and usefulness for the society (); • The available resources for research (human resources, cooperation with other research centres and enterprises, research equipment, funding sources etc.) • Participation in doctoral studies. <p>The amount of funding in each year depends on the sums foreseen for the centres of excellence in the state budget.</p>
Decision making procedure	The election was made in 2 rounds. In the 1 st round SCC made its proposals to MER. In the 2 nd round, the applications were evaluated by international experts and an advisory commission.
Duration of financing	Initially for 5 years (2002-2006), but the funding was prolonged for one extra year (2007), i.e. the total length was 6 years. The new competition was announced in 2007.
Budget of funding mechanism, 2005, Mio. of EUR	0.6

Table 8 PhD Scheme

Name of programme	PhD Scheme
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	MER, SCC
Field of application / purpose	Funding of PhD students' research, funding of costs related to the defence of PhD thesis'
Eligibility criteria	PhD students studying in state funded positions that have not exceeded the nominal length of studies.
Allocation criteria	Applications of all PhD students were satisfied.
Decision making procedure	SCC makes funding proposals to MER, the funding volumes are fixed with the minister's order
Duration of financing	Funding is decided in each year
Budget of funding mechanism, 2005, Mio. of EUR	Last funding was allocated in 2004, 0.9 Mio. Of EUR

8.3 APPENDIX 3 Detailed description of instruments of ESF

Table 1 Grants

Name of programme	ESF grants
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	ESF
Field of application / purpose	Project financing to single researchers or research teams for applied or fundamental research; support of graduate studies, development of international cooperation
Eligibility criteria	<ul style="list-style-type: none"> • Holder of grant: PhD, publications • Principal investigator: academic degree (PhD or MA)
Allocation criteria	The novelty and originality of the research task; the clearness and justification of the research task; the contemporariness of the research method; the availability of equipment and other facilities; the scientific qualification of the principal investigators; the participation of graduate and undergraduate students in the research; the complexity of research; the forecasted importance of the research for science, Estonia, its economy etc..
Decision making procedure	Each application evaluated by two experts (from Estonia or abroad), expert commissions in different scientific fields make funding decisions.
Duration of financing	Up to 4 years
Budget of funding mechanism, 2005, Mio. of EUR	5.4

Table 2 Post-doctoral research grants

Name of programme	Post-doctoral research grants
Origin of funds	State budget
Type of funding	Project funding
Managing organization/ responsible ministry	ESF
Field of application / purpose	Financing of the specified research projects undertaken by young PhD's
Eligibility criteria	Persons, who have received PhD no later than 5 years after the starting date of the applied grant. The PhD degree must have been received from an institution other than the one where the applicant will work during the post-doctoral research grant.
Allocation criteria	Scientific quality and innovativeness of the research project; the competence of the applicant
Decision making procedure	Each application is evaluated by two experts (from Estonia or abroad). Based on the evaluations of experts, an ad hoc commission will make the ranking of the project applications. The final decision is made by the council of ESF.
Duration of financing	2 or 3 years
Budget of funding mechanism, 2005, Mio. of EUR	0.4

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

