

GOVERNMENT BUDGET APPROPRIATIONS OR OUTLAYS FOR R&D BY SOCIO-ECONOMIC OBJECTIVES (GBAORD) – METHODOLOGICAL INTRODUCTION

A. METHODOLOGY

Among main duties of the government in the science and technology area, respective in research and development area, belongs also the role of policy maker, who establishes the strategy of the research and development policy in medium-term period. In the Czech Republic, the national research and development policy is declared in the document *“National research and development (and innovation since 2009) policy of the Czech Republic”*¹. Appropriate indicators of the status and development of investment and human resources in research and development are necessary for the preparation of a draft national policy of research and development and the subsequent allocation of financial support for research, development and innovation. This data is provided by the Czech Statistical Office. GBAORD indicators fall into the group of input indicators (the investment in R&D is monitored), while for example innovations fall into the category of so-called output indicators (specific use of research and development).

The aim of GBAORD (Government Budget Appropriations or Outlays for R&D by Socio-economic Objectives) is to provide data on the government support of R&D funding from public budgets broken down by socio-economic objectives. The GBAORD data helps the member EU countries to decide which R&D fields need to strengthen funding in the forthcoming years.

A.1 Legislative background

Within the European Community, the GBAORD project is organized on obligatory base under **Commission regulation (EC) No 753/2004** of 22 April 2004 implementing Decision No 1608/2003/EC of the European Parliament and of the Council regarding statistics on science and technology. The collecting of GBAORD data is obligatory for the Czech Republic. The principal national regulation on research and development is **ACT No. 130/2002 Coll. on the Support of Research and Development from Public Funds.**

A.2 Methodological sources

Methodological information about the GBAORD project can be found in the international manual *“Proposed standard practice for survey on research and experimental development”* known as **“Frascati manual 2002”**, which was initiated by the OECD. GBAORD data are broken down by socio-economic objectives on the basis of **NABS: Nomenclature for the analysis and comparison of scientific programmes and budgets** (rev. 1992, Eurostat 1994 and rev. 2007, Eurostat 2007).

A.3 Conception of GBAORD

Unlike other statistical surveys carried out in the field of research and development, GBAORD data are based on the analysis and identification of all appropriations spent on research and development (R&D) from public budgets. These government R&D appropriations are broken down by socio-economic objectives. This means that the approach is based on the funder of research and development activities (here the state represented by administration), unlike performance-based approach, which is adopted for example in the R&D survey (VTR5-01). **GBAORD covers only direct financial support. Indirect support of R&D by means of tax-deductible expenditure on R&D is not covered.**

In 2009 a major reform of system of public support of R&D has been launched. The most significant change is the covering of innovation activities into R&D public support. Since 2010 the state budget law defines the budget item “public support of research, development and innovations” instead of “public support of research and development”. GBAORD covers all appropriations or outlays allocated to R&D from public budgets to support research and development, including all contributions to international R&D programmes or institutions abroad. **The support of innovation activities is not classified as GBAORD.** Under definitions provided in the Frascati manual, pre-financing of projects financed by EU structural funds is excluded from GBAORD. The same approach is used for supporting innovation activities. The data are based on final budget appropriations (figures as voted by parliament for the coming year – provisional data) and actual outlays (money paid out during the year – final data). Public budgets cover the central government budget and provincial budgets. The central government is always included and provincial government is included when its contribution is significant. Local government funds are excluded.

GBAORD includes both current costs and capital expenditure. All support provided by repayable loans is excluded from GBAORD.

¹ The document „National Research and Development Policy of the Czech Republic for 2009–2015“, which takes into account the promotion of innovation in accordance with an amendment to the law on supporting research and development from public funds, is available on the following website: <http://www.vyzkum.cz/FrontClanek.aspx?idsekce=631>.

GBAORD also covers general university funds (NABS1992-SEO 10: General research financed by Ministry of Education/ NABS2007-12: General advancement of knowledge: R&D financed from General University Funds), which have been defined using narrow definition in line with the Frascati manual as a sum of money given to universities by the Ministry of Education in support of their overall research activities.²

Codes of socio-economic objectives are distributed according to the purpose or general content of the R&D programme or project, or according to the research objective.

A.4 GBAORD in line with the system of the public support of research and development in the Czech Republic covers the following budget items

Direct public support of research and development in the CR is provided in two basic forms (for more details see ACT No. 130/2002 Coll.):

- **Targeted support** may be provided for a) a grant project, in which the receiver him/herself sets the goals and method of their achievement in basic research as one of a set of grant projects announced by the grantor, b) a programme project, in which the receiver expresses how and under what conditions he/she will contribute to achieving the programme goals; the performance of a programme project may also cover essential basic research activities, provided these lead on to applied research, development or innovation activities, c) specific university research, which is research performed by students as part of accredited doctoral or masters study programmes and which is directly related to their studies, d) major infrastructure.
- **Institutional support** may be provided for a) the long-term conceptual development of research organisations on the basis of an evaluation of the results they have already achieved, b) the international cooperation of the Czech Republic in research and development, performed on the basis of international treaties, including cooperation performed on the basis of legal documents issued therefore, such as 1. fees for the participation of the Czech Republic in international research and development programmes, 2. fees for membership of international research and development organisations, or 3. financial contributions from to support projects for international cooperation in research, development and innovation, provided this financial contribution can be paid from public funds and provided these projects are supported from other state budgets or from the European Union budget or are funded by international organizations, c) operational programmes in research, development and innovation, or the parts thereof that will ensure achievement of the research, development and innovation goals, d) ensuring public tenders in research, development and innovation, as well as issuing public contracts, including costs for project evaluation and monitoring and assessing the results achieved, as well as assessing conditions for the provision of support for specific university research, major infrastructure or international cooperation by the Czech Republic in research, development and innovation, to a maximum amount not exceeding 2.5% of the funds provided by the grantor for research, development and innovation in a given calendar year, with the exception of organisational outgoings paid in accordance with sub-paragraph f), e) material or financial reward for the results of research, development and innovation or financial reward for the promotion or popularisation of research, development and innovation, where the conditions for this reward are set by the Government on the basis of a proposal by the Council for Research, Development and Innovation, f) expenditure related to the activities of the Council for Research, Development and Innovation, the Grant Agency of the Czech Republic, the Technological Agency of the Czech Republic and the Academy of Sciences of the Czech Republic.

Parts of the direct support of public support are following:

- Research projects – Project/targeted funding (included in R&D&I Information System)
- Research intentions – Institutional funding (included in R&D&I Information System)
- Development of research institutions – Institutional funding (included in R&D&I Information System since 2010)
- Specific research at universities – Project/targeted funding (included in R&D&I Information System since 2010)
- Funding to international research programmes and institutions – Institutional funding (included in R&D&I Information System since 2010)
- Other items – Both Project/targeted and Institutional funding (not included in R&D&I Information System)

² In the case of the Czech Republic, the general university funds are not defined. For this reason, SEO 10 in line with the guideline of the Frascati manual covers money given to universities by the Ministry of Education in support of their overall research activities.

A.5 Short definition of terms

- **Research projects** – covers R&D projects (project/targeted funding).
- **Research intentions** – covers R&D intentions (institutional funding).
- **Development of research institutions** – covers an institutional support of research institutions by their achieved results. Development of research institutions will substitute gradually research intentions, which will have be replaced by this type of support by 5 years.
- **Specific research at universities** – covers research performed by students in activities connected with accredited doctoral or master's programmes which is directly linked with the students' education.
- **Funding to international research and development programmes and institutions** – covers fees for participation of the Czech Republic in international programmes of research and development, fees for partnership in international R&D institutions or payments for the cooperation of the Czech Republic in R&D projects if they can be funded from public sources and if they are co-financed by EU or other international institutions.
- **Other items** – covers R&D infrastructure (Academy of Science of the Czech Republic), specific research at universities (funded by Ministry of Defence), administrative costs (Academy of Science of the Czech Republic, Grant Agency of the Czech Republic, Technology Centre of Academy of Science) and other items connected with administration of projects, research intentions and honours.

A.6 Transmission of GBAORD data

GBAORD data is to be send to Eurostat (on obligatory base) and OECD (on voluntary base of membership) twice a year as:

- provisional data,
- final data.

On the above mentioned legal act, Eurostat is provided with provisional GBAORD data (government R&D appropriations in the provisional budget – as approved by the Parliament at the beginning of the budget year) within 6 months of the end of the calendar year, and with final data (government R&D appropriations in the final budget) within 12 months of the end of the calendar year.

Differences between the preliminary and final data i.e. between planned / budgeted and final/ spent amounts are caused by transfers of funds within the budget chapters during the year and between years (transfers to a reserve fund).

Total GBAORD in CZK billion; 2002–2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Planned/budgeted (GBAORD preliminary data)	12,5	13,9	14,7	16,5	18,2	21,5	23,0	24,8	25,4	25,9
Planned/budgeted*	.	.	.	.	.	25,1	23,1	32,4	29,4	28,9
Actually spent (GBAORD final data)	12,3	13,4	14,2	16,4	18,3	20,5	20,5	23,0	22,6	.
Actually spent*	.	.	.	.	.	20,5	20,5	24,1	24,9	.

*) including advancing of the EU programmes

Determining the total GBAORD is based on the expenditure included in the final state accounts for R&D provided by the Ministry of Finance. Ergo actual spent expenditure on R&D is taken into account instead of planned expenditure on R&D.

Planned (budgeted) expenditure on R&D in the last four years was much higher than actually spent at the end of the given reference year. Concerning the pre-financing/advancing of EU structural programmes, the difference between planned and actual spent expenditure is even more remarkable.

A.6 Chapters (main socio-economic objectives) of the 1992 version of the NABS

The classification NABS 1992 define 13 main socioeconomic objectives SEO1, which are divided into more detailed 2nd level SEO2. NABS 1992 classifies 102 partial objectives SEO2.

Two partial 2nd level objectives (SEO05 – Production, distribution and rational utilization of energy and SEO07 – Industrial production and technology) are divided further into 3rd level SEO3.

Code	Main socio-economic objectives (SEO)	Number of sub-objectives SEO2	Number of sub-objectives SEO3
SEO01	Exploration and exploitation of the Earth	8	0
SEO02	Infrastructure and general planning of land-use	8	0
SEO03	Control and care of the environment	11	0
SEO04	Protection and improvement of human health	10	0
SEO05	Production, distribution and rational utilization of energy	8	4
SEO06	Agricultural production and technology	8	0
SEO07	Industrial production and technology	14	10
SEO08	Social structures and relationships	9	0
SEO09	Exploration and exploitation of space	6	0
SEO10	Research financed from General University Funds (GUF)	10	0
SEO11	Non-oriented research	10	0
SEO12	Other civil research	0	0
SEO13	Defence	0	0

NOTE: The complete list of all socioeconomic objectives can be found in the methodology annex. The classification NABS 1992 with detailed description of objectives is available in PDF format on the website of the Czech Statistical Office at http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NABS_1992&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC.

B. GBAORD IN THE CZECH REPUBLIC

In the Czech Republic, the GBAORD project is realized in close cooperation with R&D Council and the Ministry of Education, Youth and Sports through the Information system of research and development and its related databases.

The concept of the GBAORD project takes into account existing legal rules as stated in the Legislative Act No. 130/2002 Coll. on the Support of Research and development and government regulations, especially the Government Regulation No. 267/2002 on the Information System of Research, Development and Innovation³. According to the current law, the R&D Information System administrator is the secretary of the Research and Development Council. The CEP database (Central register of R&D projects) and the CEZ database (Central register of research intentions) are used for the needs of the GBAORD project. Supplementary data are obtained from the department of budget preparing at the R&D Council. EP and CEZ databases do not include all government appropriations on R&D, and that is why detailed information about contributions to international R&D programmes or institutions abroad and the specific university research must be obtained in cooperation with the Ministry of Education. Some data on socioeconomic objective SEO 10 (e.g. general university research broken down by fields of science) are taken directly from universities. Information about returnable loans was taken directly from providers (government departments), which fund R&D activities through their budgets. In the period of 2002–2005, this concerned only two providers. Since 2006 no returnable loans have been identified.

The processing of the GBAORD project and distribution of codes of socio-economic objectives (SEO) by NABS are carried out by employees of the Czech Statistical Office. According to the data in the CEP and CEZ databases and in line with methodological guidelines of the “Frascati manual”, non-R&D appropriations must be excluded from GBAORD. In this case it regards returnable loans (only projects carried out before validation Act no. 130/2002 Coll.) and certain administrative costs. Adjusted data are classified by NABS at 3-digit level of socio-economic objectives. Multi-annual projects are processed by database software and new entered projects by the manual procedure according to a specific classification key based on the structure of the CEP and CEZ database.

Since 2006 there has been a system of sophisticated control tools that further improves the quality of data. Concerning GBAORD data 2006, the complex quality report was set up within the grant project Transition Facility 2004, which was granted by Eurostat. The quality report will be submitted to Eurostat every 2 years in accordance with the new legal act for quality report in R&D statistics.

Since 2006 new formulas for better estimation of preliminary data have been used as well. The methodology of these estimations will be further developed. Eurostat for GBAORD data also publishes its own estimations for every 2 forthcoming years (t+1, t+2).

Since 2007 the revised and much simpler classification NABS 2007 has been used for GBAORD data. Data are published simultaneously according to both the old (detailed) NABS 1992 and the new NABS 2007.

³ For more information about the Information System of R&D&I, see the following website: <http://www.vyzkum.cz/>.

Since 2008 the CZSO has launched activities on linking GBAORD data with other surveys (especially with data from the research and development survey VTR5-01) and with the Business register. Now there is more data available according to additional breakdowns (for example: regions – NUTS3, beneficiaries, type of support), which is published separately on website.

In 2009, the further stage of GBAORD data enlargement based on Eurostat's and OECD's initiative was introduced. It covered the public support for international R&D programmes and institutions, especially 7th Frame programme. The stage also included a pilot coverage of the EU structural funds. The CZSO is actively involved in the process of forming new experimental indicators within the ERA project, which is led by Eurostat in cooperation with other statistical offices. The CZSO prepared pilot data from this project for the reference year 2008.

C. THE DISCREPANCY BETWEEN GBAORD AND GOVERD DATA

Since the statistical task GBAORD is based on the analysis and identification of all sums provided to R&D from the public budget (administrative data sources), differs from data obtained directly from the beneficiaries of this support (R&D survey).

In the Czech Republic, public expenditure on R&D (GOVERD) obtained from the R&D survey is higher than the state budget expenditure on R&D and outlays derived from the statistical task GBAORD. Overestimation of public expenditure on R&D (GOVERD) can also be caused by the following reasons:

- Research and development in the Czech Republic is partly supported by EU Structural Funds. The financial support from these funds is redistributed by state authorities. Reporting units can consider any funds received from government as national public resources for R&D instead of resources from abroad (from European Commission). Public expenditures on R&D from abroad can be underestimated and data obtained from the R&D survey may not correspond to administrative data (GBAORD).
- Universities receive from the state budget support for educational and research activities. It is not excluded that the funds for educational activities may be paid salaries of teachers who are also researchers. Government budget appropriations or outlays for R&D do not need to include the total expenditure on salaries of researchers. In contrast, expenditures on research and development from public funds derived from the R&D survey include total labour costs per R&D employee may therefore be higher than the government budget appropriations or outlays on research and development.
- The data from the R&D survey includes resources from the regional administration.
- The GBAORD data includes fees in international R&D programs and contributions to international R&D institutions.

Total GBAORD and GOVERD in CZK billion; 2002–2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010
GBAORD final data	12,3	13,4	14,2	16,4	18,3	20,5	20,5	23,0	22,6
GOVERD	12,4	13,5	14,7	17,2	19,4	22,4	22,3	24,3	23,5
Difference	-0,1	-0,1	-0,5	-0,8	-1,1	-1,9	-1,8	-1,3	-0,9

D. THE CHANGE OF THE CONCEPTION OF GBAORD(I) STATISTICS IN THE CZECH REPUBLIC

In 2010 the amendment of Act No. 130/2002 Coll. on research and development from public funds came into force. This led to a fundamental change in public support when the promotion of innovative activities was implemented in the public support. Public expenditures on research and development were renamed as public expenditure on research, development and innovations. The corresponding English abbreviation for the new name would be GBAORDI. However, such an indicator has been defined neither by Eurostat nor by the OECD yet. Therefore, the CZSO will attempt to eliminate the public support of innovation activities, when possible, so that the data will match the existing GBAORD definition, as described in Chapter 8 in "Frascati Manual". In the purpose-oriented support it will not be a problem to exclude the promotion of innovations, while in the institutional support, that will not be technically possible as research objectives, concerning research intentions, will gradually cease to exist.

E. METHODOLOGICAL CHANGES OF GBAORD DATA SINCE 2010

In 2011 R&D&I Council provided to Czech Statistical Office very detailed data about beneficiaries of public support on R&D projects. Data are available retrospectively for period 2000–2010. Data at this detailed level was not available for GBAORD processing in the pilot year 2002. To be stressed that GBAORD statistics is primarily focused on providers of public support (state budget chapters).

One or more R&D performers (i.e. beneficiaries of public support) can participate in R&D projects. Data in the last GBAORD publication was broken down according to main beneficiary (the leader/coordinator of the R&D project). Unfortunately creating all combination of socioeconomic objectives and beneficiaries would need a very detailed processing of administrative data, which also influenced the aggregative figures (especially in back-casting of data). For that reason, since 2010, the CZSO has abandoned a legal form of beneficiaries and a region, in where performing R&D activities. Also additional information based on the linkage with Business Register on sectors of beneficiaries and specially detailed data on enterprises has been abandoned. This data will be published separately on the CZSO website (pages dedicated to GBAORD statistics).