

METHODOLOGY

The legislative definition of state budget appropriations on research and development in the Czech Republic

Direct public support for research and development (R&D) is currently the primary tool of the Czech Republic to support the performing of R&D. Research and development is supported by both the targeted (grant projects, operational programs) and institutional form of support (funding of long-term conceptual research institution development and specific university research).

In monitoring of direct public support for R&D is engaged internationally comparable statistics **GBARD (Government Budget Appropriations for R&D by Socio-economic Objectives)**. The aim of this statistics is to ensure data on government support of R&D funding from public budgets broken down by socio-economic objectives. Data from the statistics is used in EU member countries as support for decision-making into which areas of research and development should be invested in the coming years.

GBARD statistics is within the European Union organized on the obligatory basis of a legislative act of **the EU Commission Regulation no. 995/2012** of 26 October 2012 laying down detailed rules for the EP and Council Decision no. 1608/2003 / EC concerning the making and development of Community statistics on science and technology. GBARD data collecting is mandatory for the Czech Republic. For ensuring this statistics is important the national legal Act no. 130/2002 Coll.

The valid methodology related to this statistics is defined in the international manual focused on the collection and reporting of data on research and experimental development known as **Frascati Manual** (revised 2015)¹, which was created by the OECD initiative. Codes of socio-economic objectives can be found in the classification **NABS: Nomenclature for the analysis and comparison of scientific programs and budgets** (rev. 1992 Eurostat 1994, rev. 2007 Eurostat 2007).

The concept of GBARD statistics

The definitions of basic R&D categories are consistent with the widely used international recommendations derived from the Frascati Manual. Detailed definition of R&D, as used in the annual Czech survey on research and development is presented in the publication "Research and Development Indicators" or on the CSO website.

The definition of research and development

The basic definition of R&D is based on § 2 paragraph no. 1 of the Act on public support for research and development (no. 130/2002 Coll.), where R&D is generally defined as systematic creative work carried out to acquire new knowledge and its use. The basic criterion for distinguishing R&D from other (related) activities is the presence of **a valuable element of novelty** and clarification of the research and technical uncertainties. R&D is further distinguished into the following categories:

- **Research** – systematic creative work extending knowledge, including knowledge of man, culture and society, using methods which allow confirmation, supplementation or refutation of acquired knowledge done as:
 - a) **Basic research** – experimental or theoretical work undertaken to acquire knowledge about the basics of observed phenomena to explain their causes and possible impacts when using lessons learned;

¹ Frascati Manual is the basic methodological document used in R&D statistics. For more information see: www.oecd.org/sti/frascatimanual

- b) **Applied research** – experimental or theoretical work undertaken to acquire new knowledge focusing on future practical application;
 - **Industrial research** – a part of applied research, the results of which are utilized through development of new products, technologies and services that are designed for business under a special legislation.
- **Experimental development** – systematic creative application of research findings or other ideas to produce new or improved materials, products or equipment, or to introduce new or improved technologies, systems and services, including acquisition and testing of prototypes and pilot or demonstration facilities.

Unlike other statistical surveys carried out in the area of research and development GBARD data are based on the analysis and identification of all amounts spent on research and development from public budgets assorted by codes socio-economic objectives. It is therefore an approach in terms of provider of funds, which in this case is represented by the state administration and not about the approach in terms of R&D performing units, which are surveyed by the annual statistical survey on research and development.

GBARD data include any funds provided from public budgets for R&D support, including funds spent on R&D abroad. Based on the methodology of the statistics, pre-financing of projects financed from EU structural funds is excluded from GBARD data. The support of innovations is also not included in GBARD data.

GBAORD data is based on spending authorized in the law on the state budget for the given year (preliminary data) and expenditures of the state final account for R&D (final data). Public budgets cover the central government budget and provincial budgets. The state budget is always included and provincial governments only if their contribution is significant². Budgets at the local government level, i.e. cities and towns are excluded.

GBARD data include both current and capital expenditures. All support provided by repayable loans is excluded strictly.

GBARD data also covers general university funds (SEO 10: General research at universities) that are defined in accordance with the definition of the Frascati Manual as any institutional funding provided to universities to support their research. In order to prevent this category from becoming a large, uninformative item, a supplementary breakdown by top level fields of research and development (FORD) is applied.

The codes of socio-economic objectives are allocated for targeted funds by the purpose and content of the R&D program (projects) and for institutional funds then by the focus of research performed by a recipient.

The terminology

The forms of public support of research and development (according to the OECD methodology, which differs from the breakdown defined in the amended law no. 130/2002 Coll., on public support for research, development and innovation) are following:

- **Targeted support** – includes projects within programs announced by the ministries and R&D agencies (GA CR and TA CR), also projects financed from operational programs (EU structural funds) and projects under the 7th Framework Programme for Research and Technological Development.
- **Institutional support** – includes the long-term conceptual research organization development, specific university research, the international support for R&D and before and research intentions.

The long-term conceptual research organization development – includes institutional support for long-term strategic development research organization on the basis of the results evaluation. Since 2010, this type of support gradually replacing the institutional support provided in the form of research intentions.

² In the case of the Czech Republic only the central state budget is taken into account. Provincial governments (at the NUTS 3 level) are excluded.



Specific university research – covers research performed by students in accredited doctoral or master's degree programs, which is directly connected with their education.

International cooperation in research and development – includes fees for the Czech Republic's participation in international research and development programs, fees for membership in international organizations for research and development or financial interest by the Czech Republic to support international cooperation projects in research and development if the financial interest can be paid from public funds, and if the projects are supported by the budget of other States or from the European Union or by international organizations.

The socio-economic objective – a pre-defined research and development area into which the state budget expenditure are allocated by priorities stated in the national R&D policy. The list of socio-economic objectives is given in the above mentioned NABS (1992, 2007), see also Annex 1.

Code	Main socio-economic objectives (SEO1)	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 1.³

Providers of government budget appropriations on R&D (statistical unit) – are all budgetary chapters, which according to the law on state budget of the Czech Republic may allocate funding to support R&D in the form of direct support. These are selected ministries, most important of which is the Ministry of Education, Youth and Sports, grant agencies (Grant agency, Technology Agency) and the Academy of Sciences, which institutionally funded "its R&D institutions" (public research institutions).

Sectors of R&D performance according to recipients of government budget appropriations on R&D⁴:

- Business (public and private enterprises, entrepreneurs and employers)
- Government (public research institutions, Academy of Sciences (headquarters), departmental research sites, libraries, archives, museums and other public recipients)
- High-education (public or state universities, private high schools, faculty hospitals)
- Private non-profit (non-profit institutions)
- Abroad (units performing/coordinating R&D outside of the Czech republic)

³ The NABS 1992 classification with detailed description of objectives is available in PDF format on the website of the Czech Statistical Office or at the Eurostat website: http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NABS_1992&StrLang=ua&Code=EN&IntPcKey=&StrLayoutCode=HIERARCHIC.

⁴ For more information about R&D performing sectors see the methodology for R&D survey (VTR 5-01) – only Czech language: https://www.czso.cz/csu/czso/statistika_vyzkumu_a_vyvoje
The 'Abroad sector' like the R&D performing sector is not defined in the R&D statistical survey (VTR 5-01), because only units performing R&D within the geographical area of the Czech Republic are surveyed.

Government budget allocations for R&D

The concept of ensuring GBARD statistics reflects the conditions for the provision of public R&D support as stated in the amended law no. 130/2002 Coll. on support for research, development and innovation, and the applicable regulations of the government, especially no. 397/2009 Coll. of Information system of Research, Development and Innovation.

In the Czech Republic, GBARD statistics is realized by Czech Statistical office in cooperation with the Council for Research, Development and Innovation and the Ministry of Education, Youth and Sports through the Information System of Research, Development and Innovation (IS RDI) and its databases. For ensuring GBARD statistics are used following databases of IS RDI:

- CEP (Central register of R&D projects)
- CEZ (Central register of research intentions)
- CEA (Central register of activities).

Supplementary data is obtained from the Department for R&D budget preparation at the Office of the Government of the Czech Republic. Databases CEP, CEZ and CEA do not include all government budget appropriations for R&D by the necessary breakdown, and therefore some more detailed data must be obtained in cooperation with the Ministry of Education, Youth and Sports. Data on the socioeconomic objective SEO 10, i.e. specific university research and support long-term conceptual research university development by fields of science (FOS), are collected directly from universities.

The processing and distribution of codes of socio-economic objectives (NABS SEO) is carried out directly by the Czech Statistical Office. The data retrieved from databases CEP, CEZ, CEA and additional data from the Ministry of Education, Youth and Sports must be processed according to the methodology of the Frascati Manual, i.e. amounts not considered as a part GBARD must be excluded. It concerns the support of R&D, which is financed in the form of repayable loans (only projects realized before validation Act no. 130/2002 Coll.), pre-financing of programs funded from EU structural funds and some administrative costs and also promoting innovation. Adjusted data is classified by NABS 1992 at the 3-digit division SEO and also by NABS 2007.

GBARD data is linked with the Business Register (was implemented from the reference year 2010). The linkage enables to get other breakdowns of GBARD data:

- Size-class of beneficiary by the number of employees (micro, small, medium and large enterprises),
- Type of beneficiary by the form (public research institutions, public and state universities, enterprises, university hospitals),
- Ownership by the SNA institutional sectors (private domestic enterprises, foreign affiliations, public enterprises),
- R&D performing sectors (higher education, government, business, private non-profit),
- Regional breakdown by regions (NUTS2, NUTS3 and NUTS4).

The revision of GBARD data conducted in 2013

In 2014, the Czech Statistical Office within a large revision of research and development statistics (R&D survey, GBARD) finished also the overall revision of GBARD data for the whole reference period 2002–2011. Data for years 2000 and 2001 was estimated.

In line with the reform of R&D system in the Czech Republic and requirements of the new EU legislation GBARD data was reviewed under the methodological revision for reason it exactly matches the Frascati Manual definitions. The revision concerned the reclassification of the definition of "general university funds" (here called "general research at universities"). The reclassification of items in socio-economic objectives had to be made to meet the new requirement of Eurostat to provide GBARD data according to the form of support. According to the revision 2013 under the "general research at universities" are classified only



institutional funds of the state budget provided to universities to conduct research and development. Previously, it was both targeted and institutional funds provided to universities only through the budget of the Ministry of Youth, Education and Sports.

Now, under SEO 10 - NABS 1992 and SEO12 - NABS 2007 are classified the following budget items:

- Research intentions (institutional funds),
- Long-term conceptual research organization development,
- Specific university research.

In the case of "specific university research" according to the methodology of the Frascati manual there can be found a discrepancy with the definition under the amended Act No. 130/2002 Coll., which considers "specific university research" as a form of targeted support. For GBARD statistics "specific university research" is considered as an institutional form of support that matches better the way how this form of support is provided (calculated according to predetermined criteria – variables). A "competition" component is not included as the basic element of projects (targeted support).

The main impact is to be a reduction of the funds which are classified into SEO 10 - NABS 1992 or SEO12 - NABS 2007 (reduction of the percentage of this goal in total GBARD). Some items of targeted support, which were included previously in this socioeconomic objective, were reclassified to other SEOs according to the focus of the R&D project (for ex. agriculture, industry, health, etc.). Although the total amount of GBARD in a given year will remain the same, the amount and percentage of socio-economic objectives are different from the version prior to the revision.

Revised data was sent to Eurostat to update the Eurostat's database and to publish it.

The availability of data: years 2000–2015 (linked with Business Register: years 2010–2015)

In 2016, the Czech Statistical Office carried out the second revision of GBARD data, which concerned a re-classification of selected units of the business sector into the government (public) sector. The re-classified units were public hospitals, public research institutions and other units which had belonged to enterprises (SNA sector 11). These units have belonged to public sector (SNA sector 13) since 2015.

The availability of data: years 2010–2015

National public funding to transnationally coordinated research

Since the reference year 2012 under Commission regulation (EC) No 995/2012 GBARD statistics have been extended with an indicator measuring national public funding to transnationally coordinated R&D (GBARD-ERA1). The preparation of methodology took several years. Eurostat kicked-off work on GBARD-ERA1 in 2007.

Data is a subcategory of GBARD and focuses on national public funding to transnationally coordinated R&D in European research area. National public funding to transnationally coordinated R&D statistics is broken down into:

- National contributions to transnational public R&D performers,
- National contributions to Europe-wide transnational public R&D programmes,
- National contributions to bilateral or multilateral public R&D programmes established between Member State governments (and with candidate countries and EFTA countries).

Each category is clearly defined by the list of international research programmes and institutions. The condition is the participation of EU Member States.

National public funding to transnationally coordinated research is defined as the total budget funded by the government (state, federal, provincial), as measured by GBARD directed to transnational public R&D performers and transnational public R&D programmes. This indicator comprises three categories: national contributions to transnational public R&D performers; national contributions to Europe-wide transnational public R&D programmes and national contributions to bilateral or multilateral public R&D programmes established between MS's governments.

1/ **Transnational public R&D performers** are inter-governmental or European Commission bodies that carry out R&D activity with own dedicated research facilities. They have as regular members EU Member States, although other European countries (as Switzerland and Norway in CERN) or non-European countries (as Israel in EMBL) might also be their members. Those international institutions can be located inside or outside EU geographical boundaries (like CERN in Switzerland).

This category includes national contributions only to the six largest European R&D institutions defined as the most relevant to ERA development: European Organization for Nuclear Research (CERN); Institute Laue-Langevin (ILL); European Synchrotron Radiation Facility (ESRF); European Molecular Biology Laboratory (EMBL); European Southern Observatory (ESO) and Joint Research Centre of the European Commission (JRC).

2/ **Europe-wide transnational public R&D programmes**, with and without cross-border flows of funds

2.1/ Transnationally co-funded public R&D programmes/schemes with cross-border flows of funds involve cross-border flows of funding by member countries usually into a common central budget. Such programmes disburse funding to research activities conducted at national level using national R&D facilities. However, they typically involve some form of trans-national coordination (common objectives/research agenda, trans-national project consortia, etc.).

2.2/ Transnationally coordinated public R&D programmes/schemes with no cross-border flows of funds involve the cross-border coordination of research agendas, objectives, and so on, but do not involve cross-border flows of funding. National authorities coordinate activities with other participating countries, but disburse funds from their own budgets to R&D performers on their own territory (i.e. each country funds its own research teams). "

Examples: ERA-NETs; ERA-NET+; European Fusion Development Agreement (EFDA); EUREKA; COST; EUROCORES; European Space Agency (ESA); European Molecular Biology Organisation (EMBO); European Molecular Biology Conference (EMBC); Article 185 initiatives: (Europe-Developing Countries Clinical Trials Platform, Eurostars and Ambient assisted living for the elderly); Joint Technology Initiatives (public funding part: ENIAC (Embedded Computing Systems) and ARTEMIS (Nanoelectronics)).

3/ **Bilateral or multilateral public R&D programmes** established between MSs' governments (and with candidate countries and EFTA countries) include non-EC funded public R&D programmes jointly undertaken by at least two MSs' governments, although other non-EU countries could also participate in them. They may or may not involve cross-border flows of funds.

The methodology of the GBARD – ERA1 indicator and data can be found on the Eurostat website:

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_budget_statistics_-_transnationally_coordinated_research

The availability of data: years 2007–2015 (in 2014 was carried out a partial revision of data for years 2011, 2012, 2013)

Indirect support of research and development (R&D tax incentive support)

In addition to direct public support of R&D, which represents GBARD – Government Budget Appropriations or Outlays on Research and Development (by socio-economic objectives), the tax deductibility of eligible costs for research and development is also possible since 2005. This instrument is called indirect support for research and development and it measured by **government tax incentives for R&D expenditure (GTARD)**. Czech Statistical Office obtains information/data on this form of support from administrative



sources and publishes it on its website. Data is available for the business sector since 2007. Only Czech version of the website is currently available.

The methodology and data (also for the Czech Republic) can be found on the OECD website:

<http://www.oecd.org/sti/rd-tax-stats.htm>

The availability of data: years 2000–2014

EXPLANATION OF SYMBOLS USED IN THE TABLES

- No cases registered
- . Data unavailable or unreliable (also : in tables with international data)
- x Not applicable
- 0 Figure less than half the unit used
- i. d. Individual data

Calculations in the tables are based on non-rounded figures (including totals).