



## METHODOLOGICAL EXPLANATION

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# RESEARCH AND DEVELOPMENT ACTIVITY BY PERFORMERS

This methodological explanation relates to the data releases:

- Research and development activity by performers, Slovenia, annually (First Release)
- Research and development activity by performers, Slovenia, annually (Electronic Release)



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## 1 PURPOSE

The purpose of publishing data on research and development activity (R&D) by performers is to present data on the annual extent of expenditure and personnel intended for the implementation of R&D in the Republic of Slovenia. Data on R&D by performers are necessary for the national monitoring of research and experimental development and for the assessment, making and implementation of science and technology and economic development policies at the national and EU level.

## 2 LEGAL FRAMEWORK

- [Annual Programme of Statistical Surveys \(LPSR\) \(only in Slovene\)](#)
- [National Statistics Act \(OJ RS, No. 45/95 and 9/01\)](#)
- Commission implementing Regulation (EU) No 1197/2020 of 30 July 2020 laying down technical specifications and arrangements pursuant to Regulation (EU) 2019/2152 of the European Parliament and of the Council on European business statistics repealing 10 legal acts in the field of business statistics (CELEX: 32020R1197).

## 3 UNIT DESCRIBED BY THE PUBLISHED DATA

The unit described by the published data is the expenditure on R&D by performers and person involved in R&D performance.

**The expenditure on R&D by performers** is described in terms of sector of performance, source of funds, type of costs, type of research, field of research and development, statistical and cohesion region, enterprise size class and activity.

**The person involved in R&D performance** applies to a person directly or indirectly involved in the scientific research work or R&D work of the R&D performer at least 10% of hers/his full working time, and is described in the context of sector of employment, occupation, sex, age group, educational attainment, citizenship, field of research and development, statistical and cohesion region, enterprise size class and activity.

**Enterprise** is legal or natural persons which had turnover or employees or investments and were therefore active during at least a part of the reference period. An enterprise may consist of several ownership-related legal persons, as long as they operate on the market as one independent enterprise.

## 4 SELECTION OF OBSERVATION UNIT

Target population covers all R&D performers in the Republic of Slovenia, i.e. all business entities located in the Republic of Slovenia, which performed R&D in the observation period.

The coverage of the observation units is full. The survey Research and development activity by performers (R-RD-IZV) covers all R&D performers on the territory of the Republic of Slovenia.

## 5 SOURCES AND METHODS OF DATA COLLECTION

Data are collected annually.

From reference year 2017 onwards data are collected using questionnaire in Excel form, which is uniform for all sectors (business enterprise, government, higher education, private non-profit). R&D performers report data on their R&D based on their own records and submit completed questionnaire via eSTAT portal. Data on R&D for private researchers are not collected by questionnaire annually, but once every five years. Data on their R&D for the intervening years are estimated.

Identification of (potential) R&D performers is done by sector, based on data from the previous address book, the Statistical business register (SPRS), the General sample framework of enterprises (VOP), the list of recipients of state aid for R&D (Ministry of finance), the list of taxpayers due to investments in R&D (National accounts section), Register of private researchers (ARRS), Slovenian current research information system (SICRIS) and Analytical information system for higher education (eVŠ).

Data for the survey are not obtained from administrative sources.

## 6 DEFINITIONS

**Gross domestic expenditure on R&D (GERD)** is total intramural expenditure on R&D performed on the national territory during a given period. GERD includes R&D performed within a country and funded from abroad, but excludes payments for R&D performed abroad. GERD consists the intramural expenditures on R&D of the four sectors of performance: business enterprise sector, government sector, higher education sector, and private non-profit sector.

According to the Frascati methodology, scientific-research organisations, R&D organisations and research units are classified according to basic activity, legal status and the source of financing into four or five sectors (when classifying

units according to financial income and expenditures, there is an additional sector, i.e. abroad or rest of the world):

- **Business enterprise sector** covers business enterprises, the basic activity of which is market production of goods and services. The price of goods and services should at least cover production costs. The core of the sector are business enterprises, both profit and non-profit-oriented. The business enterprise sector covers also public enterprises within economic public services, which are engaged in selling the same kind of goods and services as private companies but because of their pricing policy their prices can be lower than the full production price. Private market-oriented non-profit institutions producing goods and services are also covered.
- **Government sector** includes public non-financial corporations, other central government units and direct budgetary users. These are institutes, centres, hospitals, museums, central libraries and other institutions which, in addition to their principal activity, which is not R&D, perform some scientific and research work.
- **Higher education sector** covers tertiary institutions in which postsecondary education takes place, irrespective of the source of financing. Research institutes, experimental units and clinics under direct supervision of public higher education institutions are also covered.
- **Private non-profit sector** includes private non-profit institutions, which supply private persons and households. They are financed by the founder, with part of the funds contributed by companies and the government.
- **Sector abroad or rest of the world** covers all institutions and individuals outside political boundaries of a country, except vehicles, ships, aircraft and satellites run by domestic organisations. International organisations in the country are also covered.

Sectoral classification of units is based on the System of National Accounts (SNA), with the exception of the higher education sector, which is shown as an independent sector due to the important role that universities and higher education institutions play in the implementing R&D.

R&D activity covers three **types of R&D**:

- **Basic research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. Basic research analyses properties, structures and relationships with a view to formulating and testing hypotheses, theories or laws. The results of basic research are not generally sold but are usually published in scientific journals or circulated to interested colleagues. Occasionally, the publication of basic research may be restricted for reasons of national security.
- **Applied research** is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective. Applied research is undertaken either to determine possible uses for the findings of basic research or to determine new methods or ways of achieving specific and predetermined objectives. It involves considering the available knowledge and its extension in order to solve actual problems. In the business enterprise sector, the distinction between basic and applied research is often marked by the creation of a

new project to explore promising results of a basic research programme.

- **Experimental development** is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes. Experimental development is systematic use of knowledge and comprehension, obtained with applied and basic research and from practical experience, which is aimed at producing new materials, devices, systems and methods, including the phase of designing the products, registering prototypes, processes, services and organisational systems, or improvement of existing materials, devices, systems and processes.

**R&D personnel** includes internal and external R&D personnel:

- **Internal R&D personnel** are all persons employed by the organization engaged directly in R&D, who worked at least 10% of their annual working time) (i.e. 0.1 FTE or more).
- **External R&D personnel** are all persons not employed by the organization, who provide direct services that form an integral part of performing R&D of the organization. External contributors are fully involved in internal R&D activities; they act as internal employees and thus receive payment for their work on R&D tasks.

## 7 EXPLANATIONS

### 7.1 CLASSIFICATIONS

Data on R&D by fields of research and development are classified using the international **classification of fields of research and development (FORD)**.

Data on R&D by activity are classified using the **Standard Classification of Activities (SKD 2008)**.

Data on R&D personnel by educational attainment are classified using the **Classification System of Education and Training (KLASIUS)**.

Data are territorially classified according to the **Nomenclature of Territorial Units for Statistics (NUTS)**, at the level of cohesion region (NUTS 2) and at the level of statistical region (NUTS 3).

More information about classification can be found on the [Classifications and codes](#).

### 7.2 DATA PROCESSING

#### DATA EDITING

Data were edited by using appropriate systematic and individual corrections.

For more, see the general methodological explanations [Statistical data editing](#).

## **WEIGHTING**

With weighting adjustment we want to achieve representativeness of the sample, so that the weighted data give us as good population estimates as possible. The process of weighting depends on the sampling design, the unit non-response rate and available auxiliary variables used for calibration. The final weight is the product of the sampling weight, the non-response weight and the calibration factor.

With the data for reference year 2011, the non-response analysis was introduced as a standard part of the survey process (providing statistical adjustments for the units that did not answer the questionnaire). Weight for nonresponse is calculated as the proportion between the sample size and the sum of all answers. Weights are calculated on strata, which are determined by the activity and the enterprise size (according to the number of persons employed).

## **SEASONAL ADJUSTMENT**

Seasonal adjustment is not applicable.

## **DATA PROCESSING OTHER**

The total sometimes does not add up due to rounding.

Until reference year 2013 data on government budget appropriations or outlays on R&D by kind of research were calculated using the project proportion between the kind of research and all costs. From reference year 2014 onwards we considered only costs by the kind of research (not the number of projects by the kind of research).

Some data on researchers by age groups for reference year 2016 for the business enterprise sector, the government sector and the higher education sector are estimated. Reporting units reported data on researchers by age groups for all researchers (internal and external R&D personnel), while data in the table Researchers by sector of employment and age class shows only internally employed researchers (without researchers working as external contributors). To avoid a break in the time series, the structure of researchers working as external contributors was estimated and took into account in calculating the values for the mentioned table.

Until reference year 2016 data on R&D personnel, expressed in head counts, included only internal R&D personnel, i.e. persons employed for permanent or fixed-term. From reference year 2017 on data on R&D personnel includes also external collaborators. Data on R&D personnel, expressed in FTE, include both internal and external R&D personnel, i.e. persons employed by organization and external collaborators.

In the survey the statistical activity defined in the Statistical Business Register (SBR), which the main activity earmarked for specific statistical purposes. In some cases the statistical activity is different from the registered activity defined in the Slovenian Business Register (PRS), kept by the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). The statistical activity is determined for the major units which have different main activity based on statistical data available than is registered main activity.

### **7.3 INDICES**

Indices are not published.

### **7.4 PRECISION**

The survey is not conducted on the basis of a random sample.

### **7.5 OTHER EXPLANATIONS**

Data that are statistically protected to respect the confidentiality of reporting units are replaced with the letter »z«.

The total sometimes does not add up due to rounding.

## **8 PUBLISHING**

- SiStat Database: [Development and technology](#) - Research, development and innovation -Research and development (R&D) activity - Expenditure on R&D, R&D personnel, Government budget appropriations or outlays on R&D (absolute data, share of data, classifications ISCED, KLASIUS, NACE Rev. 2).
- First Release (Development and Technology, Research and Development ): »Research and development activity by performers«.
- Electronic Release (Development and Technology, Research and Development ): »Research and development activity by performers«.
- EUROSTAT (Statistical Office of the European Union)
- United Nations (UN)
- The Organisation for Economic Co-operation and Development (OECD)



## **9 REVISION OF THE DATA**

### **9.1 PUBLISHING OF PRELIMINARY AND FINAL DATA**

Provisional and final data are published.

Provisional data are published by First Release, approximately 10 months after the end of the reference period and final data by Electronic Release, approximately 14 months after the end of the reference period.

Publishing of provisional and final data is planned. Due to the needs of users for timely information, provisional data are published that meet the criteria of the quality of official statistical data but do not meet the quality that can be met with complete coverage. Data are revised when recent, more complete and better data can significantly contribute to the quality of data-based decision-making.

### **9.2 FACTORS INFLUENCING COMPARABILITY OVER TIME**

#### **Reference year 2011**

The R-RD-IZV survey for reference year 2011 began using new (additional) administrative sources, which enabled additional information for identification of R&D companies and organizations. Therefore, sample coverage of units was upgraded. Along with actually greater investments in the R&D, the increased value of total spending on R&D was as well the end result of the improved selection of reporting units, largely in the business enterprise sector, and to some extent also due to reclassification of some borderline reporting units from the government sector to the business enterprise sector. At the same time, with the data for 2011 the analysis of non-response was introduced as a standard part of the survey process, which also contributed to the increase of the value of all published statistics on R&D in all sectors. Weights for non-response are calculated on strata, which are determined by the activity and the enterprise size (considering the number of persons employed).

Data on R&D activity by performers for 2011 are thus not comparable with data for the previous years. In reference year 2011 there was thus a break in the time series.

#### **Reference year 2017**

In conformity with the Frascati manual 2015 guidelines the R-RD-IZV survey for reference year 2017 introduced some methodological changes that have an important impact on the terminology and values of certain data, therefore some data for 2017 are not completely comparable with the data for previous years. With data for 2017 the following changes were introduced:

- the extended definition of the higher education sector (in addition to higher education institutions, higher vocational institutions are included) is used;

- private researchers are involved in a part of the business enterprise sector (previously part of the private non-profit sector);
- non-profit institutions providing services for households (S.15) are involved in a part of the private non-profit sector (previously part of the business enterprise sector);
- in the presentation of personnel who worked in R&D, expressed in the number of persons, both internal and external R&D personnel are included (previously only internal R&D personnel);
- data on the occupation of R&D personnel have three categories (researchers, technicians or equivalent staff, other supporting staff). In previous years occupation referred to five categories (researchers, professional staff, technical staff, management personnel, other supporting staff).
- Statistical data protection was introduced to the survey with reference year 2017.

### **2017–2019 data revision**

Due to the inconsistent allocation<sup>[1]</sup> of data on expenditure on research and development by sources of funding by some reporting units of the business sector, in March 2022 we published together with the data for the reference year 2020 the data of the unplanned revision of R&D expenditure by sources of funding for the 2017–2019 period. The total amount of funding for R&D for these years remained unchanged and thus comparable in time. The revision affected the allocation of funds by sources of funding - a decrease in the volume of financial resources for R&D by companies and an increase in the volume of financial resources from abroad. For these two types of funding sources, the data from 2017 onwards are therefore not comparable with previous years.

[1] Not adequate with the OECD Frascati manual issued in 2015.

## **10 OTHER METHODOLOGICAL MATERIALS**

Methodological materials on SURSs website are available at <https://www.stat.si/statweb/en/Methods/QuestionnairesMethodologicalExplanationsQualityReports>.

- Questionnaire:
  - Raziskovalno-razvojna dejavnost pri izvajalcih (R-RD-IZV) (only in Slovene)

Theme: Development and Technology, Subtheme: Research and Development

- Quality report for the survey:
  - Raziskovalno-razvojna dejavnost pri izvajalcih (R-RD-IZV)

Theme: Development and Technology, Subtheme: Research and Development