

QUALITY REPORT FOR STATISTICAL SURVEY

Research and Development for 2023

Organisational unit: Innovations, Science and Technologies Unit

Prepared by: Matija Škegro Vdović and Blanka Munjin

June 2025

0. Basic information

- Purpose and subject of the survey

The survey Research and Development (R&D) is aimed at observing the R&D activity in the Republic of Croatia. The survey is carried out every year in order to collect and release data on persons in employment engaged in R&D, expenditures and sources of funds for R&D as well as on results of R&D activities. Survey results enable measuring of R&D activity in the Republic of Croatia and partly make grounds for developing a rational policy on R&D activity and monitoring its implementation. They also provide official data on R&D activity in the Republic of Croatia, which are released in national and international publications and databases. In addition to the continuous monitoring of R&D activity, the survey is also important in the calculation of domestic gross product (GDP).

- Reference period

Calendar year

- Legal acts and other agreements

Act on Higher Education and Scientific Activity (NN, No. 119/22)

Act on State Subsidies for Research and Development Projects (NN, No 64/18)

Ordinance on Scientific and Artistic Areas, Fields and Branches (NN, Nos 118/09, 82/12, 32/13, 34/16 and 56/22)

Ordinance on State Subsidies for Research and Development Projects (NN, No 9/19)

Decision on the National Classification of Activities – NKD 2007 (NN, Nos 58/07 and 72/07)

Ordinance on Register of Spatial Units (NN, No. 37/20)

National Classification of Statistical Regions 2021 (HR_NUTS 2021) (NN, No. 125/19)

Regulation (EU) 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics, repealing 10 legal acts in the field of business statistics (OJ L 327, 17 December 2019)

Commission Implementing Regulation (EU) 2020/1197 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 (OJ L 271, 18 August 2020).

Relevant international standards

Frascati Manual 2015 – Guidelines for Collecting and Reporting Data on Research and Experimental Development, OECD, 2015

Fields of Research and Development classification, OECD, 2015 (FORD classification)

Nomenclature for the analysis and comparison of scientific programmes and budgets – NABS 2007, Eurostat, 2007

International Standard Classification of Education – ISCED-2011, UNESCO, dokument 35C/19, 2011.

- Classification system

Classification of scientific and artistic areas and fields

National Classification of Activities 2007

CodeBook of Socio-Economic Objectives

International Standard Classification of Education

- Concepts and definitions

Research and development comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of man, culture and society – and to devise new applications of available knowledge. For an activity to be an R&D activity, it must satisfy five criteria. The activity must be novel, creative, uncertain, systematic and transferable and/or reproducible. There are three types of R&D activities: basic research, applied research and experimental development. 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. Applied research is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective. 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.

Business enterprise sector comprises enterprises and institutions the main activity of which is production of goods and services intended for market at commercial price. The business enterprise sector includes public enterprises, as well as non-profit institutions that are market producers of goods or services.

Government sector comprises all units of central and local government, including social security funds, except institutions of higher education, as well as all non-profit institutions that are controlled by government units, and that are not themselves part of the Higher education sector.

Private non-profit sector comprises non-market, non-profit institutions serving households (that is, the general public), except those mainly controlled and financed by government, their main characteristic being that they should not be the source of revenue or profit to the institutions controlling them.

Higher education includes all institutions providing formal tertiary education programmes, whatever their source of finance or legal status, and all research institutes and centres that have their R&D activities under the direct control of, or administered by, tertiary education institutions.

Gross domestic expenditure on R&D (GERD) is the total intramural expenditure on R&D performed in the national territory during the reporting calendar year. GERD includes domestically performed R&D that is financed from abroad but excludes funding for R&D performed abroad.

Intramural R&D expenditures are all current expenditures and gross fixed capital expenditures for R&D performed within reporting unit, irrespective of the source of funds.

Current expenditures comprise labour costs and other current costs used in R&D. Labour costs include compensations of employees (wages and salaries and social contributions paid by an employer), vocational training costs and other labour costs.

Other current costs comprise material costs, costs of persons hired under contractual agreement or author's contract, acquiring services to support intramural R&D and other costs (costs of indirect services).

Capital expenditures are the annual gross amount paid for the acquisition of fixed assets that are used repeatedly or continuously in the performance of R&D for more than one year. They comprise investing in land and buildings, machinery and equipment, computer software and patents, licences, studies and projects.

Total R&D personnel include all persons engaged directly in R&D, whether employed by the reporting unit or external contributors (persons hired under contractual agreement or author's contract) fully integrated into the unit's R&D activities, as well as those providing direct services for the R&D activities (such as R&D managers, administrators, technicians). According to the recommendations of the Frascati Manual 2015, persons who work less than 10% of full-time hours are not included.

Researchers are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods.

Technicians and equivalent staff are persons whose main tasks require technical knowledge and experience in one or more fields of engineering, the physical and life sciences, or the social sciences, humanities and the arts. They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods and the use of research equipment, normally under the supervision of researchers.

Expert associates are persons with higher education employed to perform expert jobs (librarians, IT professionals, information specialists, etc.), who participate in the scientific and research and R&D work, but are not the managers of R&D projects.

Other supporting staff are employees who perform all the activities that directly contribute to the R&D performance, which are not performed by researchers or technicians and expert associates. These activities include secretarial and other administrative tasks, the management of materials or equipment required for the R&D project implementation, supporting activities related to R&D such as planning, information and financial support, legal services, assistance in the assembly, adjustment, maintenance and repair of scientific equipment and instruments. Managerial and administrative staff who mainly deal with financial and personnel issues and general administration also perform the aforementioned activities if their activities are directly related to R&D projects.

Full-time equivalent (FTE) is expressed in person-years and presents time as a share of full working time in which persons in employment are engaged in the work related to research and development (for example, if a person was engaged in works related to research and development for six months in full working time, it is expressed as 0.5 full-time equivalent – 0.5 FTE).

- **Statistical unit**

Since this year, the main R&D observation unit in business sector is an enterprise – a business entity that makes an organisational unit engaged in producing goods and/or services and benefits from a certain degree of autonomy, in accordance with Council Regulation (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community. Depending on the business and organisational situation, enterprise may correspond to only one legal unit or a group of several legal units. In addition to legal units, enterprises also include free lances and crafts.

Each enterprise as a whole is assigned a code number of its principal activity according to the National Classification of Activities 2007. The principal activity is determined and updated by the Statistical Business Register (SBR) of the Croatian Bureau of Statistics.

For other sectors (government, private non-profit and higher education sector), the units of observation are still legal and natural persons. Government sector comprises all units of central and local government, including social security funds, except institutions of higher education, as well as all non-profit institutions that are controlled by government units, and that are not themselves part of the Higher education sector. Private non-profit sector comprises non-market, non-profit institutions serving households (that is, the general public), except those mainly controlled and financed by government, their main characteristic being that they should not be the source of revenue or profit to the institutions controlling them. Higher education sector includes all institutions providing formal tertiary education programmes, whatever their source of finance or legal status, and research institutes and centres that have their R&D activities under the direct control of, or administered by, tertiary education institutions.

- **Statistical population**

The statistical survey Research and Development in 2023 includes all legal units in the Republic of Croatia that are either known or assumed to be engaged in R&D. Due to the importance of research and development (R&D), which is seen as an initiator of economic growth and innovations, various data sources have been analysed in order to improve the survey coverage and to identify hitherto unknown legal units engaged in R&D. The following sources have been used: Register of Scientific Organisations of the Ministry of Science and Education, Survey on Innovation Activities in Croatian Enterprises (enterprises that indicated that they are engaged in R&D activities), Statistical Business Register of the Croatian Bureau of Statistics, previous Research and Development surveys and the project database within the Horizon Europe programme for the Republic of Croatia for data on funds allocated by applicants (EU_CORDIS base), information on awarded grants to enterprises from the European Structural and Investment Funds, a list of scientific institutions of the Croatian Scientific Bibliography (CROSBI), a list of funded HAMAG-BICRO projects as well as a list of legal entities that have reported investments in R&D in the Annual Report on Gross Investment in Fixed Assets (INV-P form) for 2022. The analysis of the mentioned sources resulted in the basic list of 1 868 reporting units, to which a form was sent. The completed form was submitted by 671 units, 949 units were not engaged in the R&D activity and 248 units did not respond in any way. The 2023 data are not comparable with data for the previous years.

1. Relevance

1.1. Data users

Users of data on Research and Development are:

- internal users
 - national accounts, investments, structural business statistics
- external national users
 - Ministry of Science and Education – uses data for the purposes of planning, creating of policies and strategies, monitoring their implementation, analyses and for international comparisons
 - science and research institutes (Institute of Economics) – use data for national and international scientific and research projects and comparative analyses
 - individual researchers – use data for scientific and research projects
- international users:
 - directorate-generals for policies of the European Commission – use survey data for a systematic and user-oriented presentation of internationally comparable indicators on research and development.

1.1.1. User needs

National accounts require data on expenditure on R&D and for computation of regional investments.

Structural business statistics – need data on costs of investments in R&D made by foreign companies in Croatia – FATS (iFATS and OFATS).

1.1.2. User satisfaction

User satisfaction, targeted specifically at the Survey on Research and Development (R&D) data, is not measured.

The first user satisfaction survey of the Croatian Bureau of Statistics was conducted in 2013, the second one in 2015, and the last one at the end of 2022. The survey results can be checked on the website of the Croatian Bureau of Statistics <https://dzs.gov.hr/highlighted-themes/quality/user-satisfaction-surveys/686>

1.2. Completeness

The survey was carried out in the Croatian Bureau of Statistics pursuant to the Official Statistics Act (NN, Nos 25/20 and 155/23). The EU legal basis for the implementation of the survey is Regulation (EU) 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics, repealing 10 legal acts in the field of business statistics (OJ L 327, 17 December 2019) and Commission Implementing Regulation (EU) 2020/1197 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 (OJ L 271, 18 August 2020).

The survey results are submitted to Eurostat in a specified manner.

1.2.1. Data completeness rate

The indicator is not computed.

2. Accuracy and reliability

2.1. Sampling error

Not applicable.

2.1.1. Sampling error indicators

The indicator is not applicable.

2.2. Non-sampling error

Not applicable.

2.2.1. Coverage error

The survey includes all units which are either known or assumed to be engaged in research and development (R&D).

2.2.2. Overcoverage rate

The indicator is not computed.

2.2.3. Measurement errors

Not applicable.

2.2.4. Non-response errors

Not applicable.

2.2.5. Unit non-response rate

The indicator is not computed.

2.2.6. Item non-response rate

The indicator is not computed.

2.2.7. Processing errors

In the period between data collection and the beginning of the statistical analysis based on the obtained statistics, data have to be processed in a certain way. The survey is carried out on the Excel form that contains certain built-in data verification procedures. A part of data verification procedures is built in the Excel questionnaire, while other rules are defined in the expert unit, which also corrects existing errors found on the material and, if necessary, contacts reporting units to get complete and accurate data. It is

not possible to set too many data verification procedures into the form itself; instead, after obtaining all reports from the field, data are entered into the Survey Processor in which they are then processed based on the prepared project request.

2.2.8. Imputation rate

The indicator is not applicable.

2.2.9. Model assumption error

Not applicable.

2.3. Data revision

2.3.1. Data revision – policy

The users of statistical data are informed about revisions on the website of the Croatian Bureau of Statistics, on the link – [General Revision Policy of the CBS](#).

2.3.2. Data revision – practice

In 2016, a revision of R&D data took place due to the modernisation of several statistical production processes. The survey methodology was revised in line with the Frascati Manual 2015 and Eurostat's methodological guidelines on the implementation of the Frascati Manual 2015 as well as on methodological harmonisation of R&D statistics in EU Member States.

2.3.3. Data revision – average size

The indicator is not computed.

2.4. Seasonal adjustment

The indicator is not applicable for the survey.

3. Timeliness and punctuality

3.1. Timeliness

Timeliness of statistics relates to the length of time between data availability and reference period the phenomenon refers to.

Timeliness of final results is T + 10 months.

3.1.1. Time lag – first results

The indicator is not applicable.

3.1.2. Timeliness – final results

Timeliness of final results is T + 10 months.

3.2. Punctuality

Timeliness of final results is T + 10 months.

3.2.1. Punctuality – delivery and publication

Data were released 15 days after the planned deadline according to the [Calendar of Statistical Data Issues 2024](#).

4. Accessibility and clarity

- Website of the Croatian Bureau of Statistics – electronic versions of the First Release
- Website of the Croatian Bureau of Statistics – STS databases

4.1. News release

Survey data were released in the First Release ZTI-2024-2-1 Research and Development, 2023.

4.2. Online database

There is no database for Research and Development in 2023. It is planned for July 2025.

4.3. Microdata access

Conditions under which certain users can have access to microdata are regulated by the [Ordinance on the Conditions and Terms of Access and Use of Confidential Statistical Data of the Croatian Bureau of Statistics for Scientific Purposes](#) (NN, No. 5/23).

4.4. Documentation on methodology

- Website of the Croatian Bureau of Statistics – electronic versions of the First Release
- Website of the Croatian Bureau of Statistics – STS databases
- Website of the Croatian Bureau of Statistics – Innovation, Science and Technology file.

5. Coherence and comparability

5.1. Asymmetry for mirror flows statistics

The indicator is not applicable for the survey.

5.2. Comparability over time

The data are not comparable to the data from previous years due to the fact that the 2023 survey was for the first time carried out on the statistical unit “enterprise”. Until 2023, the survey was conducted on legal units. Data for 2016 are not entirely comparable with data from previous years due to improvement of several statistical production processes.

5.2.1. Length of comparable time series

Length of comparable time series is 0.

5.2.2. Reasons for break in time series

The break in time series occurred in 2023 due to improvement of several statistical production processes.

5.3. Coherence – short-term and structural data

The indicator is not computed.

5.4. Coherence – national accounts

The indicator is not computed.

5.5. Coherence – administrative sources

The indicator is not applicable.

6. Cost and burden

6.1. Cost

It is not possible to estimate data collection costs.

6.2. Burden

An analysis of the burden on reporting units has not been carried out.