REPUBLIC OF CROATIA
CROATIAN BUREAU OF STATISTICS

CROATIAN BUREAU OF STATISTICS

QUALITY REPORT FOR STATISTICAL SURVEY

Annual Report on Research and Development (R&D) for 2024

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September 2026

0. Basic information

- Purpose, goal, 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 present official data on R&D activity in the Republic of Croatia, which are released in national and international publications and data bases. 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

- Official Statistics Act (NN, Nos 25/20, 155/23, 124/25 – corr. and 69/26)
- Annual Implementation Plan of Statistical Activities of the Republic of Croatia
- 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 State Subsidies for Research and Development Projects (NN, No. 9/19)
- Ordinance on Scientific and Artistic Areas, Fields and Branches (NN, No. 03/24)
- 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
- Nomenclature for the analysis and comparison of scientific programs and budgets – NABS 2007, Eurostat, 2007
- International Standard Classification of Education – ISCED-2011, UNESCO, document 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 units

The main observation unit/statistical unit for R&D in the business sector is the enterprise - a business entity that makes an organizational 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 on statistical units for the observation and analysis of the production system in the Community. Depending on the business and organizational situation, it may correspond to either 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 version. The principal activity is determined and updated by the Statistical Business Register 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 2024 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 2023 and a list of legal entities that reported the amount under item AOP 004 (Research and Development) in the Annual Financial Statement (GFI-POD) for 2024. The analysis of the mentioned sources resulted in the basic list of 1986 reporting units, to which a form was sent. The completed form was submitted by 720 units, 1081 units were not engaged in the R&D activity and 185 units did not respond in any way.

1. Relevance

1.1. Data users

Users of data on Research and Development are:

- internal users
  - Sector of macroeconomic statistics
  - Sector of business statistics
  - Sector of demographic and social statistics

- external national users

- Ministry of Science, Education and Youth – data is used for the purposes of planning, creating policies and strategies, monitoring their implementation, analysis and for international comparisons
- Ministry of Economy and HAMAG-BICRO – data is used for creating public policies, monitoring smart specialization strategies and awarding grants
- Croatian National Bank (CNB) – data is used for the purpose of macroeconomic analysis and creating economic indicators
- scientific research institutes (e.g. Institute of Economics) – data is used for domestic and international scientific research projects and comparative analyses
- independent researchers – data is used for scientific research projects

- international users

- Eurostat – uses survey data for a systematic and user-oriented presentation of internationally comparable research indicators on R&D.
- European Commission policy directorates-general – uses survey data for a systematic and user-oriented presentation of internationally comparable research indicators on R&D.
- OECD, UNESCO and the World Bank – uses data for global comparisons and index monitoring.

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

There is no targeted measurement of user satisfaction, specifically, using Research and Development (R&D) data. The first user satisfaction survey of the Croatian Bureau of Statistics was carried out in 2013, and since 2024, the survey has been conducted annually. The survey results are available on the Croatian Bureau of Statistics website under User satisfaction surveys.

1.2. Completeness

The survey was carried out in the Croatian Bureau of Statistics pursuant to the Official Statistics Act (NN, Nos 25/20, 155/23, 124/25 – corr. and 69/26). The legal basis of the European Union for conducting research is Regulation (EU) No. 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics and repealing ten legal acts in the field of business statistics (OJ L 327, 17.12.2019.) and Implemented Commission Regulation (EU) No. 2020/1197 of July 30, 2020 on establishing technical specifications and modalities in accordance with Regulation (EU) No. 2019/2152 of the European Parliament and the Council on European business statistics and the repeal of ten legal acts in the field of business statistics (OJ L 271, 18 August 2020).

The survey covers all variables required by European Union Regulations and Eurostat methodological standards. The survey results are submitted to Eurostat according to a given template.

1.2.1. Data completeness rate

The data completeness rate is: 100%

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 covers all units known or assumed to be engaged in research and development (R&D) activities during the reference year. The survey frame is regularly updated using data from previous surveys, the Statistical Business Register (SBR), administrative sources, and other available sources of information. Undercoverage may occur when new units carrying out R&D activities are not identified and included in the survey frame in a timely manner. The extent of undercoverage is unknown.

2.2.2. Overcoverage rate

The over-coverage rate is 0.9%.

2.2.3. Measurement errors

Measurement errors may arise from different interpretations of the definitions of research and development (R&D), misclassification of activities, inaccurate reporting of expenditures, personnel and other indicators, as well as from unintentional errors made by reporting units. To minimise such errors, detailed methodological guidelines are provided together with the questionnaire, reporting units are offered expert support throughout the reporting process, and the collected data are subject to logical and arithmetic checks as well as comparisons with data from previous years.

2.2.4. Non-response errors

Non-response errors are minimized through an intensive follow-up procedure aimed at monitoring the response of reporting units. Units that fail to provide data within the prescribed deadline are contacted by telephone, e-mail and written reminders in order to obtain or complete the required information. If particular variables are missing or inconsistent, the reporting unit is contacted for clarification and correction of the data. Since the survey is conducted as a census survey, special attention is paid to ensuring complete coverage of reporting units. In cases where data cannot be obtained directly from the reporting unit, appropriate imputation methods based on administrative sources or data from previous periods are applied. This ensures a high level of quality and completeness of the collected data.

2.2.5. Unit non-response rate

Unweighted non-response rate of reporting units at the level of the entire survey is 8.5%. The non-response of reporting units in the business enterprise sector (IR-1 questionnaire) is 8.2%. In the government and private non-profit sector (IR-2 questionnaire), the non-response rate is 0.3%, while in the higher education sector (IR-3 questionnaire), unit non-response have been completely eliminated (0%).

2.2.6. Item non-response rate

The indicator is not computed.

Electronic questionnaires include built-in logical and arithmetic validation checks that reduce the submission of incomplete forms. If any data item is left blank or requires clarification, the reporting unit is contacted to provide additional information. In cases where the reporting unit cannot be reached, logical imputation is applied. As a result, the final database contains no missing values for any variable.

2.2.7. Processing errors

During the period between data collection and the start of statistical processing, the data undergo several stages of control and validation. Logical and arithmetic checks are built into the Excel questionnaires, while additional data verification rules applied during the post-validation phase are defined by the expert unit. The data are compared with those from previous years and with other available data sources. Any identified inconsistencies are verified with the reporting units and corrected where necessary. This process reduces the possibility of errors arising from data entry, coding and processing.

2.2.8. Imputation rate

The imputation rate at the reporting unit level is 1%. The imputation was carried out by combining historical data from these units from previous years and insight into other official sources.

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

Data revisions are carried out only exceptionally. In 2016, R&D data were revised as a result of improvements implemented in several statistical production processes. The survey methodology was revised in accordance with the Frascati Manual 2015 and Eurostat's methodological guidelines on the implementation of the Frascati Manual 2015 and the methodological harmonisation of research and development statistics across European Union 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.

3.1.1. Timeliness – first results

The timeliness of the first results is T + 11 months.

3.1.2. Timeliness – final results

Timeliness of final results is T + 19 months.

3.2. Punctuality

The results were published in accordance with the planned publication deadline of the Calendar of Statistical Data Issues and Publishing Programme.

3.2.1. Punctuality − delivery and publication

Delivery and publication is: 1.

4. Accessibility and clarity

- website of the Croatian Bureau of Statistics – electronic version of the First Release
- website of the Croatian Bureau of Statistics – Database

4.1. News release

Survey data are released in the First Release ZTI-2026-2-6 Research and Development, 2024.

4.2. Online database

Science, Technology and Information Society; Research and development - PC-Axis databases.

4.3. Microdata access

Conditions under which certain users can have access to microdata are regulated by the Ordinance on 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 version of the First Release
- website of the Croatian Bureau of Statistics – PC-Axis databases
- website of the Croatian Bureau of Statistics – Notes on methodology

5. Coherence and comparability

5.1. Asymmetry for mirror flows statistics

The indicator is not applicable for this survey.

5.2. Comparability over time

Data for 2024 are comparable with data for 2023, when the statistical unit enterprise was introduced for the first time. The data are not comparable with those from earlier years, as the survey for 2023 was conducted at the level of the statistical unit enterprise for the first time (prior to 2023, the survey was conducted at the level of legal units). Data for the period 2016-2022 are comparable over time. Data for 2016 are not fully comparable with those for earlier years due to improvements in several statistical production processes.

5.2.1. Length of comparable time series

Length of comparable time series is 1.

5.2.2. Reasons for break in time series

The break in time series occurred in 2023 due to introduction of the statistical unit enterprise, and in 2016 due to improvement of several statistical production processes.

5.3. Coherence – short-term and structural data

The indicator is not applicable.

5.4. Coherence – national accounts

The indicator is not applicable.

5.5. Coherence – administrative sources

The indicator is not applicable.

6. Cost and burden

6.1. Cost

	2024
Direct costs	40 440 €
Indirect costs	25 741 €
General costs	13 122 €
Total costs	79 303 €

6.2. Burden

The average estimated time for completing the questionnaire in all sectors was 573 minutes. In the business enterprise sector was 283 minutes, in the government and private and non-profit sector 1184 minutes and in the higher education sector 1754 minutes.