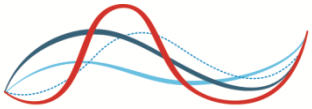
REPUBLIC OF CROATIA



CROATIAN BUREAU OF STATISTICS

# QUALITY REPORT FOR STATISTICAL SURVEY

## Community Innovation Survey

## 2014 – 2016

Organisational unit: Education, Culture and Science Statistics Department
Prepared by: Ivana Goda and Matija Škegro Vdović

September, 2020

## 0. Basic information

- Purpose, goal, and subject of the survey

The aim of the statistical survey on innovation activities of enterprises is to determine the share and characteristics of innovative enterprises in Croatia in the period 2014 – 2016. Innovative enterprises are business entities that introduced a product, process, organisational or marketing innovation as well as those who were engaged in innovation activities that were abandoned or suspended before completion, or in those that were still ongoing at the end of 2016.

The collected data provide information on the following:

- the number of enterprises that introduced new or significantly improved product (goods or services)
- the number of enterprises that introduced new or significantly improved methods of manufacturing or producing goods or services, new or significantly improved logistics, delivery or distribution methods for inputs, new or significantly improved supporting activities for processes
- the number of enterprises that had innovation activities that did not result in a product or process innovation because the activities were abandoned or still ongoing

- innovation activities and expenditure on product and process innovations
- public financial support for innovation activities
- sources of information and co-operation for product and process innovations
- the number of enterprises that introduced organisational or marketing innovation
- factors hampering innovation activities
- effect of legislation or regulations on innovation activities
- intellectual property rights
- characteristics of non-innovators
- innovations in logistics
- basic economic information on enterprises, such as total turnover for 2014 and 2016 (total turnover and average number of employees)

- Reference period

Several calendar years

- Legal acts and other agreements

Legal acts that define the responsibilities and authority of the Croatian Bureau of Statistics for collecting, processing and disseminating statistics are the following:

Official Statistics Act (NN, Nos. 103/03, 75/09, 59/12 and 12/2013 – consolidated text)
Programme of Statistical Activities of the Republic of Croatia (NN, No. 69/13)
Annual Implementation Plan of Statistical Activities of the Republic of Croatia 2017 (NN, No 63/2017)

- Relevant national standards:

  - Act on Scientific Activity and Higher Education (NN, Nos. 123/03., 198/03, 105/04, 174/04, 02/07, 46/07, 45/09, 63./11, 94/13, 139/13, 101/14, 60/15, 131/17)

- Decision on the National Classification of Activities – NKD 2007. (NN, No. 58/07 and 72/07)
- Register of Spatial Units – RPJ (codes of cities/municipalities, settlements)
- Ordinance on the Register of Statistical Spatial Units (NN, No. 37/08)
- Ordinance on the Classification of Business Entities according to the National Classification of Activities – NKD 2007. (NN, No. 80/07)

- Relevant international standards:
  - Oslo Manual – The Measurement of Scientific and Technological Activities – Guidelines for Collecting and Interpreting Innovation Data, OECD/Eurostat, 2005
  - Decision No 1608/2003/EC of the European Parliament and of the Council of 22 July 2003 concerning the production and development of Community statistics on science and technology
  - Commission Regulation (EC) No 995/2012 of 26 October 2012 implementing Decision No 1608/2003/EC of the European Parliament and of the Council concerning the production and development of Community statistics on science and technology

- Classification system

National Classification of Activities, 2007 version
International Standard Classification of Education
Code List of Countries

- Concepts and definitions

Innovative enterprises are business entities that introduced a product, process, organisational or marketing innovation in their business in the period from 2014 to 2016 as well as those who were engaged in innovation activities that were abandoned or suspended before completion or in those that were still ongoing at the end of 2016.

Product innovation is the introduction of a new or significantly improved good or service on market with respect to its capabilities, user friendliness, components or sub-systems. The product innovation (new or improved) must be new to the enterprise, but it does not need to be new to the market. It does not matter if the innovation was originally developed by the enterprise that introduces it or by another enterprise.

Process innovation is the implementation of a new or significantly improved production process, distribution method or support activity for goods or services. The innovation (new or improved) must be new to the enterprise, but it does not need to be new to the market. It does not matter if the innovation was originally developed by the enterprise that introduces it or by another enterprise.

Innovation activities include the acquisition of machinery, equipment, buildings, software and licenses; engineering and development work, feasibility studies, design, training, marketing and R&D when they are specifically undertaken in order to develop and/or implement a product or process innovation.

Ongoing or abandoned innovation activities include the acquisition of machinery, equipment, software, and licenses; engineering and development work, industrial design, training, marketing and R&D when they are specifically undertaken in order to develop and/or implement a product or process innovation.

Organisational innovation is a new organisational method in the enterprise's business practice (including knowledge management), workplace organisation or relations with external entities that has not been previously used by the enterprise. Organisational innovation must be the result of strategic decisions taken by the management. Excluded are mergers or acquisitions, even if they occurred for the first time.

Marketing innovation is the implementation of a new marketing concept or strategy that differs significantly from the enterprise's existing marketing methods and that has not been used before. It requires significant changes in a product design or packaging, product placement, product promotion or pricing. Excluded are seasonal, regular and other routine changes in marketing methods.

Innovation in logistics is a new set of services including planning, organisation, management, execution and monitoring of an enterprise's entire material, goods and related information flows (beginning with purchasing, production and warehousing to added value services, distribution and reverse logistics).

Product and process innovators are enterprises that introduced a product and/or process innovation or had ongoing or abandoned innovation activities in the period from 2014 to 2016.

Organisational or marketing innovators are business entities that introduced an organisational and/or marketing innovation in the period from 2014 to 2016.

Industrial activities in this survey are as follows: Mining and quarrying (05 – 09), Manufacturing (10 – 33), Electricity, gas, steam and air conditioning supply (35) and Water supply, sewerage, waste management and remediation activities (36 – 39).

Service activities in this survey are as follows: Construction (41 – 43)*, Wholesale trade, except of motor vehicles and motorcycles (46), Transportation and storage (49 – 53), Accommodation and food service activities (55 – 56)*, Information and communication (58 - 63), Financial and insurance activities (64 – 66), Real estate activities (68)*, Architectural and engineering activities, technical testing and analysis (71), Scientific research and development (72), Advertising and marketing research (73).

Activities marked with an asterisk are included in the analysis of innovation activities because of their significance in the Croatian economy.

Small enterprises are business entities employing 10 to 49 persons.
Medium-sized enterprises are business entities employing 50 to 249 persons.
Large enterprises are business entities employing 250 and more persons.

In-house R&D is a creative work undertaken within an enterprise in order to increase the stock of knowledge for the development of new and improved products and processes (including software development).

External R&D includes the same activities as above, purchased by the enterprise, but performed either by other companies (including other enterprises within the own group) or by public or private research organisations.

Acquisition of machinery, equipment, software and buildings comprises the acquisition of advanced machinery, equipment, software and buildings to be used for new or significantly improved products or processes.

Acquisition of existing knowledge from other enterprises or organisations comprises the acquisition of the existing know-how, copyrighted works, patented and non-patented

inventions, etc. from other enterprises or organisations for the development of new or significantly improved products and processes.

All other innovation activities include training for innovative activities, market introduction of innovations, design and other (other activities within an enterprise or activities that the enterprise has contracted with other companies in order to introduce new or significantly improved products and processes such as feasibility studies, testing, preparing production lines, industrial engineering, etc.).

- Statistical units

The basic units of statistical characteristics (observations) to which data refer are enterprises – legal entities and natural persons. Enterprises are broken down into three main size classes:

- 10 – 49 employees – small enterprises
- 50 – 249 employees – medium enterprises
- 250 + employees – large enterprises

- Statistical population

Target population covers active enterprises – legal entities and natural persons employing 10 or more persons that are, according to the main activity, classified in sections B, C, D, E, F, G, H, I, J, K, L, M of NACE Rev. 2

# 1. Relevance

## 1.1. Data users

The users of data on the Community Innovation Survey are divided into the following:

- internal users – national:
  - Ministry of Science, Education and Sport and Ministry of Economy, Entrepreneurship and Crafts – data are used for planning and creating policies and strategies, monitoring, analysis and international comparisons
  - scientific-research institutes (Institute of Economics) – data are used for national and international scientific-research projects with the aim to analyse innovativeness, competitiveness of Croatian enterprises and for comparative analysis
  - independent researchers – data are used for scientific-research projects
- external users – international:
  - Eurostat – data are used for systematic and user-oriented presentation of internationally comparable indicators on the Community Innovation Survey (for all Member States of the European Union).

### 1.1.1 User needs

Standard prescribed by Eurostat meets the needs of local and international users.

### 1.1.2 User satisfaction

A targeted measurement of user satisfaction specifically with the data from the survey on innovation activities of enterprises is not conducted. However, a general user satisfaction survey was conducted in 2015, which gave an assessment of user satisfaction for the area of

education, research and development, and culture statistics. According to the results of the survey, out of the total number of all users of data of the Croatian Bureau of Statistics, as much as 27% of them requested data from the field of education, research and development, and culture (to which this survey belongs) and rated their quality with a high score of 3.61. Detailed results of this survey can be found at http://www.dzs.hr/Hrv/international/Quality_Report/Quality_Report_Documents/Quality_Report Satisfaction_Survey.pdf.

### 1.2. Completeness

The survey was conducted by the Croatian Bureau of Statistics and was completely in accordance with the survey entitled "Community Innovation Survey", which is conducted in the European Union every two years. The survey covers all mandatory and optional variables laid down in Commission Regulation (EC) No 995/2012 of 26 October 2012 implementing Decision No 1608/2003/EC of the European Parliament and of the Council concerning the production and development of Community statistics on science and technology.

1.2.1. Data completeness rate

Data completeness rate is: 100%.

## 2. Accuracy and reliability

### 2.1. Sampling error

The sampling error can be expressed as follows:

- in absolute terms – as the standard error
- in relative terms – as the coefficient of variation
- in terms of reliability – as the interval of confidence.

According to the Eurostat methodological recommendations, a certain level of precision for the following indicators should be achieved:

1. percentage of innovative enterprises
2. percentage of innovators that introduced new or improved products to the market
3. turnover from new or improved products, as a percentage of total turnover
4. percentage of enterprises involved in innovation cooperation (in the total of product and/or process innovative enterprises)
5. total turnover per employee.

The 95% confidence intervals for the first three indicators should be ± 0.05, for indicator 4 ± 0.10 and for indicator 5 ± 10% of the estimate.

2.1.1 Sampling error indicators

The indicator for this survey is not calculated.

2.1.2 Bias due to sample selection process

The indicator for this survey is not applicable.

## 2.2. Non-sampling error

Non-sampling errors occur in all phases of a survey. They add to the sampling errors (if present) and contribute to decreasing the overall accuracy. It is important to assess their relative weight in the total error and devote appropriate resources for their control and assessment.

### 2.2.1 Coverage error

Coverage errors (or frame errors) occur due to divergences between the target population and the frame population.

The frame population is a set of target population members that have a chance to be selected into the survey sample. It is a list of all items in the population from which the sample is drawn, which contains contact details as well as sufficient information to perform stratification and sampling.

The companies that were liquidated during the observed period are deleted from the sample and target population, unless they were liquidated at the end of the observed period so they should be included in the target population. It is difficult to assess under-coverage because it is impossible to have information on the units not included in the frame population.

The frame misclassification rate was 13.22% (the number of enterprises that have changed stratum in relation to the number of enterprises in the stratum that have responded).

### 2.2.2 Over-coverage rate

The indicator for this survey is not calculated.

### 2.2.3 Measurement errors

Measurement errors occur during data collection and generate bias by recording values different from the true ones. The survey questionnaire used for data collection may have led to the recording of wrong values, or there may be respondent bias. Measurement errors can be divided into interviewer errors, respondent errors and data entry errors.

Interviewer errors in the survey on innovation activities in enterprises do not exist because the respondents (enterprises) fill in the online questionnaire (without interviewers). Respondent errors are reduced to minimum by instructions given to respondents in the questionnaire, built-in controls and skips in the online questionnaire, space for comments and telephone number for contact in the case respondents need additional explanations.

Filled in questionnaires are controlled and in the case of incomplete or inconsistent answers, respondents are contacted in order to receive correct and complete answer.
During data processing a detailed logical and mathematical control of all the answers is done.

### 2.2.4 Non-response errors

Non-response occurs when a survey fails to collect data on all survey variables from all the population units designated for data collection in a sample or complete enumeration.

There are two types of non-response – unit non-response, which occurs when no data (or so little as to be unusable) are collected for a designated population unit, and item non-response, which occurs when only data on some, but not all survey variables are collected for a designated population unit.
Non-response rate was 25.5% (enterprises that did not respond to the survey or did not receive the announcement letter).

### 2.2.5 Unit non-response rate

Unweighted non-response rate is: 24.5%.

Weighted non-response rate is: 26.61%.

### 2.2.6 Item non-response rate

The indicator for this survey is not calculated.

### 2.2.7 Processing errors

Between data collection and the beginning of statistical analysis on the basis of the statistics produced, data must undergo a certain processing: coding, data entry, data editing, imputation, etc. Errors that occur at these stages are called processing errors. Data editing identifies inconsistencies in the data, which usually represent errors.

During data processing, logical and mathematical control of the collected data is done. A part of logical and numerical controls is incorporated in the online questionnaire, and the rest of the rules is defined in the methodological unit responsible for the survey. Detected errors are corrected and if necessary, enterprises are contacted in order to receive complete and correct data. Processing errors are reduced to a minimum. Possible misclassification of enterprises by main activity is checked additionally and enterprises choose their main activity from a drop down menu. The questionnaire is programmed in a way that respondents answer to the questions by ticking a box depending on their answer. Only 12 variables have to be entered manually (innovation expenditure, turnover, number of employees) and special attention is paid to the answers to these questions.

### 2.2.8 Imputation rate

The indicator for this survey is not applicable.

### 2.2.9 Editing rate

The indicator for this survey is not calculated.

### 2.2.10 Hit rate

The indicator for this survey is not calculated.

### 2.2.11 Model assumption error

In the processing of the data collected by this survey, entirely methodologically correct models used in all EU Member States according to Eurostat recommendations were used. Therefore, there is no model assumption error.

### 2.3. Data revision

2.3.1 Data revision – policy

The users of statistical data are informed about revisions (preliminary, final data) on the website of the Croatian Bureau of Statistics.

2.3.2 Data revision – practice

Preliminary data are not published in the survey; therefore, there is no data revision.

2.3.3 Data revision – average size

The indicator for this survey is not applicable.

### 2.4. Seasonal adjustment

The indicator for this survey is not applicable.

## 3. Timeliness and Punctuality

### 3.1. Timeliness

3.1.1 Time lag – first results

The indicator for this survey is not applicable.

3.1.2 Time lag – final results

Time lag – final results is: T+18 months.

### 3.2. Punctuality

3.2.1 Punctuality – delivery and publication

Delivery and publication is 0.

## 4. Accessibility and clarity

The media used for the dissemination of the Community Innovation Survey results are the following:

- Paper publications – First Release
- website of the Croatian Bureau of Statistics – electronic version of the First Release.

### 4.1. News release

Survey data are published in First Release 8. 2. 5. Innovation activities in Croatian Enterprises, 2014 – 2016.

### 4.2. Other publications

Not applicable.

### 4.3. On-line database

Not applicable.

### 4.4. Micro-data access

The conditions under which certain users can access microdata are regulated by the Ordinance on the Conditions and Manner of Using Confidential Statistical Data for Scientific Purposes.

### 4.5. Documentation on methodology

Methodological documents are published in First Release in paper form and in electronic version available on the website of the Croatian Bureau of Statistics.

## 5. Comparability

### 5.1. Asymmetry for mirror flows statistics

The indicator for this survey is not applicable.

### 5.2. Comparability over time

5.2.1 Length of comparable time series

Length of comparable time series is: 5.

5.2.2 Reasons for break in time series

Break in time series occurred in 2009 in the survey for the period 2006 – 2008 due to the change in the National Classification of Activities.

## 6. Coherence

### 6.1. Coherence – short-term and structural data

The indicator for this survey is not calculated.

### 6.2. Coherence – national accounts

The indicator for this survey is not applicable.

### 6.3. Coherence – administrative sources

The indicator for this survey is not applicable.

## 7. Cost and burden

### 7.1. Cost

It is not possible to assess the costs of data collection, but they are reduced to a minimum due to the complete shift to online data collection.

### 7.2. Burden

A detailed analysis of the burden on reporting units was not carried out. The time spent on filling in the questionnaire depends on the size of the enterprise, the number of persons in the enterprise involved in filling in the questionnaire, and on whether the enterprise introduced an innovation or not. Small enterprises without innovation spend between 10 and 20 minutes filling in the questionnaire, while large enterprises spend about 1 hour or even more if the enterprise introduced innovation.