Innovation

1 Contact	
1.1 Organization	The Statistical Office of the Slovak Republic
1.2 Address	Miletičova 3, 824 67 Bratislava
1.3 Contact name	Branislav Ružek
1.4 Organization unit	Cross-sectional Statistics Department
1.5 Phone number	+421 2 50236 341; +421 2 50236 339
1.6 Email address	info@statistics.sk

2 Metadata update	
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3 Statistical presentation

3.1 Data description

Published data on innovations are the result of statistical surveys carried out by the Statistical Office of the Slovak Republic. The methodology of the innovation survey in Slovakia is harmonized with EU countries and is in line with international standards - OSLO manual fourth edition from 2018. The surveys are carried out on a selective basis (sample survey) in small and medium-sized enterprises and exhaustively (census) in large enterprises in industry, construction and in selected service sectors. The purpose of the statistical survey is to obtain information on the innovative activities of enterprises, i.e. from on new or significantly improved products and production processes, organizational and marketing methods. The results of the survey will be used for analytical purposes of statistics, to meet the needs of the information system of the Statistical Office of the Slovak Republic, the requirements of the European Statistical System and international organizations.

Statistical innovation survey collect data on on enterprise innovation activities (product innovation and process), business strategies, innovation expenditures, financing of innovation from public sources, cooperation on innovation activities, factors hampering innovation activities and overall enteprise expenditures. Data are available by economic activity (SKNACE Rev.2) in industry and selected services, by size category of enterprises and by regional breakdown by NUTS2 territorial classification. Innovation data are broken down by type of innovation activity (technological and non-technological innovation) and by technological sectors in manufacturing and services. The structure of innovation expenditure is broken down by type of innovation activities such as internal and external research & development and other innovation activities.

3.2 Classification system

Innovation statistics is compiled in accordance with the international statistical classifications:
- Statistical Classification of Economic Activities (SK NACE Rev. 2)

- Classification of Organizations by Number of Employees (KATP)
- Classification of Statistical Territorial Units (NUTS).

3.3 Sector coverage

The survey includes small and medium-sized enterprises, namely budget organizations, contributory organizations, non-profit organizations, non-profit funds, public non-profit institutions, non-investment funds, enterprises registered in the business register of 10 or more employees by random stratified sampling. Large enterprises are included exhaustively. According to the statistical classification of economic activities, Innovation survey covers the following SK NACE:
05 to 09 - Mining and quarrying,
10 to 33 – Manufacturing,
35 – Electricity, gas, steam and air conditioning supply,
36 to 39 – Water supply, sewerage, waste management and remediation,
41 to 43 – Construction,
46 – Wholesale trade, except of motor vehicles and motorcycles,
49 to 53 – Transportation and storage,
58 to 63 – Information and communication,
64 to 66 – Financial and insurance activities,
71 – Architectural and engineering activities; technical testing and analysis,
72 – Scientific research and development,
73 – Advertising and market research.

3.4 Statistical concepts and definitions

Innovation is a new or significantly improved product (good, service) introduced to the market or introduction of a new or significantly improved process within an enterprise or introducing of new organisational or marketing methods. Innovations are based on the results of new technological development, new combinations of existing technology or on the use of other knowledge acquired by the enterprise.
Product innovation is the introduction of a new product or service, or a product or service with significantly improved characteristics such as user friendliness, components and subsystems products or services. Product innovation includes products or services with significantly different characteristics from previous products or services introduced on the market.
Process innovation is the introduction of a new or significantly improved production process, distribution method or support activity for new products or services. Process innovation is the business process of a enterprise that differs significantly from business processes that have been implemented within the firm in the past.
Innovations may be developed by the innovating enterprise or by another enterprises; however purely selling innovation wholly produced and developed by other enterprises is not included as an innovation activity. Innovations should be new to the enterprise concerned; for product innovations they do not necessarily have to be new to the market and for process innovations the enterprise does not necessarily have to be the first to have introduced the process.
Expenditure on product and process innovation includes expenditure on internal research and development, external research and development and expenditure on all other innovation activities. Expenditure includes capital and current expenditures including wages.

3.5 Statistical unit

The statistical units used in order to compile innovation statistics are enterprises at national level.

3.6 Statistical population

The survey includes small and medium-sized enterprises with 10 or more employees by random stratified sampling. Large businesses are included exhaustively. In the survey for 2018 (CIS 2018) there were 8499 units in the target population (without construction) and 3409 units in the sample. The number of units in the sample based on the size category of enterprises was as follows:
Small enterprises - 10 - 49 employees = 2318
Medium enterprises - 50 - 249 employees = 626
Large enterprises - 250 and more employees = 465
According to the statistical classification of economic activities, the following activities enter the Innovation survey:
05 to 09 - Mining and quarrying,
10 to 33 – Manufacturing,
35 – Electricity, gas, steam and air conditioning supply,
36 to 39 – Water supply, sewerage, waste management and remediation,
41 to 43 – Construction,
46 – Wholesale trade, except of motor vehicles and motorcycles,
49 to 53 – Transportation and storage,
58 to 63 – Information and communication,
64 to 66 – Financial and insurance activities,
71 – Architectural and engineering activities; technical testing and analysis,
72 – Scientific research and development,
73 – Advertising and market research

3.7 Reference area

Innovation statistics are available in total for the Slovak Republic and and broken down by NUTS2 classification for 4 regions (Bratislava, Western Slovakia, Central Slovakia, Eastern Slovakia).

3.8 Time coverage

The SO SR database contains data on innovations since 2001.

3.9 Base period

The base period is not used in innovation statistics.

4 Unit of measure

Number of enterprises, average number of employed persons (before 2018 average number of employees), data on turnovers and expenditures on innovations in thous. EUR, share indicators in percent.

5 Reference period

The innovation survey is carried out on a biennial basis and the reference period covers 3 calendar years.

6 Institutional mandate

6.1 Legal acts and other agreements

The Statistical Office of the Slovak Republic collects information on innovations in the Inov 1-92 statistical survey on innovations which is included in the Program of State Statistical Surveys, published for three years in the Collection of Laws of the SR. The reporting obligation to submit statistical questionnaires by entities arises from the Act No. 540/2001 Coll. on State Statistics, as amended (Article 18 (3)) and it cannot be refused (Article 18 (8)). The Statistical Office of the Slovak Republic is responsible for the protection of confidential data obtained and guarantees its use solely for statistical purposes.

6.2 Data sharing

Statistical information from the innovation survey is a source for fulfilling the obligations of the Slovak Republic resulting from the requirements of the European Statistical System, the requirements of international institutions and to meet the needs of the national information system. The outputs are provided to international and national organizations on a regular biennial basis. Until 2003, R&D data were reported to Eurostat on the basis of a gentlemen's agreement. In 2003, 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 was adopted. For the reference years 2003 to 2011, the submission of data to Eurostat was based on Commission Implementing Regulation No. 1450/2004 of 13 August 2004 on the production and development of Community innovation statistics. From the reference year 2012 onwards, the updated Commission Implementing Redulation No. 995/2012 is applied.

7 Confidentiality

7.1 Confidentiality - policy

Protection of statistical confidentiality (protection of confidential statistical data) is a system of interconnected measures in legislative, methodological, organizational, technical, security, personnel area, which are preventing leakage of confidential statistical data or untimely publication of statistical information. Authorities or bodies executing state statistics shall adhere the obligation to ensure protection confidential statistical data as specified in §25a a §29 and §30 of the Act No 540/2001 on state statistics. Principles of applying protection of confidential statistical data are available on the website of the Statistical Office of the SR (only in Slovak) at: https://slovak.statistics.sk/wps/portal/ext/services/infoservis/confidential

7.2 Confidentiality - data treatment

Confidential statistics are not published. In publications and databases of the Statistical Office of the Slovak Republic, the symbol “D” is used instead of such data. Only research bodies for scientific purposes may have access to confidential data, for details see paragraph 10.4 of this report.

In innovation statistics we applie local suppression (primary and secondary), minimum frequency rule (n=3) and dominance rule (1, 90) (i.e. the turnover of the largest enterprise in aggregation exceeds 90 %).

8 Release policy

8.1 Release calendar

Data is not subject to publication in the first publication calendar. Basic data from the innovation survey are published on the SO SR portal by the end of June (18 months after the end of the reference period) and by the end of July data in various breakdowns and structure in DATAcube database.

8.2 Release calendar access

Not relevant.

8.3 User access

The Policy on dissemination is defined in accordance with the Act on State Statistics, the development strategy of the Statistical Office of the SR, the information dissemination strategy of Eurostat and European Statistics Code of Practice.
Principles of release and provision of statistical information are available on the website of the Statistical Office of the SR at:
https://slovak.statistics.sk/wps/portal/ext/services/infoservis/principles

9 Frequency of dissemination

Biennial.

10 Accessibility and clarity

10.1 News release

10.2 Publications

Publication of Innovation activity of enterprises in the Slovak Republic is available on the website of the SO SR at: https://slovak.statistics.sk/wps/portal/ext/themes/multi/science/publications
Statistical Yearbook of the Slovak Republic - contains selected indicators also for research and development innovation.

10.3 On-line database

Databases of the SO SR: DATAcube, STATdat on the website of the SO SR at: https://slovak.statistics.sk/wps/portal/ext/Databases

10.4 Micro-data access

Micro data are not published. Access to anonymised microdata may only be for scientific purposes by research entities
- universities and other higher education educational organizations
- scientific research organizations or institutions.

The conditions for granting access to confidential statistical data for scientific purposes are listed on the website of the SO SR at:
https://slovak.statistics.sk/wps/portal/ext/services/infoservis/access

10.5 Other

Specific outputs are provided to international and national organizations, in particular to the OECD, central government bodies and professional and trade unions.

10.6 Documentation on methodology

Methodology of innovation statistics in Slovakia is harmonized with EU countries and complies with international standards - OSLO Manual Fourth Edition of 2018. The English manual can be found on the OECD website at: https://www.oecd-ilibrary.org/science-and-technology/oslo-manual-2018_9789264304604-en
Methodological information on innovation statistics is provided in the survey questionnaire Inov 1-92, in the publication of Innovation activity of enterprises in the Slovak Republic and in tables in the public database of the Statistical Office of the Slovak Republic.

10.7 Quality documentation

Internal documentation of the Statistical Office of the SR on ensuring the quality of statistical outputs: internal Methodological directive for application of mathematical-statistical methods for statistical surveys MET-3/201, internal methodological directive - Quality indicators of statistical outputs and statistical processes MET-2/2012.
Quality reports for the innovation survey in accordance with the ESS Handbook for Quality Reports (EQHQR) are prepared in the ESS Metadata Handler environment on a two-yearly basis, based on Eurostat requirements.
Basic information on the quality of the Inov 1-92 survey (sample size, coverage, response rate, weighting) is also given in the publication of Innovation activity of enterprises in the Slovak Republic.

11 Quality management

11.1 Quality assurance

Statistical Office of the SR has established the system of quality management. Quality manual contains description of system of quality management and fulfillment of requirements of standard ISO 9001. The application of the manual in practice ensures that all activities with impact on the quality of statistical products are planned, managed, examined, evaluated and meet the requirements accepted in the customer order. Quality manual is available at:
https://slovak.statistics.sk/wps/wcm/connect/9ca43aa4-bfaf-4101-9dae-5263aa834df7/Prirucka_kvality.pdf?MOD=AJPERES&CVID=mu8R9IM&CVID=mu8R9IM
The basis of the whole system of quality management is European Statistics Code of Practice:
https://slovak.statistics.sk/wps/portal/ext/aboutus/key.documents/code.of.practise

11.2 Quality assessment

The quality of innovation statistics is very good. The coverage of the innovation survey, the reference period, the sampling methodology used, data collection, data control and data processing are governed by Eurostat methodology and recommendations for the production of common innovation statistics EU Member States.
The main strengths of the survey:
- The methodology is in line with the OSLO manual - fourth edition of 2018 and harmonized Eurostat / OECD data collection.

- Enables the fulfillment of the obligations of the Slovak Republic for data reporting according to Commission Regulation (EU) no. 995/2012.
- Results of the CIS 2018 survey are published in national electronic publication on the web site of the Statistical Office of the Slovak Republic (Data at NUTS2 level are available). Innovation data are also available in the public database. Data are accompanied with methodological description and made available for users in all forms of dissemination.
- Overall unit response rate (un-weighted unit response rate in Core NACE) was 84,3 %, so the non-response analysis was not carried out.
- The process of data collection and output generation is ensured within the integrated statistical information system, which incorporates controls for data collection and output generation algorithms that ensure the quality of output information. To evaluate the quality, the system provides statistics on the return of completed questionnaires, the number of erroneous questionnaires, the number of reminders, etc.

12 Relevance

12.1 User needs

The share of innovative enterprises, expenditure on innovations and their share in total turnover (innovation intensity) are among the most important indicators in the innovation survey.
The main users of innovation data are European Commission - Directorates-General for Research and Innovation, DG JRC, Eurostat, OECD, UNESCO, central government, research organizations, academia, researchers and doctoral students, professional associations, etc.

12.2 User satisfaction

Since 2009, the Statistical Office of the Slovak Republic has carried out at two-year intervals customer satisfaction surveys. The purpose of the survey is to obtain information on users interest and opinion regarding provision and quality of statistical products and services. Result of the survey in 2017 is published on the website of the Statistical Office of the SR.
https://slovak.statistics.sk/wps/portal/ext/aboutus/marketing/survey.of.satisfaction
In this user satisfaction survey, innovation has been linked with areas of R&D and information society statistics, therefore does not accurately reflect the satisfaction with innovation statistics. Communication with customers in case of specific requirements implies that users of innovation statistics are satisfied.

12.3 Completeness

100% compared to the relevant legislation - Commission Regulation no. 995/2012.
Time series of data for particular indicators are available in the public database of the Statistical Office of the SR and in the Eurostat database.

13 Accuracy and reliability

13.1 Overall accuracy

The SO SR makes a great effort to prevent errors in data and performs consistent data verification to detect errors. The survey methodology is based on general statistical methodological rules and recommendations for qualitative surveys, which guarantees a standard high accuracy of indicators.

13.2 Sampling error

In the innovation survey data for the responding units are calculated by calibrated weights to the total number of units (target population). The sampling error is the part of the difference between the value of the target population and its estimate that is caused by the estimate being calculated from a sample that is only a subset of the target population. The coefficient of variation is the main indicator for measuring the sampling error in the innovation survey and it is calculated for 3 basic share indicators:
Coefficient of variation (%) in CIS 2018 for key variables by NACE categories for enterprises with 10 and more employees together is as follows:

	(1)	(2)	(3)
Core NACE (B-C-D-E-46-H-J-K-71-72-73)	2,8	5,3	4,6
Core industry (B_C_D_E - excluding construction)	3,6	7,3	6,2
Core Services (46-H-J-K-71-72-73)	4,3	6,1	6,8

(1) = The share of innovative enterprises in the total population of enterprises.
(2) = The share of the turnover of product innovative enterprises with new or improved products, as a percentage of total turnover of product innovative enterprises.
(3) = The share of product and/or process innovative enterprises (incl. enterprises with abandoned and or on-going activities) involved in any innovation co-operation arrangement, as a percentage of innovative enterprises.

13.3 Non-sampling error

Non-sampling errors can occur in all phases of a survey. Coverage errors (or frame errors) are due to divergences between the target population and the frame population. To avoid non-sampling errors, i.e. errors in the process of collection and processing the Statistical Office of the Slovak Republic has integrated in the integrated statistical information system (IISIS) logical and data checks at level of micro-data and aggregated data, which are performed during the data collection and processing. The electronic questionnaire itself provides many arithmetic and logical checks between variables, which we distinguish between serious and informative. If there are serious errors in the form, it is not accepted and, after consultation with the reporting unit, it will be corrected so that it is correct and entered into processing. With these tools we try to minimize errors in the actual collection and subsequently during the data processing.
Coverage errors - are errors that result from differences between the target population and the frame population used to determine the sample. Coverage errors arise due to incorrect identification, classification, coding of the unit or a changed unit identification after sampling. Over-coverage - rate in CIS 2018:
Un-weighted over-coverage rate for Core NACE: 2,0 %
Weighted over-coverage rate for Core NACE: 2,1 %
Measurement errors resulted from incorrect data entry by the respondents, which occurred during the completion of the electronic questionnaire. These errors were identified and corrected through software controls in the data collection process.
Non response errors
1. Unit non-response - un-weighted and weighted unit non-response rate by NACE categories for enterprises with 10 or more employees in CIS 2018:

	(1)	(2)	(3)	(4)
Core NACE (B-C-D-E-46-H-J-K-71-72-73)	526	3342	15,7	16,5
Core industry (B_C_D_E - excluding construction)	244	1745	14,0	14,8
Core Services (46-H-J-K-71-72-73)	282	1597	17,7	18,2

(1) = Number of eligible units with no response
(2) = Total number of eligible units in the sample

(3) = Un-weighted unit non-response rate (%)

(4) = Weighted unit non-response rate (%)

In the innovation survey data for the responding units are calculated by calibrated weights to the total number of units (target population).

2. There are no item non-responses in the questionnaire, the filling of relevant items is ensured by built-in automatic checks during data collection.

Processing errors have been eliminated

In the final stage of processing the survey results before their transmission to Eurostat and publication, the data validation procedure is performed, in particular the control of data coding, the control of the relationships between variables and output tables. After obtaining the data, Eurostat also applies its own validation procedure.

14 Timeliness and punctuality

14.1 Timeliness

The publication of data in the public database of the SO SR is governed by an internal timetable. Innovation data are published up to 18 months after the end of the reference year.

Data are provided to Eurostat in accordance with Commission Regulation No. 995/2012 as follows: selected basic indicators up to the 15th month after the end of the reference year and the complete set of definitive data up to the 18th month after the end of the reference year.

14.2 Punctuality

Publication deadlines are respected.

15 Coherence and comparability

15.1 Comparability - geographical

Statistics on innovations are compiled for the whole territory of the Slovak Republic. In the classification by geographical area, according to NUTS2 classification it is divided into four regions (Bratislava, West Slovakia, Central Slovakia, East Slovakia).

15.2 Comparability - over time

Basic data are comparable over the entire time series. Since 2008, non-technological innovations have been included in the survey in addition to technological innovations. By implementation of the revised international methodology, the OSLO Manual fourth edition from 2018, several new indicators and methodological clarifications were introduced. The most significant change since 2018 has been the expansion of process innovations, partly to include non-technological innovations, which have not been included separately in the survey since that period.

15.3 Coherence - cross domain

Innovation survey are compared with data of annual structural business statistics. The comparison results show a high level of comparability.

15.4 Coherence - internal

There are no deviations, the statistical outputs are internally consistent.

16 Cost and burden

It is estimated on the basis of the reporting unit of the time required to complete the form. Costs in hours for all reporting units for 2018: 8499 hours. Average hours worked by one respondent in completing the questionnaire: 2.6 hours.

17 Data revision

17.1 Data revision - policy

The revision policy regulates the basics rules and general procedures for revisions of preliminary compiled data and also for revisions due to other reasons. The revision policy and the revision calendar are available on the website of the Statistical Office of the SR (only in Slovak): https://slovak.statistics.sk/wps/portal/ext/products/revisions

17.2 Data revision - practice

The data are considered definitive on first publication and are usually not subject to revision. In the event of any revision (also in previous years), a note is placed in the databases and in the relevant publications of the SO SR, indicating that the data have been revised. Changes in methodology are announced after their introduction in the form of methodological notes or notes to published data.

18 Statistical processing

18.1 Source data

Innovation statistics are compiled on the basis of survey Inov 1-92 - Statistical innovation survey (in the European Union called Community Innovation Survey - CIS) that is sample survey for small and medium-sized enterprises and exhaustive for large enterprises.

18.2 Frequency of data collection

Biennial.

18.3 Data collection

Electronic data collection enabling reporting units to fill in statistical forms online in the integrated statistical information system of the SO SR.
Since 1 January 2016, reporting units (legal entities, natural persons - entrepreneurs) have been obliged to submit statistical reports electronically in accordance with the amendment to Act no. 540/2001 Coll. on State Statistics as amended by Act No. 326/2014 Coll., Which contains new rules for the submission of statistical reports.

18.4 Data validation

Data validation is embedded in the integrated statistical information system (ISIS)of the SO SR. When collecting data, the following checks are distinguished:
1- formal checks carried out automatically in the data collection process
2- informal checks to check the complexity and relationships between variables.

In terms of severity of errors, a distinction is made between:
I - Infomatic errors - provide additional information that is necessary for the process of data checking and correction. They provide information on possible exceedances of the set limits, partial non-response, etc.
Z - serious errors - refer to specific errors that must be corrected or justified by the reporting unit. These errors are consulted with the reporting unit and corrected by employees of the SO SR.
Controls and algorithms for creation of outputs, which ensure their required quality, are also defined in the ISIS system.

18.5 Data compilation

The innovation survey is a combination of exhaustive and sample survey. The data collected are calculated. to the total number of units in the target population by means of calibrated weights and then processed by individual classification.

18.6 Adjustment

Data are not being edited.

19 Comment