

## 27. SCIENCE AND TECHNOLOGY

### Methodological notes

**Research and development (R&D)** surveys covers legal and natural persons with the prevailing activity in R&D as well as legal and natural persons, whose prevailing activity is different from R&D but their R&D potential calculated to the full time equivalent (FTE) is equal at least to one man-year.

According to the change in the methodology given in the Frascati manual 2015 since 2016 the indicator R&D employees (including doctoral students) was replaced by the new indicator R&D personnel. Since 2018 the indicator R&D personnel includes total number of persons engaged in R&D during the reference year, before it was number of persons engaged in R&D at the end of the reference year (as of December 31).

R&D activities include basic research, applied research and experimental development.

Methodology and content of R&D statistics is comparable with the EU international statistics.

**Industrial legal protection** statistics contains patents, utility models, designs and trade marks. Classification of inventions by subject is based on the International Patent Classification. Since 2017, the Industrial Property Office of the Slovak Republic has proceeded to publish data on patent applications and granted patents in aggregate form on the basis of recommendations from the World Intellectual Property Organization.

Survey methodology on **innovation** in the SR is harmonized with EU countries. The surveys were realized as a sample surveys in enterprises with 10 and more employees in industry, in construction and selected services. Selective sample included 40 % of total number of enterprises in the given branches and size classes of enterprises.

Data are presented at the prices and by methodology of the current year.

### Definitions

**R&D personnel** includes persons employed directly in the field of R&D as well as persons providing direct services to R&D. In extent of conducted R&D activity and providing direct services to R&D the number of R&D personnel includes R&D employees, pedagogical staff at universities and colleges, health employees, employees in prototypes, employees accepted to educational stay, working proprietors and unpaid family workers, external personnel and doctoral students.

Category of **researchers** comprises employed persons with decisive importance for production and social use of the scientific knowledge.

**Technicians and equivalent personnel** include employed persons participating in research projects by performing scientific and technical tasks usually under the supervision of researchers.

**Supporting staff** includes qualified and non-qualified workers, secretaries and other employed persons participating in the work on R&D projects. There are also included other managers and administrative employees dealing with personal and financial matters whose activities are qualified as a direct service supporting research.

**Expenditures on research and development** comprise total amount of expenditures spent in organization on R&D activities, i.e. they are internal expenditures. Expenditures spent out of the organization include only those serving for support to the internal R&D (e.g. purchase of equipment for R&D institutions). Depreciation of buildings, machines and equipment is excluded from

the statistical survey of internal expenditures on R&D.

**Capital expenditures** are resources for supplying tangible and intangible property. There are included expenditures on lands obtained for R&D needs (e.g. exploration lands, location for laboratories, semi-operational facilities), expenditures on buildings obtained by construction or purchase, expenditure for reconstruction or modernization of buildings etc. and expenditures on machines and equipment obtained for R&D needs (e.g. machines, computers including software etc.).

**Current expenditures** comprise costs on own activities of organizations and workplaces (it is a sum of operational and financial costs related to R&D activities) as well as the remuneration for persons working upon contract out of a labour-law relation and the expenditures for the purchase of direct services, which serve for carrying out of the internal R&D. The scholarships of the students of doctoral study are included too.

**Patent** is a protective document that guarantees its owner a time-limited and territorially restricted exclusive right for commercially exploitation of the protected invention. According to the Act No 435/2001 Coll. on Patents, Supplementary Protection Certificates and on Amendment of Some Acts as Amended (The Patent Act), patents shall be granted for inventions which are new, involve an inventive activity and are susceptible of industrial application after performing preliminary and substantive examination.

**Utility model** is a form of protection of new technical solutions which are results of an inventive activity from any technical field (not comply with the strict terms for the granting of a patent). Rights and obligations from creation and application of utility models are governed by the Act No 517/2007 Coll. on Utility Models and on Amendment of Some Acts as Amended.

**Design** shall mean the appearance of a whole or a part of a product resulting from the features of, in particular, lines, contours, colours, shape, texture or materials of a product itself or its ornamentation. Applications of designs must meet formal and substantive requirements according to the Act No 444/2002 Coll. on Designs as Amended, Novelty and a specific character of a design belong among the basic requirements for the entry of a design into the Register and certification.

A **trade mark** is verbal, figurative, three-dimensional or combined sign which is capable of distinguishing goods and services on the market. The Act No 506/2009 Coll. on Trade Marks as Amended defines the conditions for the so-called registrability of a trade mark and specifies in details the exclusions from registration as well as the signs that cannot serve as a trademark. For example, signs which are devoid of any distinctive character, indications containing official names of states, signs that designate the kind of goods or services, well-known geographical indications, deceptive denominations, signs identical with a trademark already registered for another person for identical goods or services.

The definition of **innovation** based on the revised Oslo manual methodology (fourth edition, 2018) includes two types of innovation: product innovation and business process innovation. According to the previous edition of the Oslo manual (2005), innovation covered product innovation or process innovation (technological innovations), but also organizational innovation and marketing innovation (non-technological innovations). Since 2018, in accordance with the revised Oslo manual methodology, non-technological innovations have not been separately surveyed but are partly included in business process innovations. Therefore, there has been an increase in data for business process innovation in the time series from 2018 and terms technological innovation and non-technological innovation are further not used.

**Innovation** is a new or significantly improved product (good, service) introduced to the market or introduction of a new or significantly improved process (including new organizational or marketing method). Innovations are based on the results of new technological development, new

combinations of existing technology or the utilization of other knowledge acquired by the enterprise. Innovations may be developed by the innovating enterprise or by other 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 business process innovations the enterprise does not necessarily have to be the first to have introduced the process.

**Product innovation** was realized when a product (good, service) which is new or significantly improved with respect to their fundamental characteristics, technical specifications, incorporated software or other immaterial components, intended uses or user friendliness. Changes of a solely aesthetic nature and pure sale of product innovations wholly produced and developed by other enterprises are not included.

**Business process innovation** includes new or significantly improved production technologies or new and significantly improved methods of supplying services, delivering products, information processing, accounting, workflow or work responsibility organization, and marketing methods. The outcome of such innovations should be significant with respect to the level of output, quality of products or costs of production and distribution.

**Enterprises with innovation activity** are enterprises that have had any kind of innovation activity during the surveyed period, i.e. have introduced new or significantly improved products or business processes or have had on-going or abandoned innovation activity aimed at products or business processes or had completed innovation activities that were not implemented or had carried out alternatively contracted-out research and development.

## Source

Published data on R&D and on innovations are the results of the statistical survey of the Statistical Office of the SR. Data on industrial legal protection are kept by the Statistical Office of the SR from the informational system of the Industrial Property Office of the SR.

More detailed information can be obtained from annual publications Yearbook of Science and Technology in the SR, from monothematic publication Innovation Activity of Enterprises in the Slovak Republic as well as from the Statistical Office of the SR website in the section Statistics – Multi-domain statistics – Science, technology and innovation including the public database of the Statistical Office of the SR – DATAcube.