

8. SCIENCE AND TECHNOLOGY

Notes on Tables 8-1 to 8-4 and 8-6

Data on the number of employees in research and development were obtained from the results of the regular annual statistical survey on research and development applicable to all businesses, which carry out R&D activities (systematic and creative work executed for the purpose of acquiring new knowledge or applying of it) as their principal or secondary activities irrespective of the number of personnel.

- The **registered number of employees as at 31 December (headcount)** refers to the number of persons, fully or partially active in research and development activities, employed under a contract of employment by the end of the year in the entities monitored. First of all, in higher education sector and partly also in the general government one, there are large numbers of persons working in R&D, particularly researchers, who have jobs, often part time, in more than one entity. Therefore, this indicator does not reflect the actual number of persons employed in R&D in the CR and so the given number of employees is overrated.
- **Researchers** are engaged in or manage projects that encompass a concept or creation of new knowledge, products, processes, methods, and systems. They are mostly science and professional intellectual workers and managers of research and development bodies and institutions.
- **Technicians and equivalent staff** (hereinafter only as technicians) carry out scientific and technical tasks within R&D activities, apply concepts and operating methods (usually under the supervision of researchers).
- **Other research and development personnel** contribute to or are assigned to research and development activities (e.g. craftsmen, secretaries, and clerks). This group also encompasses managers and administrative workers, whose activities provide direct services to R&D.
- **Business enterprise sector** includes all companies, organizations, and institutions, principal activity of which is market production of goods or services for sale to the general public at an economically significant price.
- **General government sector** includes, first of all, workplaces of the Academy of Sciences of the CR, other R&D workplaces established or managed by respective ministries (since 1 January 2007 majority of them adopted the new statute of public research institution), bodies of central and local government at all levels, except higher professional education and higher education under public control. Moreover, it includes also public libraries, archives, museums, and other cultural institutions, which carry out R&D activities as their secondary activity.
- **Higher education sector** includes all public and private universities, colleges, and other institutions of post-secondary education. R&D workplaces in higher education sector in the Czech Republic consist mainly of individual faculties of universities and since 2005, in accord with the OECD methodology, of 10 university hospitals as well. The sector is not a separate institutional sector; however, it was identified separately for the needs of the R&D statistics namely due to its indispensable role in the research and development field.

Detailed methodological information on this survey can be found in the CZSO publication "Research and Development Indicators 2015, code 211002-16", available for free on the link: <https://www.czso.cz/csu/czso/ukazatele-vyzkumu-a-vyvoje-2015> (Czech only)

Notes on Table 8-5

The Czech Statistical Office publishes, in cooperation with the Industrial Property Office (IPO), detailed statistics on patents according to the OECD Patent Statistics Manual (OECD, Paris, 2009).

- An **inventor** of an invention is a person, who created the invention by his or her own creative work. An inventor or co-inventor can only be a natural person. This person has the right to authorship (it is a personal right, non-transferable to a third person). The inventor is mentioned in the patent application and patent documents and information about the inventor is recorded in a patent register.
- A **patent** is a public deed issued by the competent patent office, which provides legal protection for an invention for the period of up to 20 years (if maintenance fees are paid) on the territory, for which it has been issued by the competent office (e.g. the IPO grants using so-called national way patents effective in the CR). A patent is applied for by filling a **patent application** at the competent patent

office. Patents are granted for inventions, which are new, are results of an inventive activity, and can be utilised in industry.

- The **technical solution of a utility model**, which is its essence and is protected by it after the certificate of registration has been issued, yet may not reach the level of an invention. It is, however, required this solution goes beyond the framework of mere professional skills, is not just a modification of the product resemblance, and has to be applicable on industrial scale. Manufacturing and production processes cannot be protected by a utility model.

Detailed information can be found at: https://www.czso.cz/csu/czso/patentova_statistika (Czech only)

Notes on Tables 8-7 to 8-11

These tables source data from 4 main data sources:

1. **Associated Information from Student Registers** (Ministry of Education, Youth and Sports, Czech Republic) report numbers of university students and graduates of science and engineering fields of education (included under code 05 Natural Sciences, Mathematics and Statistics and 07 Engineering, Manufacturing and Construction of CZ-ISCED 2013 classification).
2. **Labour Force Sample Survey** conducted quarterly by CZSO in households among individuals indicates number of professionals working in science and engineering sector (annual averages). Professionals in science and engineering are defined here through the internationally used ISCO-08 classification, code 21.

If the value is lower than 3,000, the data is considered to be of low reliability. Therefore, there is no information stated for categories of 'primary education or lower' and 'secondary education without A-level examination' and age groups 'up to 24 years' and '55+ years' where the number of persons is very low.

3. **Structural Wage Statistics** provide information on average wages and salaries of professionals in science and engineering. There are data stated for the code 21 of ISCO-08 classification, too.
4. **Eurostat** which provides data for the international comparison of the number of professionals in science and engineering included under code 21 of ISCO-08 classification.

More statistical data and methodological information on human resources in the field of science and engineering is available at the following website:

<https://www.czso.cz/csu/czso/lidske-zdroje-ve-vede-a-technologich> (Czech only)