

8. SCIENCE, RESEARCH AND INNOVATION

Notes on Tables 8-1 to 8-7

Data on the number of research and development (R&D) employees and workers were obtained from results of the regular annual statistical survey on research and development covering all economic entities, which carry out R&D activities, which shall mean systematic and creative work executed in order to acquire new knowledge or to apply it, as their principal or secondary activities irrespective of the number of their employees.

- 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 the higher education sector and partly also in the general government one, there are large numbers of persons working in R&D, particularly researchers, who are employed, 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 Czech Republic and so the given number of R&D employees is overvalued.
- **Research and development workers** 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 personnel**, 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 auxiliary personnel**, hereinafter as **other personnel**, contribute to or are assigned to research and development activities, e.g. craftsmen, secretaries, and clerks. This group also encompasses managers and administrative support workers, whose activities provide direct services to R&D.
- The **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.
- The **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.
- The **higher education sector** includes all public and private universities and other institutions of post-secondary education. R&D workplaces in the higher education sector in the Czech Republic consist mainly of respective 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 8-7

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).

- The **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 inventorship, which is a personal right non-transferable to a third person. The inventor, as a person, is given in the patent pending and patent documents and information on the inventor is recorded in a patent register.
- A **patent** is a public deed issued by the competent patent office, which provides legal protection of the invention for the period of up to 20 years, on condition that maintenance fees are paid, on the territory,

for which it has been issued by the competent office, e.g. the IPO grants so-called *national way patents* effective on the territory of the Czech Republic. 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 inventive activities, and can be utilised in industry.

- The **technical solution of a utility model**, which is its essence and is protected by the utility model after the certificate of the utility model 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 the utility model.

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

Notes on Tables 8-10 to 8-14

The tables take data from four main data sources:

1. The **Union Information from Students' Registers (SIMS)** of the Ministry of Education, Youth and Sports report numbers of university students and graduates of science and technology fields of education, which are included under codes '05 natural sciences, mathematics and statistics', and '07 engineering, manufacturing and construction of the manual CZ-ISCED-F 2013 to the classification CZ-ISCED 2011.
2. The **Labour Force Sample Survey** carried out quarterly by the CZSO among individuals in households indicates the number of professionals working in science and engineering sector (annual averages). Professionals in fields of science and technology are defined here under code 21 of the international classification of occupation ISCO-08,.

If the number of respondents of the survey sample is below 3 000, the data are considered to be of low reliability. Therefore, there is no information given for educational attainments of 'no education and primary education' and 'secondary education without A-level examination' and age groups 'below 25 years' and '55+ years' in which numbers of respondents are very low.

3. The **Structural Wage Statistics** provide information on average wages and salaries of professionals in the fields of science and technology. There are data for the code 21 of the ISCO-08 given here again.
4. **Eurostat** which provides data for the international comparison of the number of professionals in fields of science and technology included under code 21 of the ISCO-08.

More statistical data and methodological information on human resources in the fields of science and technology are available on the CZSO website at:

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