***23 SCIENCE, RESEARCH, AND INNOVATION***

***Methodological notes***

*Data in this chapter were mainly obtained from* ***regular statistical surveys of the CZSO****, especially from the* **VTR 5-01 *survey on research and development*** *(Tab.* ***23.1*** *to* ***23.8****). Many indicators were also compiled by the CZSO from* ***administrative data sources*** *provided by the Office of the Government of the Czech Republic, the General Financial Directorate, and the Industrial Property Office of the CR, as part of internationally comparable statistics on* ***direct and indirect (tax relief) government support for research and development*** *(Tab.* ***23.9*** *to* ***23.14****) and on* ***patent statistics*** *(Tab.* ***23.15*** *to* ***23.17****).*

*Based on international definitions, classifications, and uniform definitions for the monitored groups of employees, products, and industries, data on* ***science and engineering professionals*** *(Tab.* ***23.19*** *and* ***23.20****),* ***international trade in high-tech goods*** *(Tab.* ***23.23*** *and* ***23.24****), and economic indicators for the* ***high-tech sector*** *(Tab.* ***23.25****) were compiled* ***from other data sources of the CZSO*** *such as the Labour Force Sample Survey, Structural Business Statistics, or the International trade in goods (change of ownership) database, which are primarily used for other statistics. Data on* ***students of and graduates from science and engineering fields of education at universities*** *(Tab.* ***23.21*** *and* ***23.22****) were compiled from data sources of the Ministry of Education, Youth, and Sports.*

***Notes on Tables***

***Tab. 23.1 to 23.8 Research and development (R&D)***

***Research and experimental development*** *(hereinafter referred to as R&D)**comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge (OECD 2015, Frascati Manual). For an activity to be a R&D activity, it must satisfy five core criteria; it must be: novel, creative, uncertain, systematic, transferable and/or reproducible.*

*The term R&D covers three types of activity:*

– ***Basic research****, which is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.*

– ***Applied research****, which is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective.*

– ***Experimental development****, which is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.*

***Characteristics of research and development*** *are surveyed by the****Annual report (questionnaire) on research and development (*VTR 5-01*)****, which includes questions on human and financial resources earmarked for R&D activities realised in the territory of Czechia in respective sectors of R&D performance. The statistical survey is based on an international methodology mentioned in the****Frascati Manual*** *and results of the survey are used to fulfil obligations resulting from the Regulation (EU) 2019/2152 of the European Parliament and of the Council.*

*The main surveyed indicators include the* ***number of*** *persons working in R&D* ***(R&D personnel)*** *by function (researchers, technicians, and other supporting staff) and the (amount of)* ***expenditure on R&D performed*** *in the surveyed entities by type (labour cost, other current expenditure, and capital expenditure) and source of funds. Other surveyed indicators in the government and higher education sectors include* ***revenue from sale of R&D services*** *and the* ***number of researchers by citizenship****.*

*The* ***report (questionnaire) on research and development*** *is sent to**all legal and natural persons performing R&D in the territory of Czechia irrespective of whether it is their principal or secondary economic activity.*

*Based on available characteristics of surveyed entities performing R&D, all surveyed indicators are available in the* ***breakdowns as follows*** *and in their mutual combinations:*

– *by sector and type of entity performing research and development (R&D performer);*

*– by prevailing field of R&D (the FORD classification);*

– *by principal economic activity (an economic activity defined according to the CZ-NACE classification); and*

– *by (the amount of) R&D expenditure.*

***Sector of research and development performance*** *is a basic international category used in R&D statistics. Moreover, the CZSO also surveys basic characteristics of R&D within these sectors by type of entity, in which R&D is performed. Surveyed R&D indicators (Tab.* ***23.3*** *and* ***23.4****) are published in the following* ***four sectors of performance of R&D****:*

*–****business enterprise sector*** *mainly focuses on applied research and experimental development and especially includes private enterprises performing R&D for their own activity or within a group of enterprises. Based on the* ***ownership****, the business enterprise sector comprises* ***public enterprises*** *(corporations),* ***domestic-controlled private enterprises*** *(corporations), and* ***foreign-controlled private enterprises*** *(corporations). The business enterprise sector can be further broken down by* ***economic activity*** *defined based on the principal activity (CZ-NACE classification) and* ***size*** *(number of employed persons) of surveyed enterprises;*

*–****government sector*** *comprises* ***all public research institutions*** *(legal form 661) performing R&D as their principal activity (CZ-NACE 72). They are* ***workplaces of the Czech Academy of Sciences*** *and, further,****other public research institutions****, which were established by individual ministries. The government sector further includes* ***libraries, archives, and museums*** *(CZ-NACE 91),* ***health establishments*** *(CZ-NACE 86* *excluding teaching hospitals), and****other*** *semi-budgetary organisations of the state, Regions, or towns (except for universities), which perform R&D as their secondary activity;*

*–****higher education sector*** *primarily**comprises individual faculties and other workplaces of* ***public and state universities*** *and, in compliance with the methodology of OECD, also* ***teaching hospitals****. This sector is not a separate institutional sector; however, it has been separately identified by the OECD because of its important role in R&D;*

*–****private non-profit sector*** *comprises private institutions primary aim of which is not generation of profit but providing of non-market services to households. In the area of R&D, they are, for example, associations of research organisations, special-interest associations, associations, or generally beneficial companies (public benefit societies / benevolent societies). The importance of the private non-profit sector is insignificant in Czechia as for surveyed indicators of R&D.*

*The number of entities performing R&D by sector and type of entity for the year 2024 are provided in the Tab.* ***23.2****.*

*Research and development activities are especially measured* ***in the government sector and the higher education sector*** *in the following six* ***main fields of R&D******(broad fields)*** *defined according to an international classification called the****Fields of Research and Development Classification*** *(FORD classification):*

*–****Natural sciences*** *(Mathematics, Computer and information sciences; Physical sciences; Chemical sciences; Earth and related environmental sciences; Biological sciences; Other natural sciences);*

*–****Engineering and technology*** *(Civil engineering; Electrical engineering, electronic engineering, information engineering; Mechanical engineering; Chemical engineering; Materials engineering; Medical engineering; Environmental engineering; Environmental biotechnology; Industrial biotechnology; Nano-technology; Other engineering and technologies);*

*–****Medical and health sciences*** *(Basic medicine; Clinical medicine; Health sciences; Medical biotechnology; Other medical science);*

*–****Agricultural and veterinary sciences*** *(Agriculture, forestry, and fisheries; Animal and dairy science; Veterinary science; Agricultural biotechnology; Other agricultural sciences);*

*–****Social sciences*** *(Psychology and cognitive sciences; Economics and business; Education; Sociology; Law; Political science; Social and economic geography; Media and communications; Other social sciences);*

*–****Humanities and the arts*** *(History and archaeology; Languages and literature; Philosophy, ethics and religion; Arts (arts, history of arts, performing arts, music); Other humanities).*

*Data on the R&D by main field of R&D (broad field) are based on the* ***prevailing field*** *of the surveyed R&D workplaces (Tab.* ***23.6****). All surveyed characteristics of R&D for one workplace are only allocated to one prevailing group of fields of R&D even when a given workplace is active in more main fields of R&D (broad fields).*

*Since modern R&D removes boundaries among individual fields of R&D more and more, it is necessary when interpreting found data in this breakdown to do so with reserve and caution.*

***Research and development (R&D) personnel***

*Persons employed in research and development (hereinafter referred to as* ***R&D personnel****) comprise researchers, technicians, administrators, and employees at R&D workplaces in individual reporting units, who ensure direct services for those workplaces. Persons employed in R&D in surveyed entities full-time or part-time (employees) are mainly included here; those who perform R&D activities for those entities based on agreements on work activity or agreements on work performance (in Czech “*dohoda o pracovní činnosti*” (*DPČ*) and “*dohoda o provedení práce*” (*DPP*), respectively) are included here, too. R&D personnel* ***do not include*** *employees performing for a given R&D workplace* ***indirect services****, such as, for example, operation of company/staff canteen, security services, cleaning services, or security guard.*

*R&D personnel are broken down according to the work they perform (****function****) as follows:*

*–****researchers*** *who**are engaged in the conception or creation of new knowledge, products, processes, methods, and systems or who manage such projects. They are mainly professionals and R&D managers;*

*–****technicians and equivalent staff*** *(hereinafter only referred to as* ***technicians****) who participate in R&D by performing scientific and technical tasks involving the application of concepts, operational methods and the use of research equipment, normally under the supervision of researchers;*

*–****other supporting staff*** *in**R&D**who are skilled and unskilled craftsmen, and administrative, secretarial, and clerical staff participating in R&D projects or directly associated with such projects; also included are managers, administrators, and clerical staff, activities of whom are a direct service to R&D.*

*The number of R&D personnel is surveyed by* ***two main******measurement units****:*

*–****Headcount (HC)*** *of R&D personnel refers to the registered number of persons fully or partially engaged in research and development activities, employed in the reporting units in main or secondary employment as at the end of the reference year. R&D personnel also include employees who perform other activities in surveyed entities, too. For example, in the higher education sector, most of academics who are in the majority of cases mainly devoted to pedagogical activities are included in researchers. Part of them have an employment contract in several entities at the same time.*

*–****Full-time equivalent (FTE)*** *refers to the average registered number of R&D personnel converted to annual full-time workload devoted to R&D activities. One FTE equals one-year (full-time) work of a member of personnel who is 100% engaged in R&D activities. The FTE indicator also includes the number of persons working for the reporting unit under agreements on work performance and agreements on work activity converted according to the methodology valid for the FTE.*

***Research and development (R&D) expenditure***

***Research and development expenditure*** *includes all expenditure spent during the reference year on R&D performed in reporting units (intramural R&D) in the territory of a given country regardless the source or the way of funding.*

*Surveyed (intramural) R&D expenditure* ***does not include*** *extramural expenditure on R&D performed outside a reporting unit, sector, or country. The intramural R&D expenditure thus excludes expenditure spent on purchase of external R&D from entities performing R&D, sources transferred to other experts within a common R&D project, and subsidies or contributions (financial transfers) provided to third persons for R&D performed at their place. The extramural expenditure is surveyed separately within the* VTR 5-01 *statistical questionnaire (report).*

*Total expenditure on R&D made in the territory of a given country is statistically measured by the indicator of* ***the gross domestic expenditure on R&D (GERD)****. The indicator includes funds received from abroad (i.e. the “rest of the world”) for R&D performed in the territory of the given country; however, it excludes domestic funds provided for R&D performed abroad.*

*R&D expenditure* ***by******type*** *is broken down as follows:*

– ***labour costs of R&D personnel*** *including statutory (mandatory) contributions to general health insurance and social insurance schemes paid by employers for their employees (personnel expenses), and costs for remuneration for work based on various contracts for work (agreements on work performed outside an employment contract, i.e. Czech “*dohoda o  provedení práce (DPP)*” translated as “an agreement on work performance” and “*dohoda o pracovní činnosti (DPČ)*” translated as “an agreement on work activity” type of contract) in R&D;*

– ***other current (non-investment) expenditure on R&D*** *mainly includes energy, material, and equipment consumption for performed R&D as well as expenditure on services supporting R&D performed, including related administrative and other overhead costs and a share of administrative overhead costs directly related to R&D performed;*

– ***capital R&D expenditure includes:***

– *acquisition of land, buildings, and structures, including their technical improvements for the purposes of performed R&D;*

– *acquisition of tangible fixed assets such as machinery, apparatus(es), instruments, and other technical equipment and devices used for R&D; and*

– *acquisition of intangible fixed assets such as computer software and other intellectual property products used for R&D.*

***Source of R&D funds*** *(****Tab. 23.4****) belongs**to basic characteristics surveyed in the area of statistics on total R&D expenditure, but also of expenditure performed in individual sectors and entities. The CZSO, according to recommendations provided in the Frascati Manual, distinguishes the following main sources of R&D funds:*

*– funds from the****business enterprise sector*** *mainly comprising* ***own (internal) sources*** *generated from the business activities of surveyed enterprises and subsequently invested in their own R&D activities. Besides these internal sources, this also includes* ***financial transfers*** *received from domestic or foreign enterprises operating within the same group of enterprises for performing R&D in the surveyed entity. As for the* ***government and higher education sectors****, funds from the business enterprise sector mainly include* ***revenue from sale of R&D services*** *and revenue from royalties and licence fees for intangible results of R&D received from domestic or foreign enterprises;*

*– funds from the****government sector – national*** *that come from the state budget or budgets of Regions earmarked for R&D performed in the territory of Czechia. These funds include both institutional funding of long-term conceptual research organisation development and R&D project funding; and*

*–****funds from the******European Union****, which include funding of R&D performed in surveyed entities by means of individual operational programmes or research framework programmes of the EU.*

*Besides the aforementioned main sources, also* ***other sources*** *contribute to R&D funding, which mainly comprise own sources of universities and private non-profit institutions originating neither from the state budget, the business enterprise sector, nor from abroad. Sources from international organisations out of the EU are also included here.*

***Revenue from sale of R&D services***

*Revenue from sale of R&D services is total revenue that an entity performing R&D obtains in a given year for customised research. In the case of research organisations in the government sector and the business enterprise sector it is so-called* ***contract research*** *(Tab.* ***23.8****). The following information is surveyed: for whom the research organisation performed the research against payment (for a fee), whether it was an entity from Czechia or from abroad, and which sector the orderers of the services belong to (the business enterprise sector, the government sector, the higher education sector, or the private non-profit sector).*

***Tab. 23.9 to 23.13 Government budget appropriations for R&D***

*Statistics of government budget appropriations for R&D (****GBARD****) is primarily ensured from data obtained from the* ***R&D Information System*** *(the****Information system of research, development, and innovation)*** *that the CZSO further processes in the breakdown by* ***socio-economic goal*** *(Tab.* ***23.12****).**Data that are not available in this information system, the* ***CZSO ascertains*** *(obtains) directly from individual beneficiaries of government support of R&D.*

*Statistics of direct government support of R&D takes into account international methodology provided in the* ***Frascati Manual*** *and also terminology and specification of expenditure pursuant to the Act No 130/2002 Sb, on the Support of Research, Experimental Development, and Innovations from Public Funds (as amended). Results of this statistics are used to comply with obligations stemming from the Regulation (EU) 2019/2152 of the European Parliament and of the Council.*

*Government budget appropriations for R&D include* ***all funds*** *provided from the state budget to support R&D, including funds flowing to R&D abroad. Both current (non-investment) and capital (investment) expenditure are included (Tab.* ***23.10****). The statistics measures both project and institutional R&D funding from the state budget. In accordance with the valid international methodology, government budget appropriations for R&D* ***exclude*** *R&D support provided through repayable loans, pre-financing of EU programmes covered by European Union revenues, and innovation support.*

*For the year 2024, those data are presented that are provided in the* ***R&D Information System*** *(the****Information system of research, development, and innovation)*** *as* ***funds allocated*** *for the given year. These data* ***are not fully comparable*** *with data for the previous years, where the CZSO resulted from data provided in the* ***State Final Account*** *for* ***funds drawn*** *for R&D.*

*A* ***socio-economic objective*** *is a field of R&D determined in advance, which is used for analytical purposes while classifying the government budget appropriations for R&D. A list of socio-economic objectives (SEO) is provided in the****Nomenclature for the analysis and comparison of scientific programmes and budgets*** *(NABS, Eurostat 2007). It includes 11 specific objectives, 2 objectives in the area of general advancement of knowledge, and 1 objective focusing on the support of defence R&D.* ***General advancement of knowledge*** *(SEO 12+13) mainly includes support of basic research in individual fields of R&D performed at universities and workplaces of the Czech Academy of Sciences.*

*Government budget appropriations for R&D are, besides socio-economic objectives, also surveyed in the* ***following breakdowns*** *and mutual combinations thereof by:*

*– type of expenditure (current and capital);*

*– mode of support (type of funding: project funding and institutional funding) according to the OECD methodology;*

*– main providers; and*

*– type of beneficiaries (public universities, public research institutions, private enterprises, etc.)*

*In the case of beneficiaries that are* ***private enterprises*** *(Tab.* ***23.13****), also by their ownership, size (group), and economic activity (CZ-NACE section).*

*By* ***type of funding*** *of R&D from the state budget, government budget appropriations for R&D (Tab.* ***23.11****) break down according to the OECD methodology included in the Frascati Manual as follows:*

*–****project funding****, which includes R&D projects funded under national R&D programmes announced by individual ministries, by the Czech Science Foundation or the Technology Agency of the CR, and further co-financing (from the state budget) of EU programmes designated for the support of R&D in Czechia, and*

*–****institutional funding****, which mainly includes funding of long-term conceptual research organisation development, has since the year 2010 gradually replaced the support provided in the form of research intentions. Institutional support, according to the OECD methodology, also includes funding of specific university research, funding of international co-operation in the area of R&D, and funding of Czech Academy of Science infrastructure.* ***Specific research at universities*** *includes research performed by students within their doctoral and master study programmes. Support of* ***international R&D*** *(international R&D funding) includes fees for participation or membership of Czechia in international research and development programmes and also support of selected international R&D projects (such as ERA (European research area), ESA, etc.).*

*More detailed information on the statistics thereof can be obtained at:* [*www.csu.gov.cz/government-budget-allocations-for-rd*](http://www.csu.gov.cz/government-budget-allocations-for-rd)

***Tab. 23.14 Government tax relief for R&D expenditure in private enterprises***

***Statistics on******government tax relief for R&D expenditure*** *brings detailed data on indirect government support of R&D in* ***private enterprises****. The CZSO processed these data based on data available in tax returns of legal persons provided by the* ***General Financial Directorate*** *within an internationally comparable statistical task known under the abbreviation of* ***GTARD*** *standing for the Government Tax Relief for R&D Expenditure.*

*In Czechia,* ***indirect government support of R&D*** *has been provided since 2005, namely in the form of* ***tax deductions*** *from the income tax base of legal persons for eligible current (non-investment) expenditure related to R&D projects.*

*Every legal entity* ***is legally entitled******to*** *a* ***tax deduction for R&D*** *if it meets the legislative requirements, without any prior approval from the public administration. The rate of these deductions is the same for all entities in Czechia, regardless of their size, age, or the volume of investment in R&D. There is no minimum or maximum limit on R&D costs that can be used for the R&D tax deduction. Companies do not have to claim their R&D expenditure for a given tax period, but in the event of a loss, they can carry them forward as a whole or in parts to subsequent years (but no later than 3 years after they were incurred).*

*Tax deductions for R&D* ***cannot be applied*** *on (claimed for) projects, that have received at least partial direct financial support from national or foreign government sources and further on expenditure related to purchase of services and intangible results of research and development (except for those purchased from public research organisations).*

***Government tax relief for R&D expenditure*** *in the case of Czechia is equal to R&D expenditure that businesses applied for the surveyed year in their tax returns in compliance with the Section 34(4) of the Act No 586/1992 Sb, on Income tax (tax relief for R&D) multiplied by the income tax rate. The tax rate for legal persons for the years 2010*–*2013 was 19%.*

*More detailed information on the statistics thereof can be obtained at:* [*www.csu.gov.cz/government-tax-relief-for-rd-expenditure*](http://www.csu.gov.cz/government-tax-relief-for-rd-expenditure)

***Tab. 23.15 to 23.17 Patent activity***

*A****patent*** *is a public deed issued by the relevant patent office, which provides legal protection to an invention for the period of up to 20 years (provided that maintenance fees are paid), namely in the territory for which it was issued by the office. Patent protection in the territory of Czechia is ensured by the****Industrial Property Office of the CR (IPO CR)****, which is a data source for Tab.* ***23.15 and 23.16****. For Tab.* ***23.17****, the* ***World Intellectual Property Organization (WIPO)*** *is the data source.*

*Patents are granted for* ***inventions****, which are* ***novelties****, they are a result of* ***activity of inventors****, and are* ***industrially applicable****. The following can be patented: not only products and technologies, but also chemically produced substances, drugs, industrial production microorganisms, as well as microbiological ways and products obtained by those ways. What cannot be patented, on the contrary, are discoveries or scientific theories, programmes for computers, new cultivars of plants and breeds of animals or ways of surgical or therapeutic treatment of human or animal bodies, and diagnostic methods used at human or animal bodies.*

*A patent may be granted through the so-called* ***national way****, when an application is filed directly with the IPO CR. This option is mainly used by domestic applicants. It also includes utilisation of applications filed with the IPO CR by means of a* ***Patent Cooperation Treaty*** *(PCT). These so-called PCT applications make it possible to apply for patent protection of an invention in multiple countries simultaneously. The second option, which is chosen mainly by foreign applicants, is the validation of a****European patent****, granted by the European Patent Office, for the territory of Czechia, which is carried out by the IPO CR after statutory conditions have been met.*

*Patent data given in Tab.* ***23.15*** *and* ***23.16*** *are classified using the so-called****fractional method*** *(e.g., if two applicants from different countries file together a patent application, a half of the patent is assigned to each country). All these data are shown according to the year when a patent was granted or validated for the territory of Czechia. Data in the Table* ***23.17*** *are broken down by* ***country of the first mentioned applicant****, i.e. they do not take into account patents, where Czechia is stated as the second (or further in order) applicant. On the contrary, applicants from Czechia can file the same patent application with multiple patent offices (countries) for the same invention.*

*More detailed information on the statistics thereof can be obtained at:* [*www.csu.gov.cz/patents-and-licences*](http://www.csu.gov.cz/patents-and-licences)

***Tab. 23.18 Patent licensors and received patent royalties and licence fees***

*A****licence*** *is one of the possibilities to use industrial rights and intellectual property on a commercial basis. A****licence agreement*** *refers to granting of the right, in an agreed scope and in an agreed territory, for acquisition or provision of patented or non-patented inventions. The licensor entitles the licence acquirer to exercise industrial property rights in an agreed scope and in an agreed territory and the licence acquirer undertakes to provide some payments (licence fees) or another asset.*

*By subject of a licence there are* ***patent licences****, the subject of which is to provide the right to use a valid patent either in the country of the acquirer (purchaser) or in countries, to which the acquirer of the licence intends to export the licence product,* ***utility model licences****, the subject of which is an industrial design or a utility model,* ***know-how licences****, the subject of which is to provide unprotected production and technical knowledge or experience.*

*The CZSO has been surveying data on licences provided and revenue (income) thereof in the area of industrial property protection by the****Annual questionnaire on licences*** *(***Lic 5-01***). The questionnaire is sent to all entities about which the CZSO has relevant information that they have a valid licence agreement concluded for providing rights to use some of industrial property protections. In terms of dissemination of results of research and development and their capitalisation, the most important subjects of licence agreements are provided* ***patent licences****, on which the CZSO primarily focuses in its survey. Besides data on valid patent licences, data on* ***newly concluded licence agreements*** *for provided patent-protected inventions are surveyed.*

***Tab. 23.19 and 23.20 Science and engineering professionals***

***Science and engineering professionals*** *are a narrow group of experts. Within their work activities, they**conduct research, improve or develop concepts, theories and operational methods, or apply scientific knowledge relating to fields such as physics, astronomy, meteorology, chemistry, geophysics, geology, biology, ecology, pharmacology, medicine, mathematics, statistics, architecture, engineering, design, and technology. These professionals are defined based on the****Classification of Occupations (*CZ-ISCO*)*** *and contain the following minor groups of occupations of the* CZ-ISCO *sub-major group 21, which are sources of their main income:*

*211 Physical and earth science professionals;*

*212 Mathematicians, actuaries and statisticians;*

*213 Life science professionals;*

*214 Engineering professionals (excluding electrotechnology);*

*215 Electrotechnology engineers;*

*216 Architects, planners, surveyors and designers.*

*In the Tab.* ***23.19****, data on persons employed in the* CZ-ISCO *211 and 212 occupations are reported together in the category of Physicists, chemists, mathematicians, statisticians and related professionals.*

*Data on the****numbers*** *of science and engineering professionals (Tab.* ***23.19****) come from the****Labour Force Sample Survey (LFSS*)**. *In order to ensure higher reliability and to eliminate considerable year-on-year fluctuations of values for this group of employees, data in the table are provided as* ***three-year moving averages*** *(i.e., for example, the value for 2023 is calculated as an average from the values for 2022, 2023, and 2024). In 2023, a new weighing method was introduced within the LFSS. More detailed information on the LFSS can be found in the Chapter* ***10*** *Labour Market, Part B.*

*Data on* ***wages*** *of science and engineering professionals (Tab.* ***23.20****) come from a special data processing from the* ***structural wage statistics.*** *The structural wage statistics is based on data of the* ***Information and statistics on average earnings (ISAE;* ISPV** *in Czech****)****, which merges data obtained from the Salary Information System (Salary and Service Income Information System (*ISPSP *in Czech), i.e. an administrative data source of the Ministry of Finance, which exhaustively covers the* ***salary sphere*** *and from a Quarterly sample survey on average earnings of the Ministry of Labour and Social Affairs, which covers the* ***wage sphere****. More detailed information on the structural employee wage statistics can be found in the Chapter* ***10*** *Labour Market, Part A, namely in notes on Tab.* ***10.4*** *and****10.5****.*

*More detailed information on the statistics thereof can be obtained at:* [*www.csu.gov.cz/science-and-engineering-professionals*](http://www.csu.gov.cz/science-and-engineering-professionals)

***Tab. 23.21 and 23.22 Students of and graduates from science and engineering fields of education at universities***

***Education at universities*** *presented in these tables belongs to the tertiary level of education and includes a* ***bachelor, follow-up master, master****,**and* ***doctoral*** *study programme. The follow-up master and master study programmes are given in tables together as* ***master study programmes****.*

*Fields of education given in these tables are defined based on the* ***International Standard Classification of Education: Fields of Education and Training 2013 (ISCED-F 2013)*** *as follows:* ***Science fields of education*** *correspond to the broad field of Natural sciences, mathematics and statistics (code 05) and* ***Engineering fields of education*** *correspond to the broad field of Engineering, manufacturing and construction (code 07). More detailed breakdown of these fields of education is provided on the CZSO website at:* [*http://www.csu.gov.cz/klasifikace-oboru-vzdelani-cz-isced-f-2013*](http://www.csu.gov.cz/klasifikace-oboru-vzdelani-cz-isced-f-2013) *(Czech only)*

*Numbers of students and graduates are given as* ***headcount****. Students who study in several (multiple) study programmes or several fields of education simultaneously are included in each study programme or field of education they are studying. The total numbers of students and graduates thus do not have to be equal to the sums of students and graduates of respective types of study programmes.*

*The data were obtained from data sources of the Ministry of Education, Youth, and Sports, namely from* ***the Union Information from Students’ Registers (the*“SIMS” *database)****. The source* SIMS *database is continually completed and updated, including retrospective corrections. Data published in this Yearbook correspond to the state of processing as at 30 July 2025. Data on students of universities are always related to 31 December of the relevant year; data on graduates are related to the entire school year.*

***Tab. 23.23 International trade in high-tech goods***

*Goods with high technology intensity (hereinafter only referred to as* ***high-tech goods****) mean products, production and processing of which require (in a large extent) top, technologically highly advanced, and intensive operations. Development of those products is usually accompanied by relatively high costs for research, development, and innovation.*

***High-tech goods*** *are divided to nine main groups (aggregations) by Eurostat, namely according to the****Standard International Trade Classification (SITC)****.**Groups such as chemistry, pharmacy, electrical machinery or non-electrical machinery only include selected goods according to the SITC classification, as it was determined by Eurostat. As for published data on exports and imports of* ***armament****, which also belongs to high-tech goods, the CZSO (for reasons of security and in compliance with the methodology of Eurostat) does not capture the actual volume of exports and imports (international trade (change of ownership)) of this commodity. A detailed specification of these groups/categories (aggregations) according to SITC codes is provided on the CZSO website at:* [*www.csu.gov.cz/international-trade-in-hightech-goods*](http://www.csu.gov.cz/international-trade-in-hightech-goods)

*Data on exports and imports of high-tech goods are obtained from data outputs of the* ***international trade statistics****, which measures the real trade in goods carried out between Czech and foreign entities, i.e. a change of ownership between residents and non-residents. These data differ from international data published by Eurostat, which publishes within international trade statistics data on physical movement of goods across borders. More detailed information can be obtained in methodological notes provided in the Chapter* ***11*** *International trade in goods (change of ownership) or on the CZSO website at:* [*www.csu.gov.cz/international-trade-in-goods-change-of-ownership*](http://www.csu.gov.cz/international-trade-in-goods-change-of-ownership)

***Tab. 23.24 International trade in scientific and technical services***

*Data on receipts (or payments) received within international trade in scientific and technical services express technological level of an economy, i.e. they inform about the scope of international trade with industrial property and knowledge related to advanced technologies.*

*Data on exports and imports of scientific and technical services**come from a****survey of the CZSO on exports and imports of services (*ZO 1-04***). Individual items of those services are defined based on the****Extended Balance of Payments Services Classification (EBOPS 2010)*** *as follows:*

*–****research and development*** *(code SJ1) includes:*

*–****research and development services****, i.e. customised research and development performed for another entity. This item may also include contributions, subventions, or grants (financial transfer) provided or received for R&D performed among enterprises in the same group and*

*–****proprietary rights arising from research and development****, i.e. sale and purchase of patents, production processes, utility and industrial models, design or copyrights arising from R&D activities.*

*Note:* ***Royalties and licence fees for the right to use products of industrial property*** *arisen based on performed R&D activity, i.e. revenue (income) or payments for authorised temporary use of inventions, know-how, and other intangible results of R&D activity that are surveyed separately, i.e. they are not* ***included in this item****.*

*–****architectural, engineering, scientific, and other technical services*** *– hereinafter only referred to as* ***technical services*** *(code SJ31) include:*

*–****architectural services*** *(SJ311);*

*–****engineering services*** *(SJ312) for building projects, energy projects, transport, industrial, etc. projects and related technical consultancy including geological, geophysical, and related surveying and consultancy services; and*

*–****scientific and other technical services*** *(SJ313) including* ***mainly technical testing and analysis*** *services**in the area of composition, purity, and physical properties of materials and products, certification of products, vehicles, aircraft, pressure tanks, and other equipment, services of technical inspection of road transport vehicles, testing of medicinal products. This item also includes* ***geologic(al), geophysical and related services*** *and* ***scientific and technical services n.e.c.*** *including, for example, meteorological services or patent brokerage activities.*

*Data on exports and imports of* ***computer services****, which are sometimes also included among technical services (activities), are provided in the Chapter* ***22*** *Digital economy and society in Tab.* ***22.11*** *International trade in ICT services.*

*More detailed information on the statistics thereof can be obtained at:* [*www.csu.gov.cz/international-trade-in-hightech-services*](http://www.csu.gov.cz/international-trade-in-hightech-services)

***Tab. 23.25 Manufacturing by technology intensity – basic indicators***

*Breakdown of manufacturing to industries with high technological intensity (high-technology or* ***high-tech****), medium high technological intensity (****medium-high-technology****), medium low technological intensity (****medium-low-technology****), and low technological intensity (****low-technology****) was made by OECD and later by Eurostat based on how much advanced or high technologies are used in production and based on expenditure on research, development, and innovation. Businesses of the business**enterprise sector**are classified to aforementioned categories based on their prevailing economic activity according to the* ***CZ-NACE classification****.*

*Except for R&D expenditure, all surveyed indicators come from an****annual structural survey in businesses from selected production industries*** *(structural business statistics, SBS). The survey provides a more detailed range of final data, which are, however, available with a greater time delay. More detailed information about the data from the annual SBS of selected production industries, including definitions of individual indicators, can be found in the Chapter* ***15*** *Industry or on the CZSO website at:* [*www.csu.gov.cz/annual-structural-statistics-on-industry*](http://www.csu.gov.cz/annual-structural-statistics-on-industry)

*More detailed information on the statistics thereof can be obtained at:* [*www.csu.gov.cz/hightech-sector*](http://www.csu.gov.cz/hightech-sector)

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*Further information can be found on the website of the Czech Statistical Office at:*

– [*www.csu.gov.cz/research-and-development-rad*](www.csu.gov.cz/research-and-development-rad)

– [*www.csu.gov.cz/innovation-patents-high-technology*](http://www.csu.gov.cz/innovation-patents-high-technology)