CZECH STATISTICAL OFFICE

DIGITAL ECONOMY IN FIGURES

2019

CZECH REPUBLIC AND WORLD

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Contents

Introduction

The role of **information and communication technologies (ICT)** has received considerable attention in the last decade or so due to their exceptional role in enhancement of economic growth and social change. Even though the production and the expansion of ICT varies significantly among countries, a general agreement prevails that it is necessary to collect reliable and comprehensive ICT indicators in order to assess the impact of these technologies on growth, productivity or innovation.

The aim of **ICT statistics** is, on one hand, to provide data on the production of advanced ICTs, including data on investments, external trade or qualified human resources in this field **(digital economy)** and, on the other hand, to track data on the penetration and usage of these technologies in particular sectors of society such as households, enterprise sector or public administration **(information society).**

This brochure, its **eleventh edition**, was compiled in order to provide again a comprehensive overview of statistical indicators about the development of the digital economy in the Czech Republic and where possible also in other, mainly EU, countries.

The brochure consists of the following **five chapters**:

- Chapter A: **'ICT specialists and students'** provides information about **employment** in ICT specialist occupations both for ICT professionals and ICT technicians together with data about their **wages.** Data on the **university students** and **graduates of ICT fields of education** is also included here.
- Chapter B: **'ICT investments'** includes detail information about total ICT investment **by asset type** and **industry**. Data on **household expenditures** on ICT equipment and services is also included here.
- Chapter C: **'ICT research and development'** provides both data on the total financial resources invested in research and development (R&D) in ICT equipment and software and data about R&D expenditures and personnel in enterprises with the main economic activity that belongs to the ICT sector.
- Chapter D: **'ICT external trade'** includes detail data about exports and imports both in the ICT goods and ICT services.
- Chapter E: **'ICT sector'** consists of main economic indicators for industries that are primarily engaged in the production of ICT goods and services.

Data given in this brochure were acquired, in most cases, from regular statistical surveys or databases of the **Czech Statistical Office**. International comparisons were compiled by the Czech Statistical Office based on freely available Eurostat, OECD or UN data sources.

Whenever possible, the data used in this brochure are based on the standards included in **The OECD Guide to Measuring the Information Society** (Paris, 2011). This publication summarizes the statistical standards and definitions developed by the OECD Working Party on Indicators for the Information Society.

If you need any further information, do not hesitate to contact us directly. Your suggestions will be incentives for future releases.

In Prague, January 2020

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A ICT specialists and students

ICT specialists

ICT specialists are **defined** on the basis of the **International Standard Classification of Occupations (ISCO-08)** and corresponding national classification used in the Czech Republic (CZ-ISCO).

The occupations of ICT specialists based on recommendations of Eurostat and the International Labour Organisation (ILO) are subdivided into **two main categories** that include following codes (groups and subgroups) of the CZ-ISCO classification:

- **ICT managers, professionals and engineers** include ICT service managers (133); Software & applications developers and analysts (251); Database and network professionals (252); ICT sales professionals (2434) and Electronics & Telecommunication (ICT) engineers (2152+2153).
- **ICT technicians, installers and servicers** include ICT operations and user support technicians (351); Telecommunications and broadcasting technicians (352); Electronics engineering technicians (3114) and Electronics & telecommunications (ICT) installers and repairers (742).

In **a narrower definition of ICT specialists** are ICT occupations divided only between **ICT professionals (ISCO 25)** and **ICT technicians (ISCO 35).** Such definition is used for information on earnings of ICT specialists.

Data on the **numbers** of ICT specialists come from the **Labour Force Sample Survey (LFS)** of the Czech Statistical Office (CZSO). The table presents average annual data for a given year. Data since 2011 are not fully comparable with data for the previous years because of transition to the ICT specialists' definition by the CZ-ISCO. The **Eurostat LFS Database** was used for the international comparison

For further information on the Czech LFS see:

https://www.czso.cz/csu/vykazy/vyberove_setreni_pracovnich_sil

Data on **average gross monthly wages** of ICT specialists come from the **Structural Earnings Statistics (SES)** and are available in a comparable time series since the reference year 2012. For further information see:
https://www.czso.cz/csu/czso/employment_unemployment_ekon

Data about numbers and wages of ICT specialists is available **by occupation and industry of their employment and by their individual characteristics** such as gender, age and highest education attainment.

ICT fields of education

Numbers of ICT students and graduates are based on the International Classification of Education **(ISCED-F 2013)**, broad field code **06 Information and Communication Technologies** that involves detailed defined fields of education as follows: Computer use (0611); Database and network design and administration (0612); Software and applications development and analysis (0613); ICT not elsewhere classified (0619); and Inter-disciplinary programmes and qualifications involving ICT (0688).

Data on ICT field of education come from the **Ministry of Education, Youth and Sports (MEYS)** from the Union Information from Students' Registers **(SIMS database)**. Data on university students are always as at 31 December of the reference year; data on graduates are for the entire school year.

For information on ICT specialists and students see (only in Czech)**:**
https://www.czso.cz/csu/czso/lidske_zdroje_pro_informacni_technologie

A ICT specialists and students

Table A1 ICT specialists in Czechia

Thousand persons

	2015	2017	2018
Total	**173,9**	**185,6**	**206,4**
Woman	16,6	18,0	18,4
Occupation			
ICT managers, professionals and engineers	86,0	88,5	100,8
ICT technicians, installers and servicers	87,9	97,3	105,6
Age group			
20-29 years	37,3	38,0	40,0
30-39 years	63,4	70,5	73,6
40-49 years	44,5	44,0	55,9
50+ years	28,6	33,1	36,4
Highest level of education attainment			
Tertiary	97,7	105,6	112,3
Secondary with A-level examination	68,4	69,3	83,5
Other (lower)	7,8	10,9	10,6

Figure A1 ICT specialists

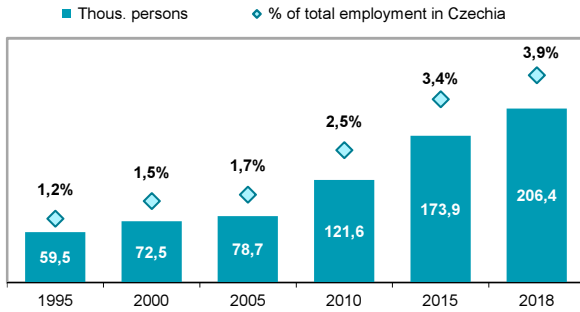
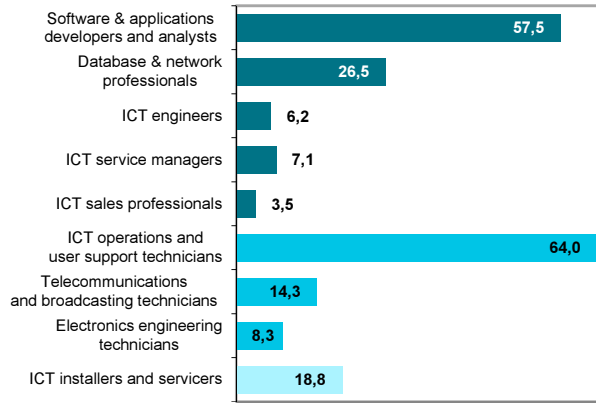


Figure A2 ICT specialists, by occupation (thousands); 2018



Source: CZSO, Labour Force Survey

A ICT specialists and students

Figure A3 ICT specialists; 2018
(% of total emloyment)

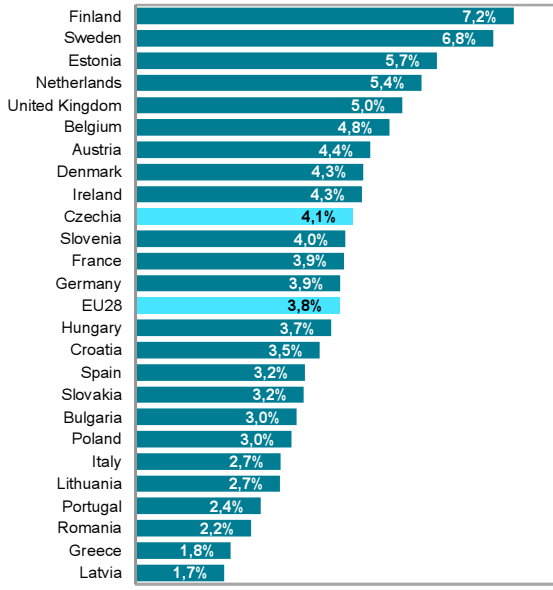
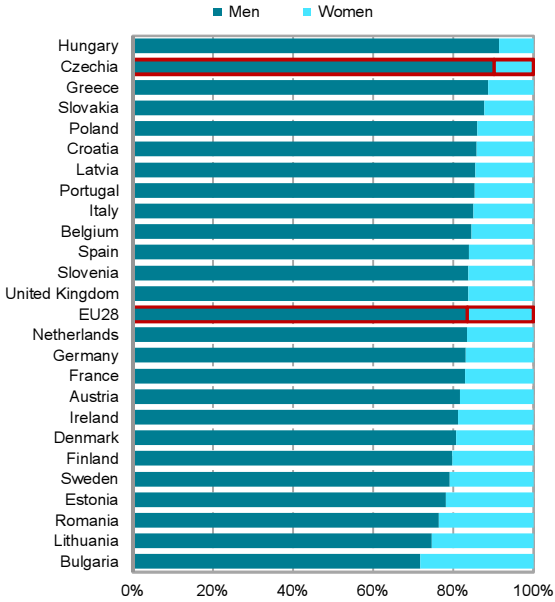


Figure A4 ICT specialists, by gender; 2018



Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists and students

Table A2 ICT managers, professionals and engineers in Czechia

Thousand persons

	2015	2017	2018
Total	**86,0**	**88,5**	**100,8**
Women	8,8	9,5	10,0
Occupation			
ICT professionals, total	**66,3**	**72,0**	**84,1**
Software and app. developers and analysts	44,9	47,8	57,5
Database and network professionals	21,4	24,0	26,5
ICT managers, and engineers	**19,7**	**16,5**	**16,8**
Age group			
20-29 years	17,1	16,7	16,8
30-39 years	32,5	34,9	39,6
40-49 years	22,5	21,9	27,2
50+ years	14,0	14,9	17,1
Highest level of education attainment			
Master's and Doctoral	60,9	63,0	71,4
Bachelor's and Higher professional	11,5	13,7	13,1
Other (lower)	12,6	10,8	16,1

Figure A5 ICT professionals

Figure A6 ICT professionals, by gender

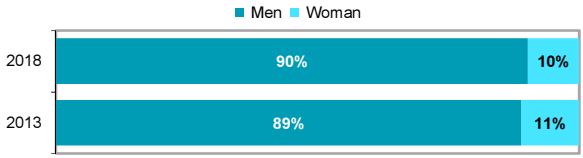
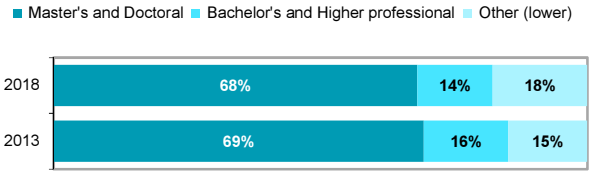


Figure A7 ICT professionals, by level of education



Source: CZSO, Labour Force Survey

Figure A8 ICT professionals; 2018
(% of total employment)

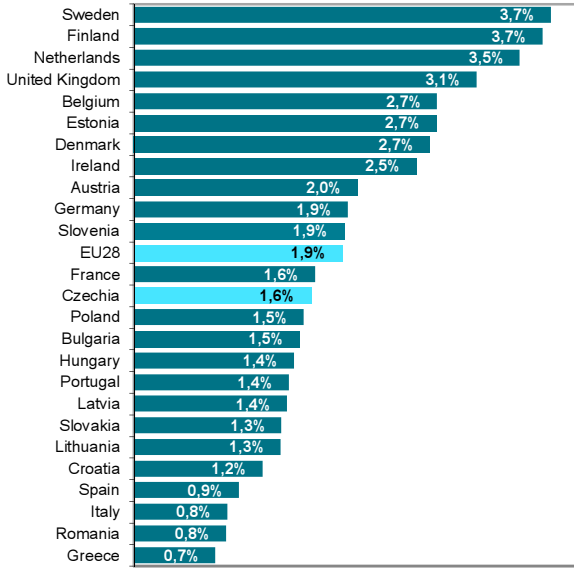
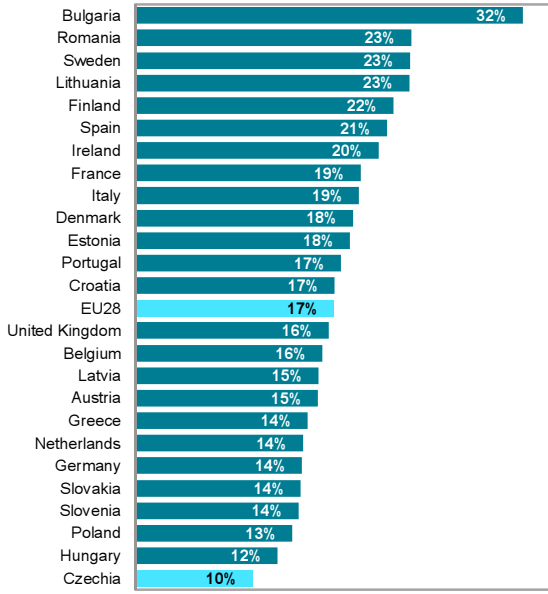


Figure A9 Share of women among all ICT professionals; 2018



Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists and students

Table A3 ICT technicians, installers and servicers in Czechia

Thousand persons

	2015	2017	2018
Total	**87,9**	**97,3**	**105,6**
Woman	7,9	8,5	8,4
Occupation			
ICT technicians, total	**61,5**	**70,0**	**78,5**
ICT operations and user support technicians	48,6	56,2	64,0
Telecomm. and broadcasting technicians	12,9	13,8	14,3
ICT installers and servicers	**26,4**	**27,3**	**27,1**
Age group			
20-29 years	20,3	21,3	23,2
30-39 years	30,9	35,6	34,0
40-49 years	22,1	22,0	28,6
50+ years	14,6	18,1	19,4
Highest level of education attainment			
Tertiary	25,2	28,9	27,8
Secondary with A-level examination	55,8	58,4	67,4
Other (lower)	6,9	9,9	10,4

Figure A10 ICT technicians

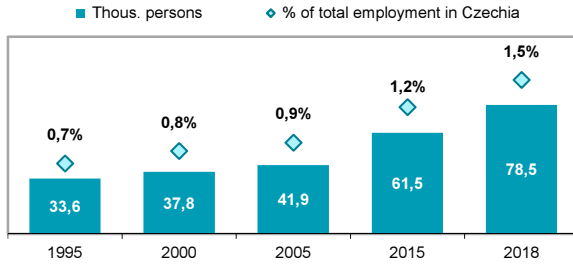


Figure A11 ICT technicians, by gender

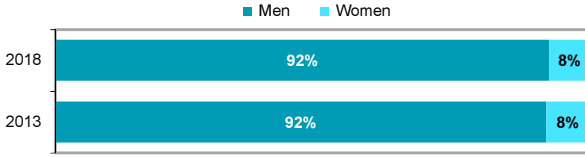
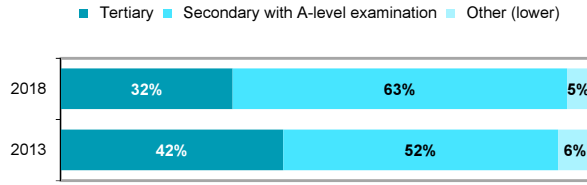


Figure A12 ICT technicians, by level of education



Source: CZSO, Labour Force Survey

A ICT specialists and students

Figure A13 ICT technicians; 2018
(% of total employment)

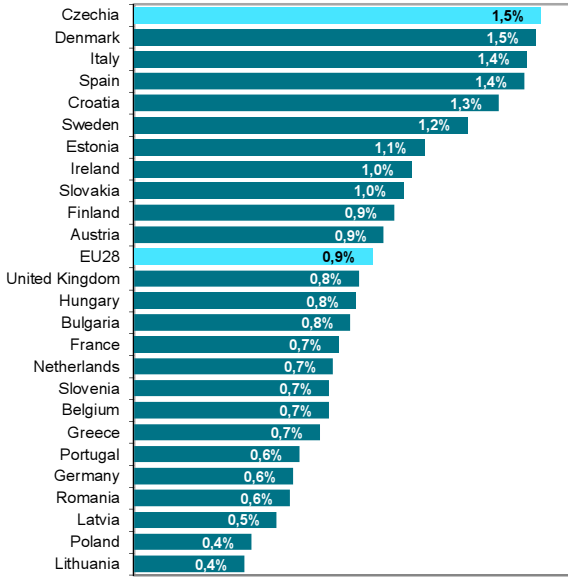
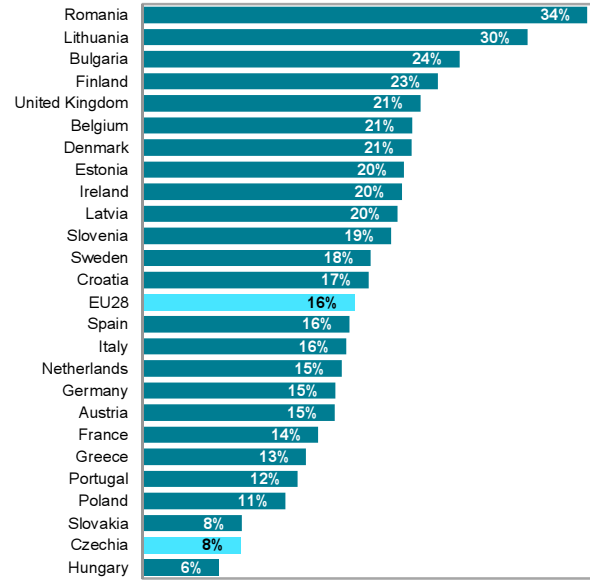


Figure A14 Share of womenamong all ICT technicians; 2018



Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists and students

Table A4 Wages of ICT professionals in Czechia

Average gross monthly wages in CZK

	2016	2017	2018
Total	**53 241**	**56 747**	**61 026**
Men	54 325	58 025	62 460
Women	45 369	47 765	51 550
Sphere of activity (earnings)			
Business (wage sphere)	54 391	57 810	62 073
Government (salary sphere)	35 422	38 876	42 060
Age group			
under 24 years	30 237	33 034	34 403
25-34 years	48 582	51 487	55 064
35-44 years	60 624	65 206	69 650
45-54 years	55 882	59 965	65 425
55+ years	49 522	51 652	57 134
Highest level of education attainment			
Master's and Doctoral	58 831	62 809	67 578
Bachelor's and Higher professional	48 644	51 906	56 425
Secondary with A-level examination	47 751	50 723	54 396

Figure A15 Wages of ICT professionals

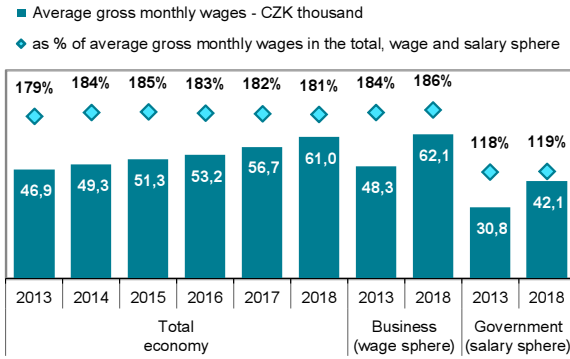
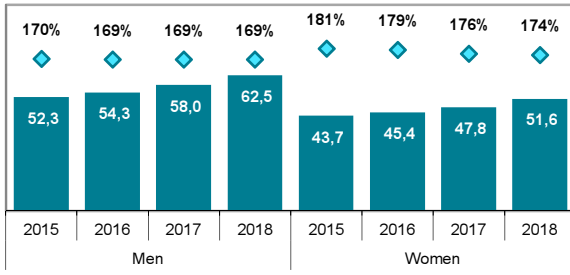


Figure A16 Wages of ICT professionals, by gender



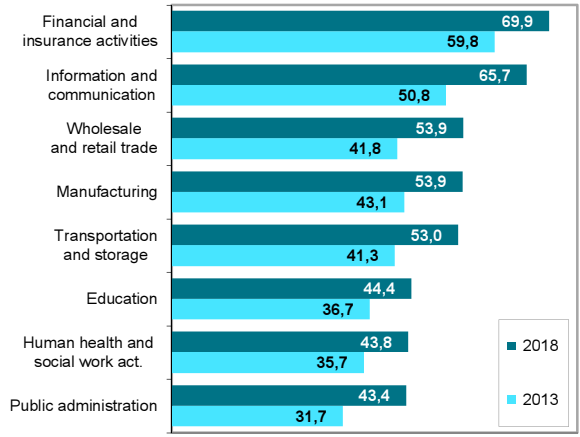
Source: CZSO, Structural Earnings Statistics

Table A5 Wages of ICT professionals in Czechia according to their occupation and industry

Average gross monthly wages in CZK

	2016	2017	2018
Total	**53 241**	**56 747**	**61 026**
Occupation			
Software and applications developers and analysts	**55 404**	**59 139**	**63 530**
Systems analysts	58 868	61 883	66 790
Software developers	58 049	61 157	64 173
Web and multimedia developers	60 708	50 488	64 153
Applications programmers	51 210	54 343	58 386
Other software and applications developers and analysts	55 124	58 207	63 466
Database and network professionals	**48 153**	**50 884**	**54 364**
Database designers/admin.	49 319	52 646	54 355
Systems administrators	47 432	49 375	52 777
Computer network professionals	52 503	55 742	59 161
Data security specialists	61 073	58 267	66 488
Industry (NACE Section)			
Manufacturing (C)	46 246	50 159	53 864
Wholesale and retail trade (G)	41 938	48 326	53 925
Information and communication (J)	57 786	61 457	65 749
Financial and insurance activities (K)	64 436	65 182	69 909
Public administration (O)	36 657	40 278	43 379
Education (P)	37 421	39 543	44 395
Human health and social work act. (Q)	37 713	40 663	43 799

Figure A17 Average gross monthly wage of ICT professionals in selected industries (CZK thousand)



Source: CZSO, Structural Earnings Statistics

A ICT specialists and students

Table A6 Wages of ICT technicians in Czechia

Average gross monthly wages in CZK

	2016	2017	2018
Total	**37 825**	**39 612**	**42 016**
Men	38 417	40 307	42 616
Women	33 702	35 084	38 269
Sphere of activity (earnings)			
Business (wage sphere)	38 629	40 387	42 726
Government (salary sphere)	28 977	31 200	34 228
Age group			
under 24 years	25 018	27 143	28 806
25-34 years	35 456	36 329	38 800
35-44 years	41 241	43 666	45 408
45-54 years	39 679	41 235	45 011
55+ years	37 142	39 161	43 452
Highest level of education attainment			
Master's and Doctoral	46 945	48 961	52 020
Bachelor's and Higher professional	38 781	41 245	44 403
Secondary with A-level examination	34 669	36 098	38 449
Other (lower)	29 274	30 926	31 753

Figure A18 Wages of ICT technicians

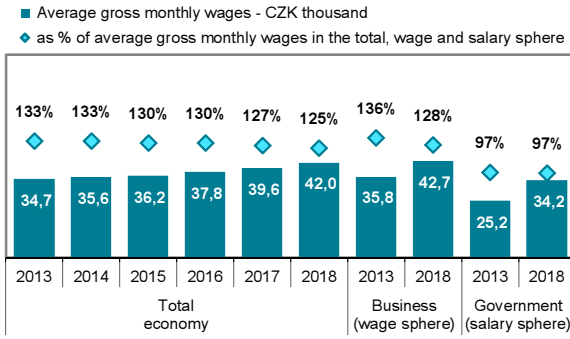
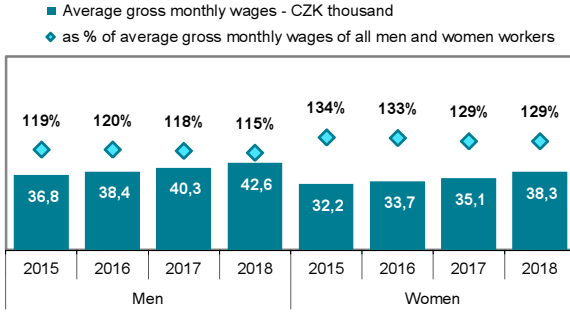


Figure A19 Wages of ICT technicians, by gender



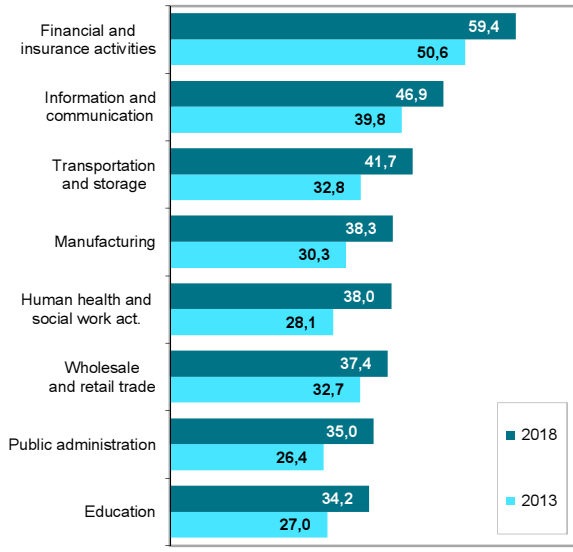
Source: CZSO, Structural Earnings Statistics

Table A7 Wages of ICT technicians in Czechia according to their occupation and industry

Average gross monthly wages in CZK

	2016	2017	2018
Total	**37 825**	**39 612**	**42 016**
Occupation			
ICT operations and user support technicians	**38 376**	**40 243**	**42 789**
ICT operations technicians	36 660	38 349	40 751
ICT user support technicians	40 779	43 911	46 576
Computer network and systems technicians	38 477	40 562	43 127
Telecommunications and broadcasting technicians	**35 291**	**36 118**	**37 922**
Broadcasting and Audiovisual Technicians	31 162	32 511	35 590
Telecommunications engineering Technicians	.	.	38 940
Industry (NACE Sections)			
Manufacturing (C)	33 180	35 002	38 292
Wholesale and retail trade (G)	35 046	36 770	37 410
Information and communication (J)	43 255	44 838	46 934
Financial and insurance activities (K)	56 113	57 115	59 387
Public administration (O)	30 259	32 226	34 995
Education (P)	29 275	31 006	34 184
Human health and social work act. (Q)	31 637	34 079	37 997

Figure A20 Average gross monthly wages of ICT technicians in selected industries (CZK thousand)



Source: CZSO, Structural Earnings Statistics

A ICT specialists and students

Table A8 University students of ICT fields of education in Czechia

Number of students

	2016	2017	2018
Total	**20 502**	**19 985**	**20 054**
of which 25 years and older	4 909	4 814	4 743
Gender			
Men	17 358	16 848	16 745
Women	3 144	3 146	3 309
Study programme			
Bachelor	13 956	13 823	14 158
Master	5 662	5 341	5 154
Doctoral	893	830	749
Nationality			
Czech	15 830	15 131	14 855
Foreigners	4 673	4 854	5 199

Figure A21 University students of ICT fields of education

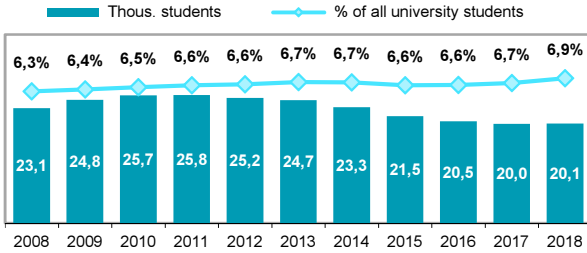


Figure A22 University students of ICT, by gender

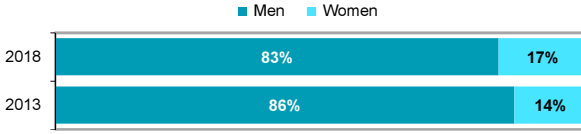


Figure A23 University students of ICT, by nationality

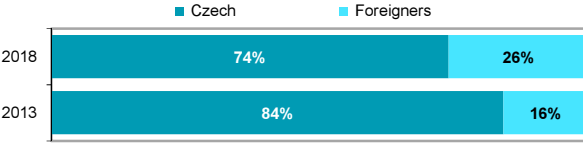
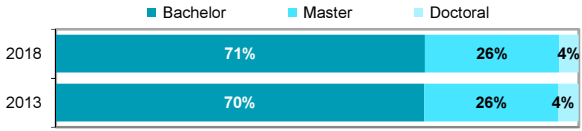


Figure A24 University students of ICT, by study programme



Source: CZSO calculation based on MEYS database

Figure A25 University students of ICT; 2017
(% of all university students)

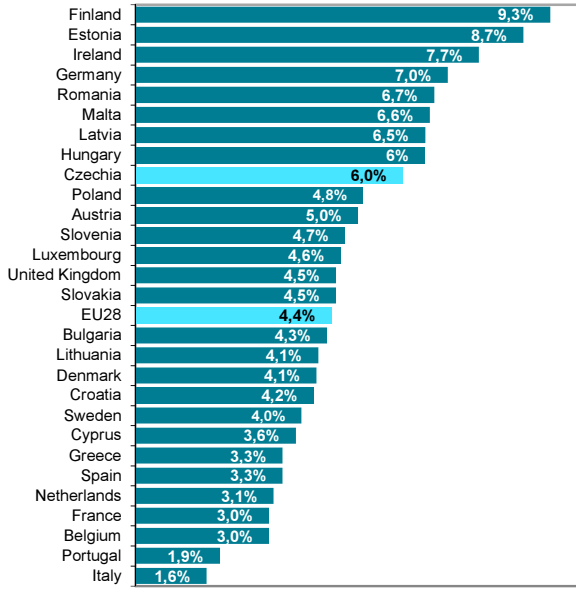
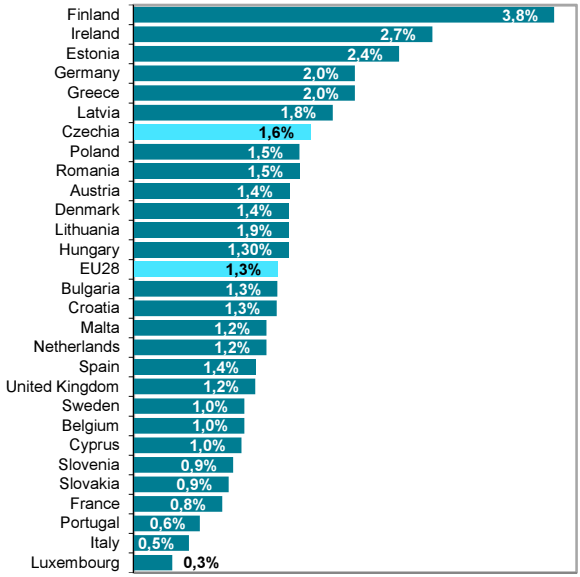


Figure A26 University students of ICT; 2017
(% of population aged 20 to 29 years)



Source: CZSO calculation based on Eurostat database

A ICT specialists and students

Table A9 University graduates from ICT fields of education in Czechia

Number of graduates

	2016	2017	2018
Total	**4 361**	**3 915**	**3 802**
Men	3 678	3 312	3 181
Women	683	603	621
Study programme			
Bachelor	2 291	2 079	2 055
Master	1 986	1 750	1 667
Doctoral	84	86	80
Nationality			
Czech	3 550	3 130	2 921
Foreigners	811	785	881

Figure A27 University graduates from ICT fields of education

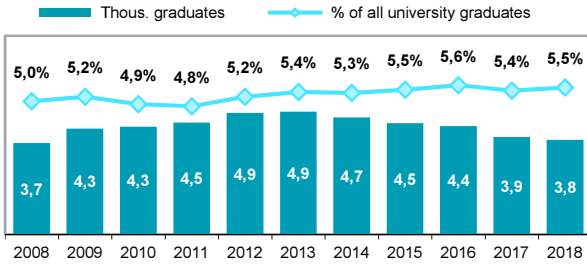


Figure A28 University graduates from ICT, by gender

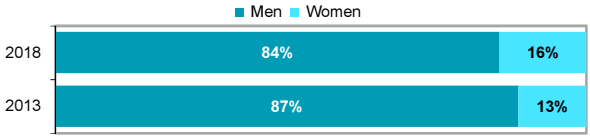


Figure A29 University graduates from ICT, by nationality

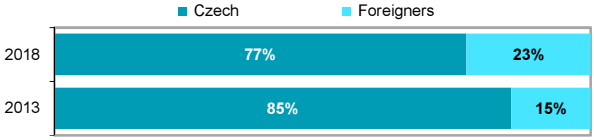
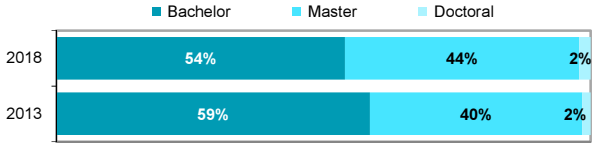


Figure A30 University graduates from ICT, by study programme



Source: CZSO calculation based on MEYS database

Figure A31 University graduates from ICT; 2017
(% of all university graduates)

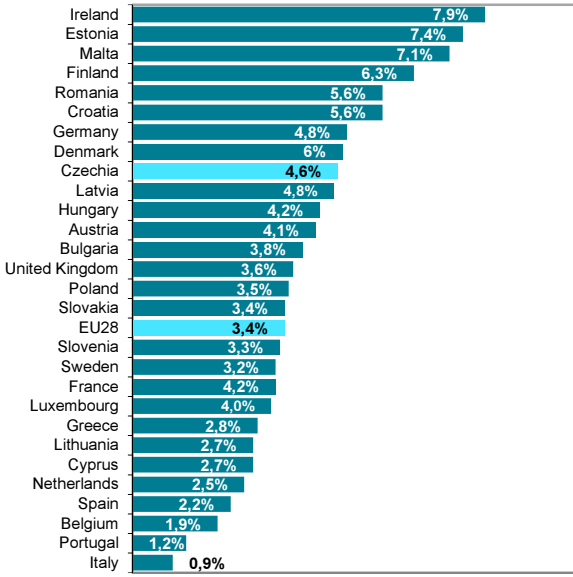
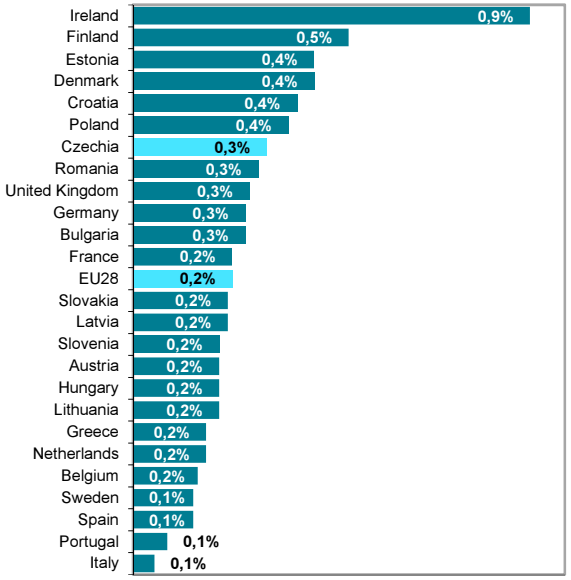


Figure A32 University graduates from ICT; 2017
(% of population aged 20 to 29 years)



Source: CZSO calculation based on Eurostat database

Figure A33 Share of women among all university students of ICT fields of education; 2017

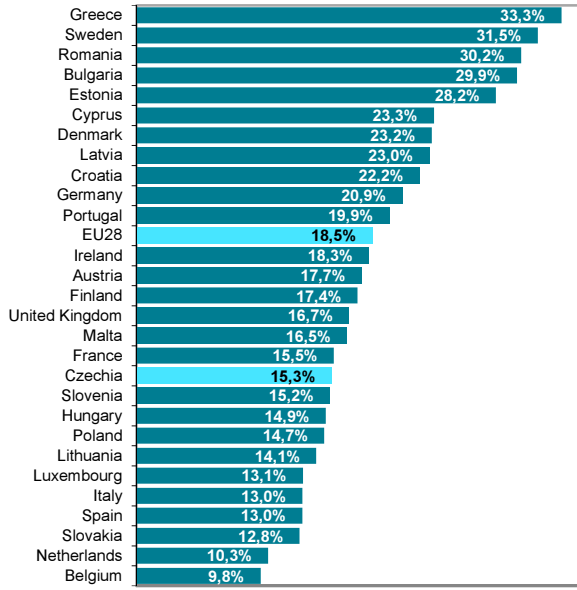
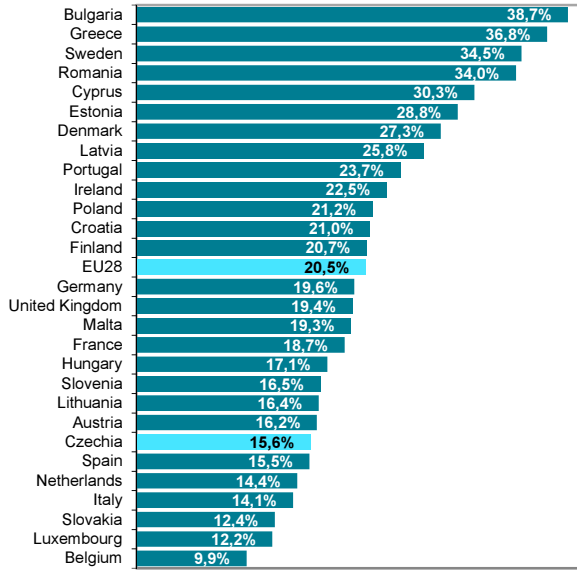


Figure A34 Share of women among all university graduates from ICT fields of education; 2017



Source: CZSO calculation based on Eurostat database

B ICT expenditure and investment

ICT investment

Investments into ICT equipment and software (hereafter **ICT investment**) in the tables shall mean the **gross fixed capital formation** (GFCF: P.51), which includes mainly acquisitions of fixed assets (P.511) used in the production processes repeatedly or continuously for more than one year. The definition of GFCF used here follows **The European System of Regional and National Accounts (ESA 2010)**.

ICT investment by asset type has **three main components**: computer equipment, communications equipment and computer software and databases (software). Software includes acquisition of pre-packaged software, customized software and software developed in-house (own-account software).

ICT assets can be also classified to the groups of the **Classification of Products by Activity (CZ-CPA),** the national version of the European standard of the Statistical Classification of Products by Activity (CPA 2008), as follows:

- **ICT equipment:** Computers and peripheral equipment (26.2); Communication equipment (26.3) and Consumer electronics (26.4)
- **Software:** Software publishing services (58.2); Computer programming, consultancy and related services (62.0) and Data processing, hosting and related services; web portals (63.1).

Investments **into computer** and **telecommunication equipment** became according to ESA 2010 a part of a newly created item of non-financial assets as **ICT equipment (AN.1132)**.

Computer software and databases (AN.1173) newly involve according to ESA 2010 two sub-items. **Computer software (AN.11731)** involves computer programs, program descriptions and supporting materials for both systems and application software. **Databases (AN.11732)** includes data files organized so as to enable cost-effective data access and use.

Households expenditures on ICT equipment and services

Data on the total ICT investment in this chapter are supplemented with data on **Final ICT consumption expenditure of households.** The final consumption expenditure of households is recorded in international classification COICOP. This is a classification where individual items of consumption are divided according to its purpose.

ICT equipment and ICT services according to this classification include the following items*:*

- **ICT equipment:** Telephone and telefax equipment (08.2); Audio-visual, photographic and information processing equipment (09.1)
- **Telecommunication (ICT) services:** Telephone and telefax services (08.3). This category contains primarily payments for calls via landline, mobile phone and payments for Internet connection

The both data, the total ICT investment and final household consumption expenditure on ICT equipment and ICT services come from the **Annual National Accounts Statistics** of the Czech Statistical Office. **2018 data are preliminary.** For more information, see:
http://apl.czso.cz/pll/rocenka/rocenka.indexnu?mylang=EN

Data for international comparisons refer to the reported or nearest available year.

Further information on ICT investment can be found at (only in Czech)**:**
https://www.czso.cz/csu/czso/investice_v_ict

B ICT expenditure and investment

Table B1 ICT investment in Czechia

CZK million

	2016	2017	2018
Total	**191 276**	**200 568**	**205 933**
ICT equipment	87 256	90 047	83 149
Software	104 020	110 521	122 784
Industry (CZ-NACE Section)			
Agriculture, forestry and fishing	2 094	2 393	2 252
Mining and quarrying	573	665	617
Manufacturing	57 057	62 484	58 061
Electricity, gas and water supply	7 620	7 361	6 164
Construction	4 189	4 666	4 266
Wholesale and retail trade	12 633	14 600	15 153
Transportation and storage	5 437	6 339	7 379
Accommodation and food service activities	1 954	2 165	1 821
Information and communication	47 037	43 882	49 835
Financial and insurance activities	22 665	21 878	23 151
Real estate activities	1 675	1 849	1 871
Professional, scientific and technical activ.	10 061	11 817	11 479
Administrative and support service activ.	2 336	2 707	2 958
Public administration and defence	7 225	7 753	9 066
Education	2 297	2 847	4 138
Human health and social work activities	3 575	3 621	4 171
Arts, entertainment and recreation	1 282	1 326	1 610
Other services	1 566	1 710	1 941

Figure B1 ICT investment

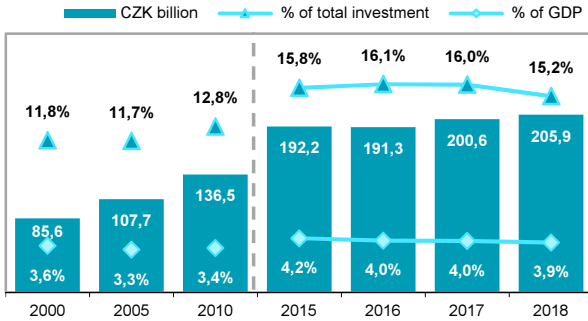
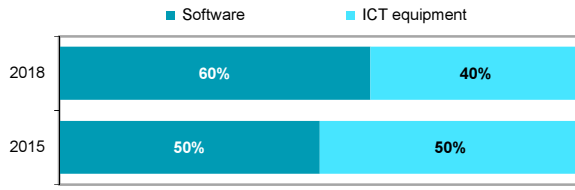


Figure B2 ICT investment, by asset



Source: CZSO, Annual National Accounts Statistics

B ICT expenditure and investment

Figure B3 ICT investment; 2017 (% of GDP)

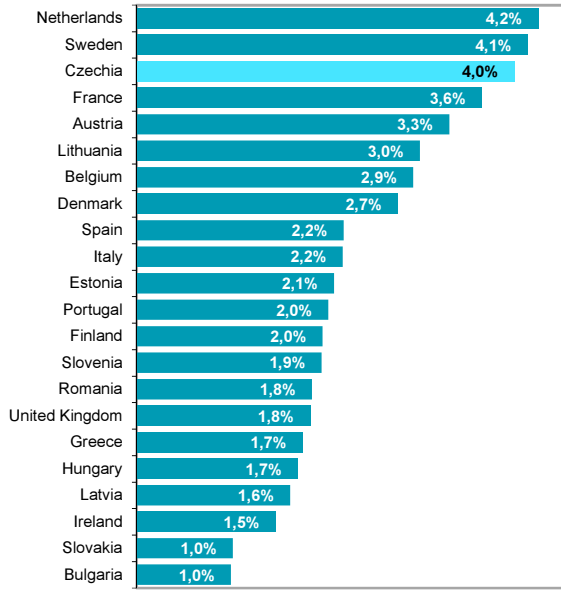
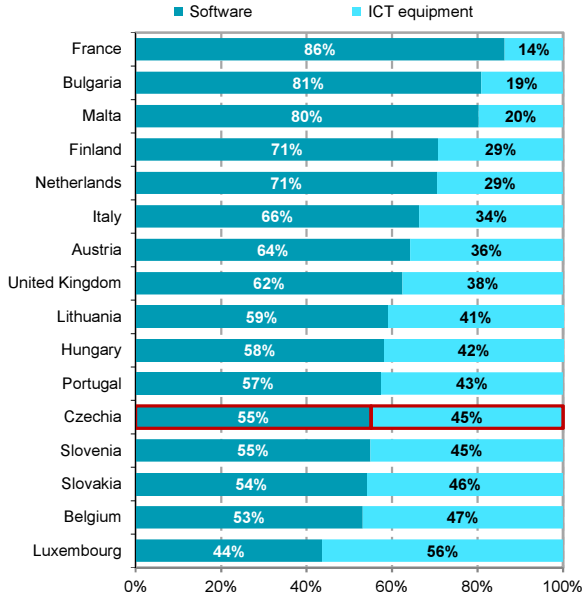


Figure B4 ICT investment, by asset; 2017



Source: CZSO calculations based on Eurostat data

B ICT expenditure and investment

Table B2 ICT equipment investment in Czechia

CZK million

	2016	2017	2018
Total	**87 256**	**90 047**	**83 149**
Computer equipment	64 221	67 087	62 111
Communication equipment	23 035	22 960	21 038
Industry (CZ-NACE Section)			
Agriculture, forestry and fishing	1 809	2 033	1 849
Mining and quarrying	454	539	479
Manufacturing	43 374	47 793	42 733
Electricity, gas and water supply	5 441	4 879	3 784
Construction	3 162	3 579	3 067
Wholesale and retail trade	4 057	5 225	4 643
Transportation and storage	1 743	2 037	2 568
Accommodation and food service activities	1 694	1 878	1 490
Information and communication	11 564	5 812	4 971
Financial and insurance activities	1 148	1 256	1 669
Real estate activities	685	816	736
Professional, scientific and technical activ.	3 377	4 425	3 414
Administrative and support service activ.	861	1 122	1 025
Public administration and defence	3 009	3 120	3 914
Education	1 346	1 730	2 680
Human health and social work activities	2 573	2 594	3 071
Arts, entertainment and recreation	684	651	714
Other services	275	331	342

Figure B5 Total ICT equipment investment

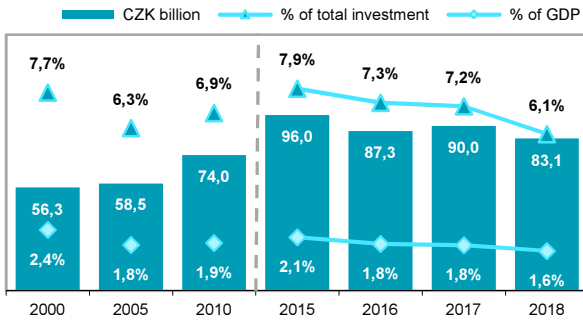
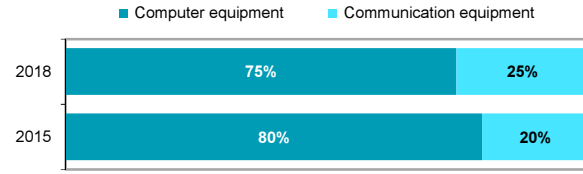


Figure B6 ICT equipment investment, by asset



Source: CZSO, Annual National Accounts Statistics

B ICT expenditure and investment

Figure B7 ICT equipment investment; 2017
(% of total investment)

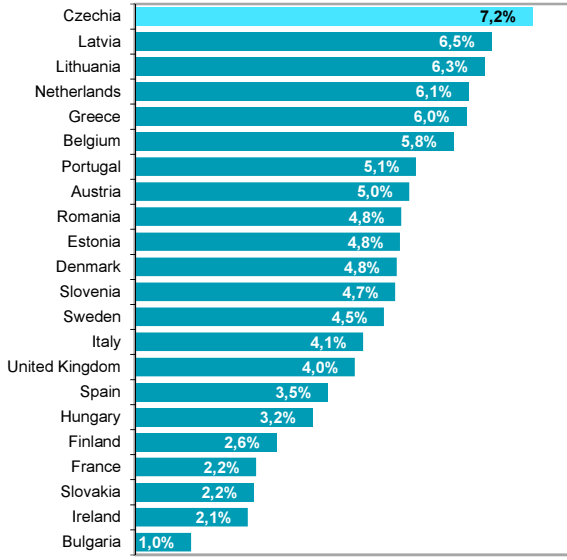
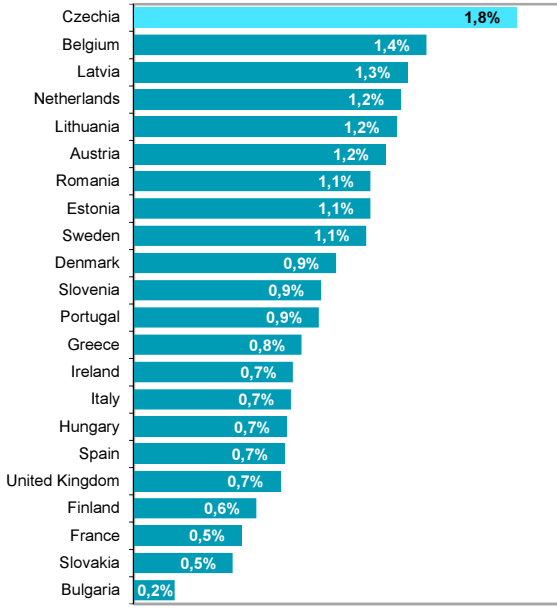


Figure B8 ICT equipment investment; 2017
(% of GDP)



Source: CZSO calculations based on Eurostat data

Table B3 Software investment in Czechia

CZK million

	2016	2017	2018
Total	**104 020**	**110 243**	**122 784**
Own-account software	25 592	26 885	28 252
Industry (CZ-NACE Section)			
Agriculture, forestry and fishing	285	360	403
Mining and quarrying	119	126	138
Manufacturing	13 683	14 691	15 328
Electricity, gas and water supply	2 179	2 482	2 380
Construction	1 027	1 087	1 199
Wholesale and retail trade	8 576	9 375	10 510
Transportation and storage	3 694	4 302	4 811
Accommodation and food service activities	260	287	331
Information and communication	35 473	38 070	44 864
Financial and insurance activities	21 517	20 622	21 482
Real estate activities	990	1 033	1 135
Professional, scientific and technical activ.	6 684	7 392	8 065
Administrative and support service activ.	1 475	1 585	1 933
Public administration and defence	4 216	4 633	5 152
Education	951	1 117	1 458
Human health and social work activities	1 002	1 027	1 100
Arts, entertainment and recreation	598	675	896
Other services	1 291	1 379	1 599

Figure B9 Software investment

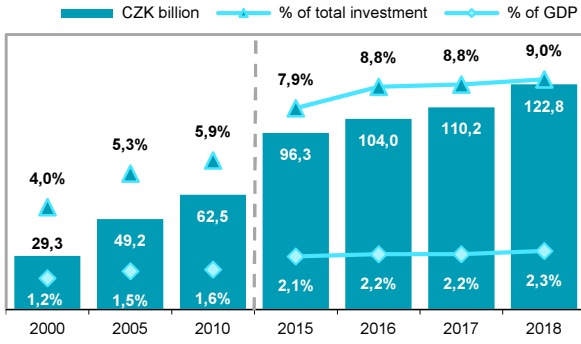
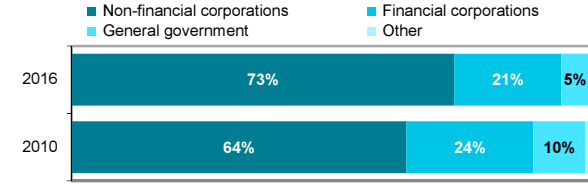


Figure B10 Software investment, by sector



Source: CZSO, Annual National Accounts Statistics

Figure B11 Software investment; 2017
(% of total investment)

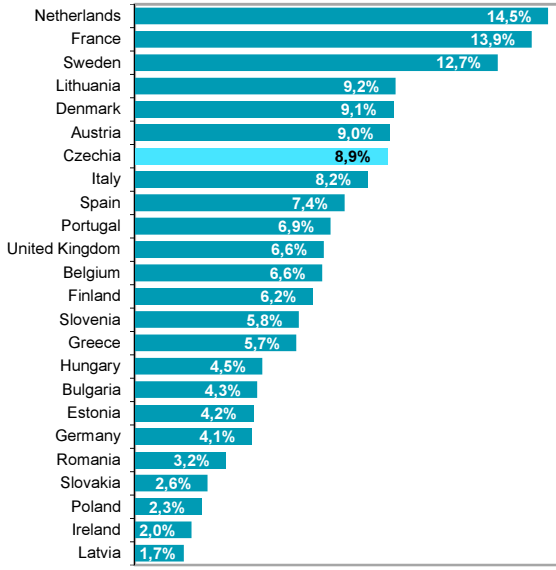
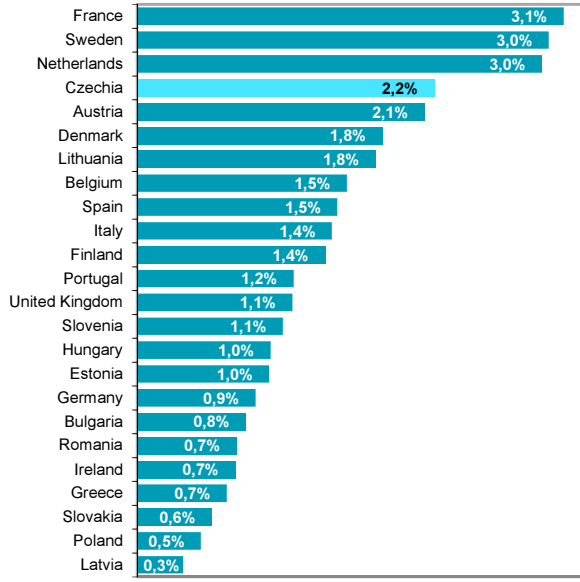


Figure B12 Software investment; 2017
(% of GDP)



Source: CZSO calculations based on Eurostat data

B ICT expenditure and investment

Table B4 Household consumption expenditures on ICT products in Czechia

CZK million

	2016	2017	2018
Total	**91 577**	**95 945**	**104 095**
ICT equipment	**33 925**	**36 520**	**41 149**
Telephone equipment, total	4 921	5 355	5 781
Computers and consumer electronics	29 004	31 165	35 368
Telecommunication (ICT) services	**57 652**	**59 425**	**62 946**

Figure B13 Household consumption expenditures on ICT

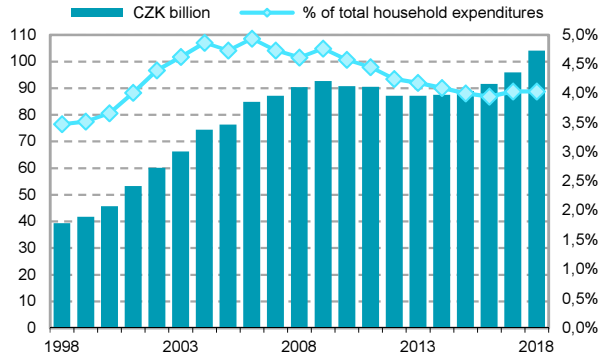


Figure B14 Household expenditures on ICT, by type of product

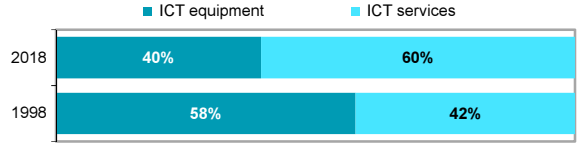
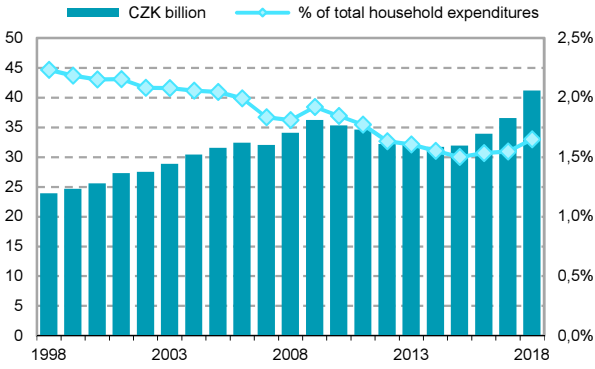


Figure B15 Households expenditures on ICT equipment



Source: CZSO, Annual National Accounts Statistics

B ICT expenditure and investment

Figure B16 Household consumption expenditures on ICT; 2018 (% of total households consumption expenditures)

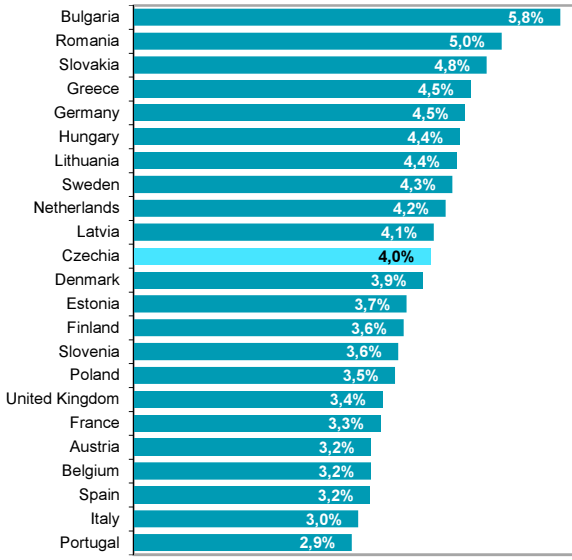
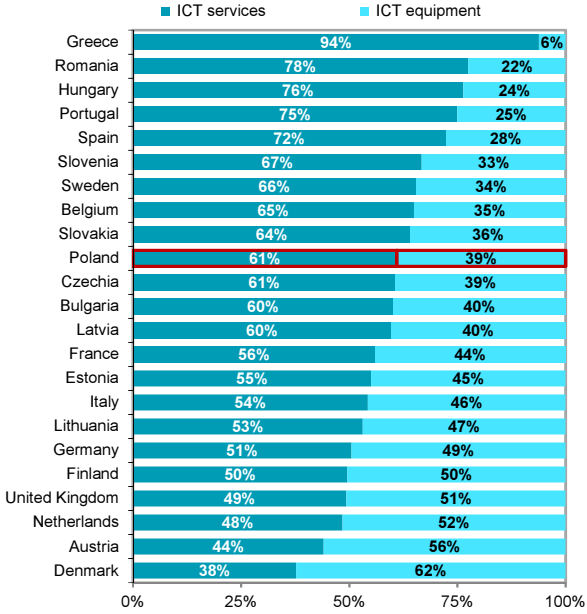


Figure B17 Household consumption expenditures on ICT, by type of product; 2018



Source: CZSO calculations based on Eurostat data

Table B5 Household consumption expenditures on telecommunication in Czechia

CZK million

	2016	2017	2018
Total	**62 573**	**64 780**	**68 727**
Telephone equipment	4 921	5 355	5 781
Telecommunication (ICT) services	57 652	59 425	62 946

Figure B18 Household expenditures on telecommunication

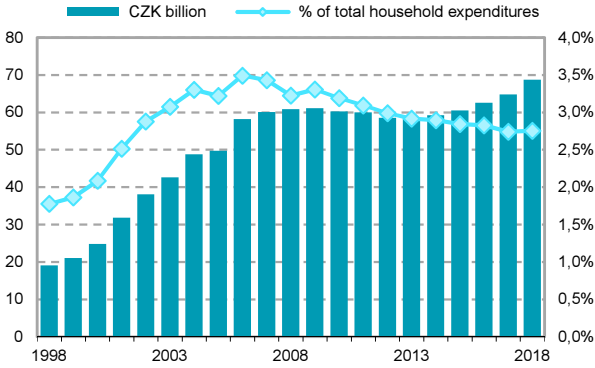


Figure B19 Household expenditures on telecommunication, by type of product

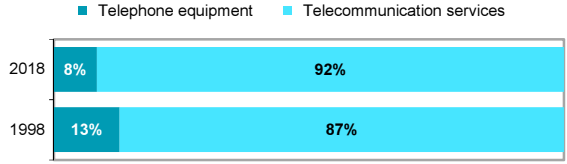
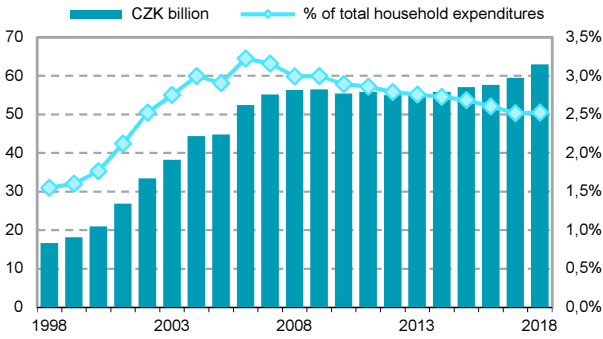


Figure B20 Household expenditures on telecommunication services



Source: CZSO, Annual National Accounts Statistics

C ICT research and development

Research and experimental development (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. **Research** is original investigation undertaken to acquire new knowledge; **Experimental development** builds upon research to produce new or improved products or processes.

Data for this chapter comes from the results of the **Czech annual questionnaire on research and developmen**t, which includes questions on human and financial resources determined for R&D activities realized on the territory of the Czech Republic. The statistical survey fully complies with methodological principles of the EU and the OECD mentioned in the Frascati Manual (OECD, Paris 2015) and Commission Implementing Regulation (EU) No 995/2012.

Further information on the **Czech R&D statistics** can be found at: https://www.czso.cz/csu/czso/vysledky_vyzkumu_a_vyvoje

Expenditures on R&D in ICT products

This sub-chapter presents data on the total **financial resources invested in research and development in ICT equipment and software (ICT products)** in the Czech Republic regardless of main economic activity and sector of R&D performers.

ICT products are classified into two main categories based on the following CPA divisions and groups:

- **ICT equipment** (CZ-CPA 261-4 a 268)
- **Software** (CZ-CPA 62)

Software-related activities of a routine nature which do not involve scientific and/or technological advances or resolution of technological uncertainties are not to be included in R&D.

Data on expenditures related to the research and development in ICT equipment and software **(ICT R&D expenditures)** are based on the results of the special module that is included in the **Czech annual questionnaire on research and development.**
International comparison is not available for this data set.

R&D expenditures and personnel in the ICT sector

This sub-chapter focuses on R&D expenditures and R&D personnel in enterprises with the main economic activity that belongs to the **ICT sector.** In general, the term ICT sector includes both: **ICT manufacturing** and **ICT services** which are associated with the production and/or distribution of information and communication technologies (ICT) and a provision of related services.

ICT sector is divided into the **two main categories**: ICT manufacturing and ICT services. **For more information see Chapter E ICT sector.**

Data on Business R&D expenditure and R&D personnel in the ICT sector have less predictive value than the figures for the total ICT R&D expenditures included in first sub-chapter. Enterprises within the ICT sector can perform their R&D activities in areas other than ICT and vice versa enterprises outside the ICT sector can exercise their R&D activities in the ICT field.

Data for international comparisons refer to the reported or nearest available year.

Further information on ICT sector can be found at (only in Czech):
https://www.czso.cz/csu/czso/odvetvi-informacni-ekonomiky

C ICT research and development

Table C1 R&D expenditures in ICT in Czechia

CZK million

	2016	2017	2018
Total	**12 477**	**15 448**	**18 720**
financed from government funds	1 579	1 452	1 924
Type of ICT product			
ICT equipment	4 295	5 024	5 594
Software	8 182	10 424	13 125
Type of R&D performer			
Enterprises, total	**11 234**	**14 330**	**17 101**
National enterprises	3 601	4 510	5 203
Foreign-controlled enterprises	7 632	9 820	11 898
Public universities	**1 193**	**1 060**	**1 535**
Other R&D performers	**50**	**58**	**84**

Figure C1 R&D expenditures in ICT

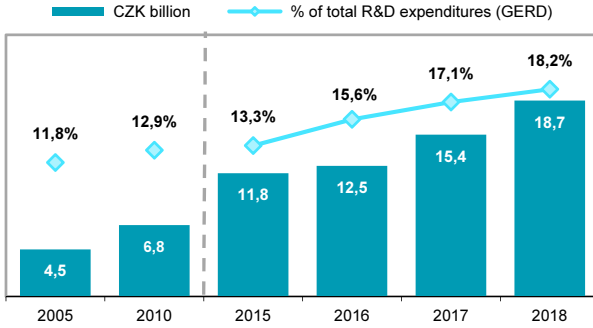


Figure C2 R&D expenditures in ICT, by type of product

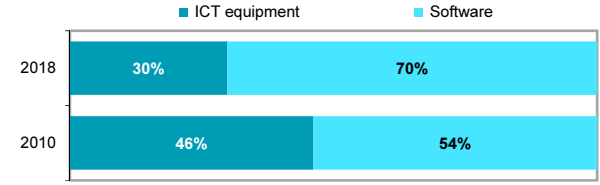
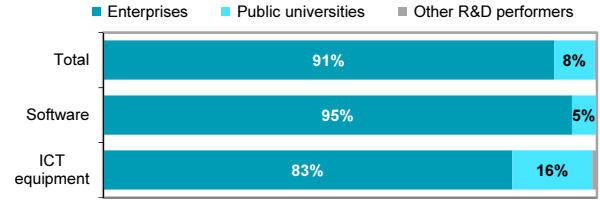


Figure C3 R&D expenditures in ICT, by type of performer; 2018



Source: CZSO, Annual R&D survey

Table C2 R&D expenditures in software in Czechia

CZK million

	2016	2017	2018
Total	**8 182**	**10 424**	**13 125**
financed from government funds	425	489	751
Type of R&D performer			
Enterprises, total	**7 830**	**10 029**	**12 464**
National enterprises	2 213	2 899	3 597
Foreign-controlled enterprises	5 617	7 130	8 867
Public universities	**327**	**367**	**630**
Other R&D performers	**24**	**27**	**32**

Figure C4 R&D expenditures in software

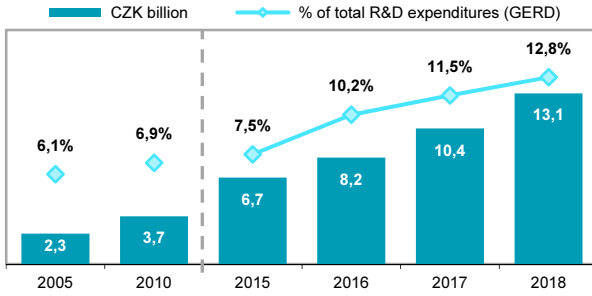


Figure C5 Software R&D expenditures, by performer; 2018

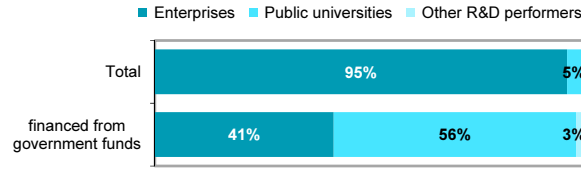
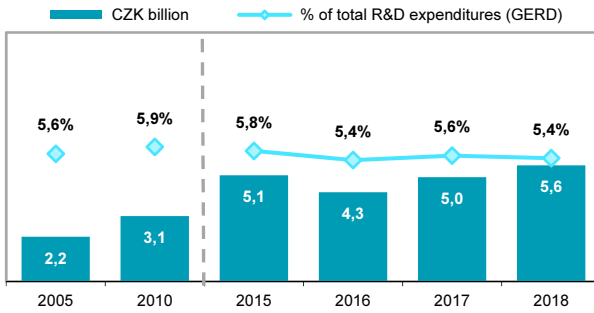


Figure C6 R&D expenditures in ICT equipment



Source: CZSO, Annual R&D survey

C ICT research and development

Table C3 Business R&D expenditures in ICT in Czechia

CZK million

	2016	2017	2018
Total	**11 234**	**14 330**	**17 101**
financed from government funds	531	646	861
Type of ICT product			
ICT equipment	3 403	4 301	4 637
Software	7 830	10 029	12 464
Enterprise size group			
Small (0-49 employees)	1 260	1 480	1 674
Medium (50-249 employees)	2 691	3 899	3 677
Large (250+ employees)	7 283	8 952	11 749
Ownership of enterprises			
National enterprises	3 601	4 510	5 203
Foreign-controlled enterprises	7 632	9 820	11 898
Industry of enterprises (CZ-NACE)			
ICT sector industries, total	**8 135**	**10 035**	**12 644**
ICT manufacturing (261-264)	262	245	295
Telecommunications (61)	672	724	794
IT services (465+582+62+631+951)	7 202	9 066	11 555
Other industries	**3 098**	**4 296**	**4 457**

Figure C7 Business R&D expenditures in ICT

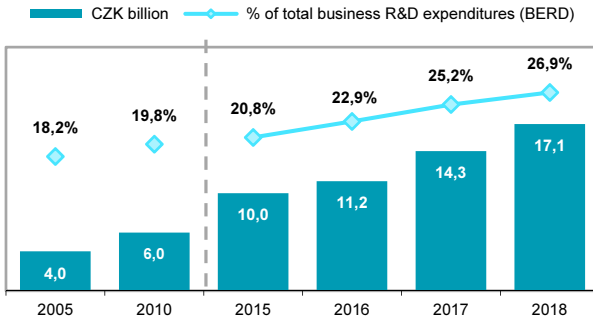
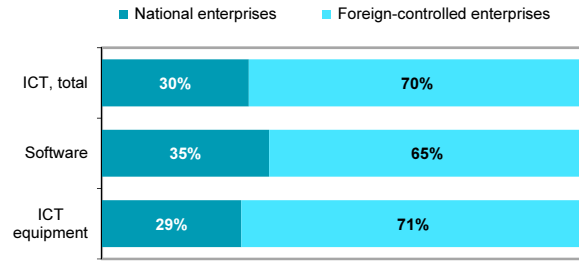


Figure C8 Business R&D expend. in ICT, by ownership; 2018



Source: CZSO, Annual R&D survey

Table C4 Business R&D expenditures in ICT in Czechia; 2018

CZK million

	Total	ICT equipment	Software
Total	**17 101**	**4 637**	**12 464**
financed from government funds	861	551	310
Enterprise size group			
Small (0-49 employees)	1 674	455	1 220
Medium (50-249 employees)	3 677	875	2 802
Large (250+ employees)	11 749	3 307	8 442
Ownership of enterprises			
National enterprises	5 203	1 606	3 597
Foreign-controlled enterprises	11 898	3 031	8 867
Industry of enterprises (CZ-NACE)			
ICT sector industries, total	**12 644**	**1 802**	**10 842**
ICT manufacturing (261-264)	295	181	114
Telecommunications (61)	794	411	383
IT services (465+582+62+631+951)	11 555	1 210	10 345
Other industries	**4 457**	**2 835**	**1 622**

Figure C9 Business R&D expenditures in ICT, by type of product

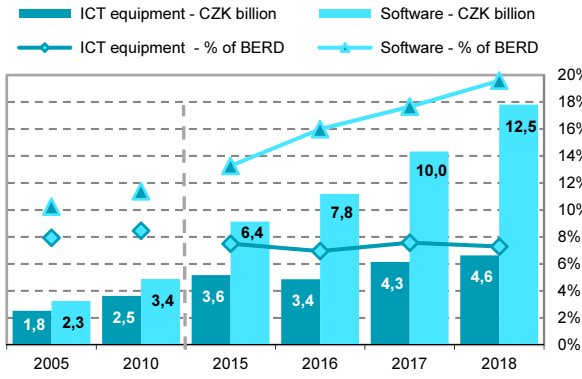
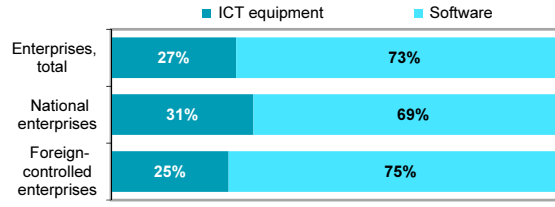


Figure C10 Business R&D expenditures in ICT, by type of product and ownership of enterprises; 2018



Source: CZSO, Annual R&D survey

C ICT research and development

Table C5 R&D expenditures in the ICT sector in Czechia

CZK million

	2016	2017	2018
Total	**9 421**	**11 190**	**13 495**
financed from government funds	652	886	1 066
Type of product			
ICT equipment	1 538	1 712	1 802
Software	6 597	8 322	10 842
Other non ICT related products	1 285	1 155	851
Enterprise size group			
Small (0-49 employees)	1 147	1 439	1 568
Medium (50-249 employees)	2 391	3 768	3 187
Large (250+ employees)	5 883	5 982	8 740
Ownership of enterprises			
National enterprises	2 929	3 800	4 306
Foreign-controlled enterprises	6 491	7 390	9 189
Industry of enterprises (CZ-NACE)			
ICT manufacturing (261-264)	**532**	**512**	**591**
ICT services, total	**8 889**	**10 677**	**12 903**
Telecommunications (61)	685	727	801
Computer programming (582+6201)	6 534	8 017	10 052
Data processing and hosting (631)	938	1 252	1 101
Other IT services (465+951+62 without 6201)	731	682	949

Figure C11 R&D expenditures in the ICT sector industries

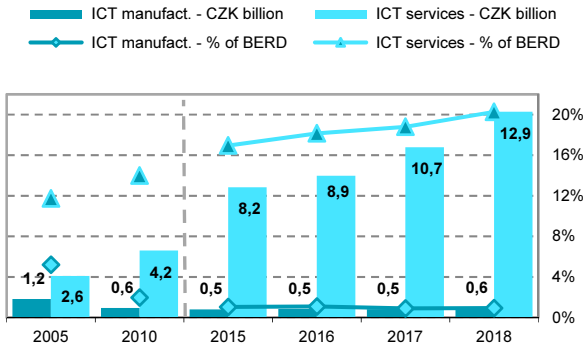
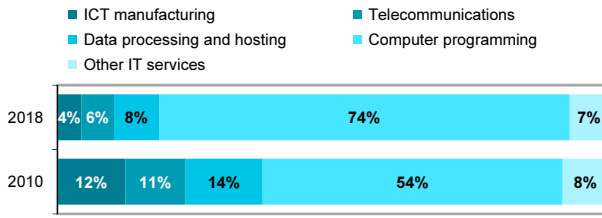


Figure C12 R&D expenditures in the ICT sector, by industry



Source: CZSO, Annual R&D survey

Figure C13 R&D expenditures in the ICT sector; 2017 (% of GDP)

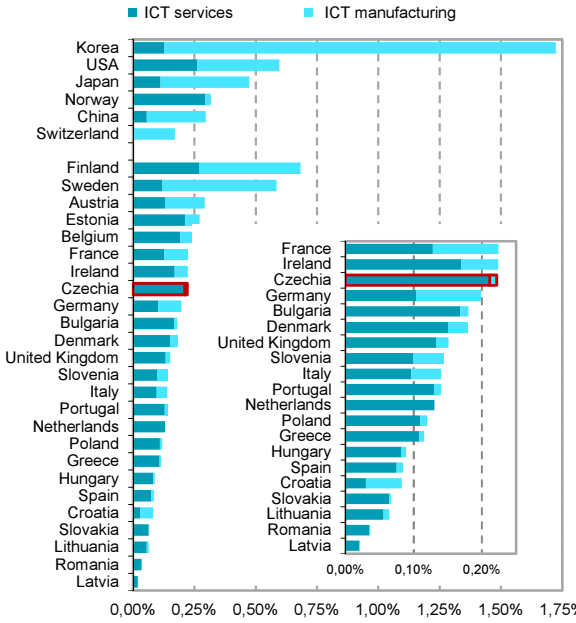
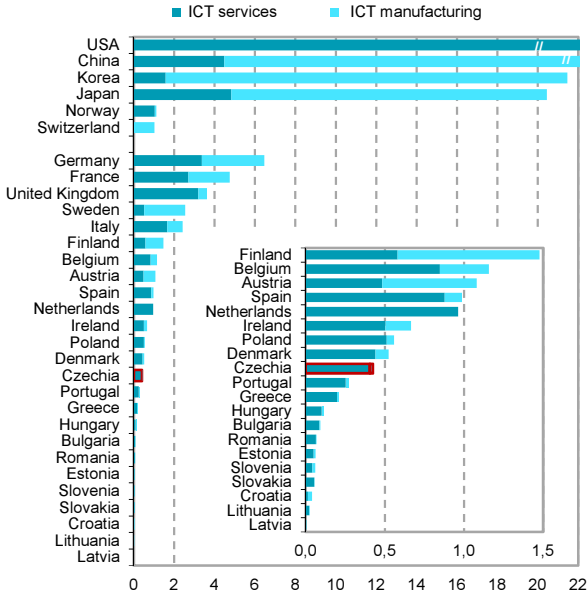


Figure C14 R&D expenditures in the ICT sector; 2017 (bilion €)



Source: CZSO calculations based on Eurostat and OECD data

C ICT research and development

Table C6 R&D personnel in the ICT sector in Czechia

R&D personnel (Full Time Equivalent Numbers - FTE)

	2016	2017	2018
Total	**8 339**	**9 130**	**10 196**
By occupation			
Researchers	5 300	5 828	6 378
Technicians and equivalent staff	2 323	2 477	3 062
Other supporting and administrative staff	716	825	756
Enterprise size group			
Small (0-49 employees)	1 470	1 709	1 857
Medium (50-249 employees)	2 408	3 214	2 891
Large (250+ employees)	4 462	4 207	5 449
Ownership of enterprises			
National enterprises	3 213	4 094	4 428
Foreign-controlled enterprises	5 126	5 037	5 768
Industry of enterprises (CZ-NACE)			
ICT manufacturing (261-264)	**546**	**553**	**623**
ICT services, total	**7 793**	**8 578**	**9 573**
Telecommunications (61)	210	234	352
Computer programming (582+6201)	5 923	6 629	7 489
Data processing and hosting (631)	888	967	852
Other IT services (465+951+62 without 6201)	771	746	880

Figure C15 R&D personnel in the ICT sector industries

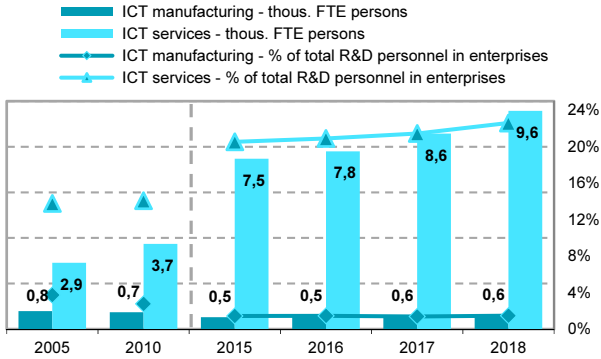
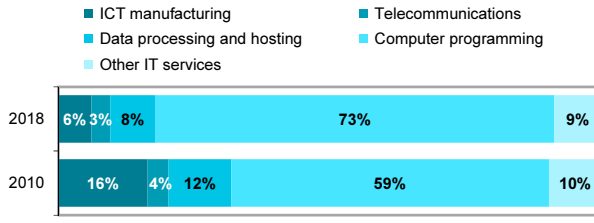


Figure C16 R&D personnel in the ICT sector, by industry



Source: CZSO, Annual R&D survey

D ICT external trade

ICT external trade **contains** trade in both ICT goods and ICT services. Goods and services in the field of information and communication technology (hereinafter as the ICT goods and services or ICT products) are **defined** as goods or services, which core function is to implement information processing and communication by electronic means, including transmission and display (OECD, 2009).

External trade in ICT goods

The **list of ICT goods** that is used for the external trade statistics is based on the Harmonised System Nomenclature (HS Nomenclature 2007), a classification of goods used for the international trade. List of ICT goods defined at 6-digit level of HS2007 was further grouped into the five main categories as follows:

- Computer equipment and peripherals;
- Communication equipment;
- Consumer electronics;
- Electronic components;
- Miscellaneous ICT components and accessories (ICT parts n.e.s.)

The **External Trade Statistics Database** of the Czech Statistical Office (CZSO) was used as a data source for national data. For more information see: http://apl.czso.cz/pll/stazo/STAZO.STAZO?jazyk=EN

The **UNCTAD database** and **The UN Comtrade database** was used as a data source for the international comparison: http://unctad.org/en/Pages/Statistics.aspx; http://comtrade.un.org/db/

External trade in ICT services

Data on exports and imports of the **ICT services** come from the CZSO direct survey at respondents on exports and imports of services.

Respective items of the ICT services are then defined according to the **International Classification** of **Extended Balance of Payment Services** (EBOPS 2010). The ICT services are subdivided into three categories as follows:

- Telecommunications services (code SI1);
- Other computer services (code SI22); and
- Computer software (codes SI21 and SH3).

Telecommunication services include, first of all, transactions of Czech and foreign telecommunication operators for implemented international calls by means of fixed or mobile telephone networks. Other telecommunication services involve payments for the access to the Internet, cable television, and to other computer networks.

Computer services consist mainly of consultancy services in the fields of hardware and software of computers, including maintenance and repairs of both hardware and software and services related to data processing.

Computer software involves purchase and sale of tailor-made software and applications (original computer software), including purchase and sale of ownership rights to such software or licence fees for the software use. Furthermore, it is also purchase and sale of standard software and applications **supplied over the Internet**, including purchase and sale of ownership rights to such software or licence fees for the software use. The computer software category here includes also **licences to reproduce and/or distribute computer software (code SH3)**

2018 data are preliminary.

Data for **international comparisons** come from **Eurostat** data sources.

Data for international comparisons refer to the reported or nearest available year.

For further information on ICT external trade see (only in Czech)**:** https://www.czso.cz/csu/czso/zahranicni-obchod-s-ict-zbozim-a-sluzbami

D ICT external trade

Table D1 ICT goods exports from Czechia

CZK million

	2016	2017	2018
Total	**506 018**	**564 570**	**665 646**
Computer equipment and peripherals	236 892	283 506	323 092
Communication equipment	97 651	138 167	194 288
Consumer electronics	72 922	74 650	77 374
Electronic components	45 144	33 101	34 591
ICT parts n.e.s.	53 409	35 146	36 301

Figure D1 ICT goods exports

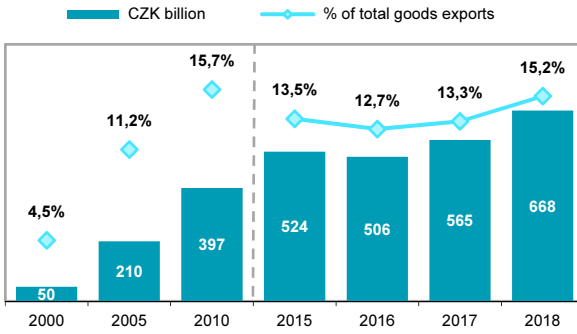


Figure D2 ICT goods exports, by commodities

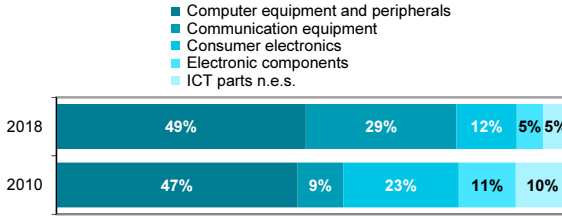
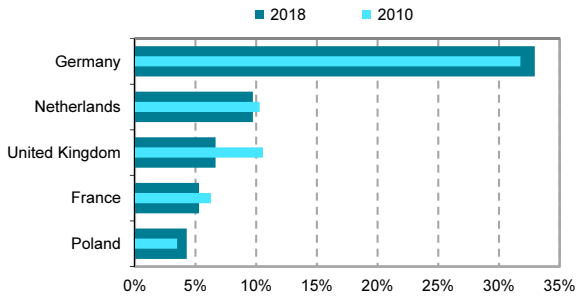


Figure D3 ICT goods exports, by countries



Source: CZSO, External Trade Statistics Database

Figure D4 ICT goods exports; 2018
(% of total goods exports)

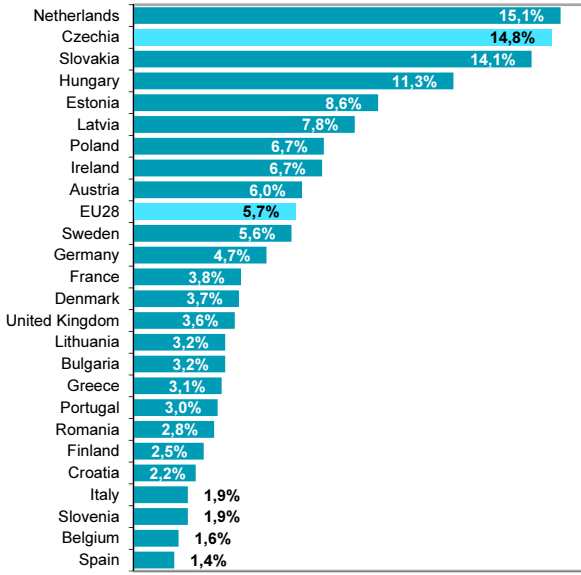
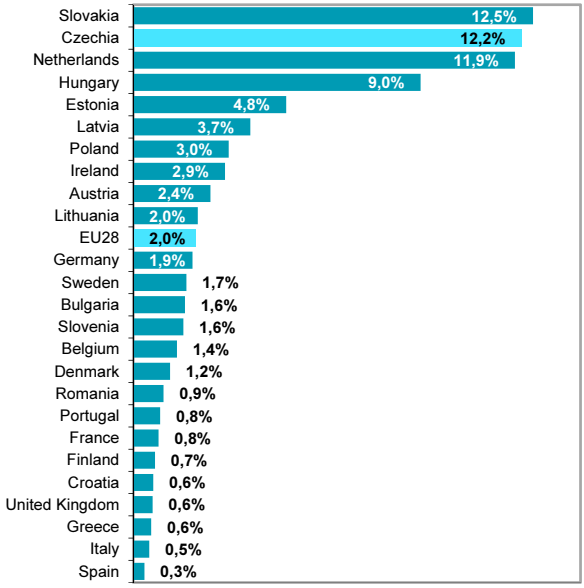


Figure D5 ICT goods exports; 2018 (% of GDP)



Source: CZSO calculations based on Eurostat

D ICT external trade

Table D2 ICT goods imports to Czechia

CZK million

	2016	2017	2018
Total	**496 943**	**578 294**	**657 087**
Computer equipment and peripherals	170 630	196 963	206 974
Communication equipment	103 219	141 049	209 053
Consumer electronics	44 109	43 031	45 400
Electronic components	84 734	101 739	105 611
ICT parts n.e.s.	94 251	95 512	90 050

Figure D6 ICT goods imports

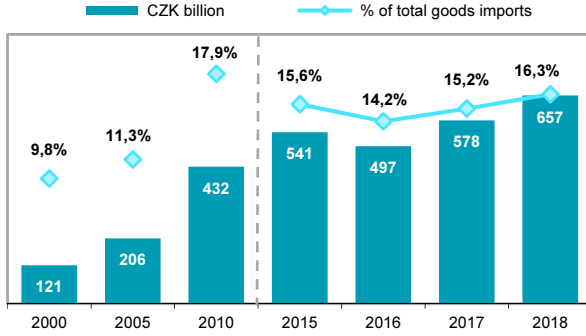


Figure D7 ICT goods imports, by commodities

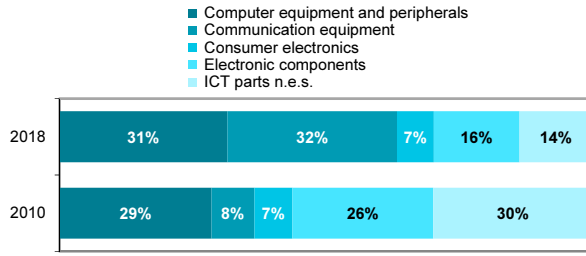
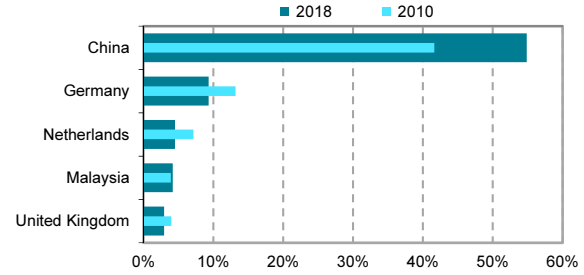


Figure D8 ICT goods imports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Figure D9 ICT goods imports; 2018 (% of total goods imports)

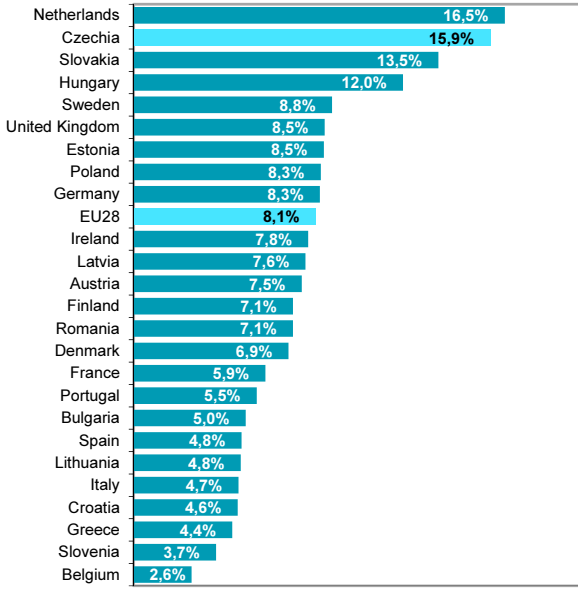
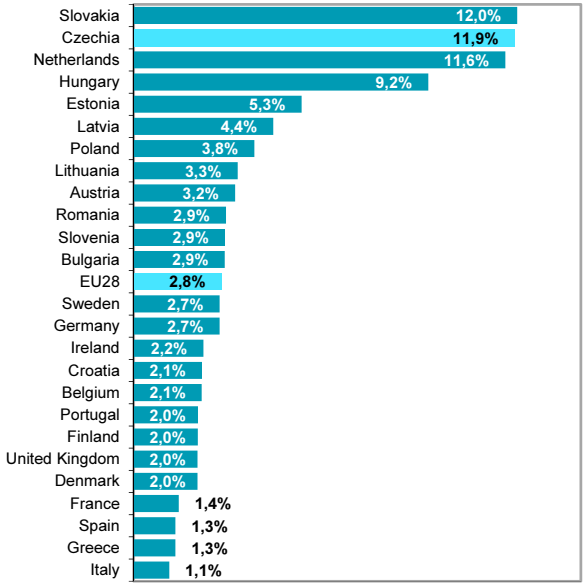
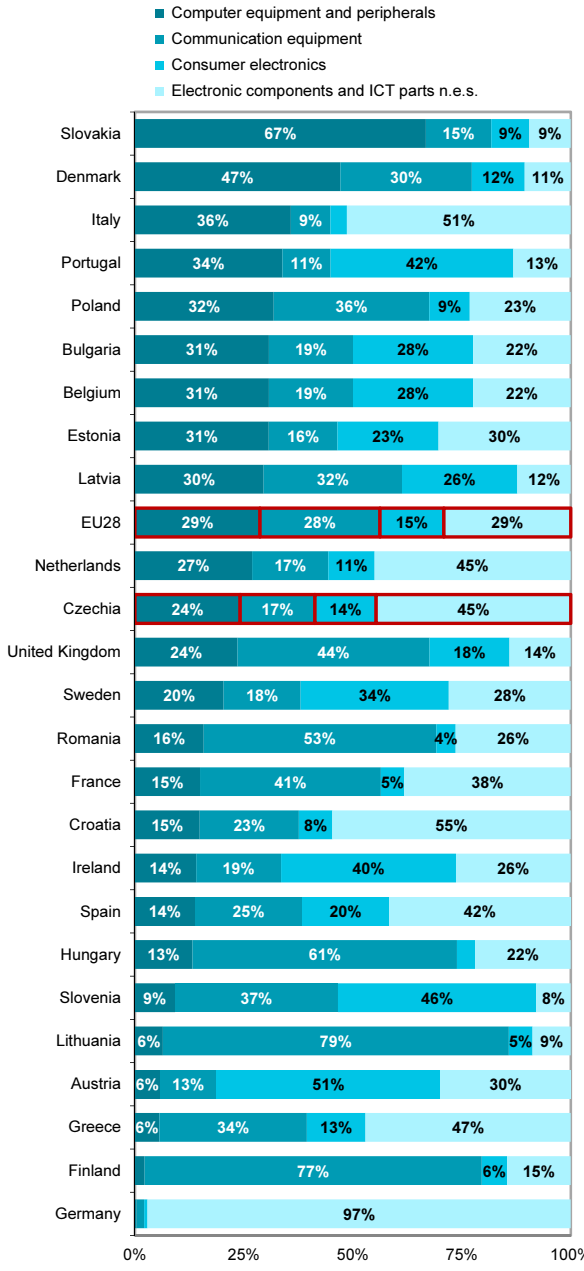


Figure D10 ICT goods imports; 2018 (% of GDP)



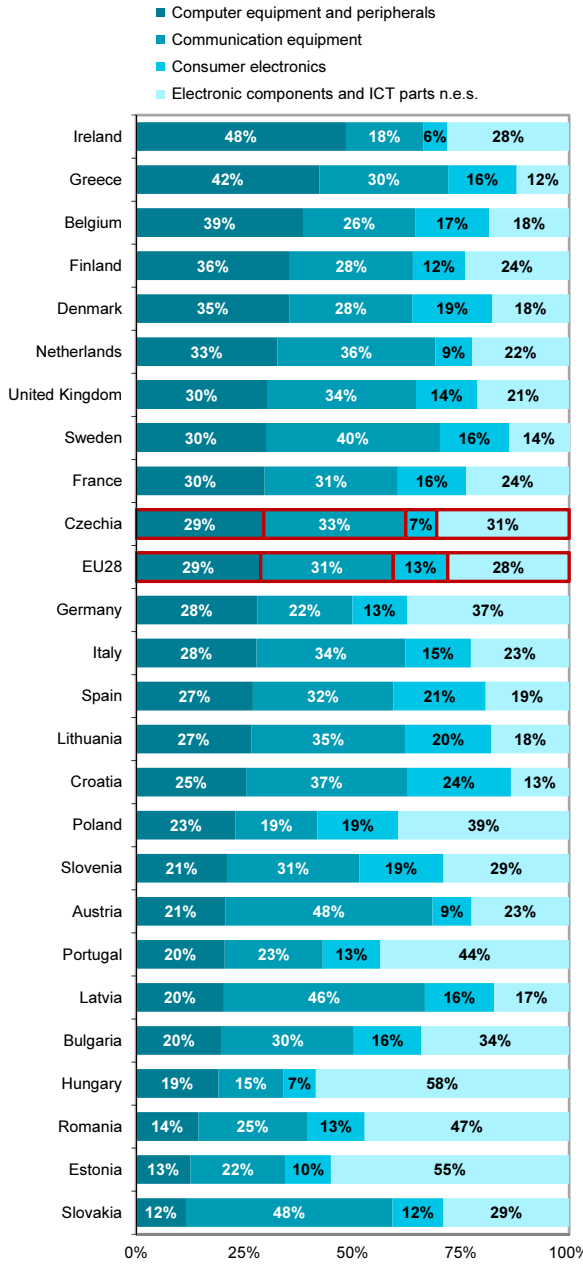
Source: CZSO calculations based on Eurostat

Figure D11 ICT goods exports, by commodities; 2018



Source: CZSO calculations based on Eurostat

Figure D12 ICT goods imports, by commodities; 2018



Source: CZSO calculations based on Eurostat

D ICT external trade

Table D3 Computer equipment exports from Czechia

CZK million

	2016	2017	2018
Total	**236 892**	**283 506**	**324 867**
Portable computers	56 158	64 699	66 589
Other computers	80 871	121 211	162 949
Computer peripherals, total	99 862	97 596	95 329
Storage units	56 238	49 816	48 255
Sound, video, network and similar cards	9 930	12 097	13 751
Monitors used with computers	16 286	19 748	19 324
Printers, copying or faxing machines	7 813	6 388	5 589
Other input or output peripherals*	9 596	9 546	8 409

** Keyboards; joysticks, computer mice, scanners or optical readers*

Figure D13 Computer equipment exports

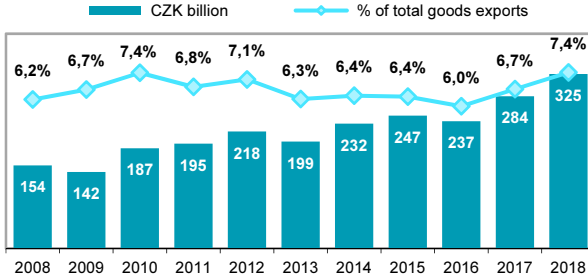


Figure D14 Computer equipment exports, by commodities

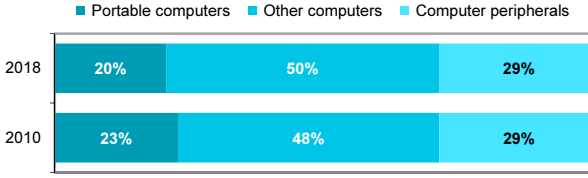
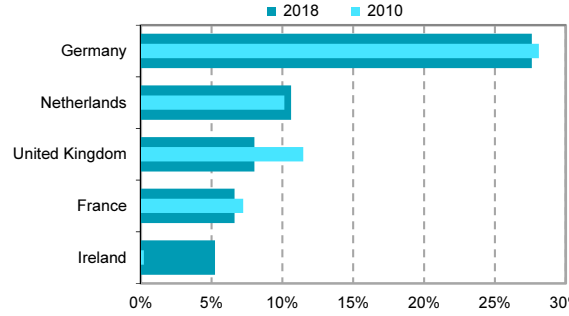


Figure D15 Computer equipment exports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D4 Computer equipment imports to Czechia

CZK million

	2016	2017	2018
Total	**170 630**	**196 963**	**206 974**
Portable computers	60 020	71 830	76 491
Other computers	19 599	20 325	22 833
Computer peripherals, total	91 011	104 809	107 650
Storage units	50 022	57 324	58 638
Sound, video, network and similar cards	8 565	11 529	12 933
Monitors used with computers	15 885	19 875	19 511
Printers, copying or faxing machines	7 862	7 150	6 798
Other input or output peripherals*	8 677	8 931	9 770

** Keyboards; joysticks, computer mice, scanners or optical readers*

Figure D16 Computer equipment imports

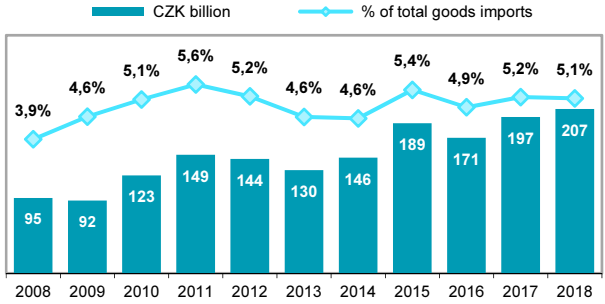


Figure D17 Computer equipment imports, by commodities

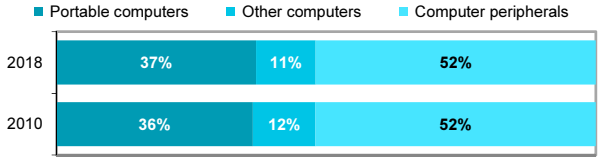
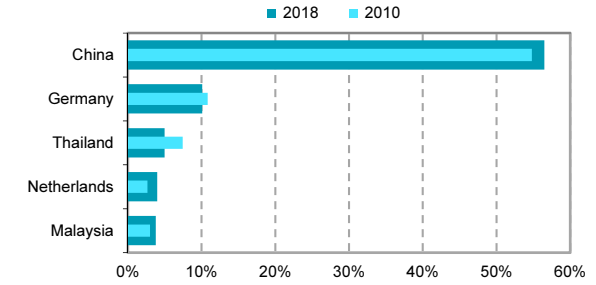


Figure D18 Computer equipment imports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D5 Communication equipment exports from Czechia

CZK million

	2016	2017	2018
Total	**97 651**	**138 167**	**196 020**
Mobile phones	62 246	87 374	141 592
Other communication equipment	35 405	50 794	54 428

Figure D19 Communication equipment exports

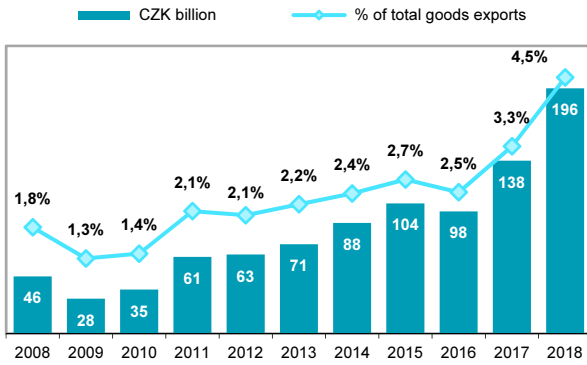


Figure D20 Communication equipment exports by commodities

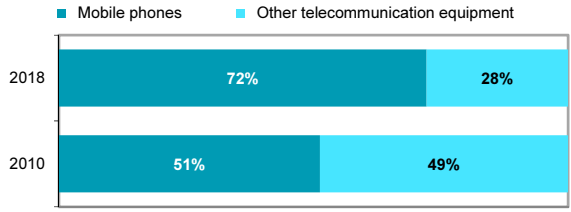
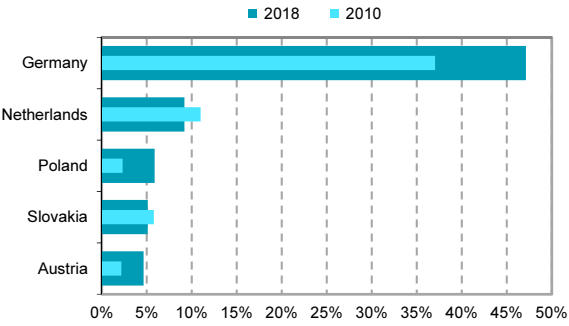


Figure D21 Communication equipment exports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D6 Communication equipment imports to Czechia

CZK million

	2016	2017	2018
Total	**103 219**	**141 049**	**209 053**
Mobile phones	68 538	98 042	156 153
Other communication equipment	34 681	43 006	52 900

Figure D22 Communication equipment imports

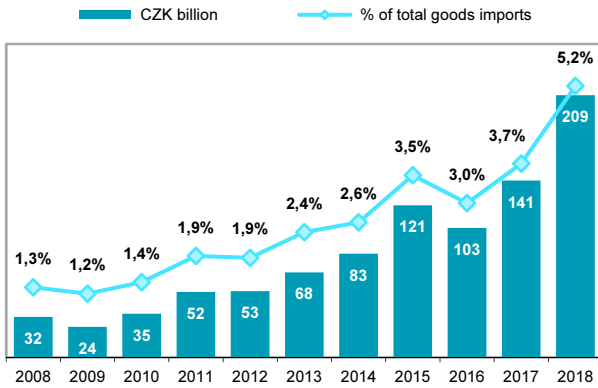


Figure D23 Communication equipment imports by commodities

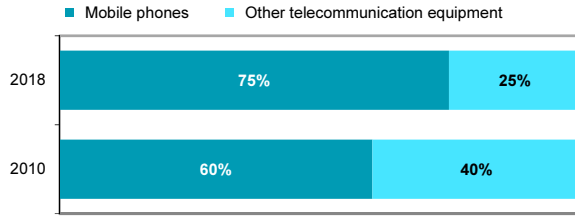
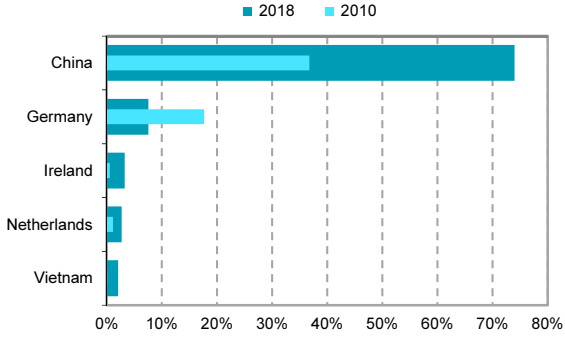


Figure D24 Communication equipment imports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D7 Consumer electronics exports from Czechia

CZK million

	2016	2017	2018
Total	**72 922**	**74 650**	**78 676**
Radio and TV receivers	39 009	34 821	35 627
Sound and image recording and reproducing apparatuses	15 119	15 264	15 935
Consumer electronics accessories*	18 793	24 565	27 114

** Monitors and projectors; Microphones and stands there for; Loudspeakers; Headphones, earphones and combined microphone/speaker sets; Audio-frequency electric amplifiers; Electric sound amplifier sets; Non-recorded media*

Figure D25 Consumer electronics exports

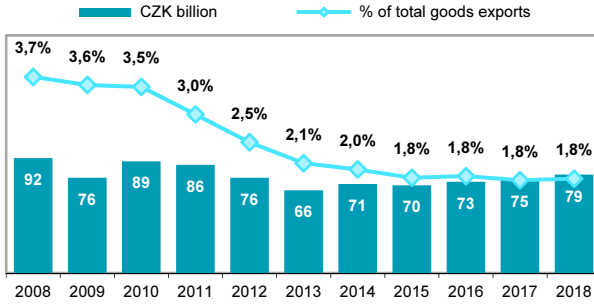


Figure D26 Consumer electronics exports, by commodities

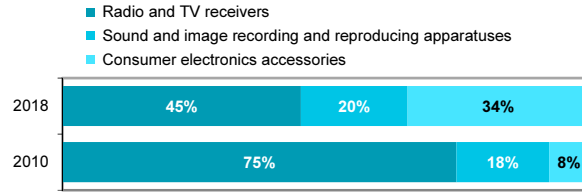
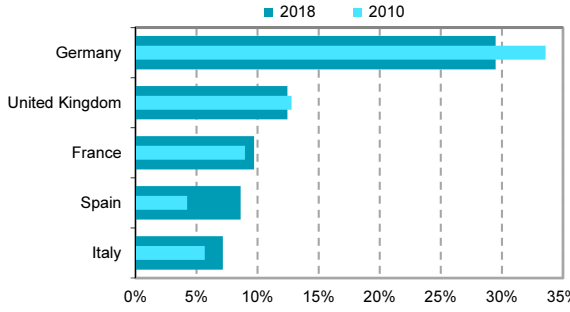


Figure D27 Consumer electronics exports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D8 Consumer electronics imports to Czechia

CZK million

	2016	2017	2018
Total	**44 109**	**43 031**	**45 400**
Radio and TV receivers	15 088	15 213	14 914
Sound and image recording and reproducing apparatuses	14 446	14 457	15 564
Consumer electronics accessories*	14 574	13 362	14 922

** Monitors and projectors; Microphones and stands there for; Loudspeakers; Headphones, earphones and combined microphone/speaker sets; Audio-frequency electric amplifiers; Electric sound amplifier sets; Non-recorded media*

Figure D28 Consumer electronics imports

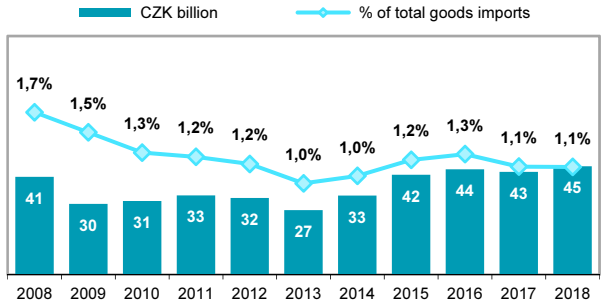


Figure D29 Consumer electronics imports, by commodities

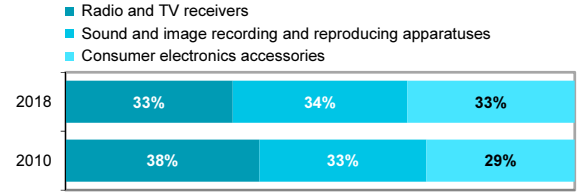
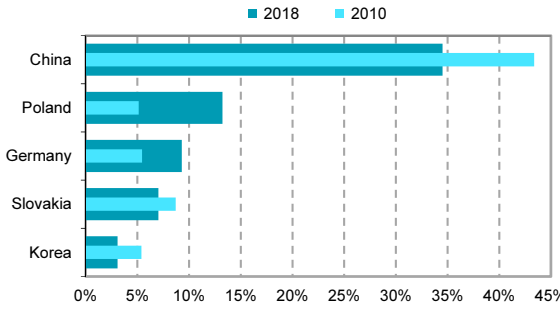


Figure D30 Consumer electronics imports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D9 Electronic components exports from Czechia

CZK million

	2016	2017	2018
Total	**45 144**	**33 101**	**34 371**
Electronic integrated circuits	33 789	21 422	21 718
Printed circuits	4 874	4 555	4 782
Other electronic components	6 481	7 124	7 870

Figure D31 Electronic components exports

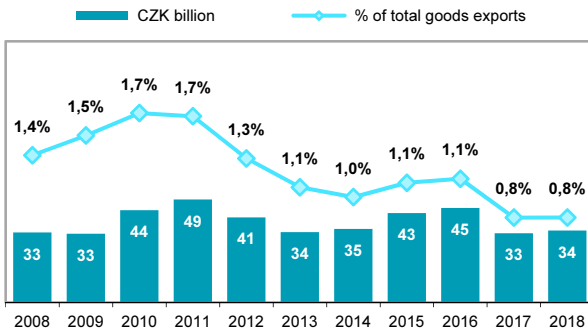


Figure D32 Electronic components exports, by commodities

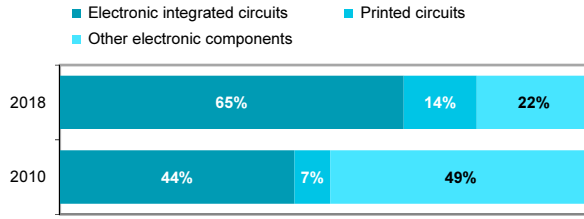
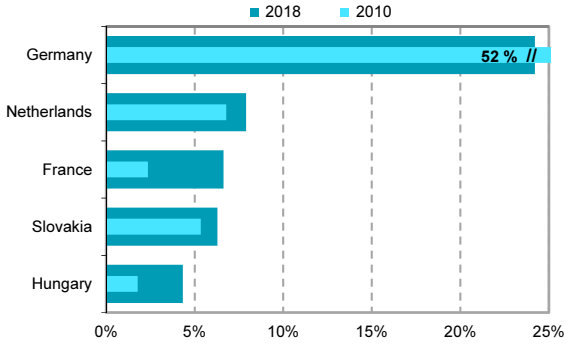


Figure D33 Electronic components exports, by countries



Source: CZSO, External Trade Statistics Database

Table D10 Electronic components imports to the Czechia

CZK million

	2016	2017	2018
Total	**84 734**	**101 739**	**105 611**
Electronic integrated circuits	63 101	77 417	81 468
Printed circuits	11 570	13 352	12 460
Other electronic components	10 064	10 969	11 683

Figure D34 Electronic components imports

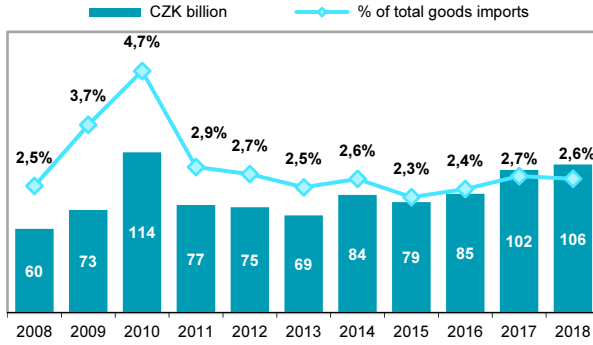


Figure D35 Electronic components imports, by commodities

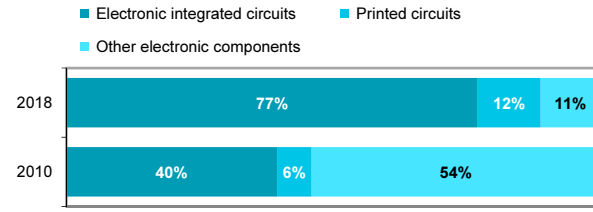
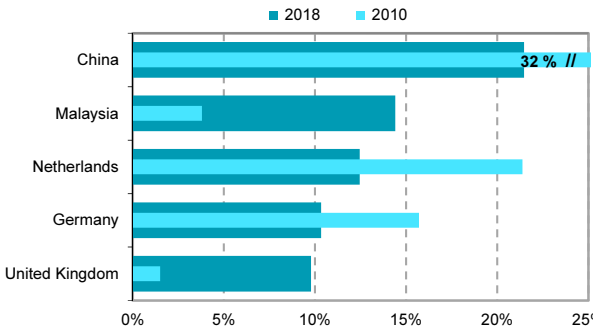


Figure D36 Electronic components imports, by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D11 Exports of ICT parts n.e.s. from Czechia

CZK million

	2016	2017	2018
Total	**53 409**	**35 146**	**33 994**
Parts and accessories n.e.s. of			
computers	29 212	17 458	16 574
telecommunication equipment	19 520	11 638	10 752
consumer electronics	4 677	6 050	6 668

Figure D37 Exports of ICT parts and accessories n.e.s.

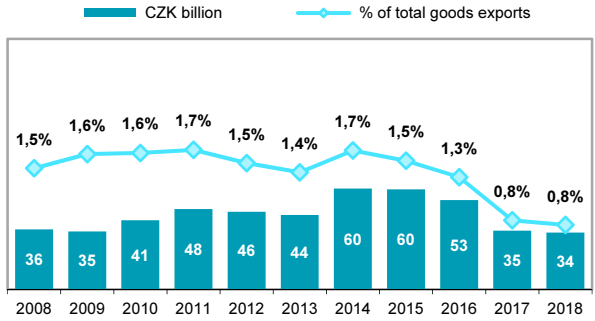


Figure D38 Exports of ICT parts n.e.s., by commodities

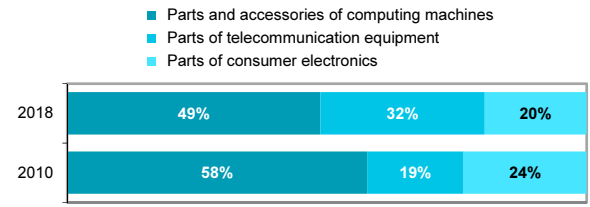
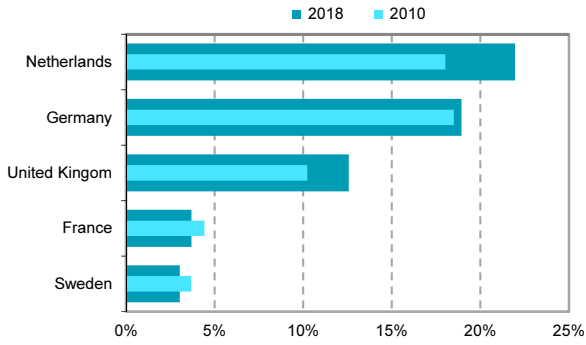


Figure D39 Exports of ICT parts n.e.s., by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D12 Imports of ICT parts n.e.s. to Czechia

CZK million

	2016	2017	2018
Total	**94 251**	**95 512**	**90 050**
Parts and accessories n.e.s. of			
computers	54 163	59 231	55 585
telecommunication equipment	14 324	7 792	7 295
consumer electronics	25 765	28 489	27 170

Figure D40 Imports of ICT parts and accessories n.e.s.

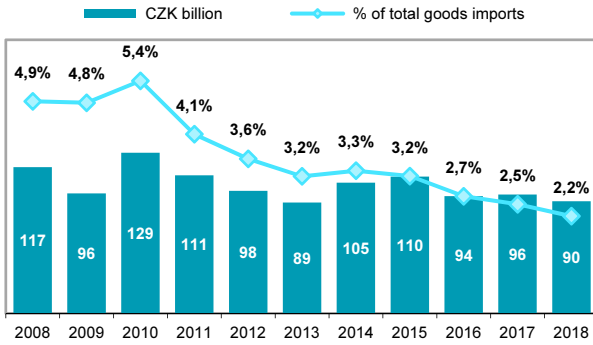


Figure D41 Imports of ICT parts n.e.s., by commodities

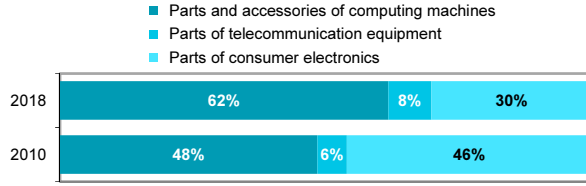
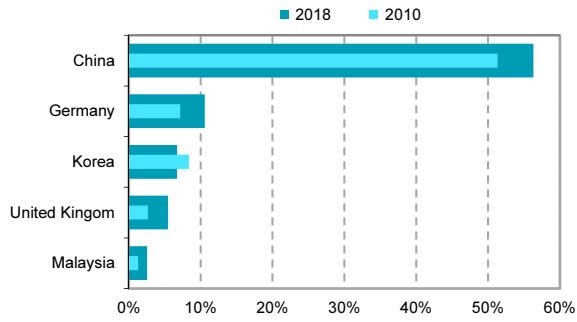


Figure D42 Imports of ICT parts n.e.s., by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D13 ICT services exports from Czechia

CZK million

	2016	2017	2018
Total	**79 287**	**88 070**	**91 655**
Telecommunication services	15 420	18 290	17 082
Computer services	43 899	47 827	46 409
Computer software	19 968	21 953	28 164
by selected countries			
EU28, total	49 812	53 823	55 434
of which to Germany	15 185	16 830	15 484
Other countries, total	29 475	34 247	36 221
of which to the United States	14 828	15 628	17 668

Figure D43 ICT services exports

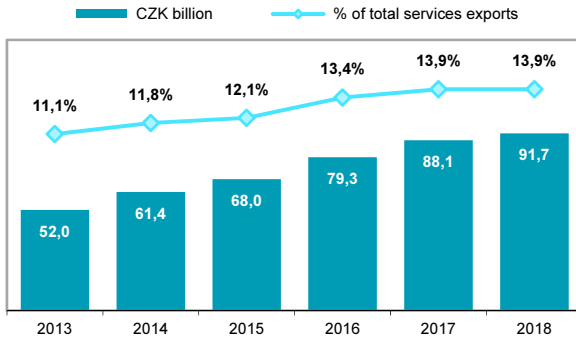


Figure D44 ICT services exports, by type of services

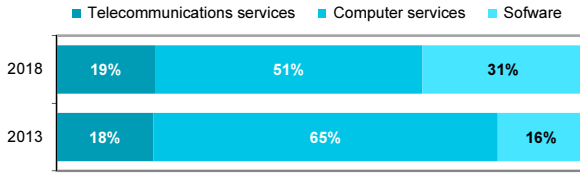
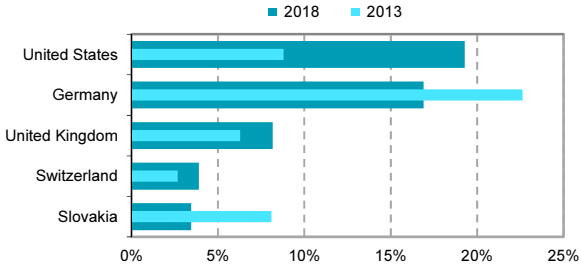


Figure D45 ICT services exports, by countries



Source: CZSO, Survey on exports and imports of services

Figure D46 ICT services exports; 2017
(% of total services exports)

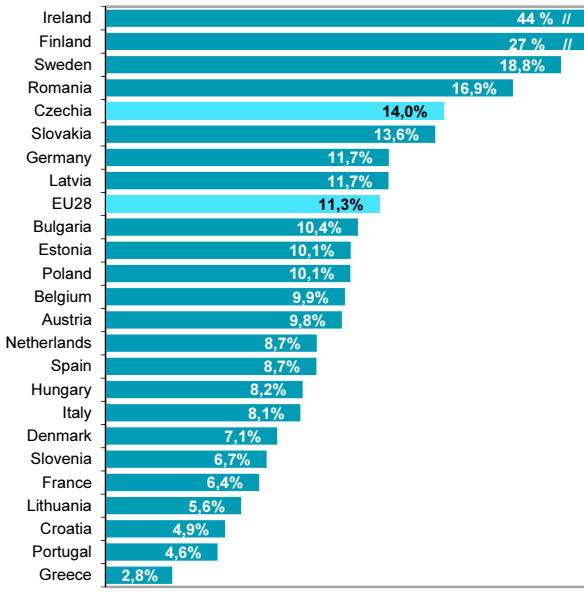
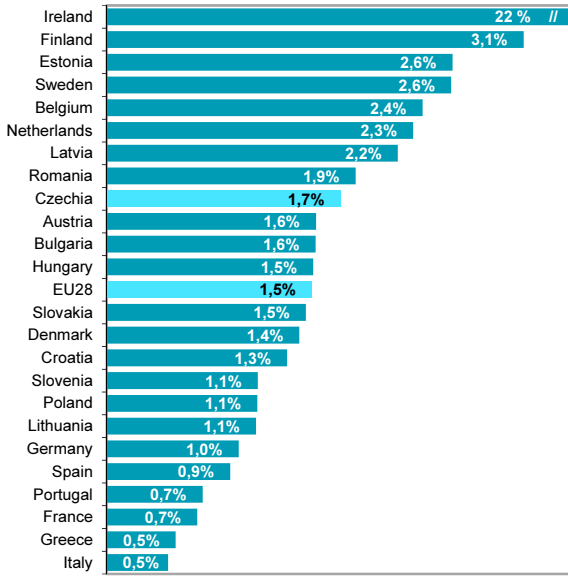


Figure D47 ICT services exports; 2017 (% of GDP)



Source: CZSO calculations based on Eurostat

D ICT external trade

Table D14 ICT services imports to Czechia

CZK million

	2016	2017	2018
Total	**45 268**	**50 899**	**51 975**
Telecommunication services	14 804	16 433	15 575
Computer services	22 606	25 414	26 913
Computer software	7 859	9 052	9 487
by selected countries			
EU28, total	31 023	33 846	36 656
of which from Germany	12 137	13 094	11 515
Other countries, total	14 246	17 053	15 319
of which from the United States	3 765	3 161	3 131

Figure D48 ICT services imports

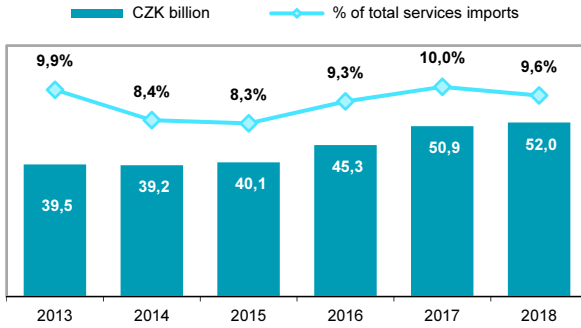


Figure D49 ICT services imports, by type of service

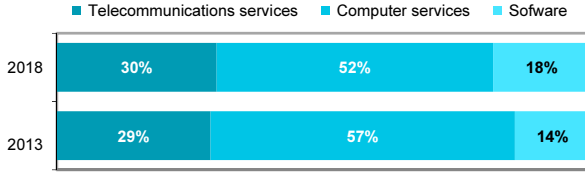
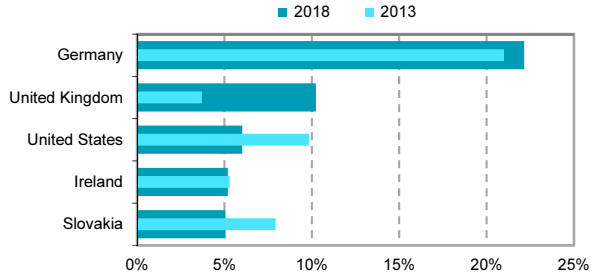


Figure D50 ICT services imports, by countries



Source: CZSO, Survey on exports and imports of services

Figure D51 ICT services imports; 2017
(% of total services imports)

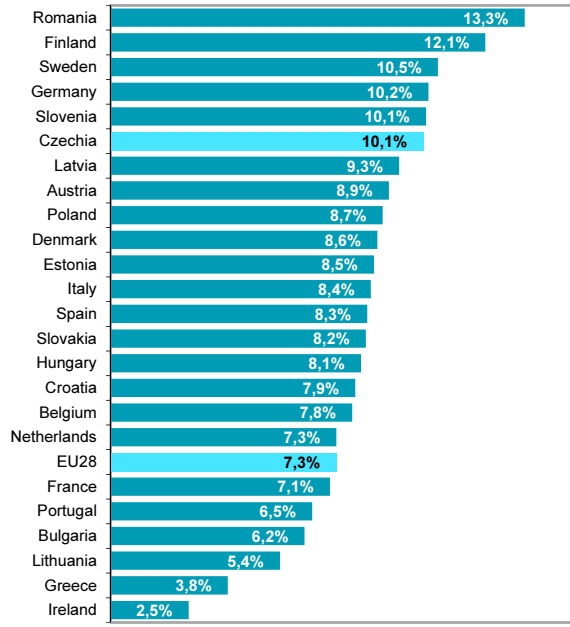
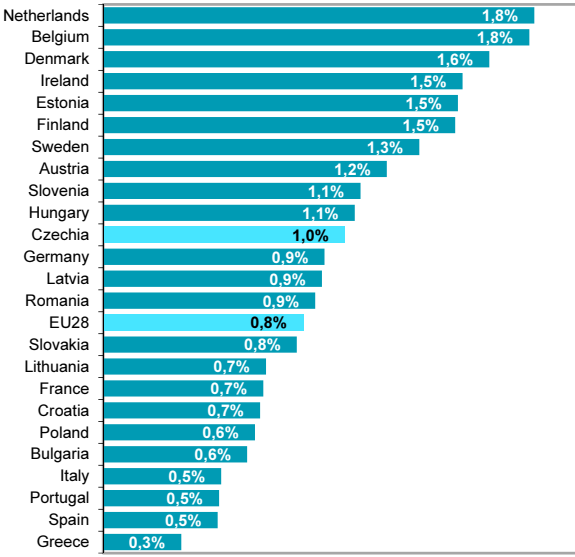


Figure D52 ICT services imports; 2017 (% of GDP)



Source: CZSO calculations based on Eurostat

Table D15 Computer services and software exports from Czechia

CZK million

	2016	2017	2018
Total	**63 867**	**69 780**	**74 573**
Computer services	43 899	47 827	46 409
Computer software	19 968	21 953	28 164
by selected countries			
EU28, total	41 536	44 253	46 443
of which to Germany	11 818	13 325	13 410
Other countries, total	22 331	25 527	28 130
of which to the United States	13 606	14 920	16 079

Figure D53 Computer services and software exports

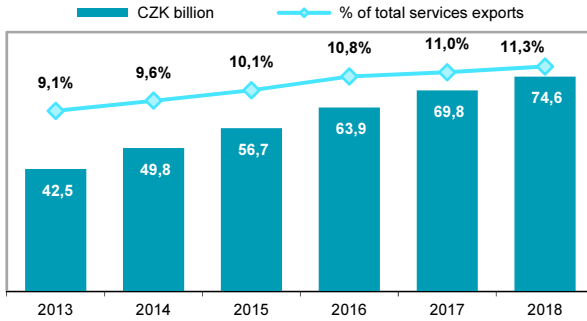


Fig. D54 Computer services and SW exports by type of service

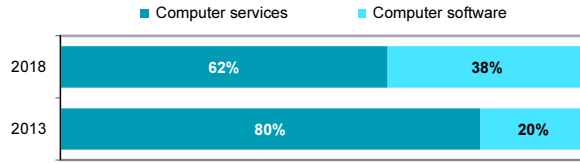
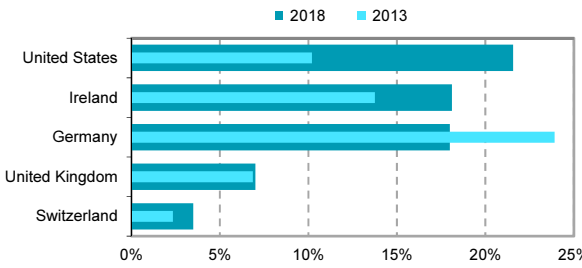


Figure D55 Computer services and SW exports by countries



Source: CZSO, Survey on exports and imports of services

D ICT external trade

Table D16 Computer services and software imports to Czechia

CZK million

	2016	2017	2018
Total	**30 465**	**34 466**	**36 400**
Computer services	22 606	25 414	26 913
Computer software	7 859	9 052	9 487
by selected countries			
EU28, total	22 256	24 673	26 372
of which from Germany	8 026	8 963	10 031
Other countries, total	8 209	9 793	10 028
of which from the United States	3 312	2 861	2 901

Figure D56 Computer services and software imports

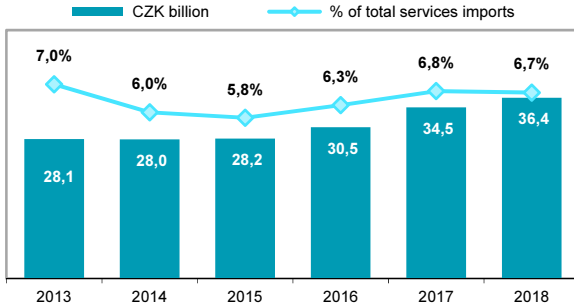


Figure D57 Computer services & SW imports by type of service

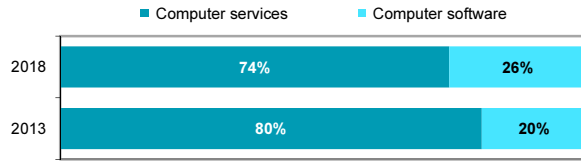
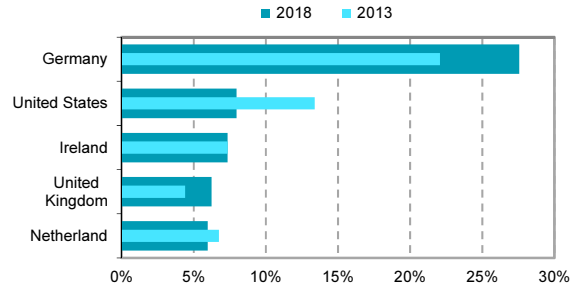


Figure D58 Computer services & SW imports by countries



Source: CZSO, Survey on exports and imports of services

Figure D59 Computer services and software exports; 2017 (% of GDP)

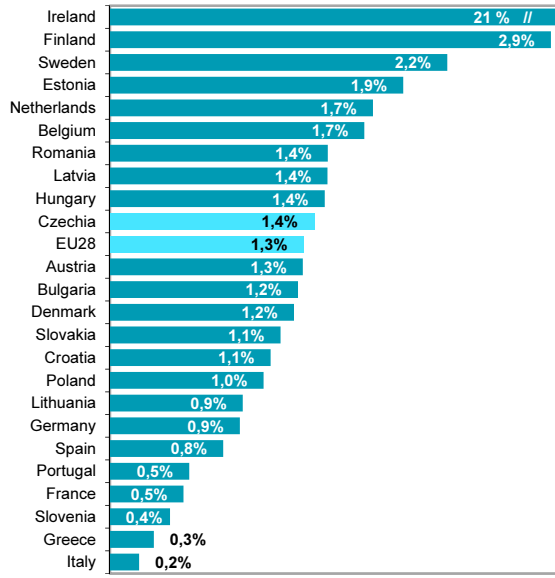
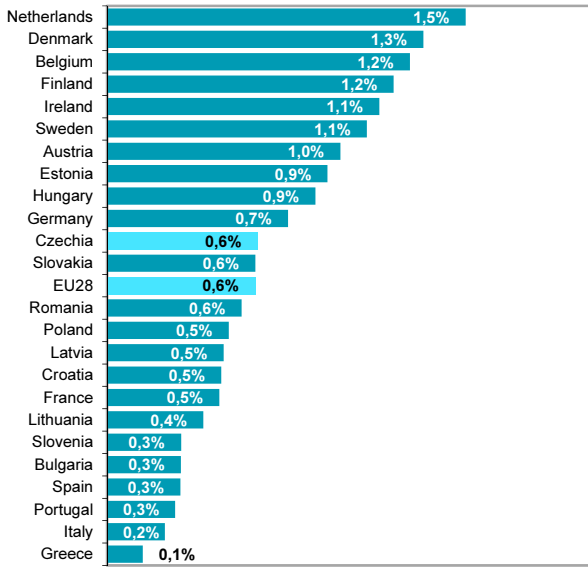


Figure D60 Computer services and software imports; 2017 (% of GDP)



Source: CZSO calculations based on Eurostat

E ICT sector

In general, the term **ICT sector** includes a combination of ICT manufacturing and ICT services industries which are associated with the production and/or distribution of information and communication technologies (ICT) and a provision of related services.

ICT sector together with Content and media sector was already in 2007 recognized by the **United Nation Statistics Division** as a new alternative grouping of economic activities called information economy. The **information economy** sector is defined within the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4. For more information see following web page: https://unstats.un.org/unsd/EconStatKB/KnowledgebaseArticle10286.aspx

ICT sector is divided into the **four main categories**: ICT manufacturing, ICT trade, Telecommunications and IT services. The ICT sector involves enterprises, which dominating activities belong to the **CZ-NACE groups and classes** as follows:

ICT manufacturing:

- Manufacture of electronic components and boards (26.1)
- Manufacture of computers and peripheral equipment (26.2)
- Manufacture of communication equipment (26.3)
- Manufacture of consumer electronics and media (26.4 and 26.8)

ICT trade industries (ICT wholesale):

- Wholesale of information and communication equipment (46.5)

Telecommunications:

- Wired telecommunications activities (61.1)
- Wireless telecommunications activities (61.2)
- Satellite and other telecommunications activities. (61.3 and 61.9)

IT services:

- Software publishing (58.2) and Computer programming, consultancy and related activities (62.0)
- Data processing, hosting and related activities; web portals (63.1)
- Repair of computers and communication equipment (95.1)

Data for this chapter, except for R&D expenditures (source: **R&D annual survey – see chapter C**), were obtained from the annual structural survey of business entities from selected production industries (**SBS – Structural Business Statistics).** For more information about Czech SBS see: https://www.czso.cz/csu/czso/annual-structural-business-statistics-methodology

Data prior to the year 2005 are estimates based on the **Annual National Accounts Statistics**. More information about this data source is available at: http://apl.czso.cz/pll/rocenka/rocenka.indexnu_en

All 2018 data are preliminary.

The **Eurostat Structural Business Statistics Database** was used as a data source for the international comparison (except for R&D expenditure). More information about the data from the SBS, including definitions of individual indicators, is available at: http://ec.europa.eu/eurostat/web/structural-business-statistics/overview

Data for international comparisons refer to the reported or nearest available year.

Further information on ICT sector can be found at (only in Czech): https://www.czso.cz/csu/czso/odvetvi-informacni-ekonomiky

E ICT sector

Table E1 Employment in the ICT sector in Czechia

Number of persons employed - headcount persons

	2016	2017	2018
Total	**157 142**	**164 209**	**169 202**
ICT manufacturing, total	**25 292**	**25 298**	**24 227**
Manuf. of computers & electr. components	14 661	14 807	14 242
Manufacturing of communication equipment and consumer electronics	10 630	10 492	9 985
ICT services, total	**131 850**	**138 911**	**144 974**
ICT wholesale	11 160	11 127	11 460
Telecommunications	19 175	20 459	21 988
IT services	101 515	107 325	111 526

Figure E1 Employment in the ICT sector

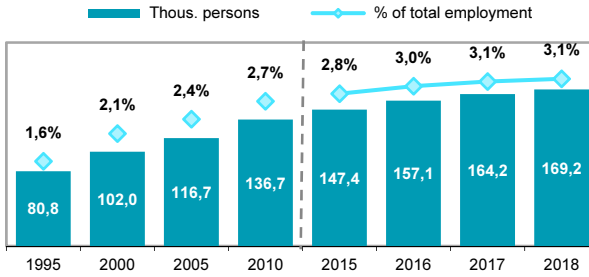


Figure E2 Employment in the ICT sector, by industry

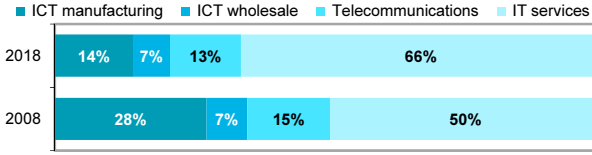


Figure E3 Employment in the ICT sector, by ownership; 2018

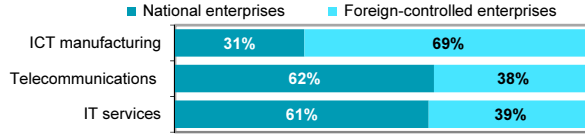
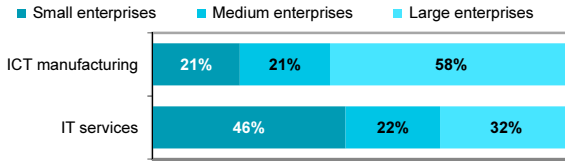


Figure E4 Employment in the ICT sector, by size; 2018



Source: CZSO, Structural Business Statistics

Figure E5 Employment in the ICT sector; 2017
(% of total employment)

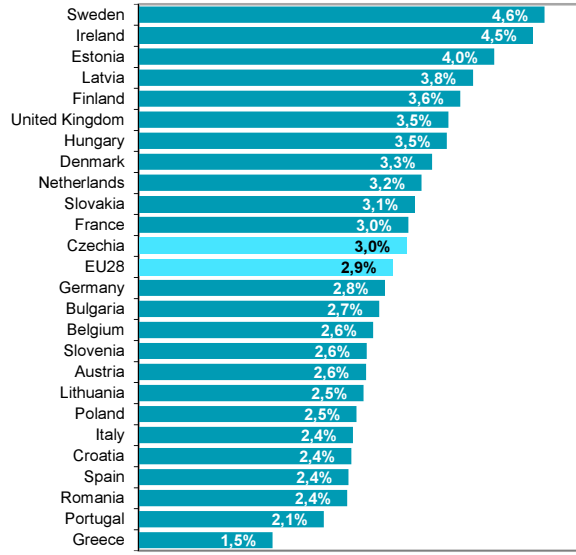
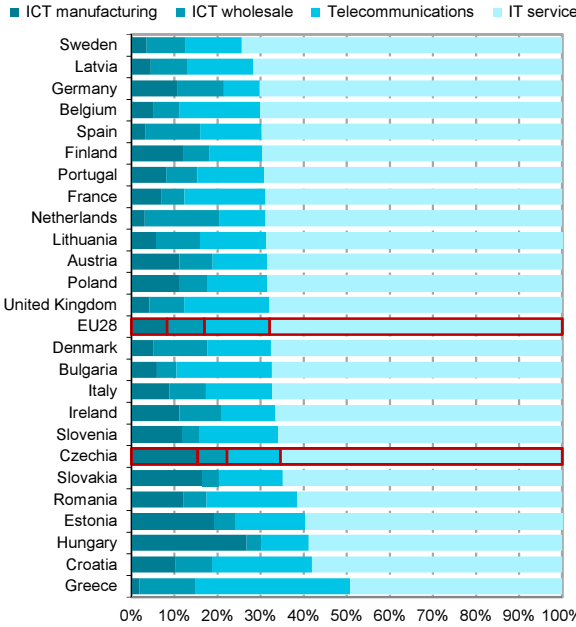


Figure E6 Employment in the ICT sector, by industry; 2017



Source: CZSO calculations based on the Eurostat SBS database

Figure E7 Employment in ICT manufacturing in Czechia

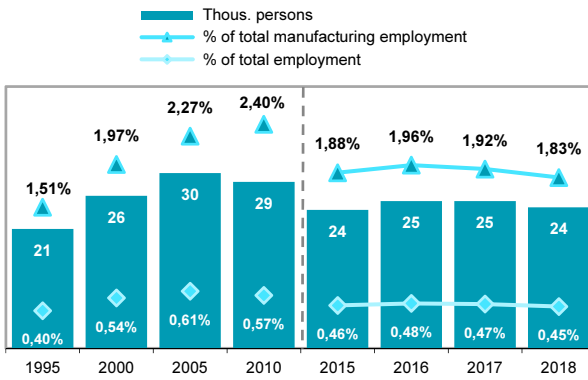


Figure E8 Employment in Telecommunications in Czechia

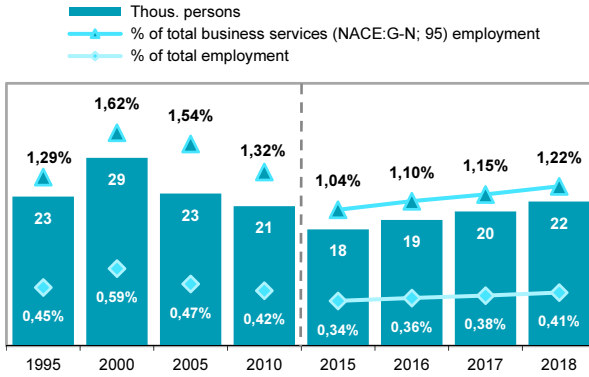
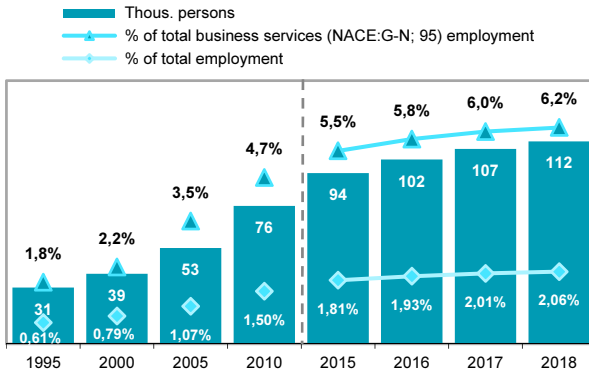


Figure E9 Employment in IT services in Czechia



Source: CZSO, Structural Business Statistics

Figure E10 Employment in ICT manufacturing; 2017
(% of total manufacturing employment)

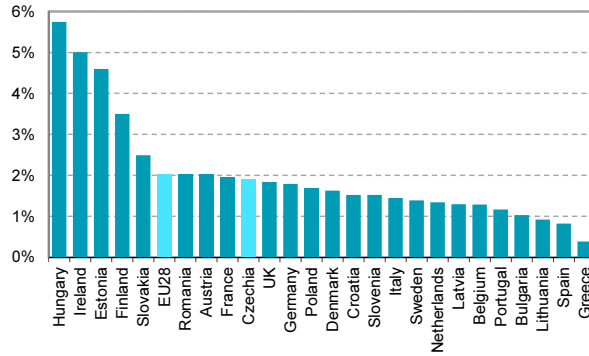


Figure E11 Employment in Telecommunications; 2017
(% of total business enterprise sector employment)

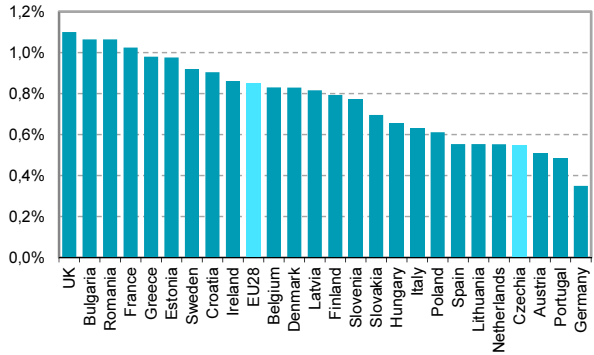
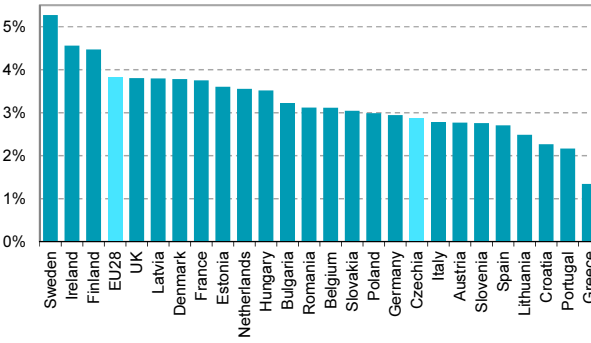


Figure E12 Employment in IT services industries; 2017
(% of total business enterprise sector employment)



Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Table E2 Turnover in the ICT sector in Czechia

CZK million

	2016	2017	2018
Total	**742 844**	**789 990**	**844 720**
ICT manufacturing, total	**226 336**	**233 272**	**262 726**
Manuf. of computers & electr. components	173 998	179 372	208 643
Manufacturing of communication equipment and consumer electronics	52 338	53 900	54 082
ICT services, total	**516 508**	**556 718**	**581 994**
ICT wholesale	153 584	167 844	157 895
Telecommunications	121 884	125 872	127 176
IT services	241 040	263 002	296 924

Figure E13 Turnover in the ICT sector

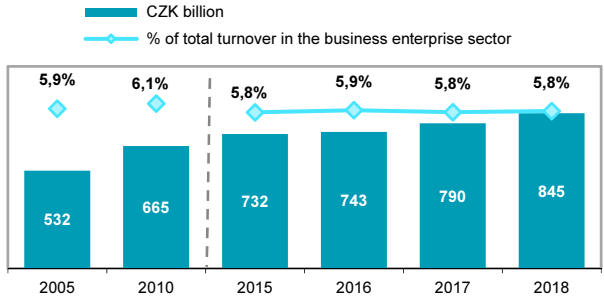


Figure E14 Turnover in the ICT sector, by industry

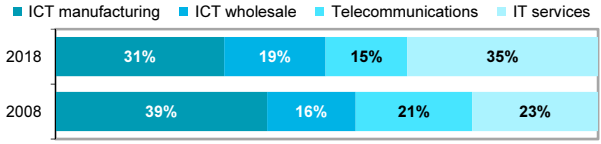


Figure E15 Turnover in the ICT sector, by ownership; 2018

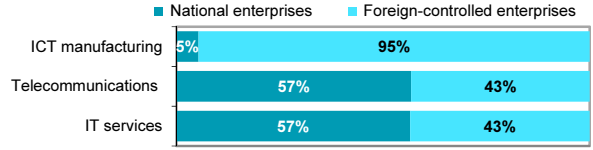
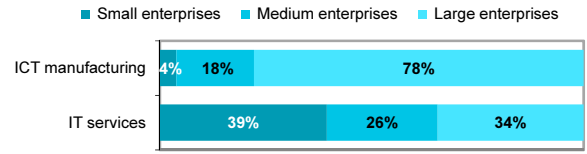


Figure E16 Turnover in the ICT sector, by size; 2018



Source: CZSO, Structural Business Statistics

Figure E17 Turnover in the ICT sector; 2017
(% of total turnover in the business enterprise sector)

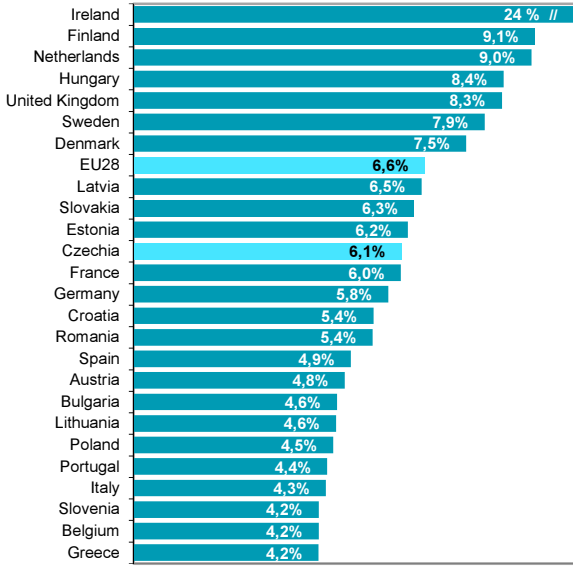
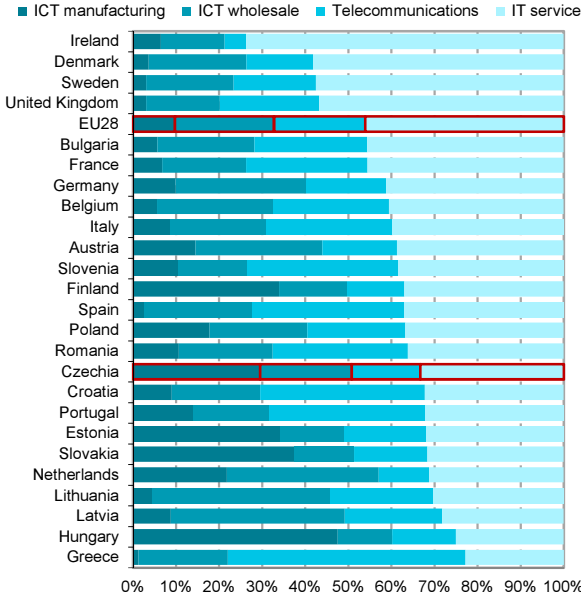


Figure E18 Turnover in the ICT sector
by industry; 2017



Source: CZSO calculations based on the Eurostat SBS database

Figure E19 Turnover in ICT manufacturing in Czechia

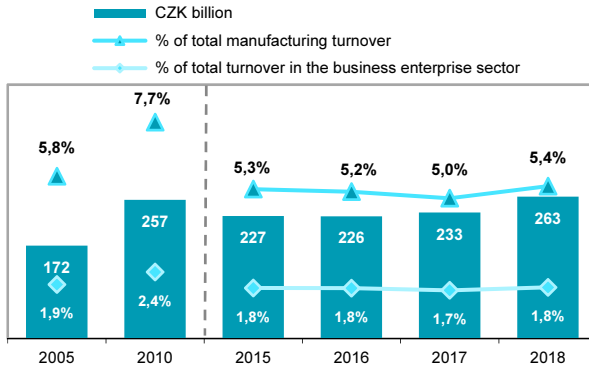


Figure E20 Turnover in Telecommunications in Czechia

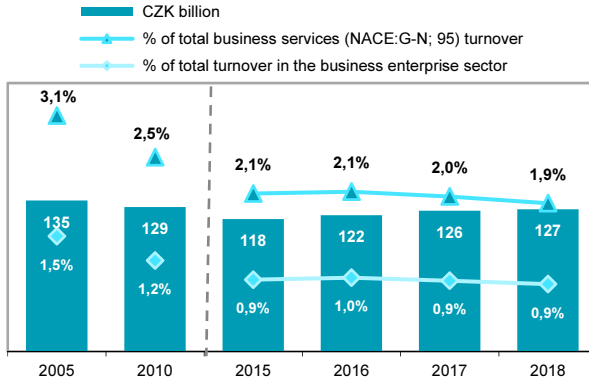
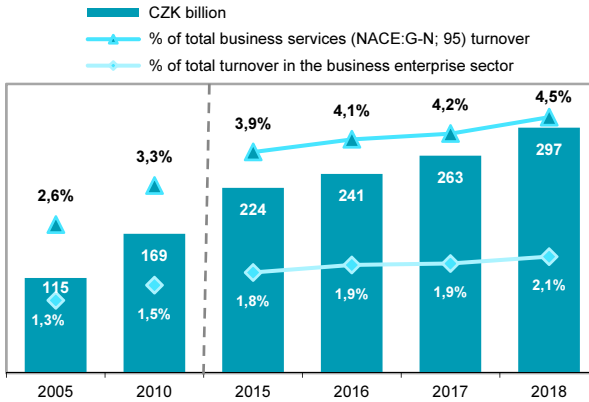


Figure E21 Turnover in IT services in Czechia



Source: CZSO, Structural Business Statistics

Figure E22 Turnover in ICT manufacturing; 2017
(% of total manufacturing turnover)

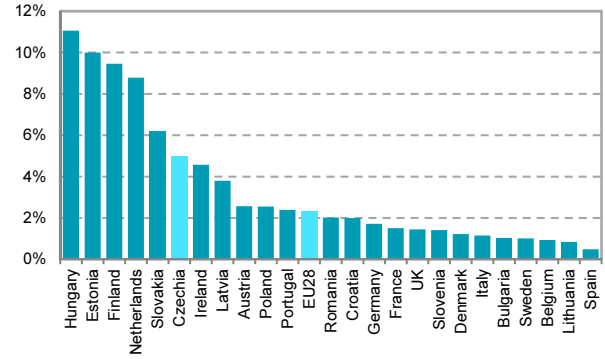


Figure E23 Turnover in Telecommunications; 2017
(% of total turnover in the business enterprise sector)

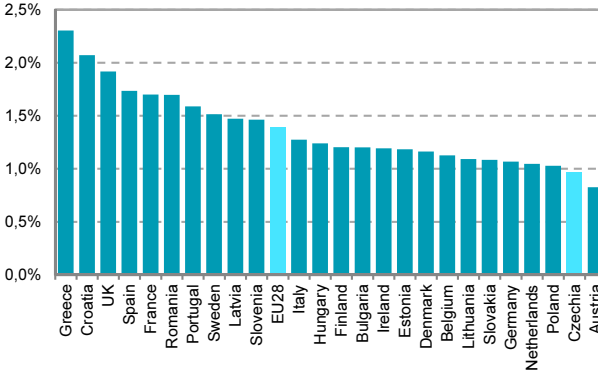
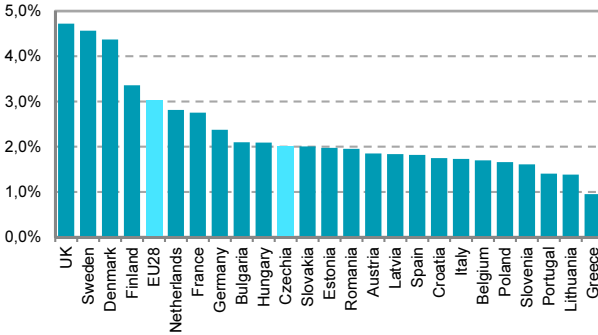


Figure E24 Turnover in IT services; 2017
(% of total turnover in the business enterprise sector)



Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Table E3 R&D expenditure in the ICT sector in Czechia

CZK million

	2016	2017	2018
Total	**9 421**	**11 190**	**13 495**
ICT manufacturing, total	**532**	**512**	**591**
Manuf. of computers & electron. components	174	202	255
Manufacturing of communication equipment and consumer electronics	358	310	337
ICT services, total	**8 889**	**10 677**	**12 903**
ICT wholesale	100	87	86
Telecommunications	685	727	801
IT services	8 104	9 863	12 017

Figure E25 R&D expenditure in the ICT sector

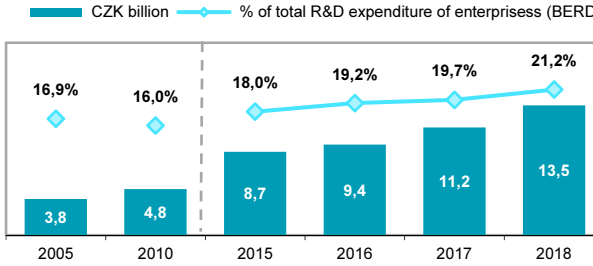


Figure E26 R&D expenditure in the ICT sector, by industry

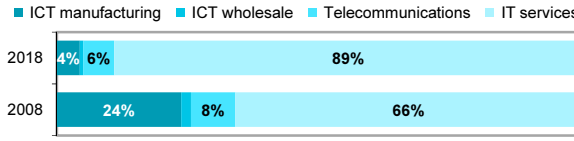


Fig. E27 R&D expenditure in the ICT sector, by ownership; 2018

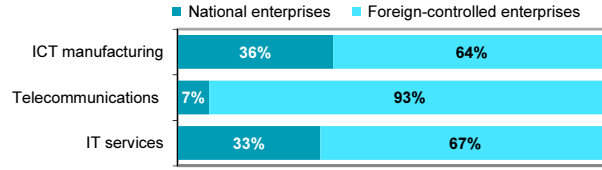
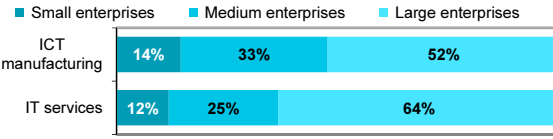


Figure E28 R&D expenditure in the ICT sector, by size; 2018



Source: CZSO, Annual R&D survey

Figure E29 R&D expenditure in the ICT sector; 2017 (% of total R&D expenditure of enterprises)

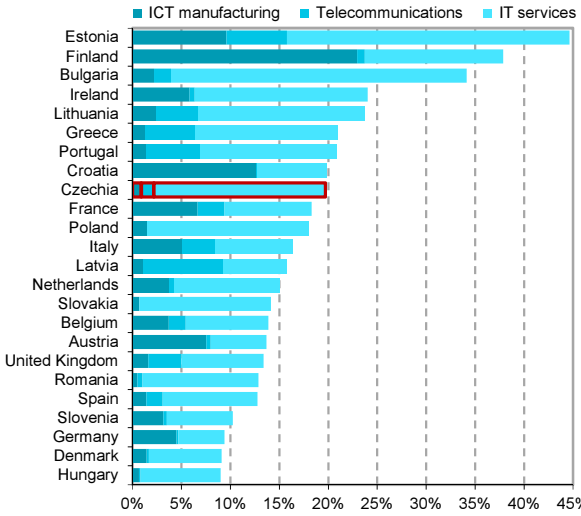
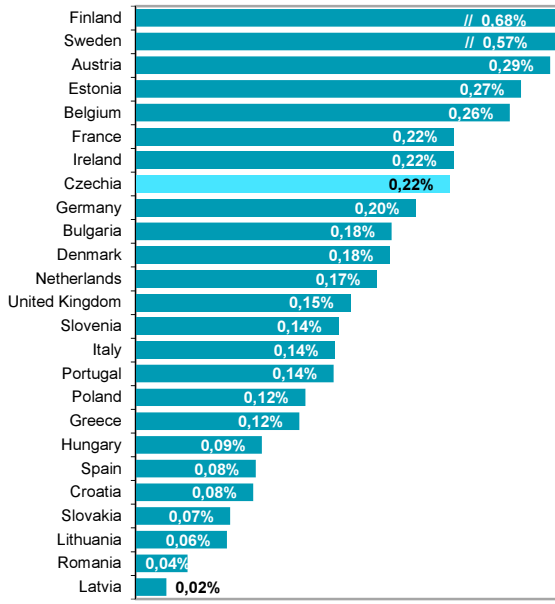


Figure E30 Total R&D expenditure in the ICT sector; 2017 (% of GDP)



Source: CZSO calculations based on the Eurostat STI Database

Figure E31 R&D expenditure in ICT manufacturing in Czechia

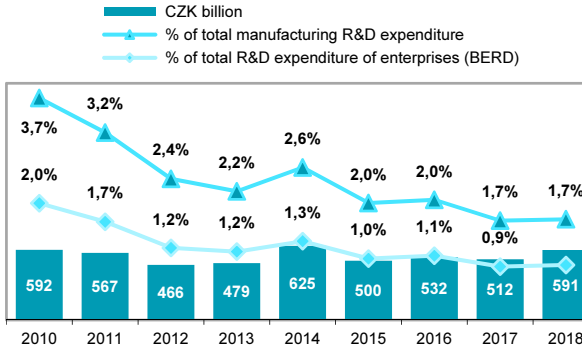


Figure E32 R&D expenditure in Telecommunications in Czechia

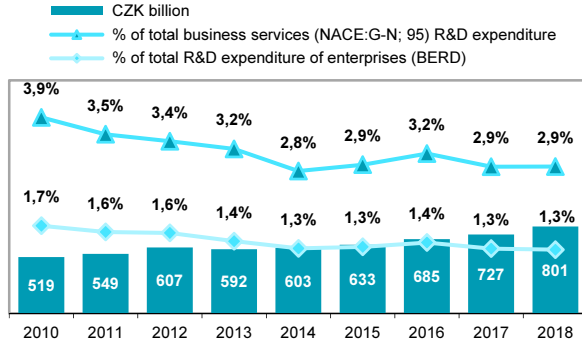
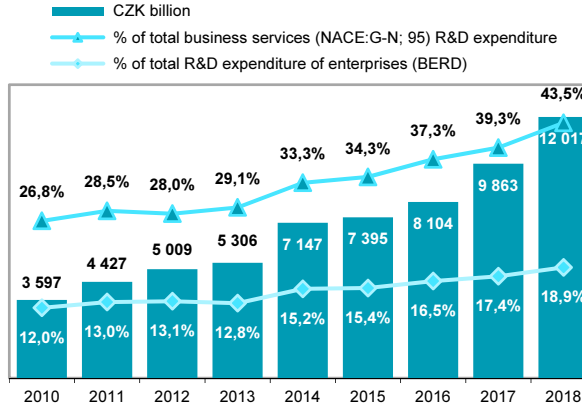


Figure E33 R&D expenditure in IT services in Czechia



BERD - Intramural R&D Expenditure in the Business Enterprise Sector

Source: CZSO, Annual R&D survey

Figure E34 R&D expenditure in ICT manufacturing; 2017
(% of total manufacturing R&D expenditure)

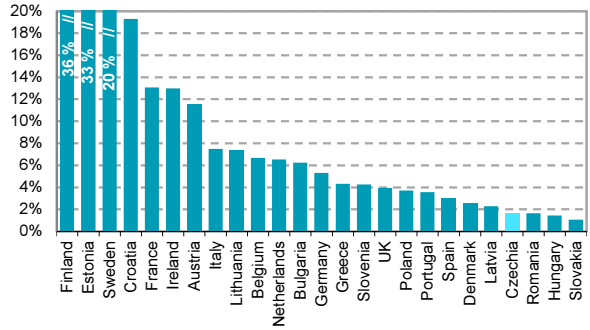


Figure E35 R&D expenditure in Telecommunications; 2017
(% of total R&D expenditure of enterprises)

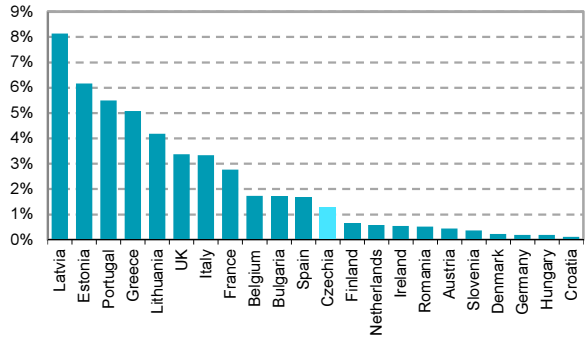
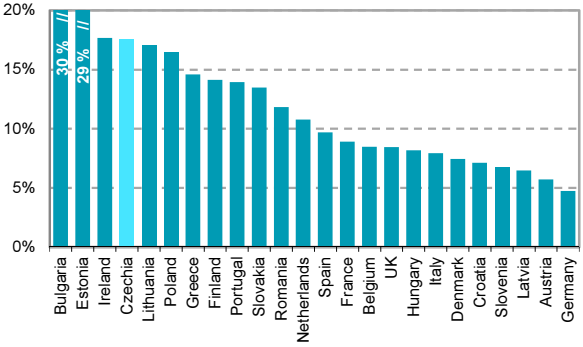


Figure E36 R&D expenditure in IT services; 2017
(% of total R&D expenditure of enterprises)



Source: CZSO calculations based on the Eurostat STI Database