



INFORMATION ECONOMY IN FIGURES

2018

**CZECH REPUBLIC
AND WORLD**

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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 (**information 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 information 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**' provides information about **employment** in ICT specialist occupations both for ICT professionals and ICT technicians together with data about their **earnings**. 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) of 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, December 2018

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A ICT specialists

A.1 Numbers and earnings of ICT specialists

ICT specialists are **defined** on the basis of the **International Standard Classification of Occupations (ISCO-08)** and corresponding national classification 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/czso/employment-and-unemployment-as-measured-by-labour-force-survey-annual-averages-2017>

Data on **gross monthly earnings** 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/structure-of-earnings-survey-2017>

Data about numbers and earnings of ICT specialists is available **by occupation and individual characteristics of ICT specialists** such as gender, age groups, highest education attainment or main economic activity.

A.2 University students and graduates of 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 further information on ICT specialists see (only in Czech):

<https://www.czso.cz/csu/czso/ict-odbornici>

A ICT specialists

Table A1 ICT specialists in the Czech Republic

	Thousand persons	
	2012	2017
Total	160,5	185,6
of which woman ICT specialists	16,3	17,8
Occupation		
ICT managers, professionals and engineers, total	67,1	88,4
of which Software & apps developers and analysts	34,7	47,8
ICT technicians, installers and servicers, total	93,5	97,3
of which ICT operations & user support technicians	48,4	56,2
Age group		
20-29 years	39,1	38,0
30-39 years	60,7	70,4
40-49 years	35,2	44,0
50+ years	25,2	33,1
Highest level of education attainment		
Tertiary	85,0	105,5
Secondary with A-level examination	61,7	69,3
Other (lower)	13,8	10,8

Figure A1 ICT specialists, total

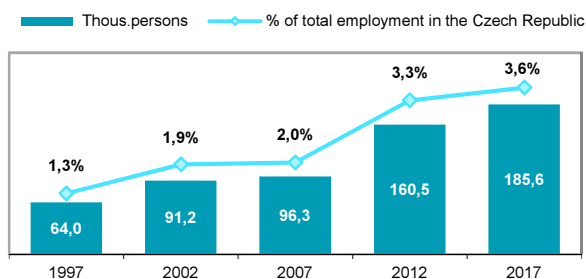
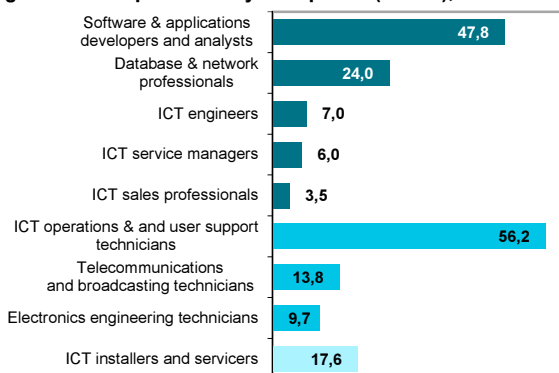


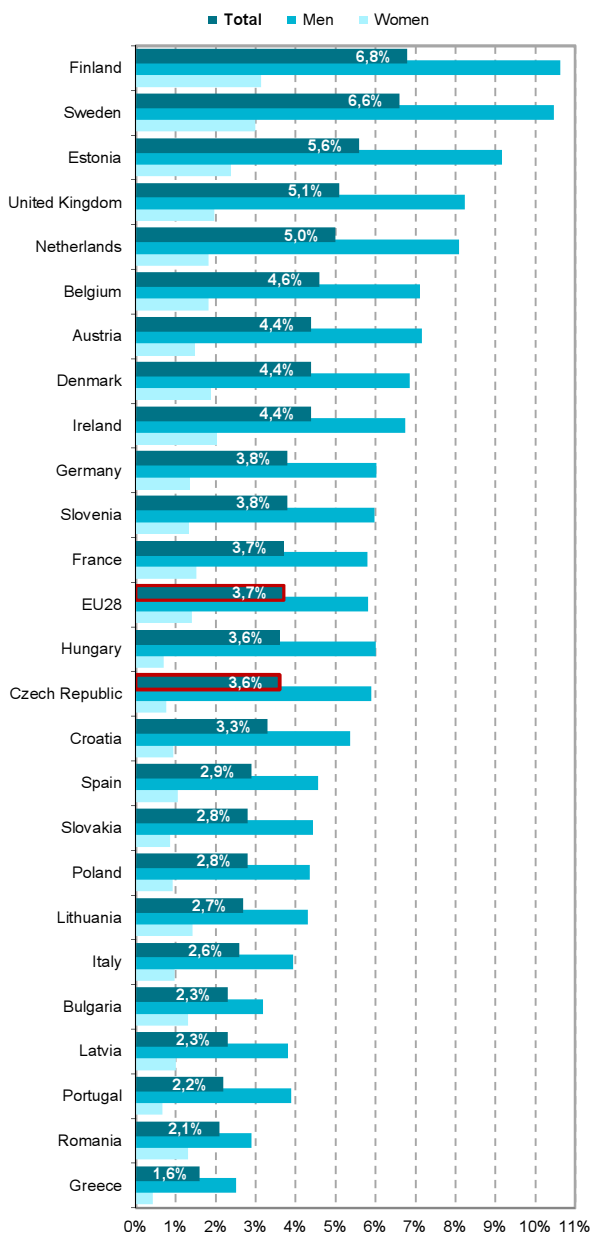
Figure A2 ICT specialists by occupation (thous.); 2017



Source: CZSO, Labour Force Survey

A ICT specialists

Figure A3 ICT specialists in EU countries; 2017
(as a percentage of total, men and women employment)



Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists

Table A2 ICT managers, professionals and engineers in the Czech Republic

	Thousand persons	
	2012	2017
Total	67,1	88,4
Women	5,6	9,4
Occupation		
ICT professionals (ISCO 25), total	53,2	71,9
Software and applications developers and analysts	34,7	47,8
Database and network professionals	18,5	24,0
Other ICT managers, professionals and engineers	13,8	16,5
Age group		
20-29 years	14,3	16,7
30-39 years	26,9	34,7
40-49 years	14,9	21,9
50+ years	10,9	14,9
Highest level of education attainment		
Master's and Doctoral	49,1	62,9
Bachelor's and Higher professional	8,4	13,7
Other (lower)	9,6	10,8

Figure A4 ICT professionals, total

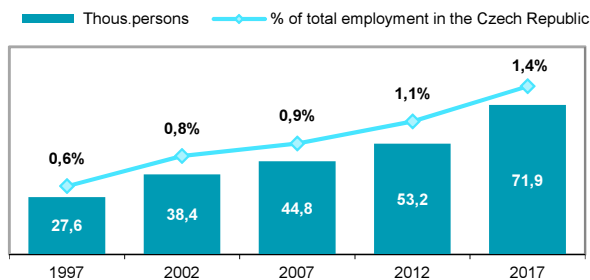


Figure A5 ICT professionals by gender

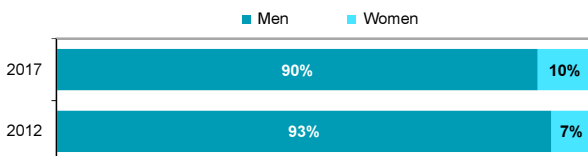
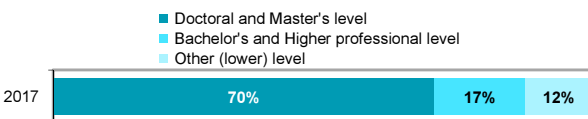


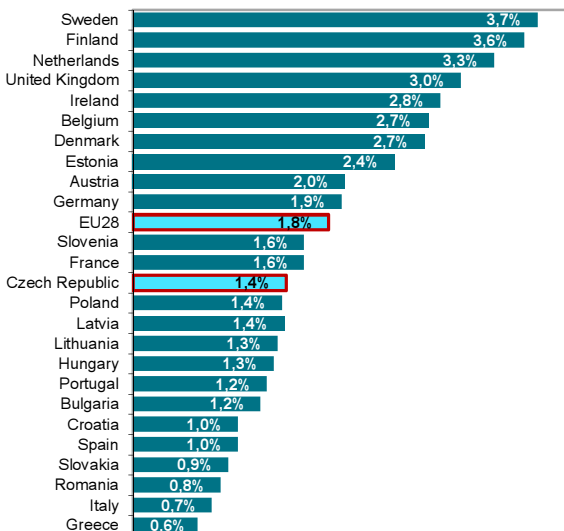
Figure A6 ICT professionals by education



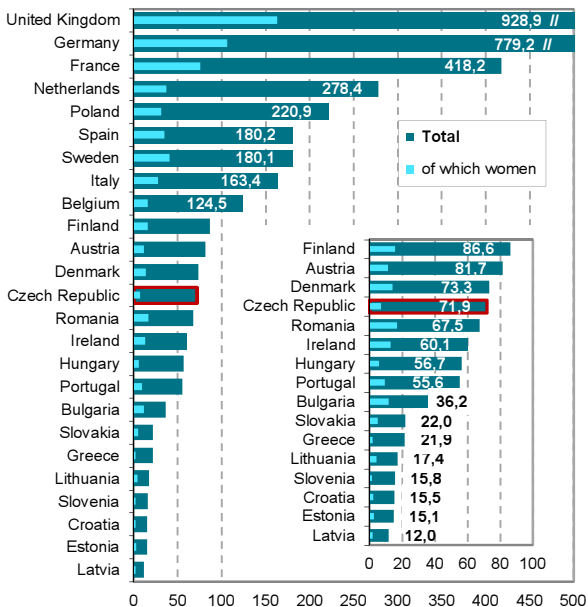
Source: CZSO, Labour Force Survey

A ICT specialists

**Figure A7 ICT professionals in EU countries; 2017
(as a percentage of total employment)**



**Figure A8 ICT professionals in EU countries; 2017
(thous. persons)**



Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists

Table A3 ICT technicians, installers and servicers in the Czech Republic

	Thousand persons	
	2012	2017
Total	93,5	97,3
of which women	10,7	8,5
Occupation		
ICT technicians (ISCO 35), total	60,7	70,0
ICT operations and user support technicians	48,4	56,2
Telecommunications and broadcasting technicians	12,0	13,8
Other ICT technicians, installers and servicers	32,7	27,3
Age group		
20-29 years	24,9	21,3
30-39 years	33,8	35,6
40-49 years	20,2	22,0
50+ years	14,5	18,1
Highest level of education attainment		
Tertiary	27,6	28,9
Secondary with A-level examination	52,7	58,4
Other (lower)	13,1	9,9

Figure A9 ICT technicians, total

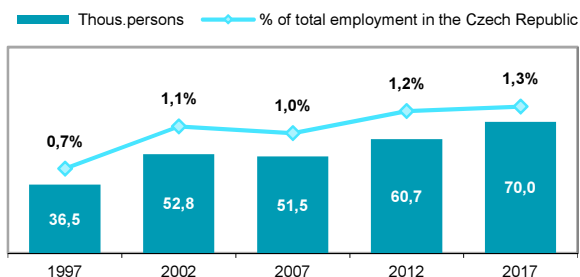


Figure A10 ICT technicians by gender

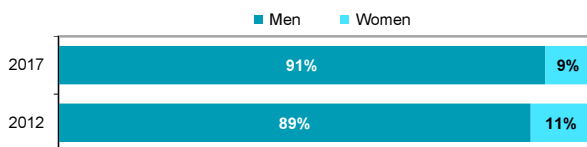
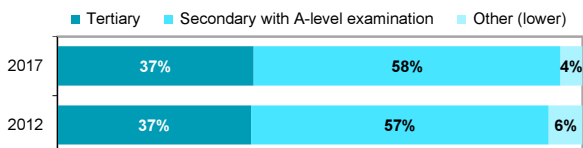


Figure A11 ICT technicians by education



Source: CZSO, Labour Force Survey

A ICT specialists

Figure A12 ICT technicians in EU countries; 2017
(as a percentage of total employment)

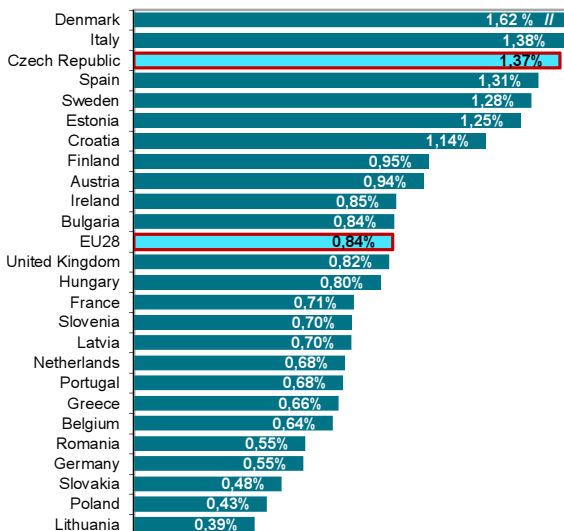
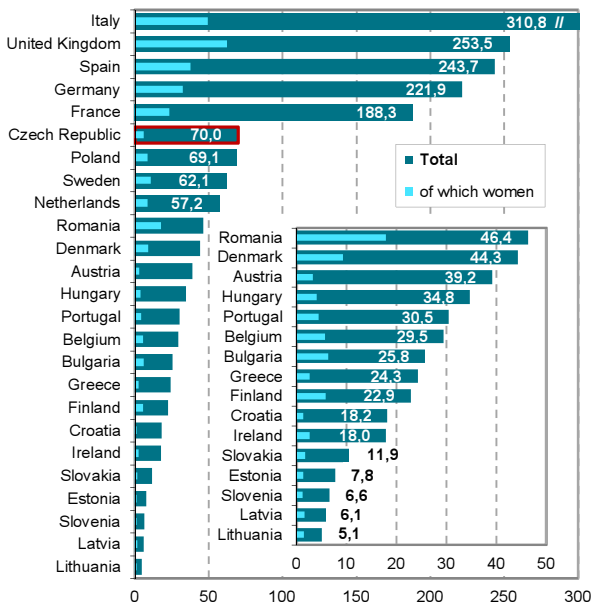


Figure A13 ICT technicians in EU countries; 2017
(thous. persons)



Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists

Table A4 Earnings of ICT professionals in the Czech Republic

average gross monthly earnings in CZK

	2015	2016	2017
Total	51 319	53 241	56 747
Men	52 296	54 325	58 025
Women	43 701	45 369	47 765
Sphere of activity (earnings)			
Business (wage sphere)	52 643	54 391	57 810
Government (salary sphere)	33 607	35 422	38 876
Age group			
under 24 years	28 393	30 237	33 034
25-34 years	47 296	48 582	51 487
35-44 years	58 751	60 624	65 206
45-54 years	52 543	55 882	59 965
55+ years	46 338	49 522	51 652
Highest level of education attainment			
Master's and Doctoral	56 172	58 831	62 809
Bachelor's and Higher professional	46 238	48 644	51 906
Secondary with A-level examination	44 930	47 751	50 723

Figure A14 Earnings of ICT professionals by sphere of activity

- Average gross monthly earnings in thous. CZK
- ▲ as % of average gross monthly earnings in the total, wage and salary sphere

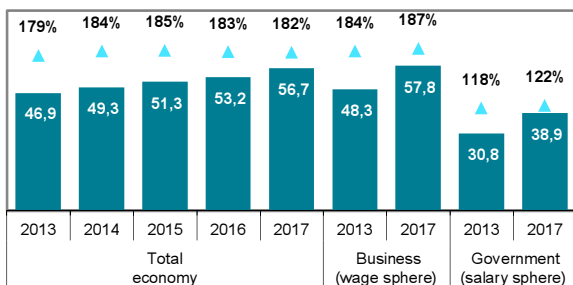
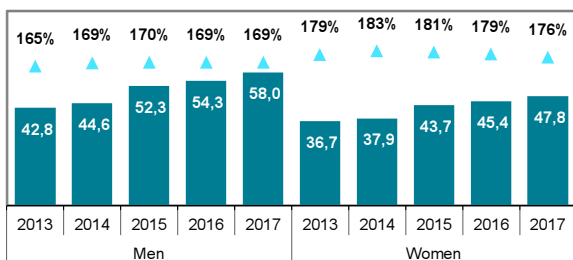


Figure A15 Earnings of ICT professionals by gender

- Average gross monthly earnings in thous. CZK
- ▲ as % of average gross monthly earnings of all men and women workers



Source: CZSO, Structural Earnings Statistics

A ICT specialists

Table A5 Earnings of ICT professionals in the Czech Republic according to their occupation and industry

average gross monthly earnings in CZK

	2015	2016	2017
Total	51 319	53 241	56 747
Selected occupations (ISCO unit groups)			
Systems analysts (ISCO 2511)	56 843	58 868	61 883
Software developers (ISCO 2512)	55 216	58 049	61 157
Applications programmers (ISCO 2514)	49 620	51 210	54 343
Database designers/admin. (ISCO 2521)	47 001	49 319	52 646
Systems administrators (ISCO 2522)	45 306	47 432	49 375
Data security specialists (ISCO 2524)	58 789	61 073	58 267
Selected industries (NACE Sections)			
Manufacturing (NACE: C)	45 769	46 246	50 159
Wholesale and retail trade (NACE: G)	40 868	41 938	48 326
Information and communication (NACE: J)	56 457	57 786	61 457
Financial and insurance activities (NACE: K)	61 962	64 436	65 182
Public administration (NACE: O)	34 929	36 657	40 278
Education (NACE: P)	35 763	37 421	39 543
Human health and social work act. (NACE: Q)	36 649	37 713	40 663

Figure A16 Average gross monthly earnings of ICT professionals in selected occupations (CZK thousand)

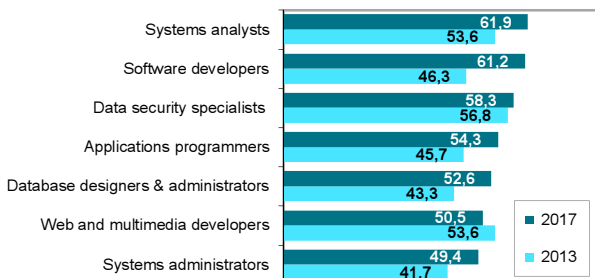
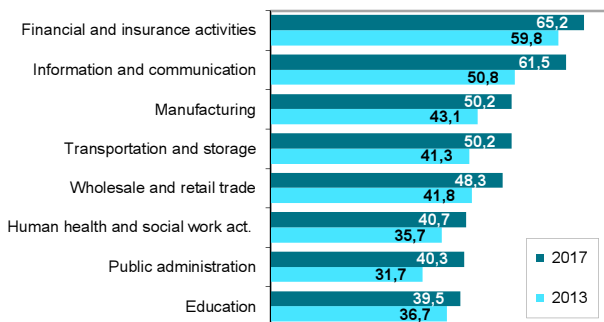


Figure A17 Average gross monthly earnings of ICT professionals in selected industries (CZK thousand)



Source: CZSO, Structural Earnings Statistics

A ICT specialists

Table A6 Earnings of Software & applications developers and analysts in the Czech Republic

average gross monthly earnings in CZK

	2015	2016	2017
Total (CZ ISCO 251)	53 075	55 404	59 139
Men	54 062	56 531	60 429
Women	45 245	47 313	49 971
Sphere of activity (earnings)			
Business (wage sphere)	53 662	55 916	59 643
Government (salary sphere)	35 077	37 206	40 440
Age group			
25-34 years	48 513	50 215	53 341
35-44 years	62 326	65 529	69 853
45-54 years	53 637	58 844	62 380
55+ years	47 162	52 483	53 017
Highest level of education attainment			
Master's and Doctoral	57 285	60 297	64 665
Bachelor's and Higher professional	47 294	50 087	53 967
Secondary with A-level examination	46 164	49 530	52 361

Figure A18 Gross monthly earnings of software & apps developers and analysts by sphere of activity (CZK thous.)

■ Total economy ■ Business (wage sphere) ■ Government (salary sphere)

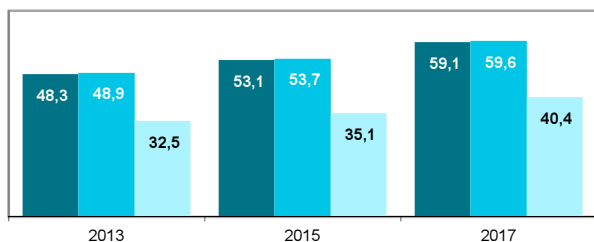
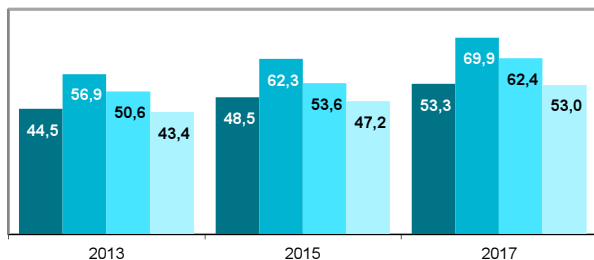


Figure A19 Average gross monthly wage of software and apps developers and analysts by age (CZK thous.)

■ 25-34 years ■ 35-44 years ■ 45-54 years ■ 55+ years



Source: CZSO, Structural Earnings Statistics

A ICT specialists

Table A7 Earnings of ICT operations and user support technicians in the Czech Republic

average gross monthly earnings in CZK

	2015	2016	2017
Total (CZ ISCO 351)	36 724	38 376	39 612
Men	37 297	38 953	40 307
Women	32 899	34 574	35 084
Sphere of activity (earnings)			
Business (wage sphere)	37 437	39 126	40 387
Government (salary sphere)	28 377	29 883	31 200
Age group			
25-34 years	33 884	36 006	36 329
35-44 years	40 234	41 894	43 666
45-54 years	37 771	39 979	41 235
55+ years	38 352	38 370	39 161
Highest level of education attainment			
Master's and Doctoral	44 126	46 541	48 961
Bachelor's and Higher professional	37 345	40 499	41 245
Secondary with A-level examination	33 150	34 722	36 098
Secondary without A-level examination	29 781	29 540	30 926

Figure A20 Average gross monthly earnings of ICT operations & user support technicians by sphere of activity (CZK thous.)

■ Total economy ■ Business (wage sphere) ■ Government (salary sphere)

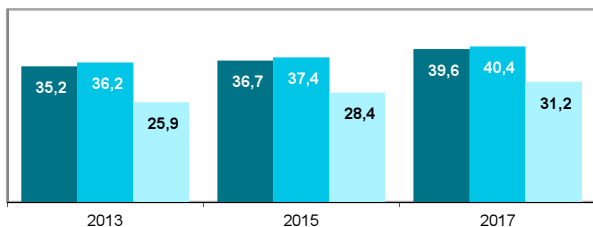
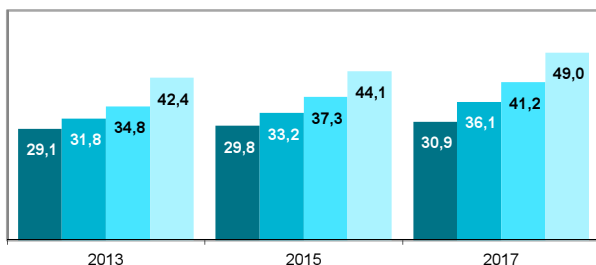


Figure A21 Average gross monthly earnings of ICT operations & user support technicians by education (CZK thous.)

■ Secondary without A-level examination ■ Secondary with A-level examination
 ■ Bachelor's and Higher professional ■ Master's and Doctoral



Source: CZSO, Structural Earnings Statistics

A ICT specialists

Table A8 University students of ICT fields of education in the Czech Republic

	number of students		
	2015	2016	2017
Total	21 482	20 502	19 994
of which 25 years and older	5 061	4 909	4 814
Gender			
Men	18 390	17 358	16 848
Women	3 092	3 144	3 146
Study programme			
Bachelor (ISCED level 6)	14 424	13 956	13 830
Master (ISCED level 7)	6 119	5 662	5 341
Doctoral (ISCED level 8)	951	893	832
Nationality			
Czech	17 056	15 830	15 137
Foreigners	4 426	4 673	4 857

Figure A22 University students of ICT fields of education

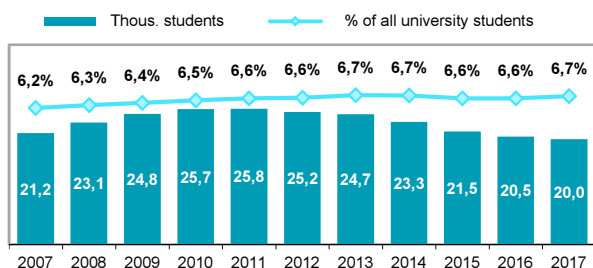


Figure A23 University students of ICT education by gender

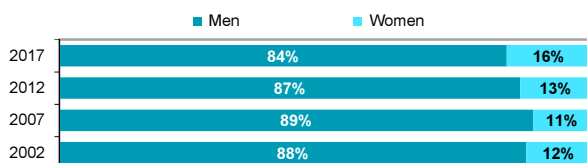


Figure A24 University students of ICT education by nationality

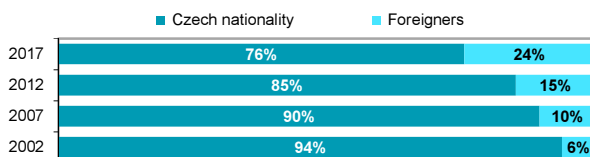
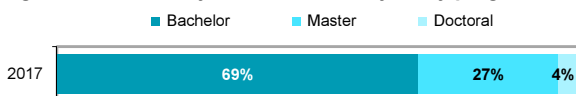


Figure A25 University students of ICT by study programme



Source: CZSO calculation based on MEYS database

A ICT specialists

Figure A26 Tertiary students* of ICT; 2016
(as a percentage of all tertiary students*)

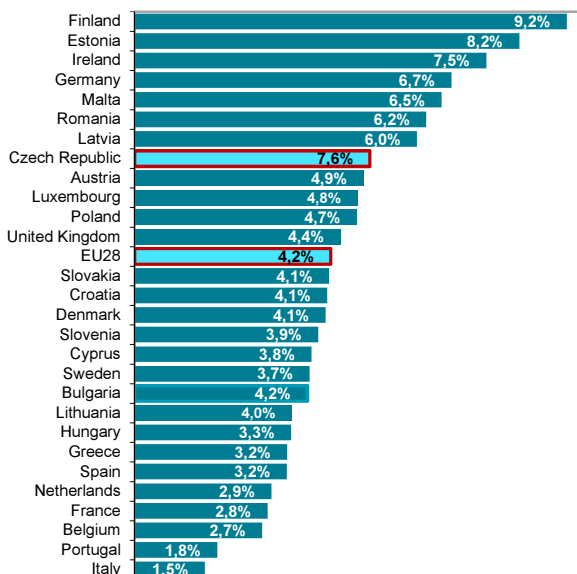
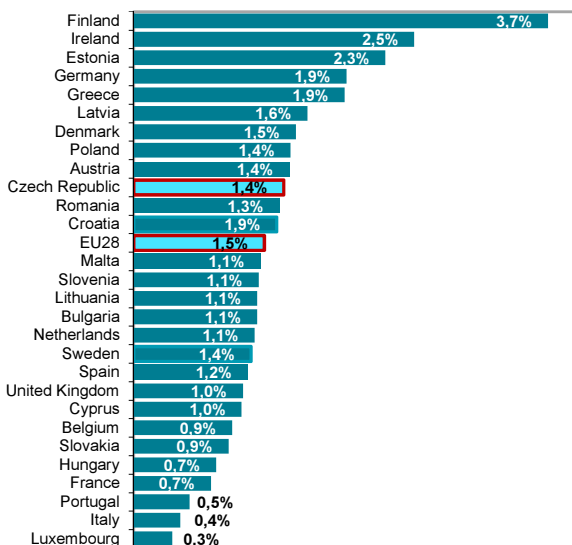


Figure A27 Tertiary students* of ICT; 2016
(as a percentage of population aged 20 to 29 years)



* Tertiary education comprises here only ISCED-2011 classification levels 6 (Bachelor or equivalent level) and 7 (Master or equivalent level).

Source: CZSO calculation based on Eurostat database

A ICT specialists

Table A9 Students of ICT fields of education in bachelor programmes in the Czech Republic

	number of students		
	2015	2016	2017
Total	14 424	13 956	13 830
of which 25 years and older	1 795	1 840	1 872
Gender			
Men	12 454	11 919	11 807
Women	1 970	2 037	2 023
Nationality			
Czech	11 371	10 685	10 517
Foreigners	3 053	3 271	3 313

Figure A28 Bachelor's students of ICT fields of education, total

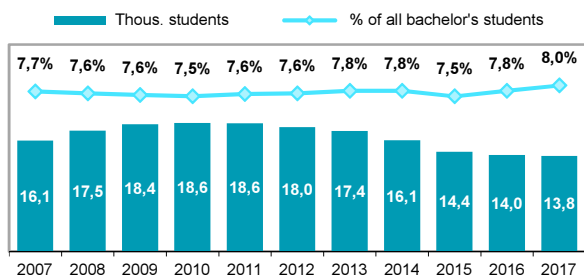


Figure A29 Bachelor's students of ICT education - men

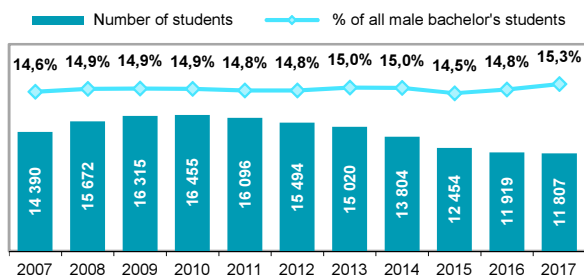
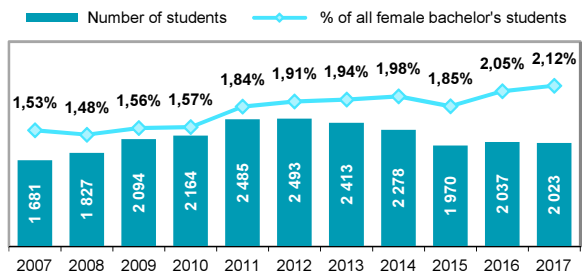


Figure A30 Bachelor's students of ICT education - women



Source: CZSO calculation based on MEYS database

A ICT specialists

Figure A31 Bachelor's students* of ICT fields of education; 2016 (thousand students)

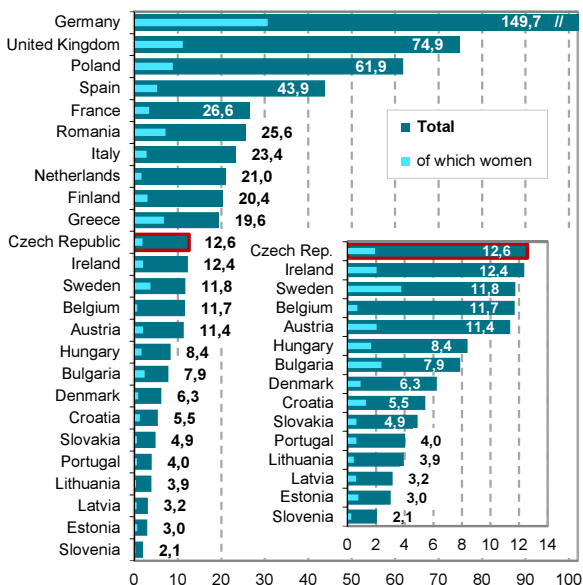
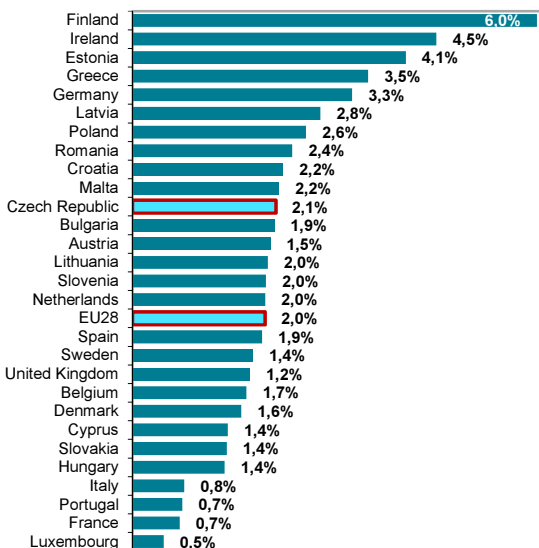


Figure A32 Bachelor's students* of ICT education; 2016 (as a percentage of population aged 20 to 24 years)



* ISCED level 6

Source: CZSO calculation based on Eurostat database

A ICT specialists

Table A10 Students of ICT fields of education in master programmes in the Czech Republic

	number of students		
	2015	2016	2017
Total	6 119	5 662	5 341
of which 25 years and older	2 368	2 225	2 152
Gender			
Men	5 108	4 673	4 338
Women	1 011	989	1 003
Nationality			
Czech	4 939	4 454	4 004
Foreigners	1 180	1 209	1 337

Figure A33 Master's students of ICT fields of education, total

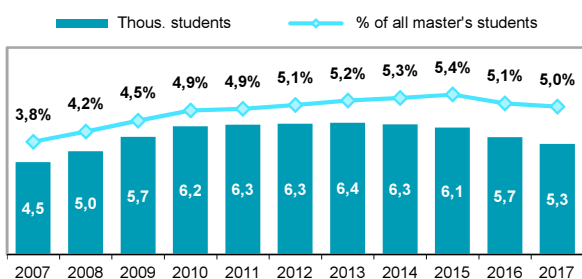


Figure A34 Master's students of ICT education- women

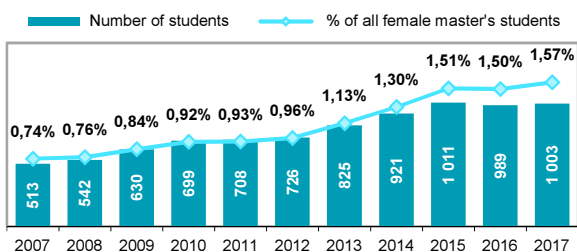
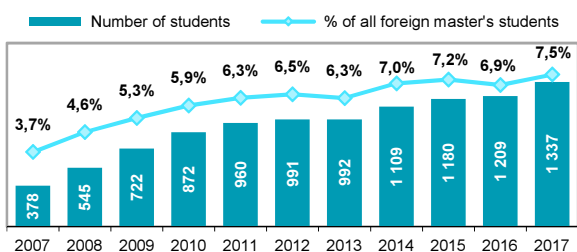


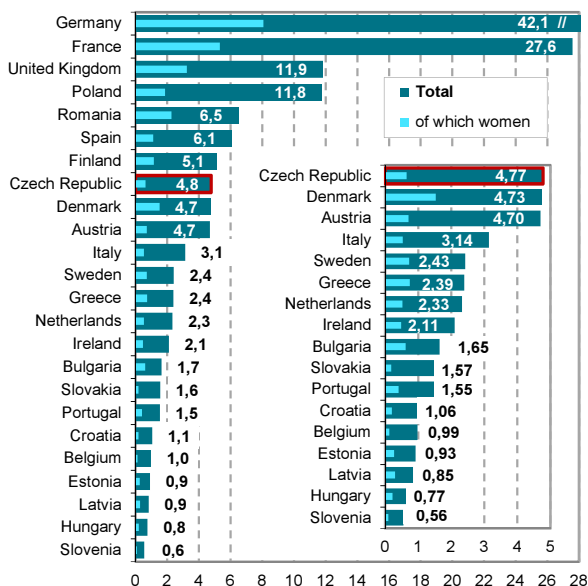
Figure A35 Master's students of ICT education - foreigners



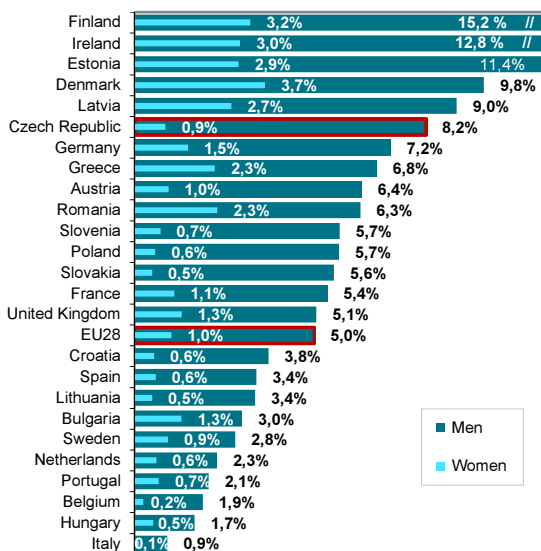
Source: CZSO calculation based on MEYS database

A ICT specialists

**Figure A36 Master's students* of ICT fields of education; 2016
(thousand students)**



**Figure A37 Master's students* of ICT fields of education; 2016
(% of all students in master programmes)**



* ISCED level 7

Source: CZSO calculation based on Eurostat database

A ICT specialists

Table A11 University graduates of ICT fields of education in the Czech Republic

	number of graduates		
	2015	2016	2017
Total	4 479	4 361	3 915
Men	3 815	3 678	3 312
Women	664	683	603
Study programme			
Bachelor (ISCED level 6)	2 579	2 291	2 079
Master (ISCED level 7)	1 828	1 986	1 750
Doctoral (ISCED level 8)	72	84	86
Nationality			
Czech	3 710	3 550	3 130
Foreigners	769	811	785

Figure A38 Bachelor programmes graduates of ICT education

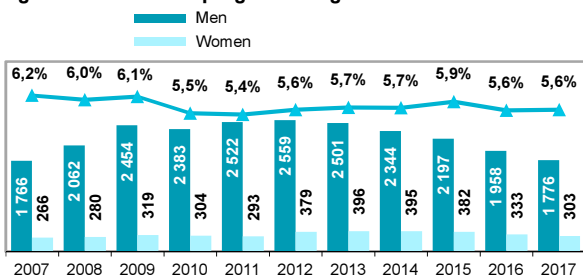


Figure A39 Master programmes graduates of ICT education

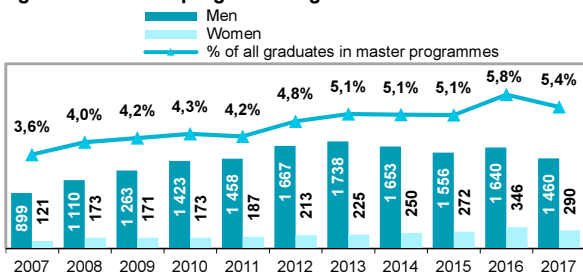
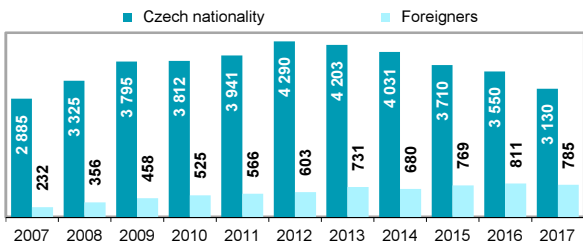


Figure A40 University graduates of ICT education by nationality



Source: CZSO calculation based on MEYS database

A ICT specialists

Figure A41 Bachelor programmes graduates* of ICT fields of education; 2016 (Thousand persons)

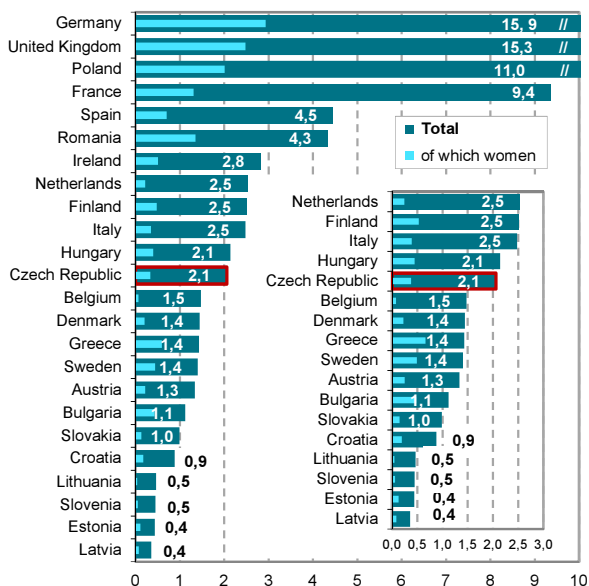
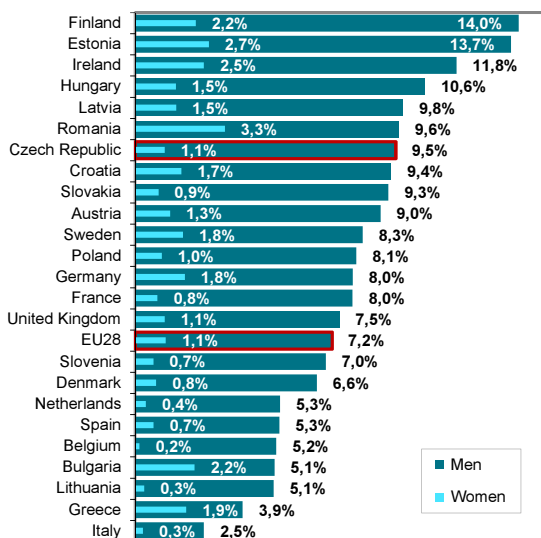


Figure A42 Bachelor programmes graduates* of ICT; 2016 (as % of all graduates in bachelor programmes)



* ISCED level 6

Source: CZSO calculation based on Eurostat database

A ICT specialists

Figure A43 Master programmes graduates* of ICT field of education*; 2016 (Thousand persons)

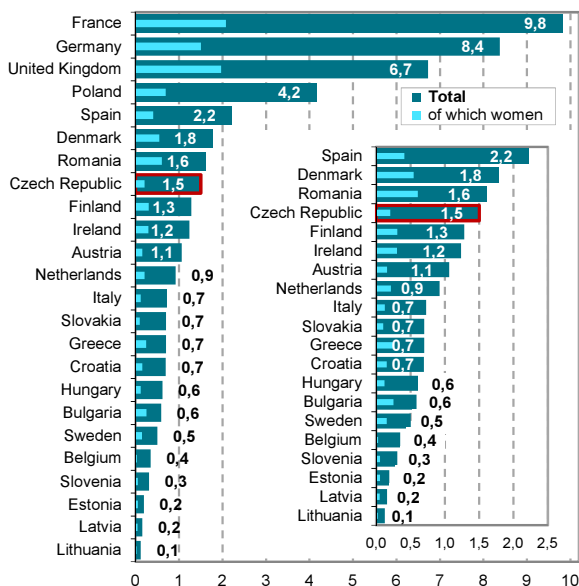
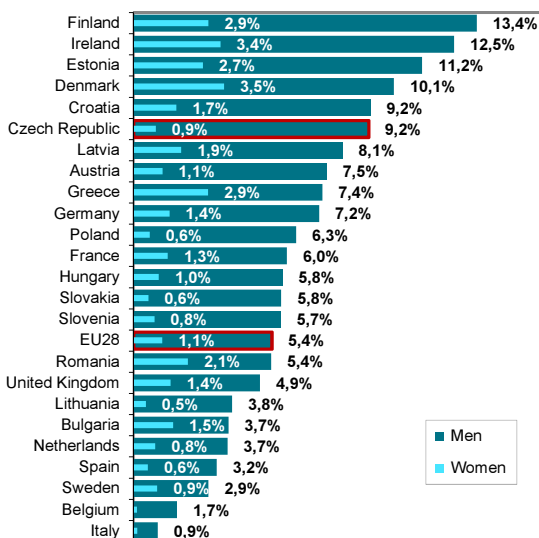


Figure A44 Master programmes graduates* of ICT; 2016 (as a percentage of all graduates in master programmes)



* ISCED level 7

Source: CZSO calculation based on Eurostat database

B ICT expenditure and investment

B. 1 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 (IT) 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.

B. 2 Households expenditures on ICT equipment and ICT 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. **2017 data are preliminary**. For more information, see: <http://apl.czso.cz/pll/rocenka/rocenka.indexnu?mylang=EN>

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

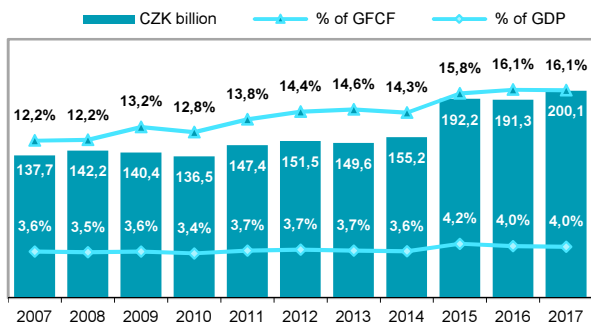
Table B1 ICT investment in the Czech Republic

CZK million

	2015	2016	2017*
Total	192 247	191 276	200 063
ICT equipment	95 977	87 256	89 820
Computer software and databases	96 270	104 020	110 243
Industry (CZ-NACE Section)			
Agriculture, forestry and fishing	808	2 094	2 393
Mining and quarrying	522	573	665
Manufacturing	53 940	57 057	62 484
Electricity, gas and water supply	5 372	7 620	7 361
Construction	3 246	4 189	4 666
Wholesale and retail trade	11 300	12 633	14 600
Transportation and storage	5 031	5 437	6 339
Accommodation and food service activities	1 650	1 954	2 165
Information and communication	49 744	47 037	43 882
Financial and insurance activities	19 217	22 665	21 878
Real estate activities	1 731	1 675	1 849
Professional, scientific and technical activ.	10 367	10 061	11 817
Administrative and support service activ.	1 964	2 336	2 707
Public administration and defence	12 484	7 225	7 753
Education	5 468	2 297	2 847
Human health and social work activities	6 274	3 575	3 621
Arts, entertainment and recreation	1 535	1 282	1 326
Other services	1 594	1 566	1 710

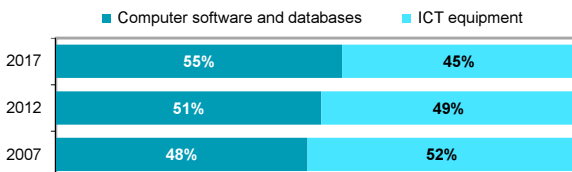
* Preliminary data

Figure B1 Total ICT investment



GFCF - Gross Fixed Capital Formation (total investment)

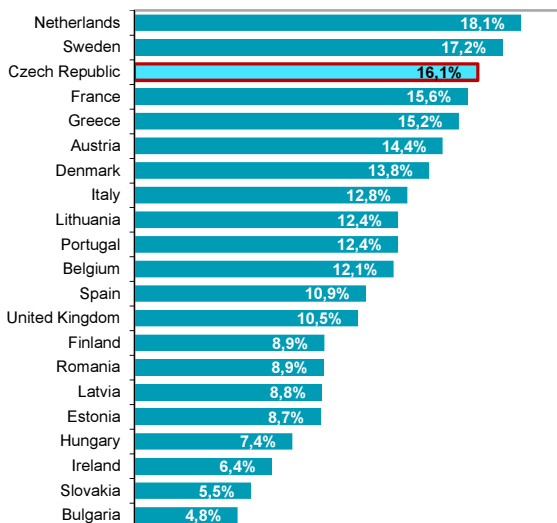
Figure B2 ICT investment by asset



Source: CZSO, Annual National Accounts Statistics

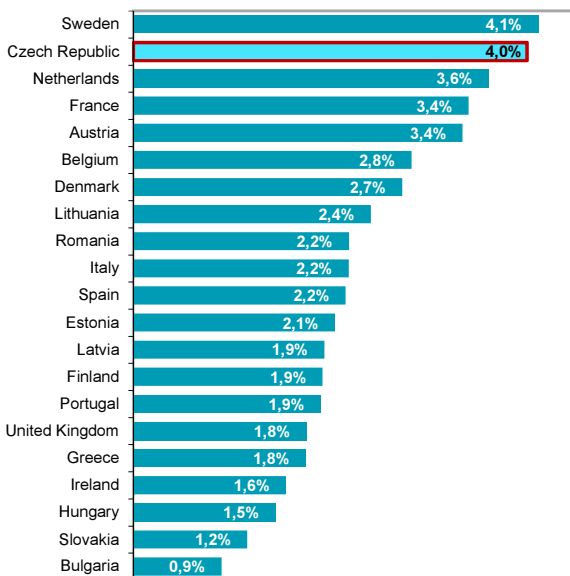
B ICT expenditure and investment

Figure B3 ICT investment; 2016*
(as a percentage of total GFCF)



GFCF - Gross Fixed Capital Formation (total investment)

Figure B4 ICT investment; 2016*
(as a percentage of GDP)

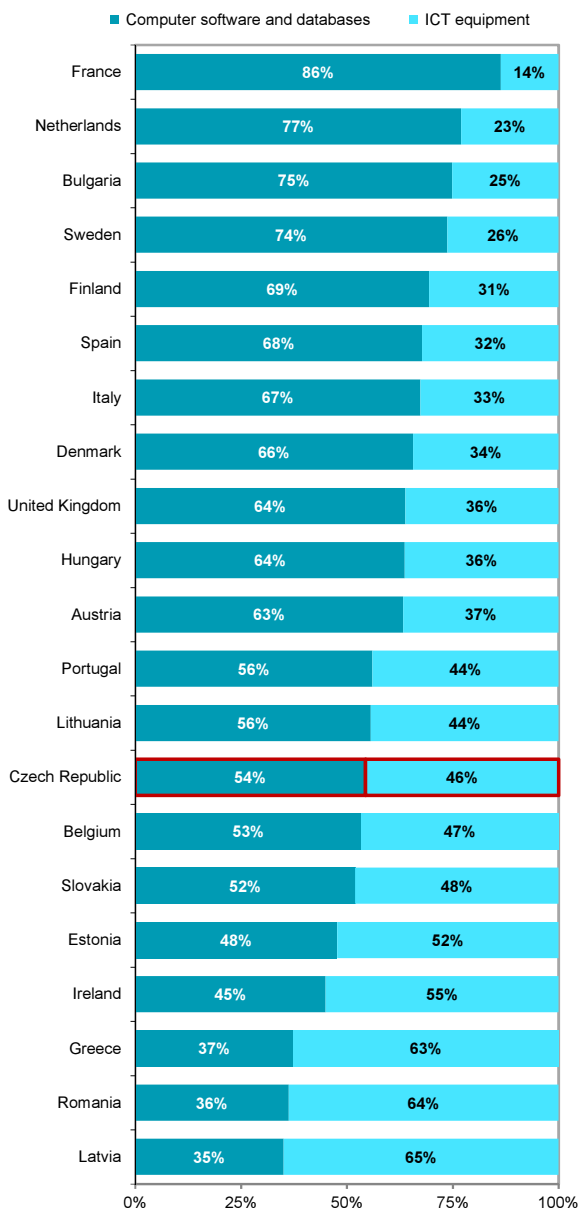


* Denmark, Estonia, Ireland, Latvia, Lithuania, Romania and Greece data for 2015

Source: CZSO calculations based on Eurostat data, 2018

B ICT expenditure and investment

Figure B5 ICT investment by asset; 2016*

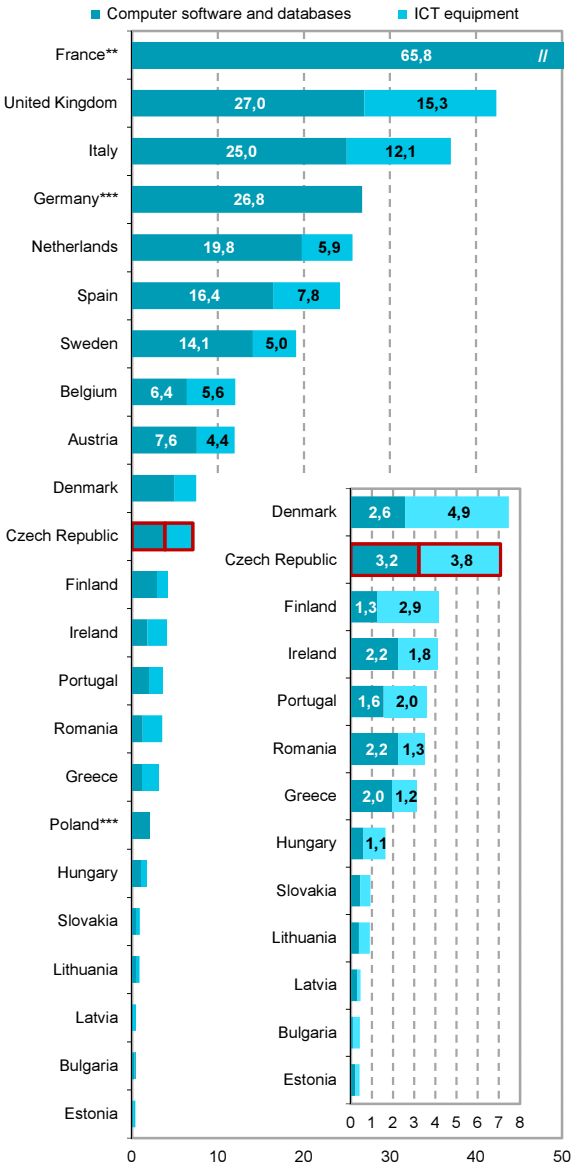


* Denmark, Estonia, Ireland, Latvia, Lithuania, Romania and Greece data for 2015

Source: CZSO calculations based on Eurostat data, 2018

B ICT expenditure and investment

Figure B6 ICT investment by asset; 2016* (EUR billion)



* Denmark, Estonia, Ireland, Latvia, Lithuania, Romania and Greece data for 2015

** ICT equipment investment in France was 10,2 billion EUR in 2016

*** ICT equipment investment data for Germany and Poland in 2016 are not available

Source: CZSO calculations based on Eurostat data, 2018

B ICT expenditure and investment

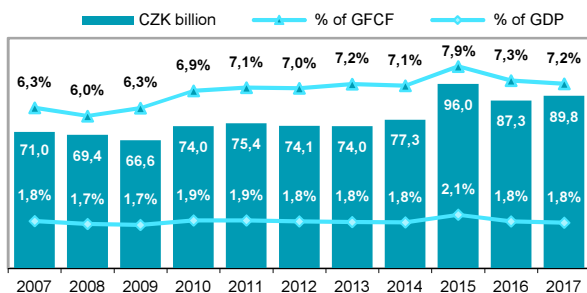
Table B2 ICT equipment investment in the Czech Republic

CZK million

	2015	2016	2017*
Total	95 977	87 256	89 820
Computer (IT) equipment	76 398	64 221	66 918
Communication equipment	19 579	23 035	22 902
Industry (CZ-NACE Section)			
Agriculture, forestry and fishing	498	1 809	2 033
Mining and quarrying	431	454	539
Manufacturing	41 090	43 374	47 793
Electricity, gas and water supply	3 528	5 441	4 879
Construction	2 353	3 162	3 579
Wholesale and retail trade	2 816	4 057	5 225
Transportation and storage	1 949	1 743	2 037
Accommodation and food service activities	1 360	1 694	1 878
Information and communication	16 426	11 564	5 812
Financial and insurance activities	2 499	1 148	1 256
Real estate activities	668	685	816
Professional, scientific and technical activ.	4 195	3 377	4 425
Administrative and support service activ.	624	861	1 122
Public administration and defence	6 789	3 009	3 120
Education	4 385	1 346	1 730
Human health and social work activities	5 283	2 573	2 594
Arts, entertainment and recreation	828	684	651
Other services	255	275	331

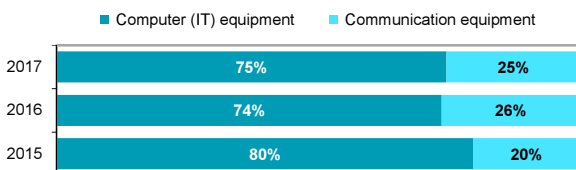
* Preliminary data

Figure B7 Total ICT equipment investment



GFCF - Gross Fixed Capital Formation (total investment)

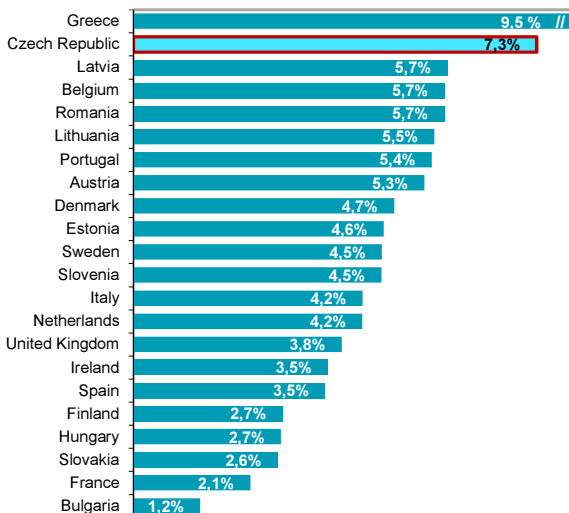
Figure B8 ICT equipment investment by asset



Source: CZSO, Annual National Accounts Statistics

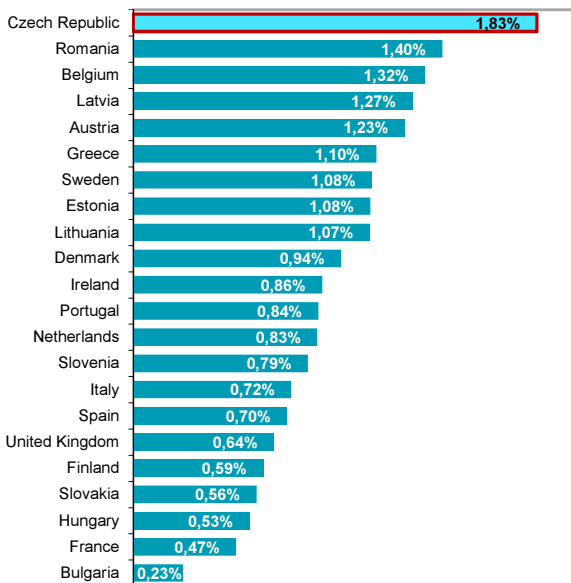
B ICT expenditure and investment

Figure B9 ICT equipment investment; 2016*
(as a percentage of total GFCF)



GFCF - Gross Fixed Capital Formation (total investment)

Figure B10 ICT equipment investment; 2016*
(as a percentage of GDP)



* Denmark, Estonia, Ireland, Latvia, Lithuania, Rumania and Greece readings per 201

Source: CZSO calculations based on Eurostat data, 2018

B ICT expenditure and investment

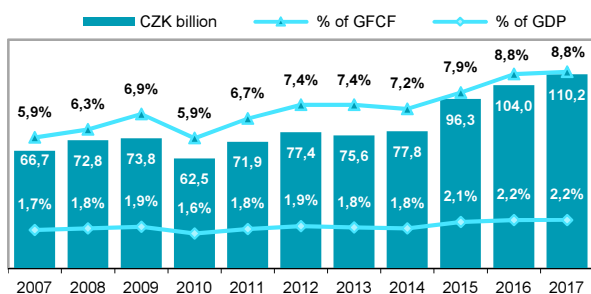
Table B3 Software investment in the Czech Republic

CZK million

	2015	2016	2017*
Total	96 270	104 020	110 243
own-account software	21 402	22 640	23 610
Type			
Computer Software	79 772	84 497	91 128
Databases	16 498	19 523	19 115
Industry (CZ-NACE Section)			
Agriculture, forestry and fishing	310	285	360
Mining and quarrying	91	119	126
Manufacturing	12 850	13 683	14 691
Electricity, gas and water supply	1 844	2 179	2 482
Construction	893	1 027	1 087
Wholesale and retail trade	8 484	8 576	9 375
Transportation and storage	3 082	3 694	4 302
Accommodation and food service activities	290	260	287
Information and communication	33 318	35 473	38 070
Financial and insurance activities	16 718	21 517	20 622
Real estate activities	1 063	990	1 033
Professional, scientific and technical activ.	6 172	6 684	7 392
Administrative and support service activ.	1 340	1 475	1 585
Public administration and defence	5 695	4 216	4 633
Education	1 083	951	1 117
Human health and social work activities	991	1 002	1 027
Arts, entertainment and recreation	707	598	675
Other services	1 339	1 291	1 379

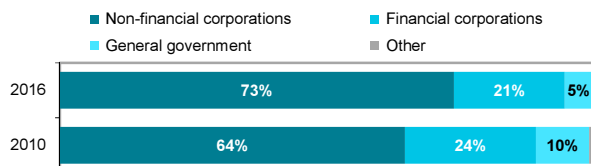
* Preliminary data

Figure B11 Total software investment



GFCF - Gross Fixed Capital Formation (total investment)

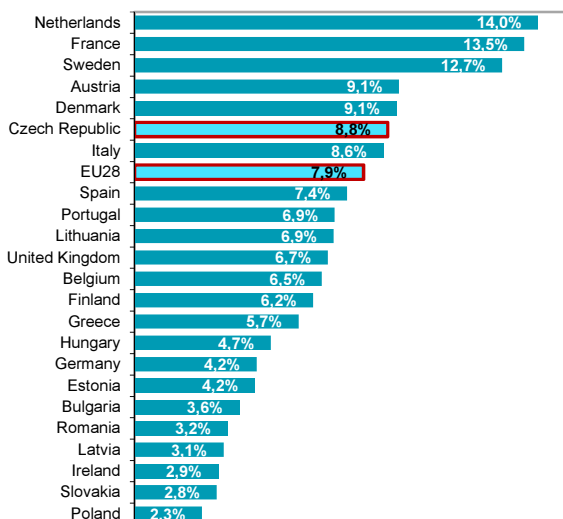
Figure B12 Software investment by sector



Source: CZSO, Annual National Accounts Statistics

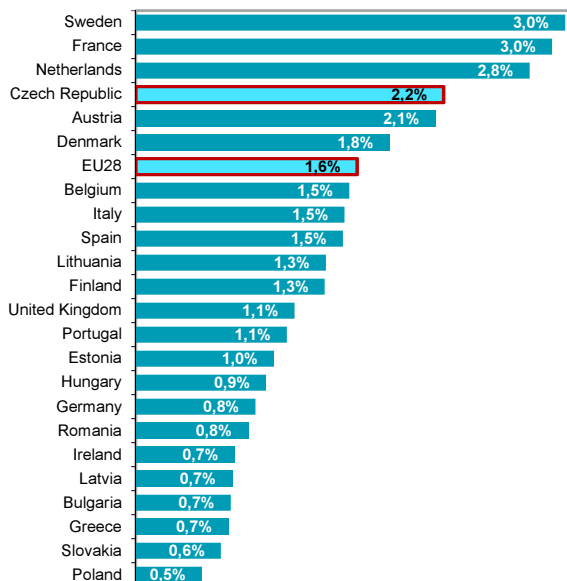
B ICT expenditure and investment

Figure B13 Software investment; 2016
(as a percentage of total GFCF)



GFCF - Gross Fixed Capital Formation (total investment)

Figure B14 Software investment; 2016*
(as a percentage of GDP)



* Denmark, Estonia, Ireland, Latvia, Lithuania, Romania and Greece data for 2015

Source: CZSO calculations based on Eurostat data, 2018

B ICT expenditure and investment

Table B4 Household consumption expenditures on ICT equipment and services in the Czech Republic

CZK million

	2015	2016	2017*
Total	88 959	91 577	95 945
Total ICT equipment	31 892	33 925	36 520
Telephone equipment	3 397	4 921	5 355
Computers and consumer electronics	28 495	29 004	31 165
Telecommunication (ICT) services	57 067	57 652	59 425

* Preliminary data

Figure B15 Total household consumption expenditures on ICT

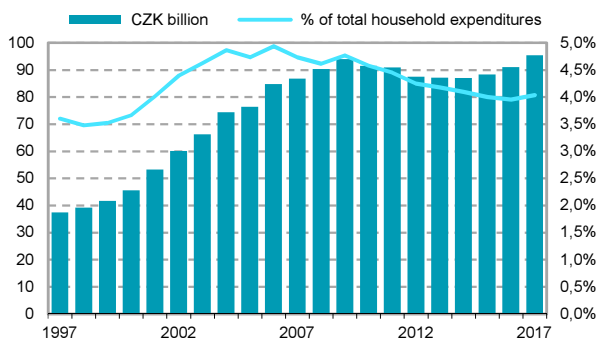


Figure B16 Households ICT expenditures by commodities

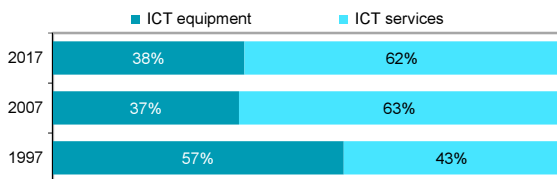
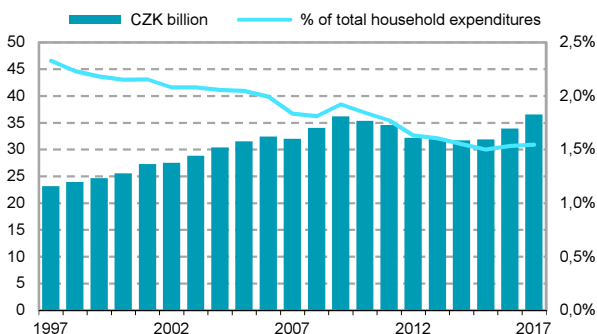


Figure B17 Households ICT equipment expenditures



Source: CZSO, Annual National Accounts Statistics

B ICT expenditure and investment

Figure B18 Household consumption expenditures on ICT; (% of total households consumption expenditures)

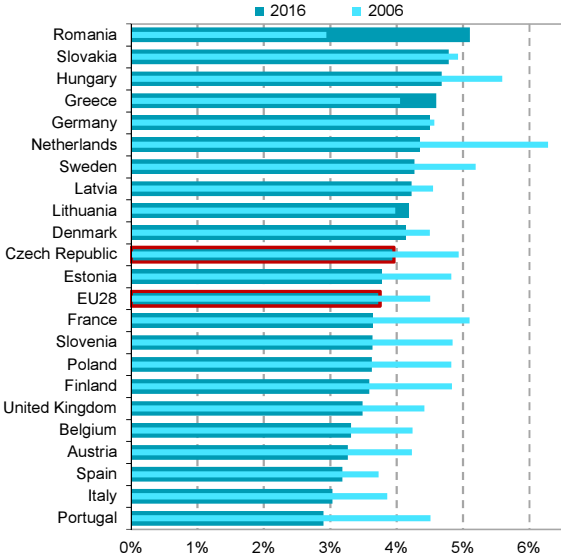
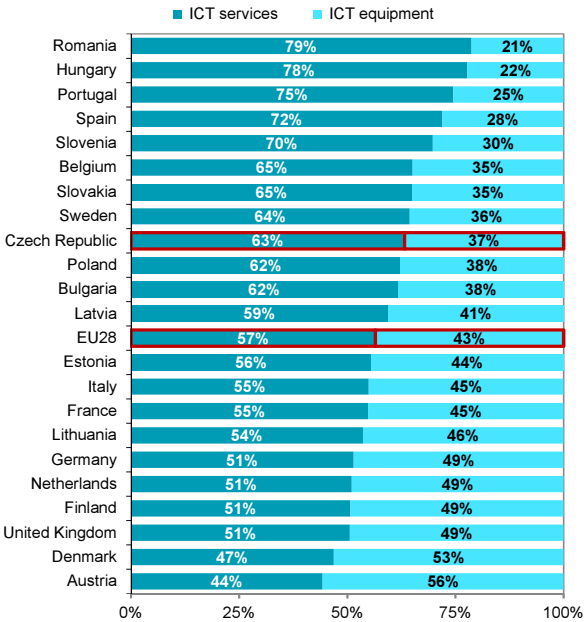


Figure B19 Household consumption expenditures on ICT by commodities; 2016 (%)



Source: CZSO calculations based on Eurostat data, 2018

B ICT expenditure and investment

Table B5 Household consumption expenditures on telecommunication in the Czech Republic

CZK million

	2015	2016	2017
Total	60 464	62 573	64 780
Telephone equipment	3 397	4 921	5 355
Telecommunication services	57 067	57 652	59 425

Figure B20 Household expenditures on telecommunication

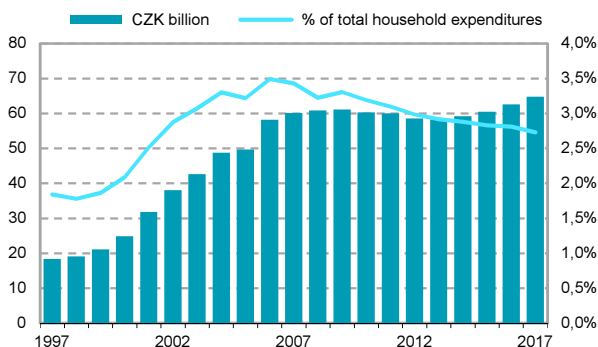


Figure B21 Household expenditures on telecommunication by commodities

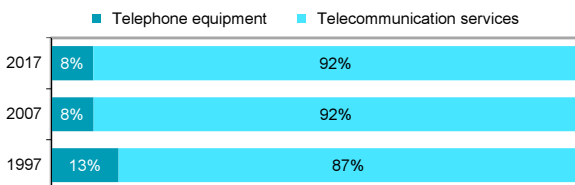
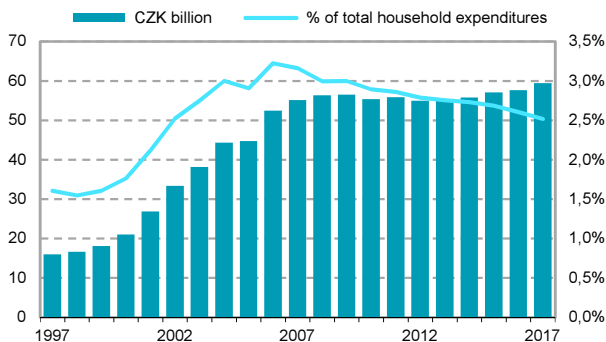


Figure B22 Household expenditures on telecommunication services



Source: CZSO, Annual National Accounts Statistics

B ICT expenditure and investment

Figure B23 Household expenditures on telecommunication services (% of total households expenditures)

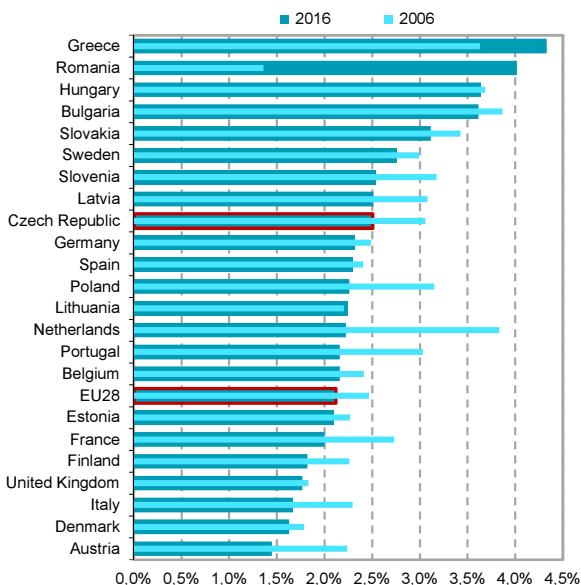
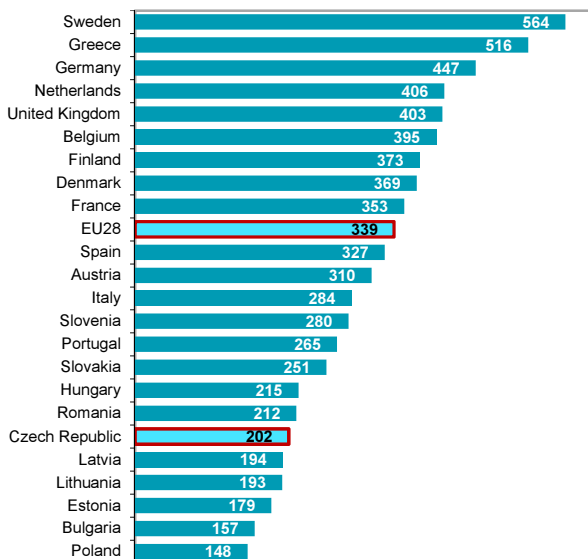


Figure B24 Household expenditures on telecommunication services (per 1 inhabitant, in EUR)



Source: CZSO calculations based on Eurostat data, 2018

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 development**, 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

C. 1 Expenditures on R&D of ICT products

This sub-chapter presents data on the total **financial resources invested in research and development of 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 of 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.

C. 2 R&D expenditures and personnel in the ICT sector industries

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 industries** 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 R&D expenditure (BERD) and R&D personnel in 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.

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

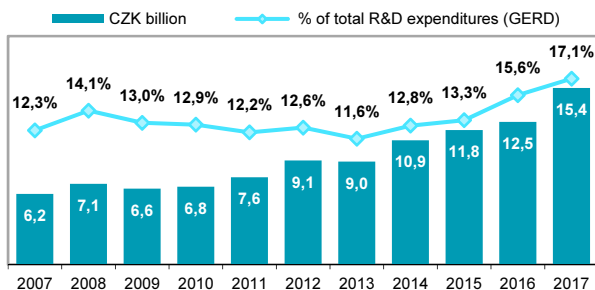
C ICT research and development

Table C1 Total ICT R&D expenditures in the Czech Republic

CZK million

	2015	2016	2017
Total	11 763	12 477	15 448
financed from government funds	1 742	1 579	1 452
ICT products for which R&D is carried out			
ICT equipment	5 112	4 295	5 024
Software	6 651	8 182	10 424
Type of R&D performers			
Enterprises, total	10 000	11 234	14 330
National enterprises	3 600	3 601	4 510
Foreign-controlled enterprises	6 400	7 632	9 820
Public universities	1 704	1 190	1 052
Other R&D performers	59	53	65

Figure C1 Total ICT R&D expenditures



GERD - Gross Domestic Expenditure on Research and Development

Figure C2 ICT R&D expenditures by type of ICT products

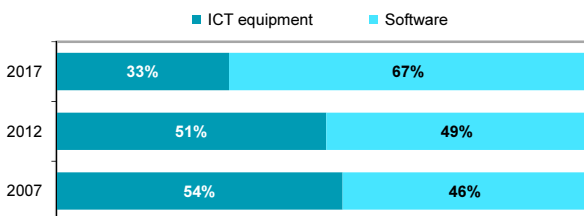
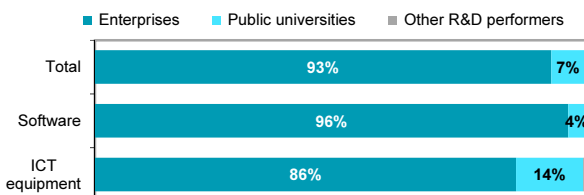


Figure C3 ICT R&D expenditures by R&D performers; 2017



Source: CZSO, Annual R&D survey

C ICT research and development

Table C2 Software R&D expenditures in the Czech Republic

CZK million

	2015	2016	2017
Total	6 651	8 182	10 424
financed from government funds	400	425	489
Type of R&D performers			
Enterprises, total	6 388	7 830	10 029
National enterprises	2 086	2 213	2 899
Foreign-controlled enterprises	4 302	5 617	7 130
Public universities	222	326	367
Other R&D performers	41	26	28

Figure C4 Software R&D expenditures

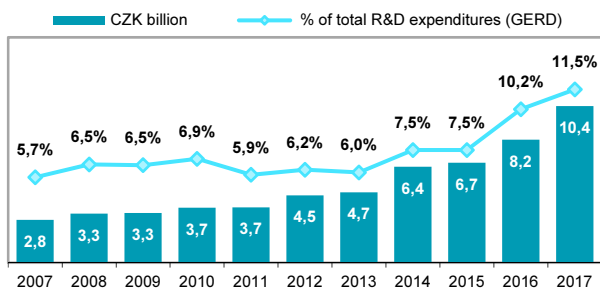


Figure C5 Software R&D expenditures by R&D performers; 2017

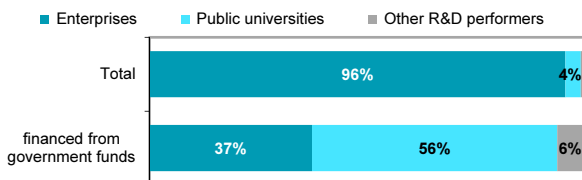
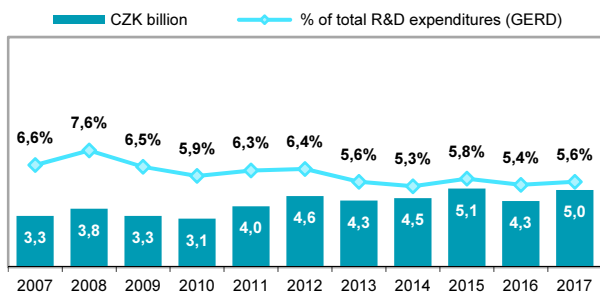


Figure C6 ICT equipment R&D expenditures



GERD - Gross Domestic Expenditure on Research and Development

Source: CZSO, Annual R&D survey

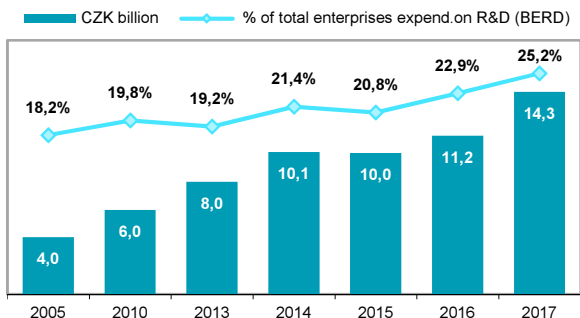
C ICT research and development

Tab. C3 ICT R&D expenditures of enterprises in the Czech Rep.

CZK million

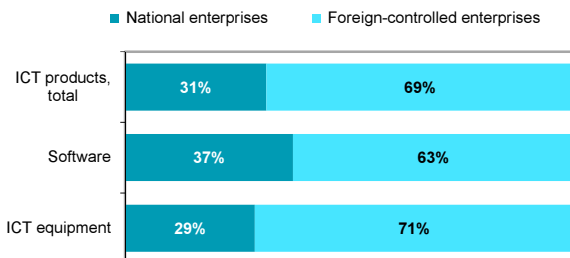
	2015	2016	2017
Total	10 000	11 234	14 330
financed from government funds	789	531	646
ICT products for which R&D is carried out			
ICT equipment	3 612	3 403	4 301
Software	6 388	7 830	10 029
Enterprise size group			
Small (0-49 employees)	1 169	1 260	1 480
Medium (50-249 employees)	3 416	2 691	3 899
Large (250+ employees)	5 415	7 283	8 952
Ownership of enterprises			
National enterprises	3 600	3 601	4 510
Foreign-controlled enterprises	6 400	7 632	9 820
Main economic activity of enterprises (CZ-NACE)			
ICT sector industries, total	7 302	8 132	10 025
ICT manufacturing (261-264)	167	262	245
Telecommunications (61)	622	668	714
IT services (465+582+62+631+951)	6 514	7 202	9 066
Other industries	2 698	3 102	4 305

Figure C7 ICT R&D expenditures of enterprises



BERD - Total intramural R&D expenditure in the business enterprise sector

Figure C8 ICT R&D expend. by ownership of enterprises; 2017



Source: CZSO, Annual R&D survey

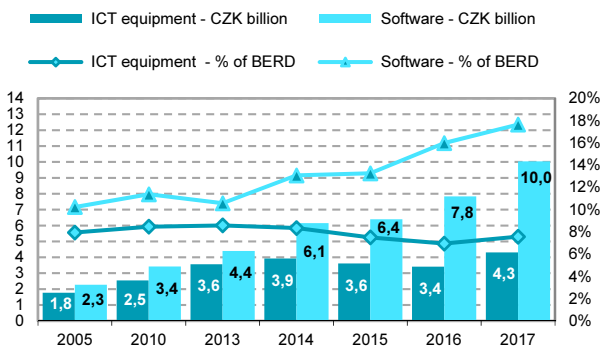
C ICT research and development

Table C4 ICT R&D expenditures of enterprises in the Czech Republic by type of ICT products; 2017

CZK million

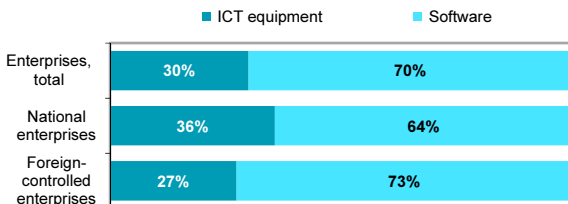
	Total	ICT equipment	Software
Total	14 330	4 301	10 029
financed from government funds	646	454	192
Enterprise size group			
Small (0-49 employees)	1 480	412	1 067
Medium (50-249 employees)	3 899	798	3 100
Large (250+ employees)	8 952	3 091	5 861
Ownership of enterprises			
National enterprises	4 510	1 610	2 899
Foreign-controlled enterprises	9 820	2 691	7 130
Main economic activity of enterprises (CZ-NACE)			
ICT sector industries, total	10 025	1 709	8 316
ICT manufacturing (261-264)	245	152	93
Telecommunications (61)	714	414	301
IT services (465+582+62+631+951)	9 066	1 144	7 922
Other industries	4 305	2 592	1 713

Figure C9 ICT R&D expenditures of enterprises by type of ICT products



BERD - Total intramural R&D expenditure in the business enterprise sector

Figure C10 ICT R&D expenditures by type of ICT products and ownership of enterprises; 2017



Source: CZSO, Annual R&D survey

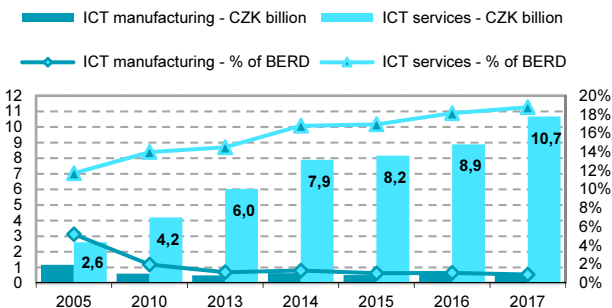
C ICT research and development

Table C5 R&D expenditures in the ICT sector in the Czech Rep.

CZK million

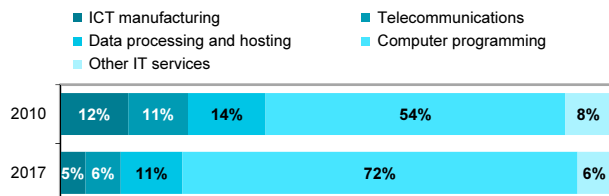
	2015	2016	2017
Total	8 659	9 417	11 180
financed from government funds	1 052	655	888
Products for which R&D is carried out			
ICT equipment	1 886	1 538	1 709
Software	5 416	6 594	8 316
Other non ICT related products	1 357	1 285	1 155
Enterprise size group			
Small (0-49 employees)	1 065	1 144	1 430
Medium (50-249 employees)	3 491	2 391	3 768
Large (250+ employees)	4 103	5 883	5 982
Ownership of enterprises			
National enterprises	3 095	2 926	3 790
Foreign-controlled enterprises	5 564	6 491	7 390
Main economic activity of enterprises (CZ-NACE)			
ICT manufacturing (261-264)	500	532	512
ICT services, total	8 159	8 885	10 668
Telecommunications (61)	630	682	717
Computer programming (582+6201)	5 643	6 534	8 017
Data processing and hosting (631)	1 080	938	1 252
Other IT services (465+951+62 without 6201)	806	731	682

Figure C11 R&D expenditures in the ICT sector



BERD - Total intramural R&D expenditure in the business enterprise sector

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



Source: CZSO, Annual R&D survey

C ICT research and development

Figure C13 R&D expenditures in the ICT sector; 2015*
(% of GDP)

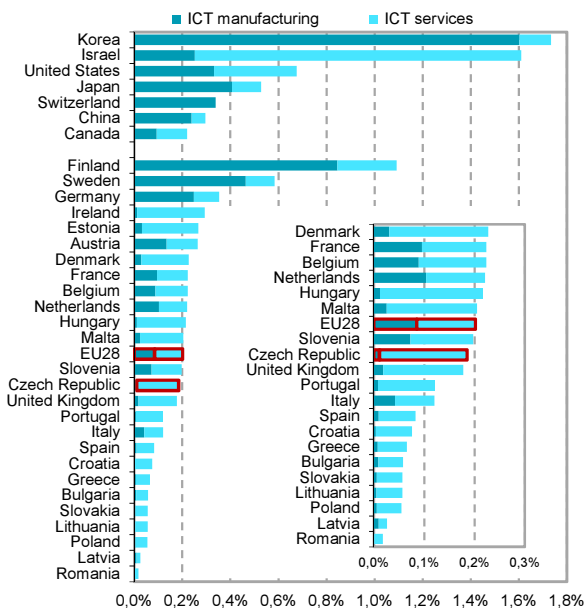
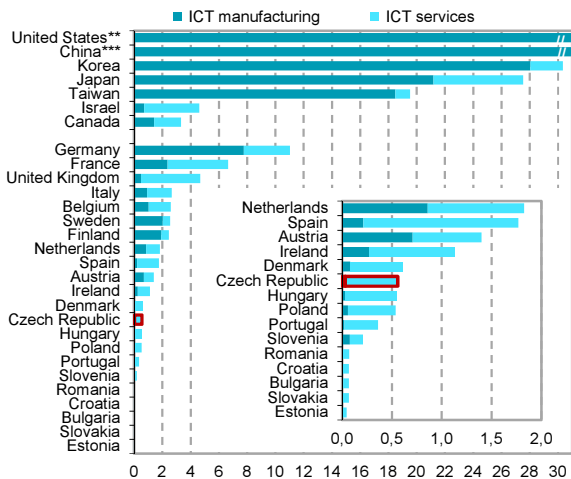


Figure C14 R&D expenditures in the ICT sector; 2015*
(USD billion PPP)



* or the latest year available

** United States: ICT manufacturing 57,9 , ICT services 59,9 USD billion PPP

*** China: ICT manufacturing 40,8 , ICT services 9,5 USD billion PPP

Source: CZSO calculations based on Eurostat and OECD data, 2018

C ICT research and development

Table C6 R&D personnel in the ICT sector in the Czech Republic

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

	2015	2016	2017
Total	7 988	8 329	9 116
By occupation			
Researchers	4 829	5 291	5 816
Technicians and equivalent staff	2 637	2 323	2 476
Other supporting and administrative staff	522	715	825
Enterprise size group			
Small (0-49 employees)	1 356	1 459	1 696
Medium (50-249 employees)	3 062	2 408	3 214
Large (250+ employees)	3 570	4 462	4 207
Ownership of enterprises			
National enterprises	3 202	3 203	4 080
Foreign-controlled enterprises	4 786	5 126	5 037
Main economic activity of enterprises (CZ-NACE)			
ICT manufacturing (261-264)	523	546	553
ICT services, total	7 465	7 783	8 564
Telecommunications (61)	197	200	220
Computer programming (582+6201)	5 434	5 923	6 629
Data processing and hosting (631)	762	888	967
Other IT services (465+951+62 without 6201)	1 072	771	746

Figure C15 R&D personnel in the ICT sector industries

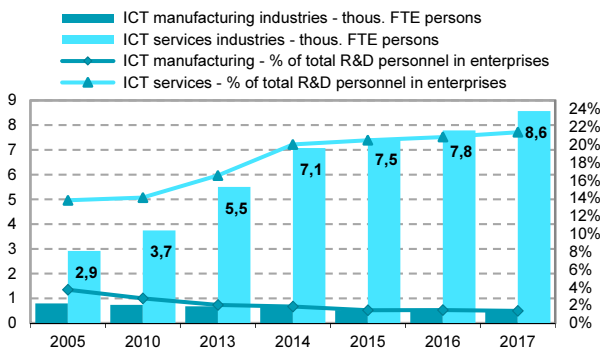
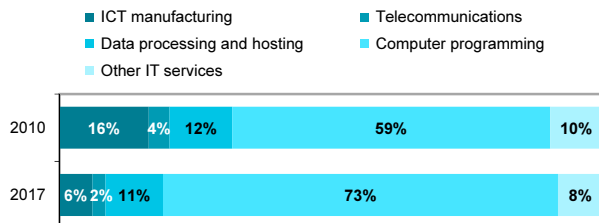


Figure C16 R&D personnel in the ICT sector by industry



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).

D. 1 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/>

D. 2 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)**

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

For further information on ICT external trade see (only in Czech):

<https://www.czso.cz/csu/czso/zahranicni-obchod-s-ict-zbozím-a-sluzbami>

D ICT external trade

Table D1 ICT goods exports from the Czech Republic

CZK million

	2015	2016	2017
Total	523 827	506 018	564 570
Computer equipment and peripherals	247 168	236 892	283 506
Communication equipment	104 021	97 651	138 167
Consumer electronics	70 087	72 922	74 650
Electronic components	42 707	45 144	33 101
ICT parts n.e.s.	59 844	53 409	35 146

Figure D1 ICT goods exports

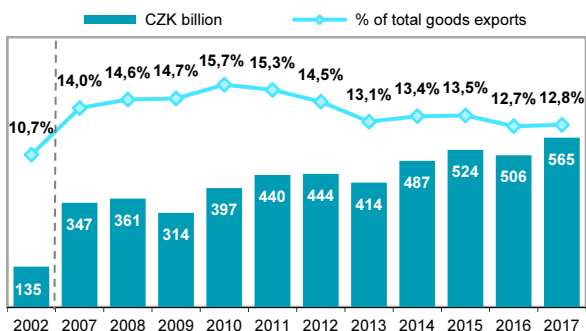


Figure D2 ICT goods exports by commodities

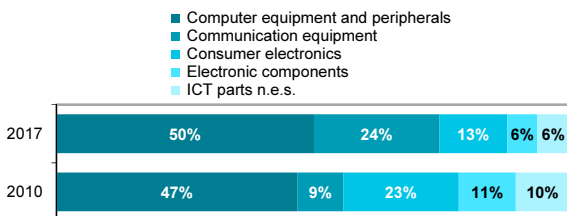
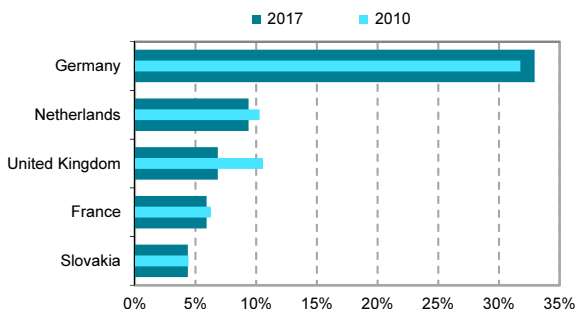


Figure D3 ICT goods exports from the Czech Rep. by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

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

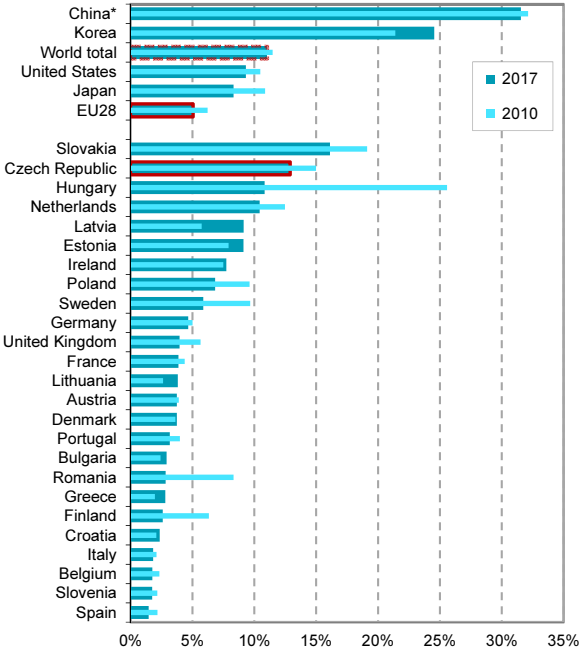
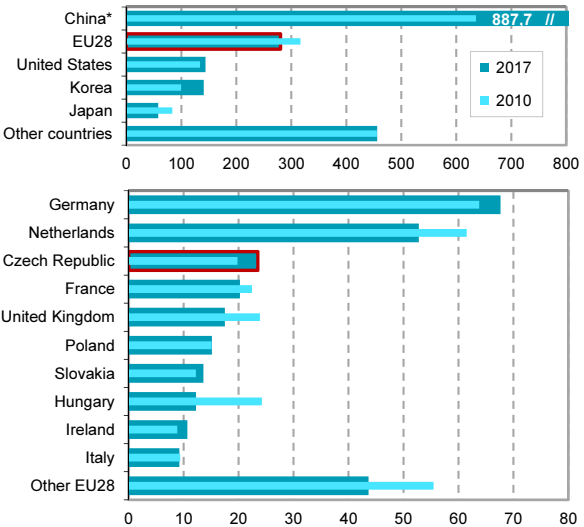


Figure D5 ICT goods exports (USD billion)



* China = China; Hong Kong China; Macao China; China Taiwan

Source: CZSO calculations based on UNCTAD

D ICT external trade

Table D2 ICT goods imports to the Czech Republic

CZK million

	2015	2016	2017
Total	540 741	496 943	578 294
Computer equipment and peripherals	189 009	170 630	196 963
Communication equipment	121 222	103 219	141 049
Consumer electronics	41 813	44 109	43 031
Electronic components	78 750	84 734	101 739
ICT parts n.e.s.	109 946	94 251	95 512

Figure D6 ICT goods imports

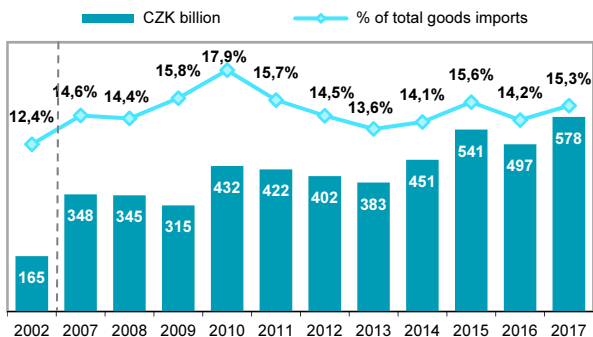


Figure D7 ICT goods imports by commodities

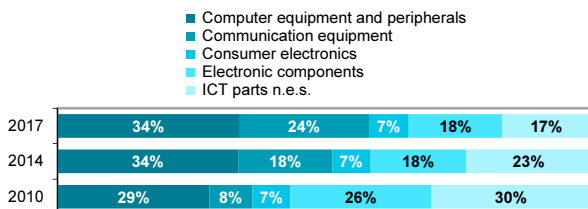
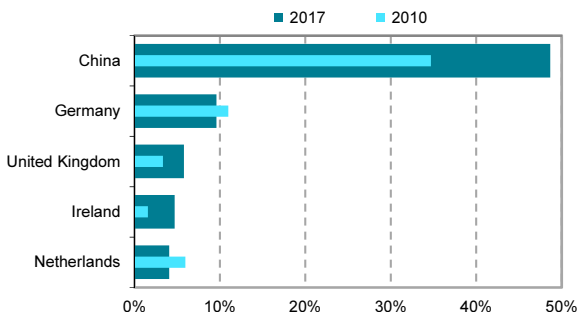


Figure D8 ICT goods imports to the Czech Rep. by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

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

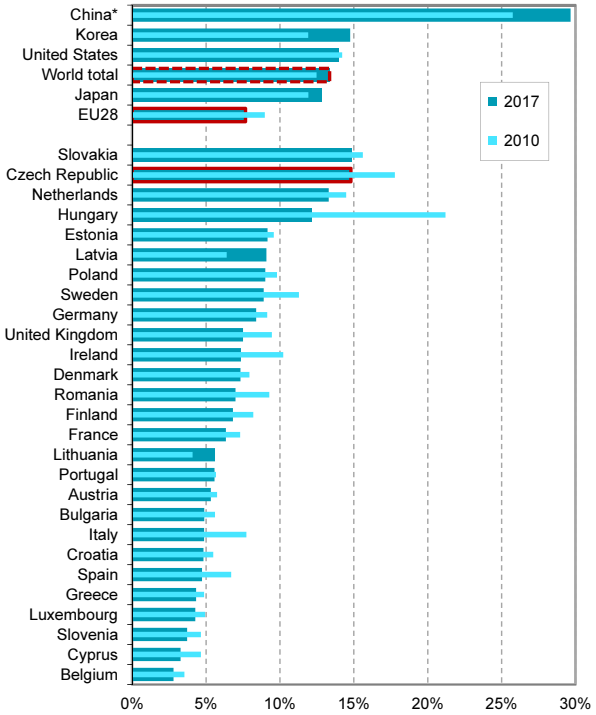
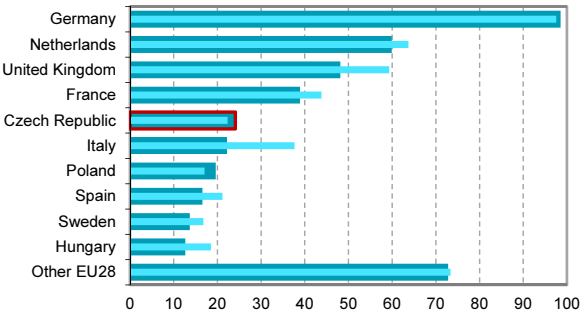
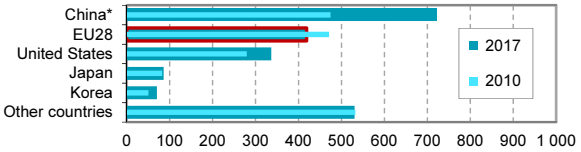


Figure D10 ICT goods imports (USD billion)

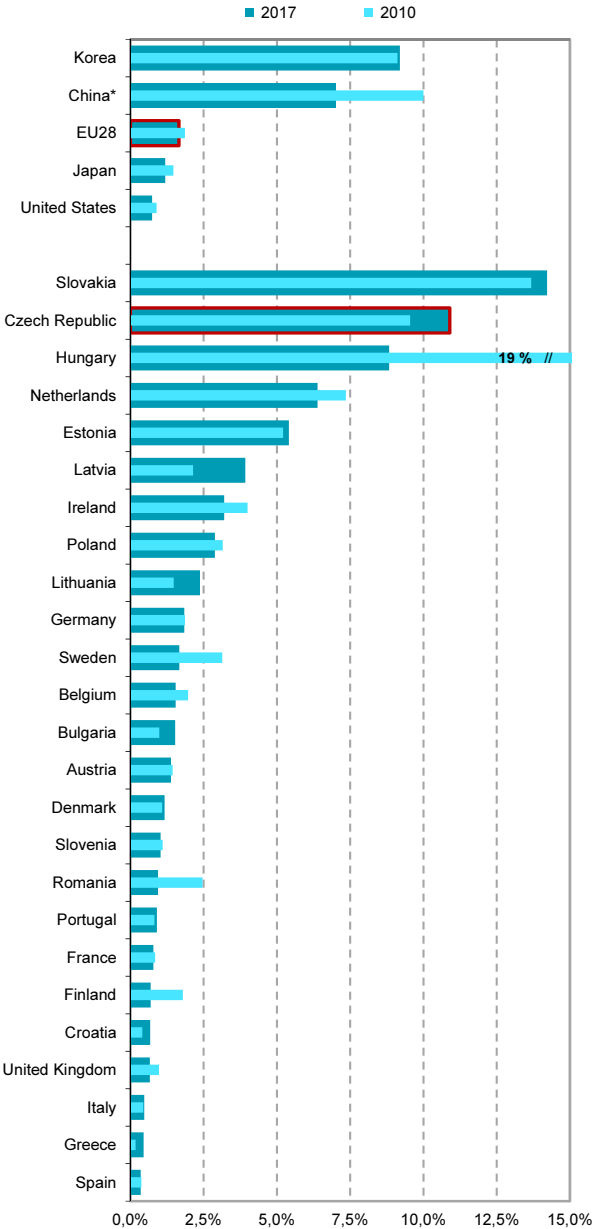


* China = China; Hong Kong China; Macao China; China Taiwan

Source: CZSO calculations based on UNCTAD

D ICT external trade

Figure D11 ICT goods exports (% of GDP)

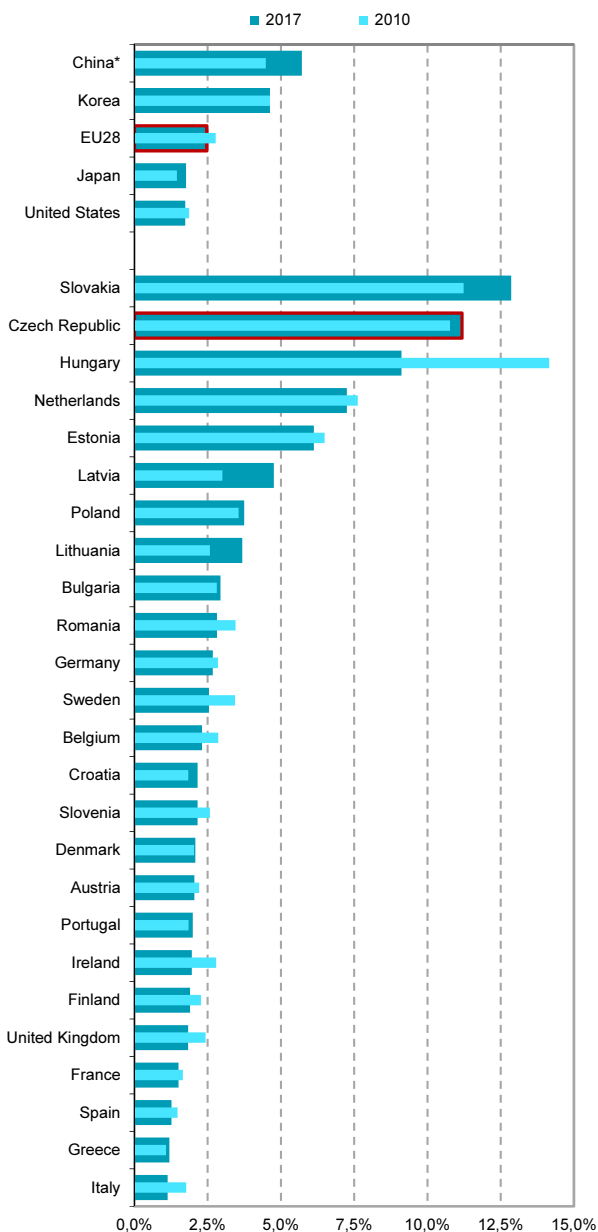


* China = China; Hong Kong China; Macao China; China Taiwan

Source: CZSO calculations based on UNCTAD

D ICT external trade

Figure D12 ICT goods imports (% of GDP)

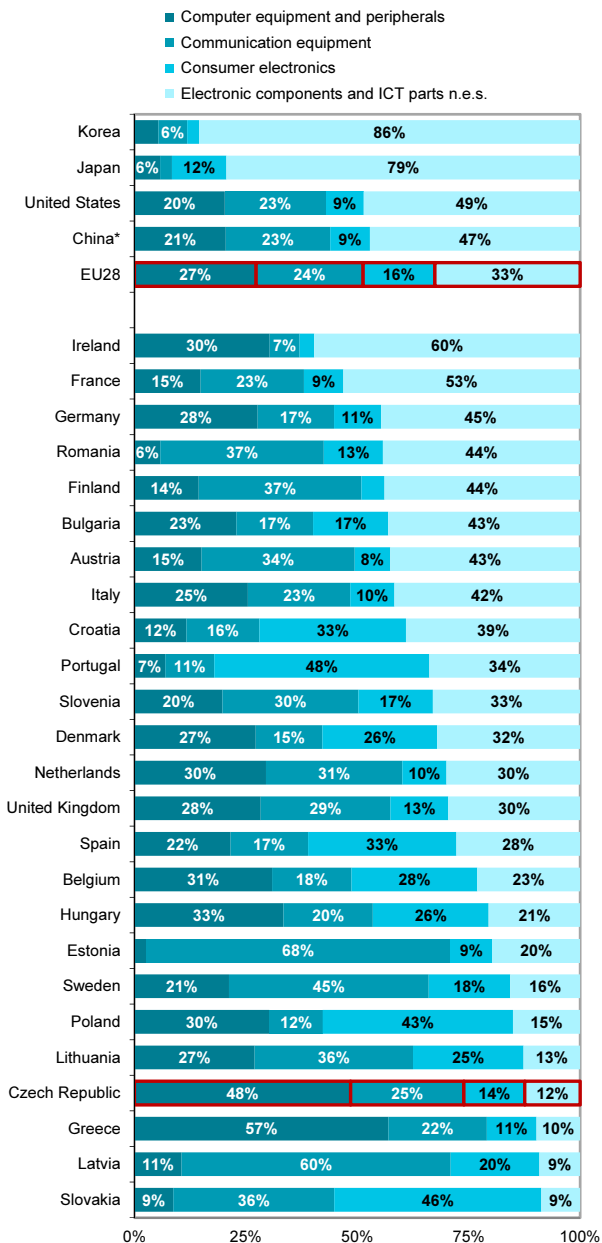


* China = China; Hong Kong China; Macao China; China Taiwan

Source: CZSO calculations based on UNCTAD

D ICT external trade

Figure D13 ICT goods exports by commodities; 2017

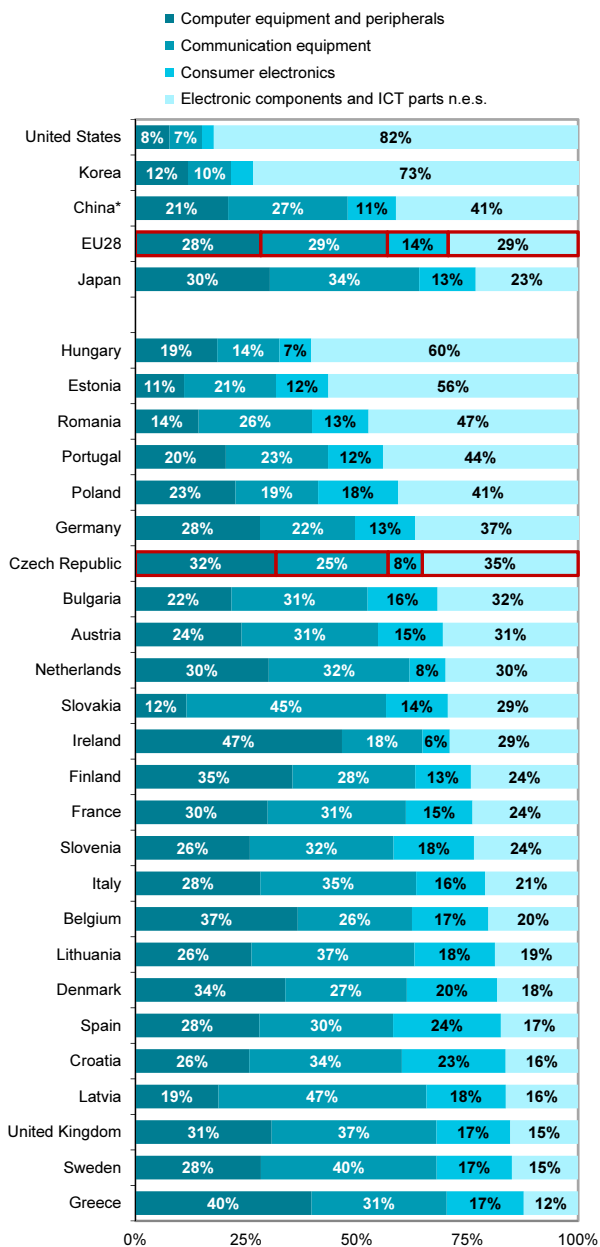


* China = China; Hong Kong China; Macao China; China Taiwan

Source: CZSO calculations based on UNCTAD

D ICT external trade

Figure D14 ICT goods imports by commodities; 2017



* China = China; Hong Kong China; Macao China; China Taiwan

Source: CZSO calculations based on UNCTAD

D ICT external trade

Table D3 Computer equipment exports from the Czech Republic

CZK million

	2015	2016	2017
Total	247 168	236 892	283 506
Portable computers	59 098	56 158	64 699
Other computers	88 595	80 871	121 211
Computer peripherals, total	99 476	99 862	97 596
Storage units	59 505	56 238	49 816
Sound, video, network and similar cards	8 933	9 930	12 097
Monitors used with computers	15 956	16 286	19 748
Printers, copying or faxing machines	7 036	7 813	6 388
Other input or output peripherals*	8 046	9 596	9 546

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

Figure D15 Computer equipment exports

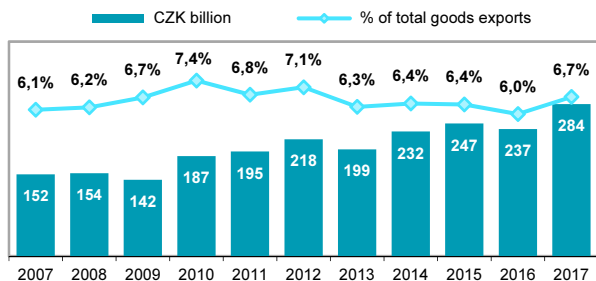


Figure D16 Computer equipment exports by commodities

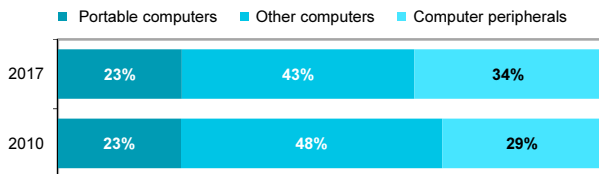
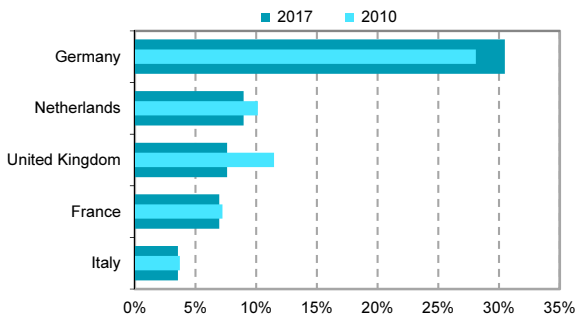


Figure D17 Computer equipment exports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D4 Computer equipment imports to the Czech Republic

CZK million

	2015	2016	2017
Total	189 009	170 630	196 963
Portable computers	75 255	60 020	71 830
Other computers	23 745	19 599	20 325
Computer peripherals, total	90 009	91 011	104 809
Storage units	50 873	50 022	57 324
Sound, video, network and similar cards	8 750	8 565	11 529
Monitors used with computers	15 164	15 885	19 875
Printers, copying or faxing machines	8 457	7 862	7 150
Other input or output peripherals*	6 766	8 677	8 931

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

Figure D18 Computer equipment imports

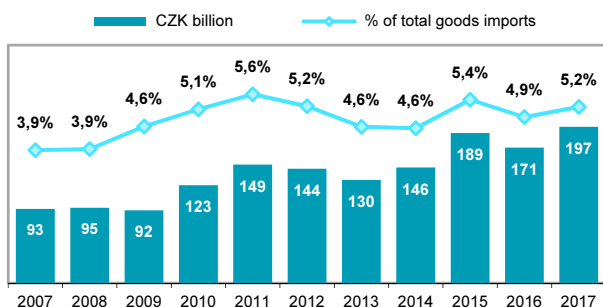


Figure D19 Computer equipment imports by commodities

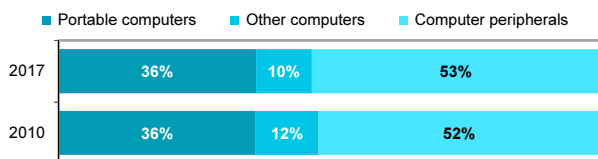
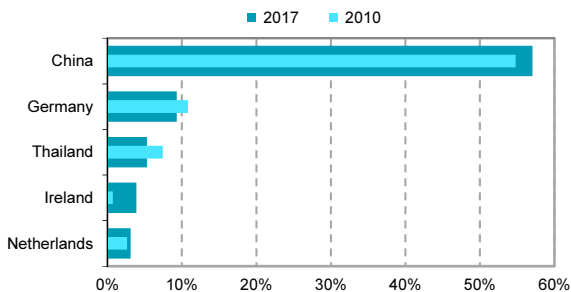


Figure D20 Computer equipment imports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Tab.D5 Communication equipment exports from the Czech Rep.

CZK million

	2015	2016	2017
Total	104 021	97 651	138 167
Mobile phones	67 793	62 246	87 374
Other communication equipment*	36 229	35 405	50 794

* Switching, routing and similiar apparatus such as routers, bridges, hubs or modems; Base stations and other apparatus for transmission or reception of voice, images or other data; Radio or television transmission apparatus

Figure D21 Communication equipment exports

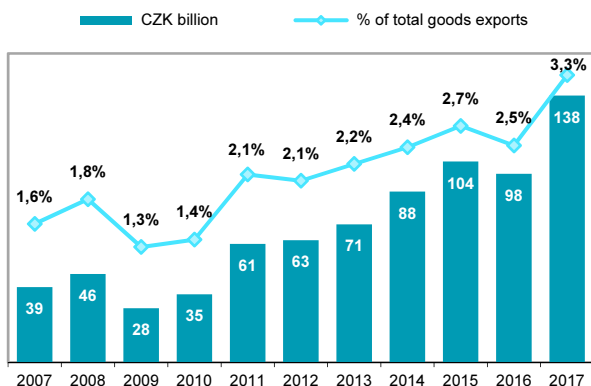


Figure D22 Communication equipment exports by commodities

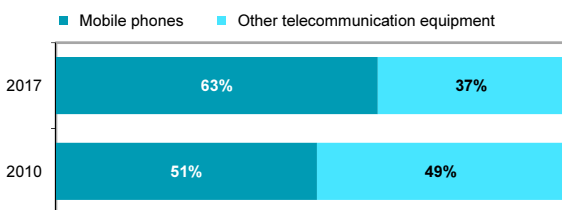
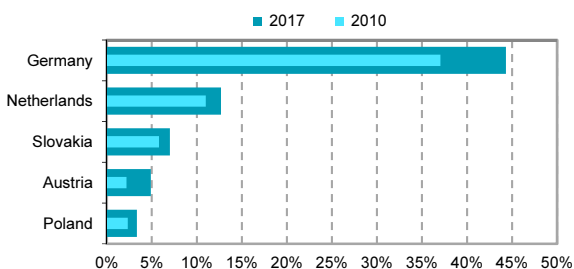


Figure D23 Communication equipment exports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D6 Communication equipment imports to the Czech Rep.

CZK million

	2015	2016	2017
Total	121 222	103 219	141 049
Mobile phones	85 666	68 538	98 042
Other communication equipment*	35 556	34 681	43 006

* Switching, routing and similar apparatus such as routers, bridges, hubs or modems; Base stations and other apparatus for transmission or reception of voice, images or other data; Radio or television transmission apparatus

Figure D24 Communication equipment imports

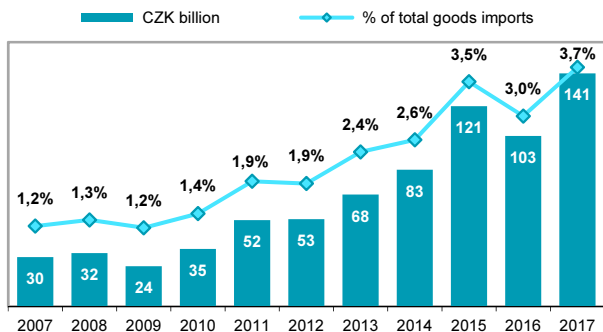


Figure D25 Communication equipment imports by commodities

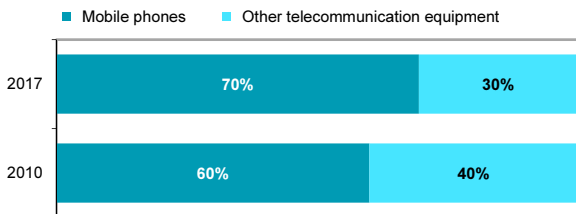
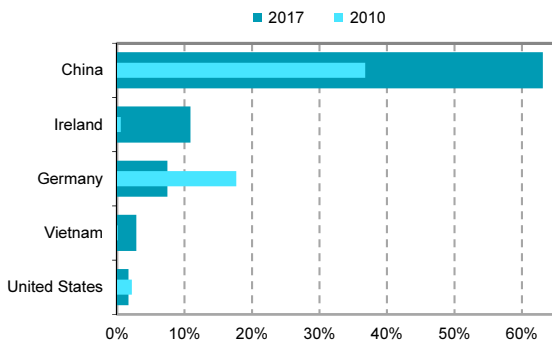


Figure D26 Communication equipment imports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D7 Consumer electronics exports from the Czech Republic

CZK million

	2015	2016	2017
Total	70 087	72 922	74 650
Radio and TV receivers	42 537	39 009	34 821
Sound and image recording and reproducing apparatuses	13 366	15 119	15 264
Consumer electronics accessories*	14 183	18 793	24 565

* *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 D27 Consumer electronics exports

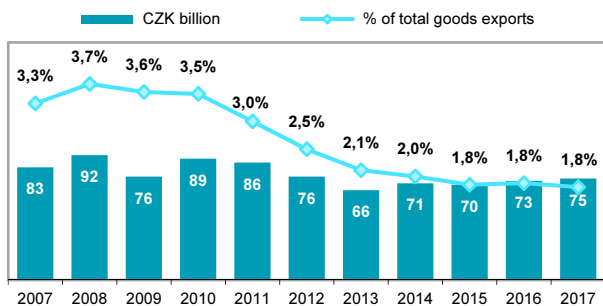


Figure D28 Consumer electronics exports by commodities

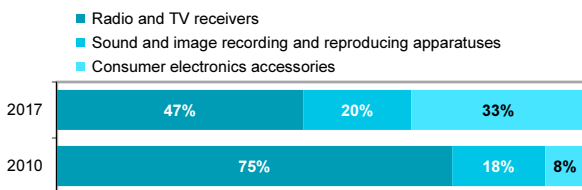
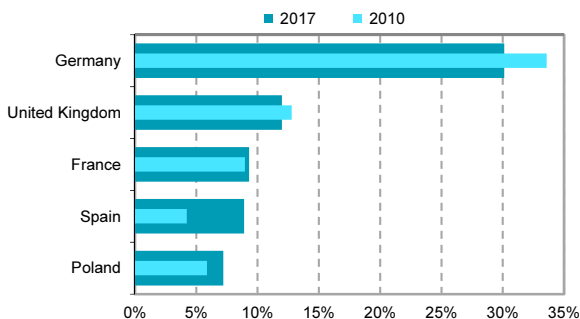


Figure D29 Consumer electronics exports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D8 Consumer electronics imports to the Czech Republic

CZK million

	2015	2016	2017
Total	41 813	44 109	43 031
Radio and TV receivers	17 529	15 088	15 213
Sound and image recording and reproducing apparatuses	12 899	14 446	14 457
Consumer electronics accessories*	11 385	14 574	13 362

* 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 D30 Consumer electronics imports

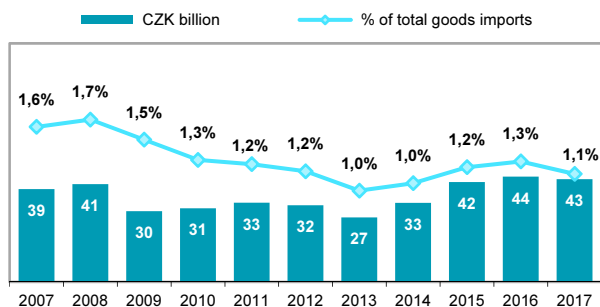


Figure D31 Consumer electronics imports by commodities

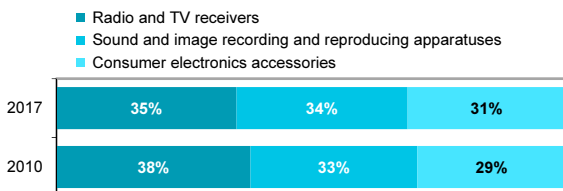
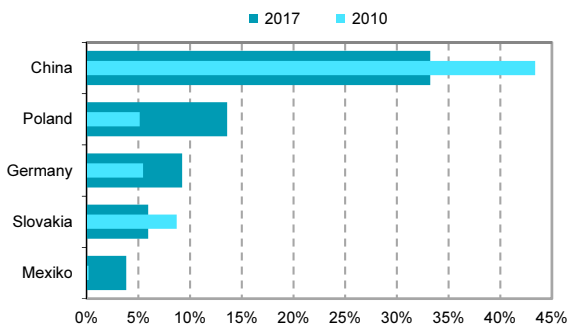


Figure D32 Consumer electronics imports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D9 Electronic components exports from the Czech Rep.

CZK million

	2015	2016	2017
Total	42 707	45 144	33 101
Electronic integrated circuits	30 686	33 789	21 422
Printed circuits	4 584	4 874	4 555
Other electronic components	7 436	6 481	7 124

Figure D33 Electronic components exports

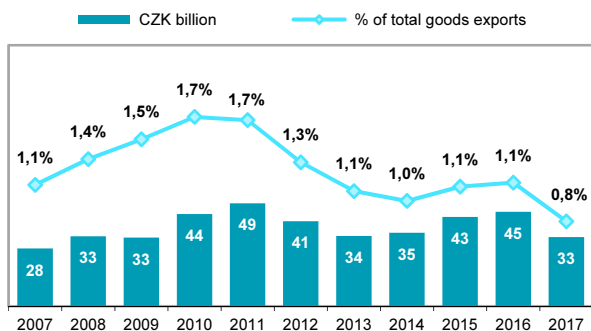


Figure D34 Electronic components exports by commodities

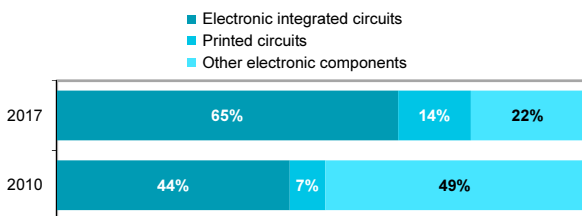
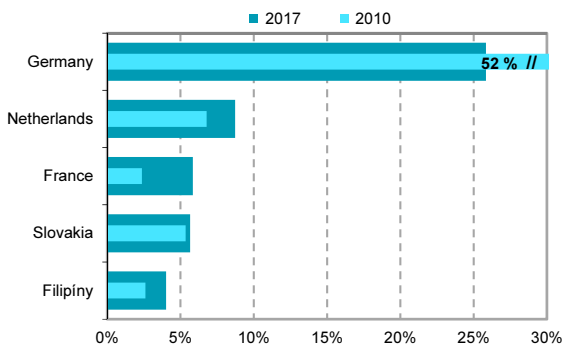


Figure D35 Electronic components exports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D10 Electronic components imports to the Czech Rep.

CZK million

	2015	2016	2017
Total	78 750	84 734	101 739
Electronic integrated circuits	57 802	63 101	77 417
Printed circuits	9 914	11 570	13 352
Other electronic components	11 034	10 064	10 969

Figure D36 Electronic components imports

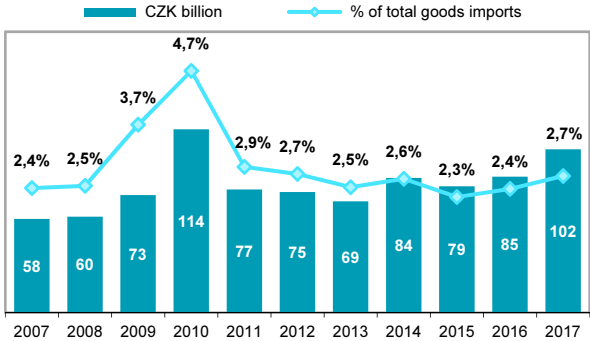


Figure D37 Electronic components imports by commodities

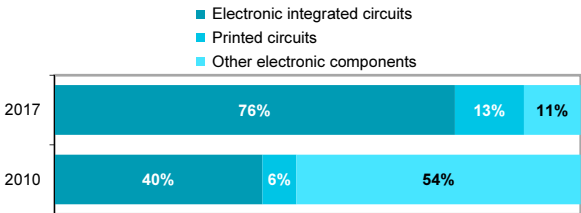
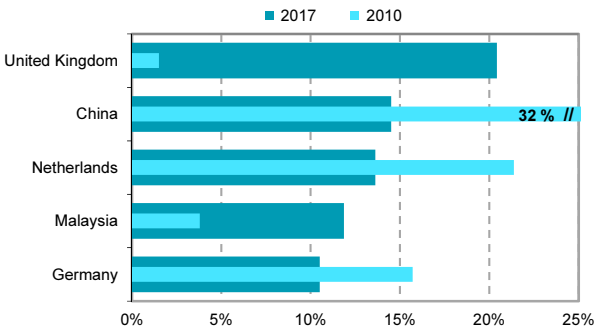


Figure D38 Electronic components imports by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D11 Exports of ICT parts n.e.s. from the Czech Republic

CZK million

	2015	2016	2017
Total	59 844	53 409	35 146
Parts and accessories n.e.s. of			
- computers	35 203	29 212	17 458
- telecommunication equipment	18 987	19 520	11 638
- consumer electronics	5 654	4 677	6 050

n.e.s. - not else specified

Figure D39 Exports of ICT parts and accessories n.e.s.

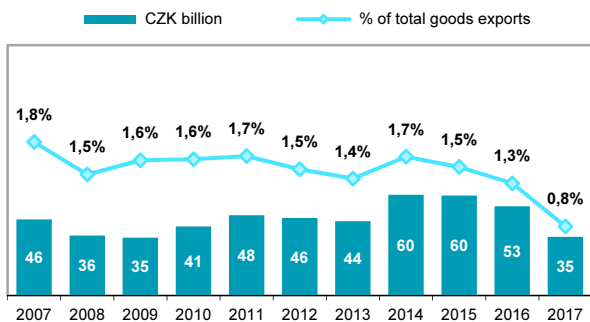


Figure D40 Exports of ICT parts n.e.s. by commodities

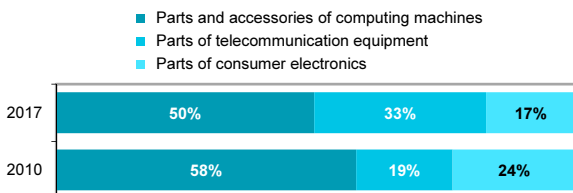
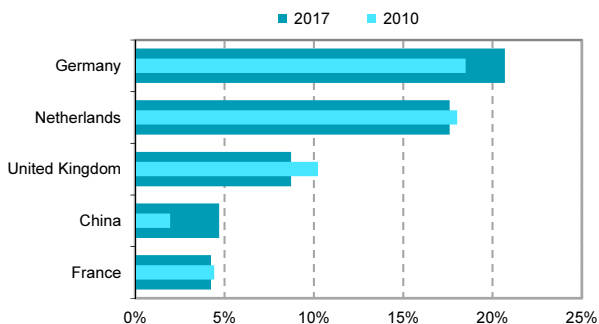


Figure D41 Exports of ICT parts n.e.s. by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D12 Imports of ICT parts n.e.s. to the Czech Republic

CZK million

	2015	2016	2017
Total	109 946	94 251	95 512
Parts and accessories n.e.s. of			
- computers	66 188	54 163	59 231
- telecommunication equipment	19 500	14 324	7 792
- consumer electronics	24 258	25 765	28 489

n.e.s. - not else specified

Figure D42 Imports of ICT parts and accessories n.e.s.

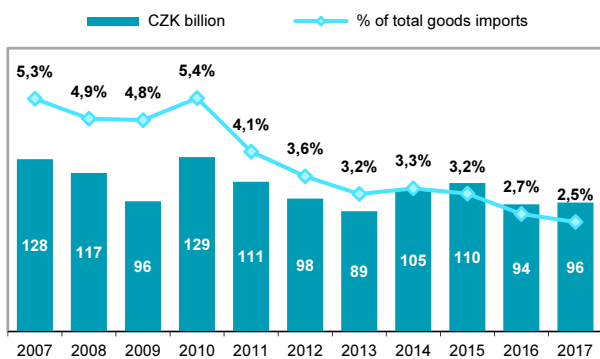


Figure D43 Imports of ICT parts n.e.s. by commodities

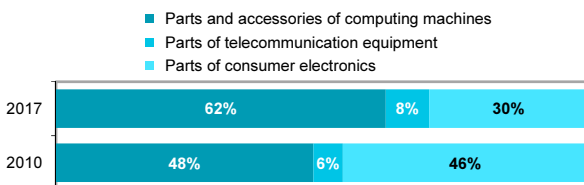
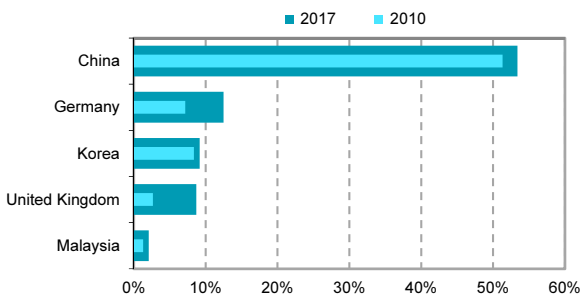


Figure D44 Imports of ICT parts n.e.s. by countries



Source: CZSO, External Trade Statistics Database

D ICT external trade

Table D13 Total ICT services exports from the Czech Republic

CZK million

	2015	2016	2017
Total	67 988	79 287	87 987
Telecommunication services	11 299	15 420	18 289
Computer services	39 502	43 899	47 747
Computer software	17 188	19 968	21 952
by selected countries			
EU28, total	44 680	49 812	53 717
of which to Germany	12 851	15 185	16 794
Other countries, total	23 308	29 475	34 270
of which to the United States	11 586	14 828	15 635

Figure D45 Total ICT services exports

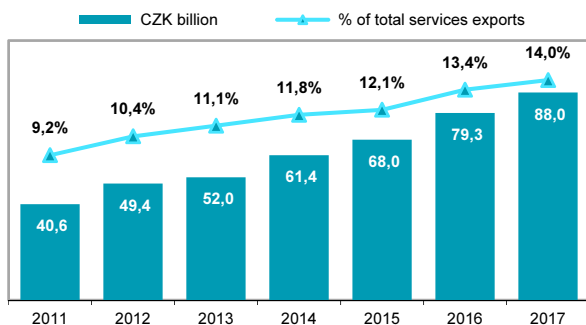


Figure D46 ICT services exports by type of service

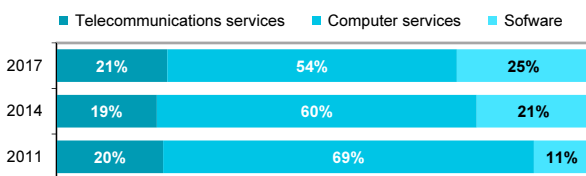
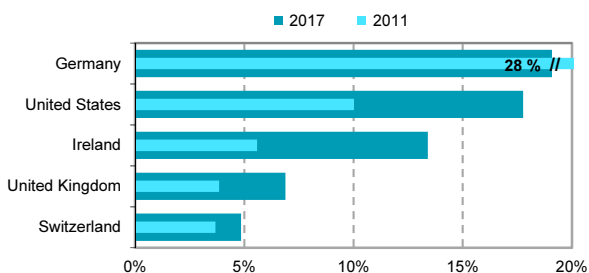


Figure D47 ICT services exports by countries



Source: CZSO, Survey on exports and imports of services

D ICT external trade

**Figure D48 ICT services exports
(% of total services exports)**

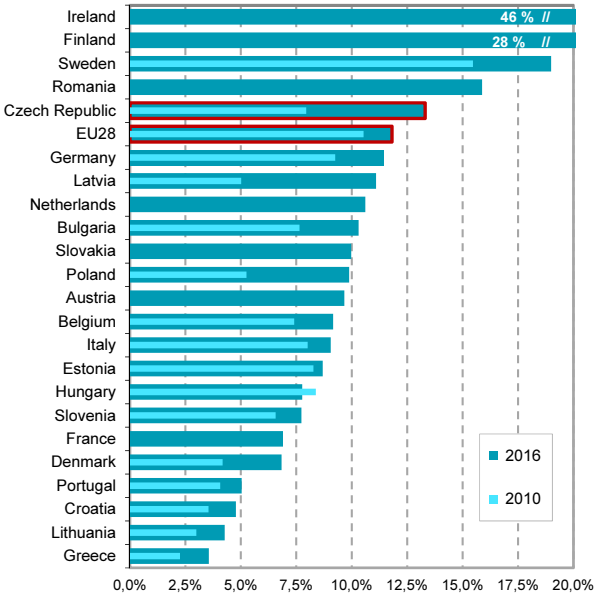
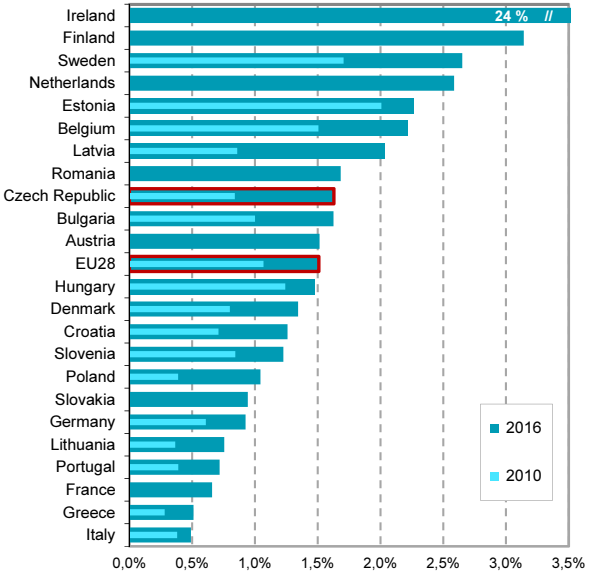


Figure D49 ICT services exports (% of GDP)



Source: Eurostat

D ICT external trade

Table D14 Total ICT services imports to the Czech Republic

CZK million

	2015	2016	2017
Total	40 080	45 268	50 976
Telecommunication services	11 902	14 804	16 431
Computer services	21 566	22 606	25 425
Computer software	6 613	7 859	9 120
by selected countries			
EU28, total	27 255	31 023	33 897
of which from Germany	9 526	12 137	13 064
Other countries, total	12 826	14 246	17 079
of which from the United States	3 616	3 765	3 172

Figure D50 Total ICT services imports

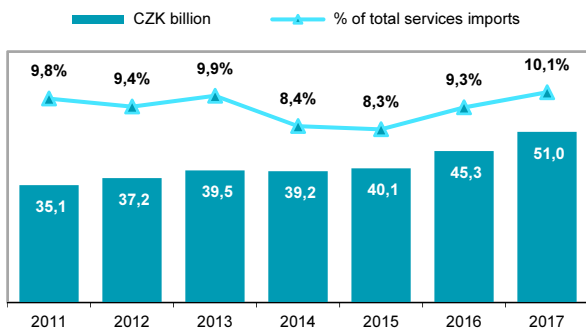


Figure D51 ICT services imports by type of service

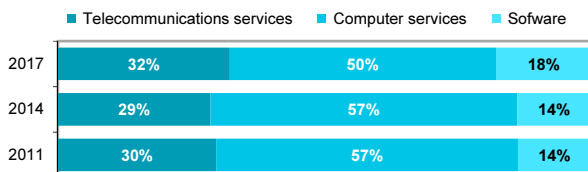
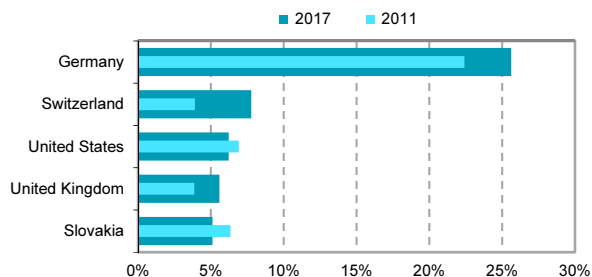


Figure D52 ICT services imports by countries



Source: CZSO, Survey on exports and imports of services

D ICT external trade

**Figure D53 ICT services imports
(% of total services imports)**

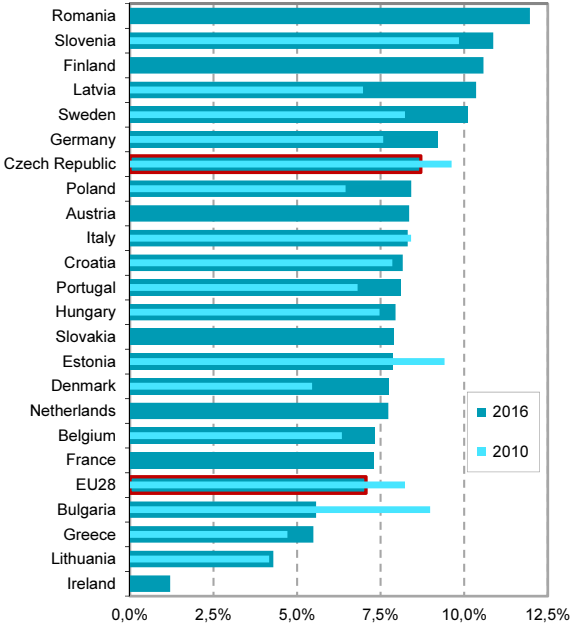
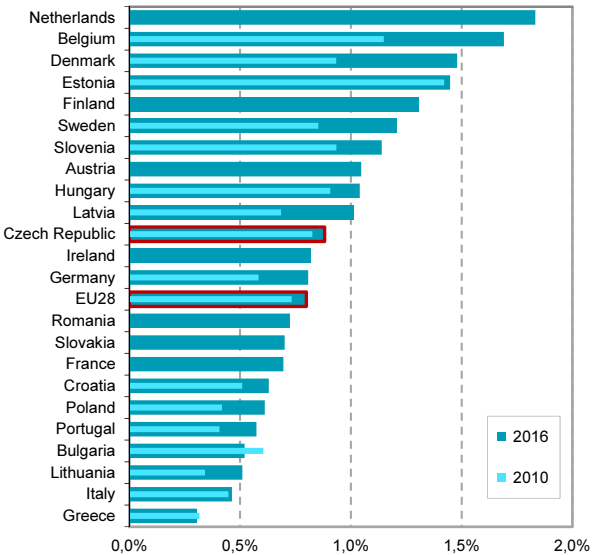


Figure D54 ICT services imports (% of GDP)



Source: Eurostat

D ICT external trade

Table D15 Computer services and software exports from the Czech Republic

	CZK million		
	2015	2016	2017
Total	56 690	63 867	69 698
Computer services	39 502	43 899	47 747
Computer software	17 188	19 968	21 952
by selected countries			
EU28, total	38 564	41 536	44 148
of which to Germany	10 345	11 818	13 289
Other countries, total	18 126	22 331	25 550
of which to the United States	10 958	13 606	14 927

Figure D55 Computer services and software exports

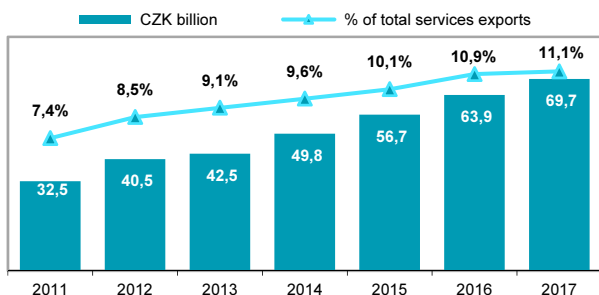


Fig. D56 Computer services and SW exports by type of service

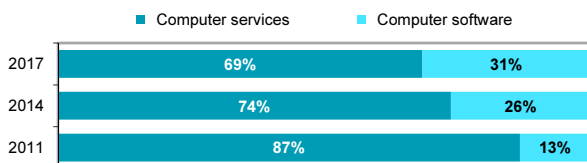
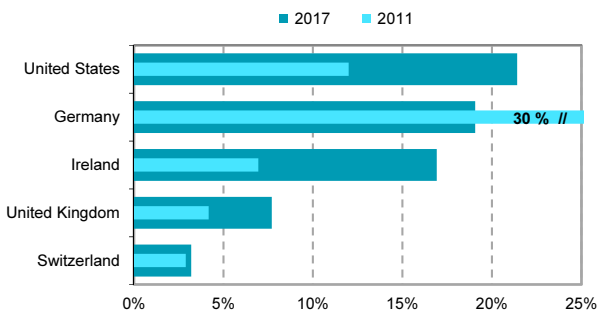


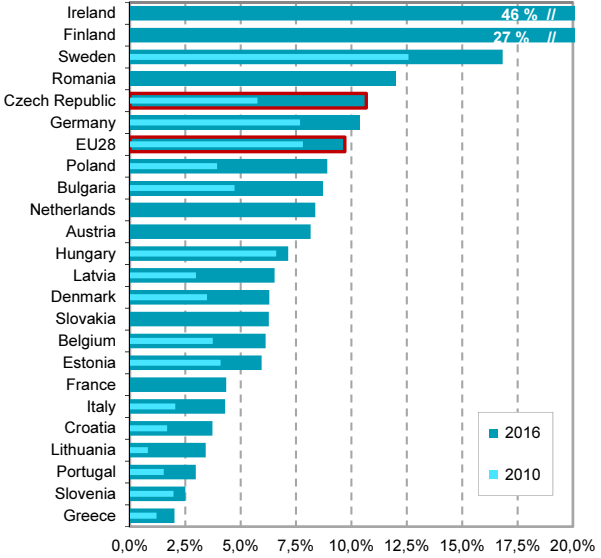
Figure D57 Computer services and SW exports by countries



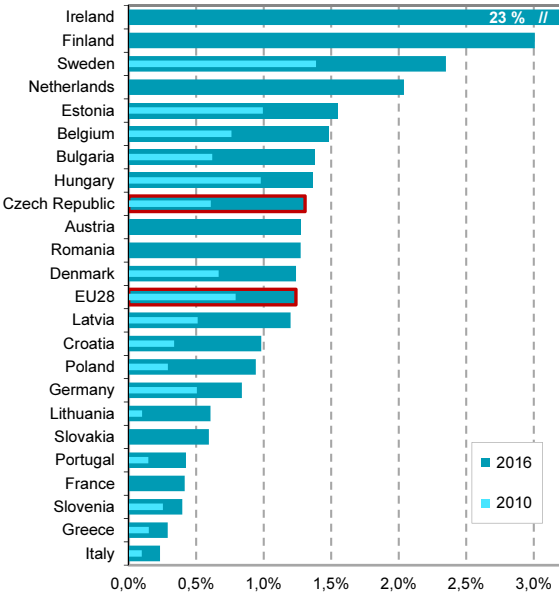
Source: CZSO, Survey on exports and imports of services

D ICT external trade

**Figure D58 Computer services and software exports
(% of total services exports)**



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



Source: Eurostat

D ICT external trade

Table D16 Computer services and software imports to the Czech Republic

CZK million

	2015	2016	2017
Total	28 178	30 465	34 545
Computer services	21 566	22 606	25 425
Computer software	6 613	7 859	9 120
by selected countries			
EU28, total	20 219	22 256	24 726
of which from Germany	6 554	8 026	8 935
Other countries, total	7 959	8 209	9 819
of which from the United States	3 358	3 312	2 873

Figure D60 Computer services and software imports

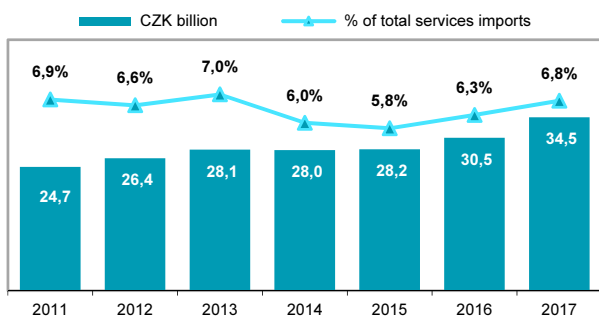


Figure D61 Computer services & SW imports by type of service

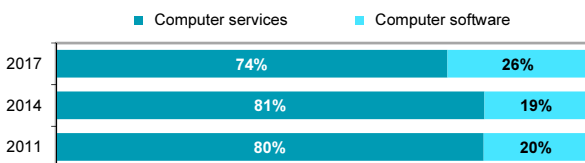
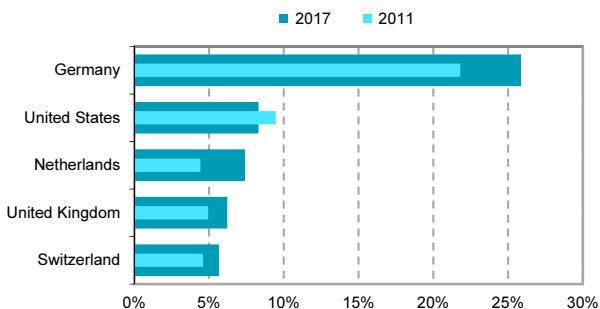


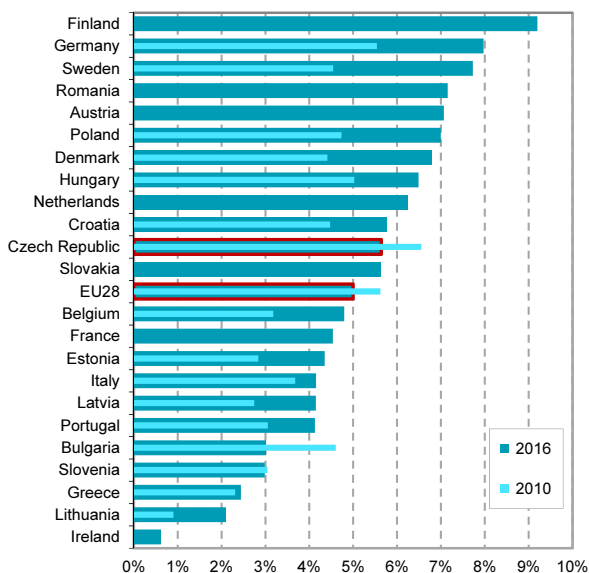
Figure D62 Computer services & SW imports by countries



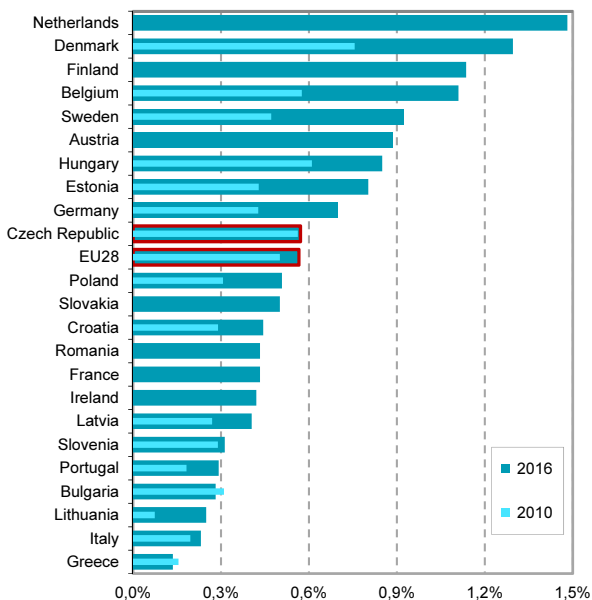
Source: CZSO, Survey on exports and imports of services

D ICT external trade

**Figure D63 Computer services and software imports
(% of total services imports)**



**Figure D64 Computer services and software imports
(% of GDP)**



Source: 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. For more details see: „**OECD Guide to Measuring the Information Society 2011**: www.oecd.org/sti/measuring-infoeconomy/guide“

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:

http://unstats.un.org/unsd/cr/registry/docs/i4_information_economy.pdf

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 2017 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>

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 ICT sector in the Czech Republic

number of persons employed - headcount persons

	2015	2016	2017*
Total	147 389	155 749	163 109
ICT manufacturing, total	23 771	24 951	25 362
Manuf. of computers & electr. components	13 907	14 314	14 826
Manufacturing of communication equipment and consumer electronics	9 864	10 637	10 536
ICT services, total	123 618	130 798	137 746
ICT wholesale	11 837	11 211	11 349
Telecommunications	17 733	19 125	20 371
IT services**	94 048	100 462	106 026

* Preliminary data

** Programming, consultancy & related IT activities including data processing

Figure E1 Employment in the ICT sector

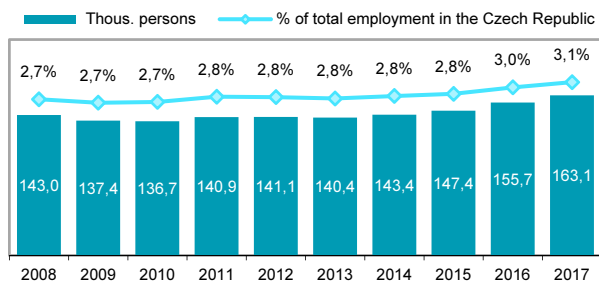


Figure E2 Employment in ICT sector by industry

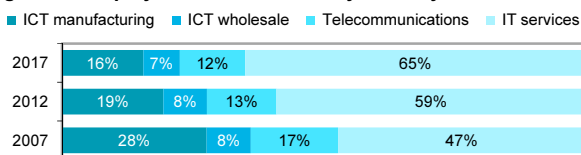


Figure E3 Employment in ICT sector by ownerships; 2017

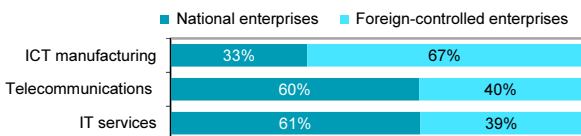
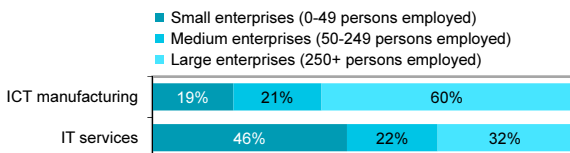


Figure E4 Employment in ICT sector by size; 2017

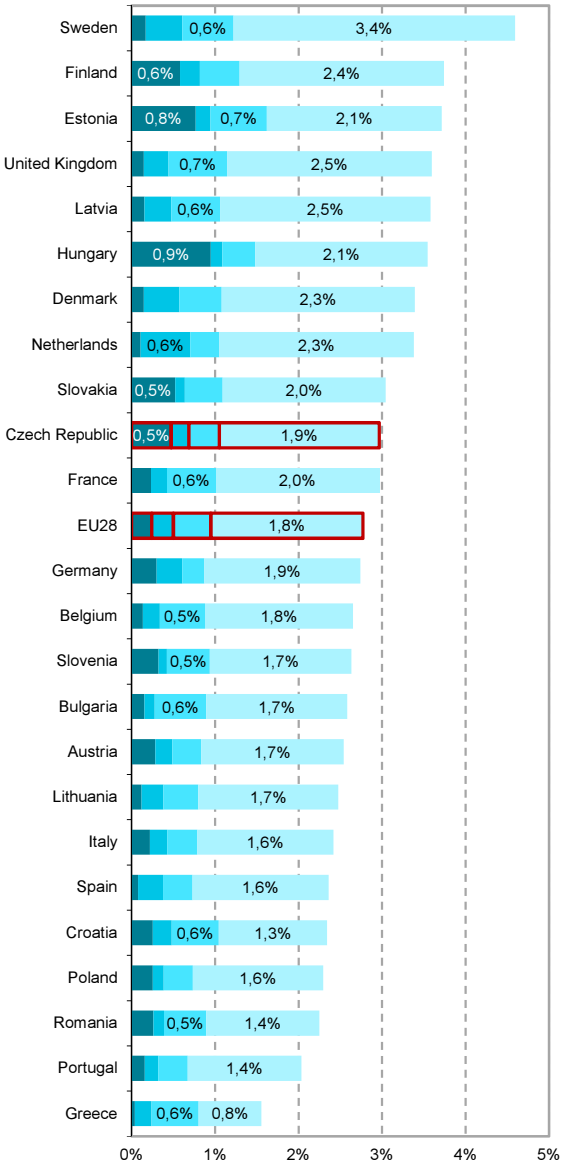


Source: CZSO, Structural Business Statistics

E ICT sector

Figure E5 Employment in the ICT sector; 2016*
(as a percentage of total employment)

■ ICT manufacturing ■ ICT wholesale ■ Telecommunications ■ IT services



* or the latest year available

Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Figure E6 Employment in ICT manufacturing

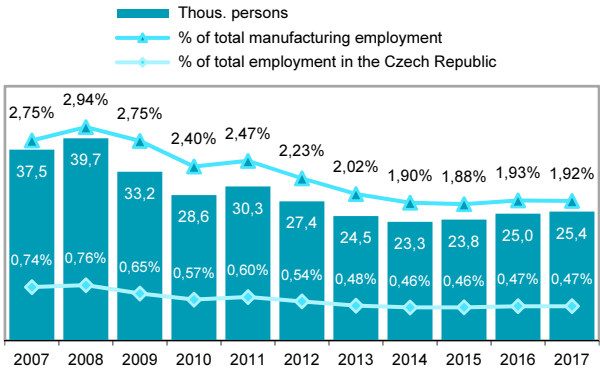


Figure E7 Employment in Telecommunications

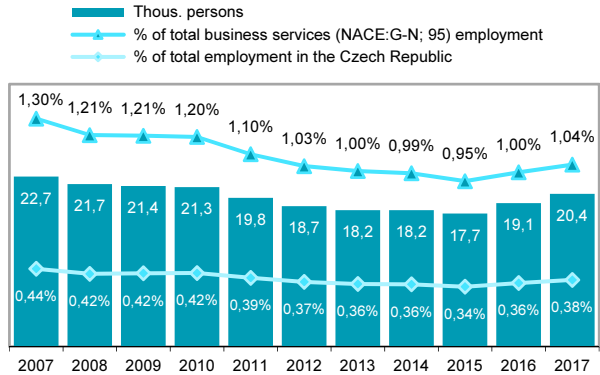
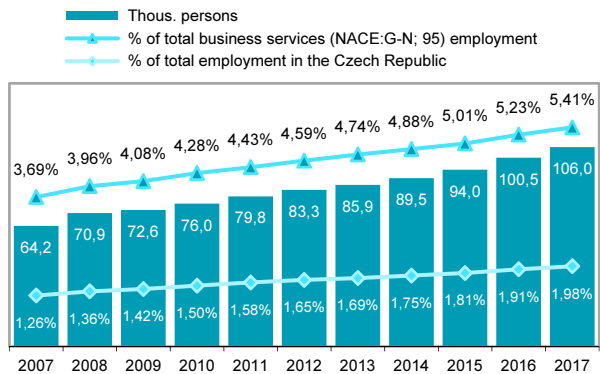


Figure E8 Employment in IT services



Source: CZSO, Structural Business Statistics

E ICT sector

Figure E9 Employment in ICT manufacturing; 2016*
(as a percentage of total manufacturing employment)

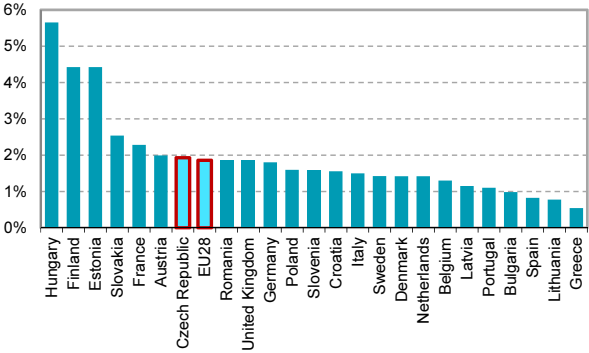


Figure E10 Employment in Telecommunications; 2016*
(as a percentage of total business enterprise sector employment)

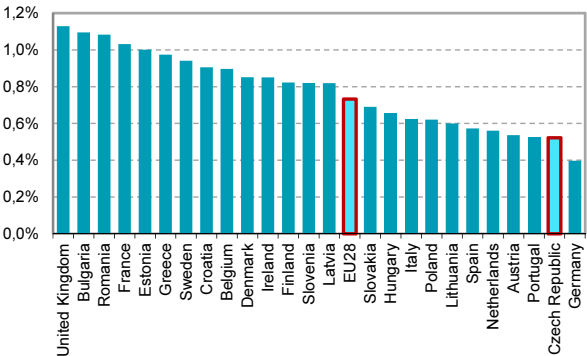
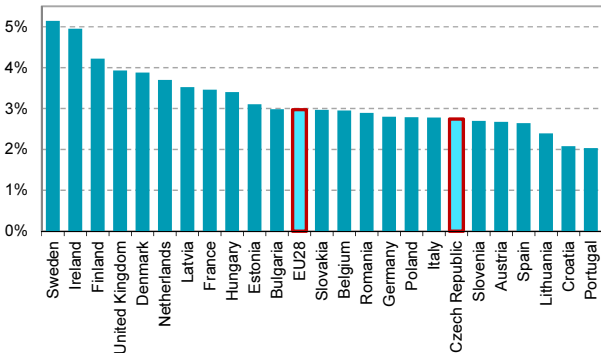


Figure E11 Employment in IT services industries; 2016*
(as a percentage of total business enterprise sector employment)



* or the latest year available

Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Table E2 Turnover in the ICT sector in the Czech Republic

CZK million, current prices

	2015	2016	2017*
Total	731 591	738 861	788 218
ICT manufacturing, total	226 828	226 859	233 854
Manuf. of computers & electr. components	173 772	174 461	179 868
Manufacturing of communication equipment and consumer electronics	53 057	52 398	53 986
ICT services, total	504 763	512 002	554 364
ICT wholesale	162 425	152 745	166 933
Telecommunications	118 336	121 803	125 708
IT services**	224 002	237 453	261 722

* Preliminary data

** Programming, consultancy & related IT activities including data processing

Figure E12 Turnover in the ICT sector

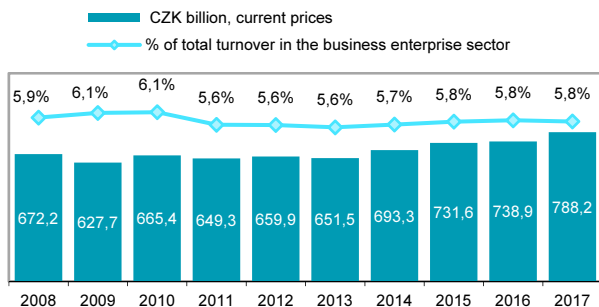


Figure E13 Turnover in ICT sector by industry

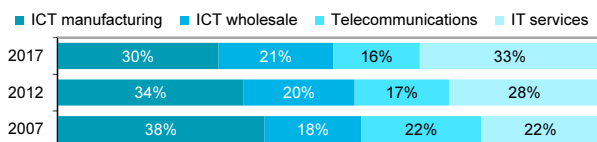


Figure E14 Turnover in ICT sector by ownerships; 2017

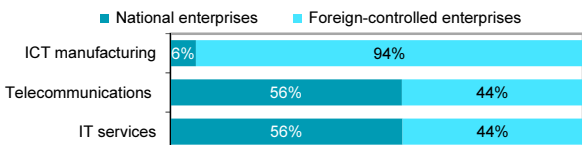
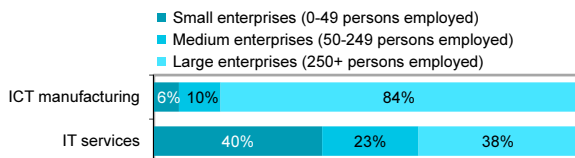


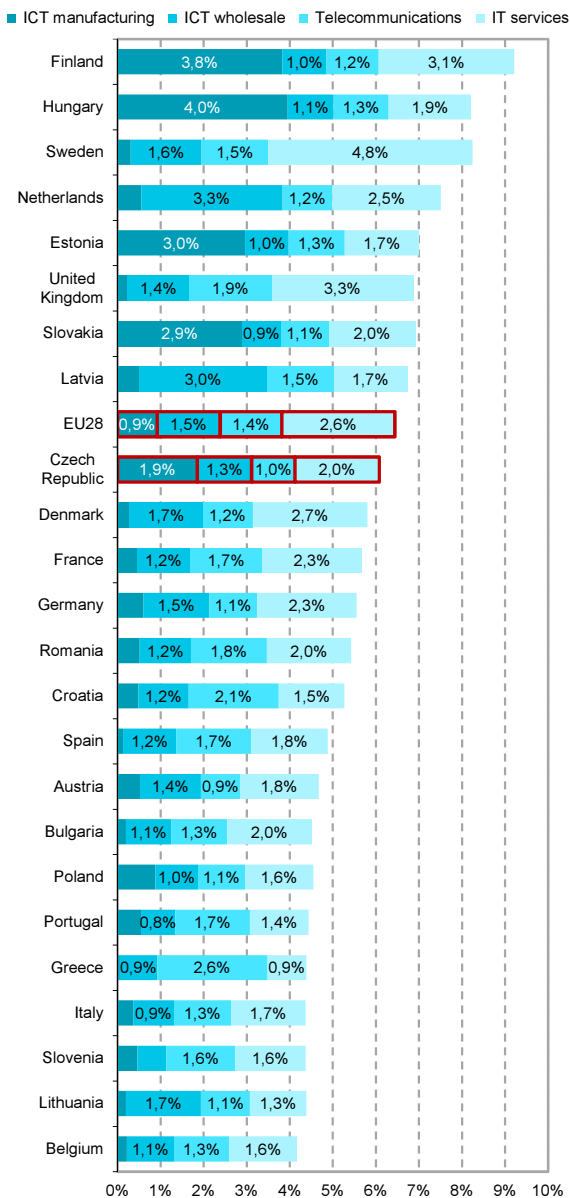
Figure E15 Turnover in ICT sector by size; 2017



Source: CZSO, Structural Business Statistics

E ICT sector

Figure E16 Turnover in the ICT sector; 2016*
(as a percentage of total turnover in the business enterprise sector)



* or the latest year available

Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Figure E17 Turnover in ICT manufacturing

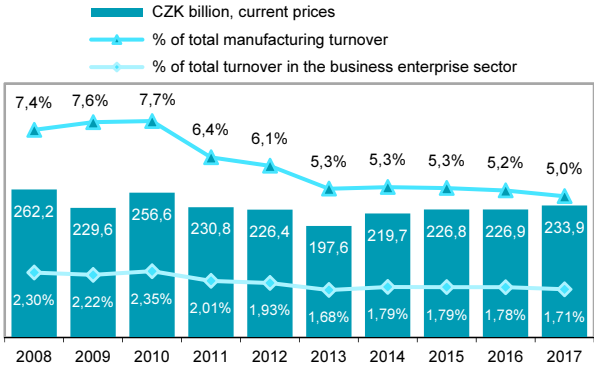


Figure E18 Turnover in Telecommunications

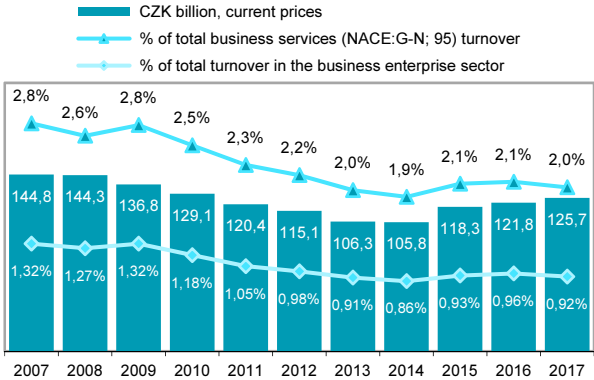
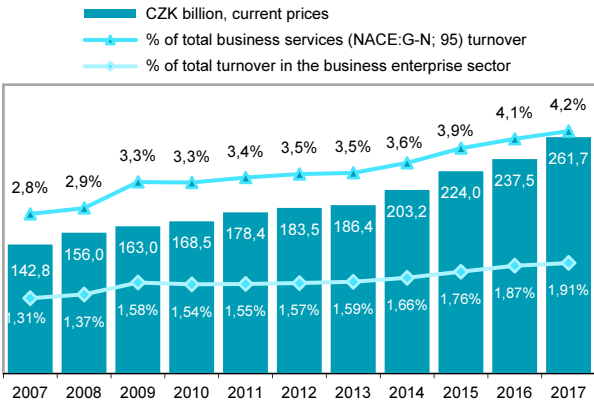


Figure E19 Turnover in IT services



Source: CZSO, Structural Business Statistics

E ICT sector

Figure E20 Turnover in ICT manufacturing; 2016*
(as a percentage of total manufacturing turnover)

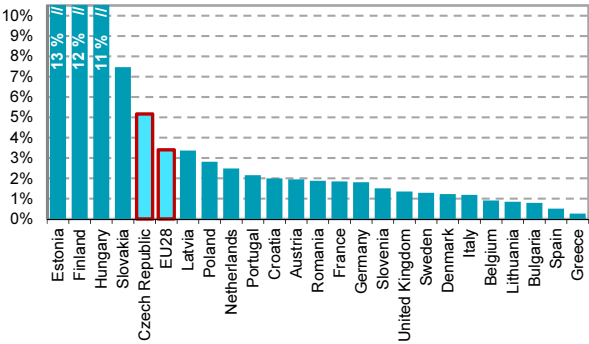


Figure E21 Turnover in Telecommunications; 2016*
(as a percentage of total turnover in the business enterprise sector)

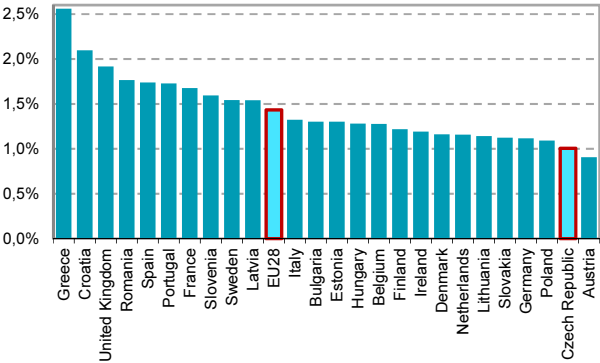
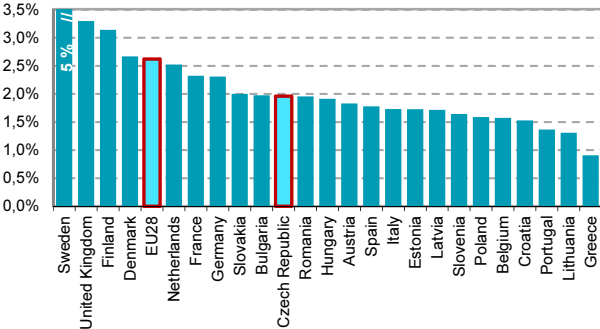


Figure E22 Turnover in IT services; 2016*
(as a percentage of total turnover in the business enterprise sector)



* or the latest year available

Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Table E3 Value added of the ICT sector in the Czech Republic

CZK million, current prices

	2014	2015	2016
Total	165 899	174 965	183 305
ICT manufacturing, total	17 046	15 416	16 889
Manuf. of computers & electr. components	8 728	6 293	7 447
Manufacturing of communication equipment and consumer electronics	8 318	9 123	9 442
ICT services, total	148 854	159 549	166 416
ICT wholesale	11 105	11 738	11 659
Telecommunications	46 543	45 972	46 983
IT services*	91 206	101 839	107 774

* Programming, consultancy & related IT activities including data processing

Figure E23 Value added of the ICT sector

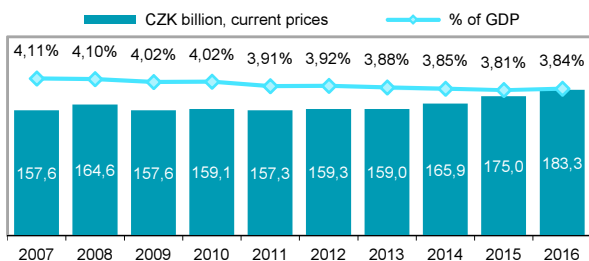


Figure E24 Value added of ICT sector by industry

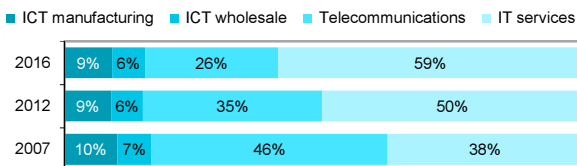


Figure E25 Value added of ICT sector by ownerships; 2016

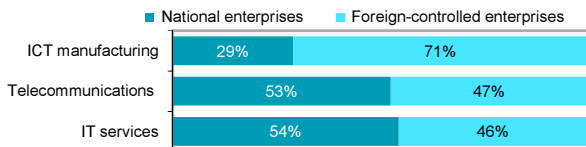
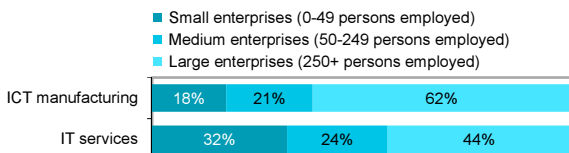


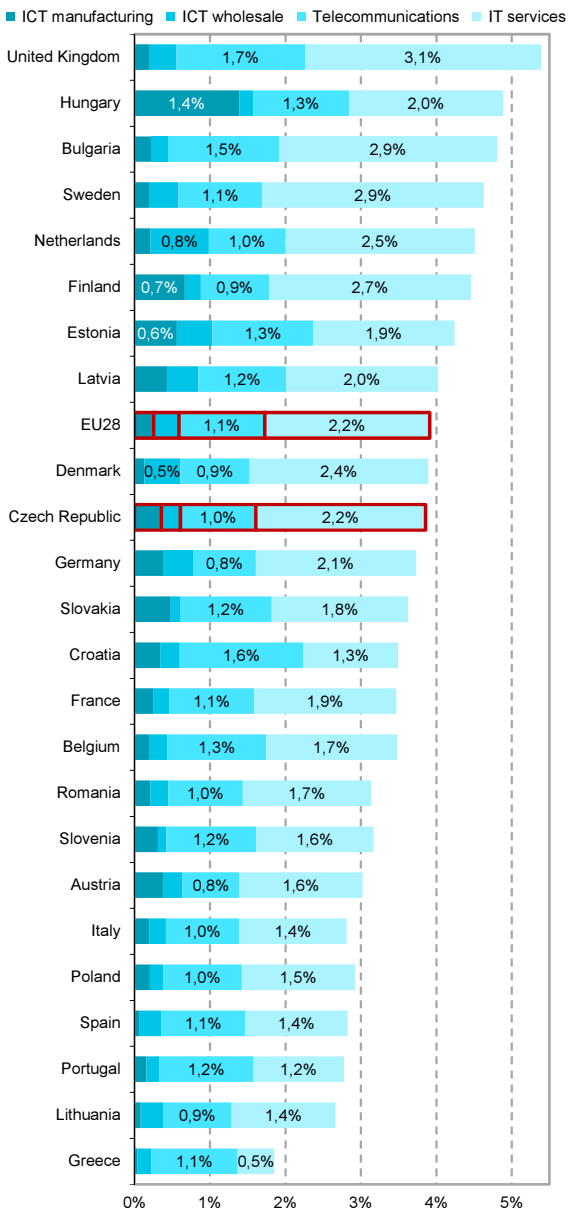
Figure E26 Value added in ICT sector by size; 2016



Source: CZSO, Structural Business Statistics

E ICT sector

**Figure E27 Value added of ICT sector; 2016*
(as a percentage of GDP)**



* or the latest year available

Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

Figure E28 Value added of ICT manufacturing

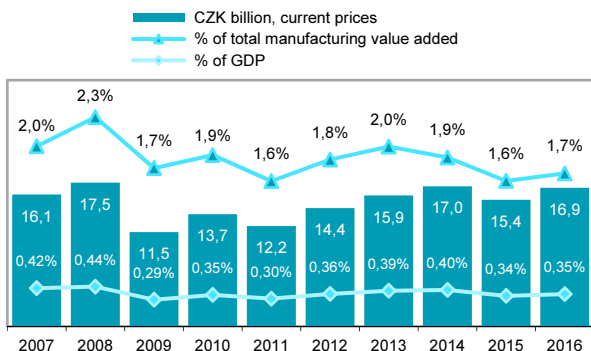


Figure E29 Value added of Telecommunications

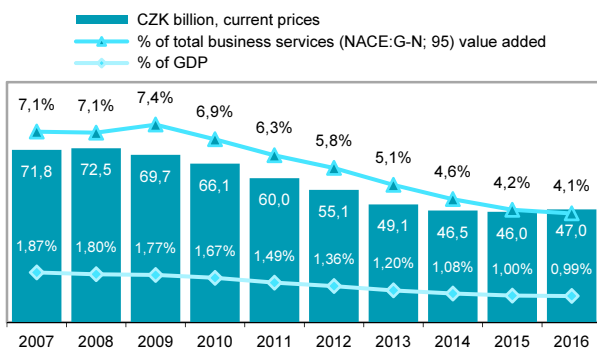
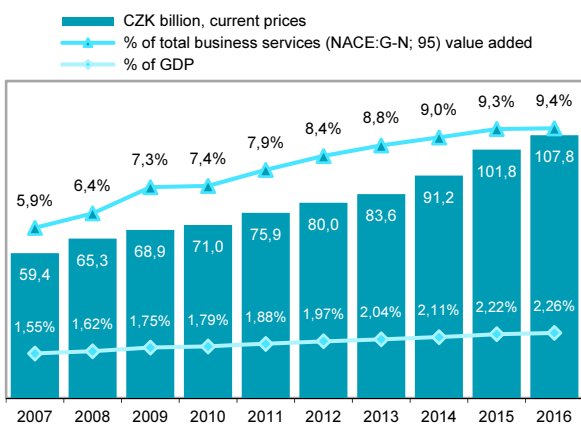


Figure E30 Value added of IT services



Source: CZSO, Structural Business Statistics

E ICT sector

Figure E31 Value added of ICT manufacturing; 2016*
(% of total manufacturing value added)

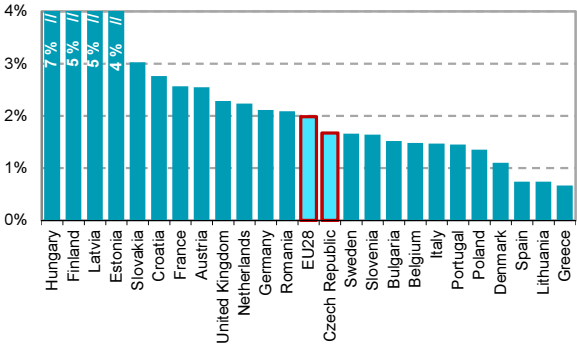


Figure E32 Value added of Telecommunications; 2016*
(% of total value added in the business enterprise sector)

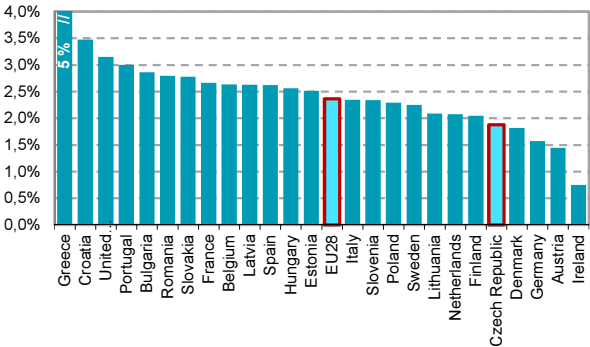
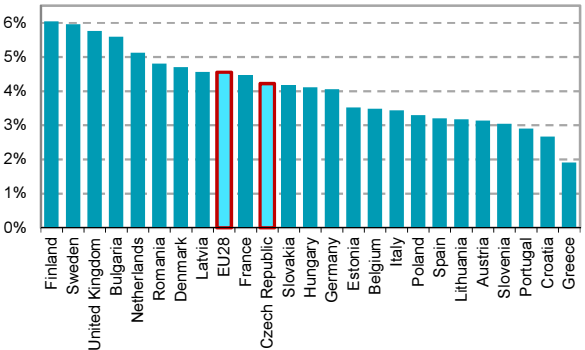


Figure E33 Value added of IT services; 2016*
(% of total value added in the business enterprise sector)



* or the latest year available

Source: CZSO calculations based on the Eurostat SBS database

E ICT sector

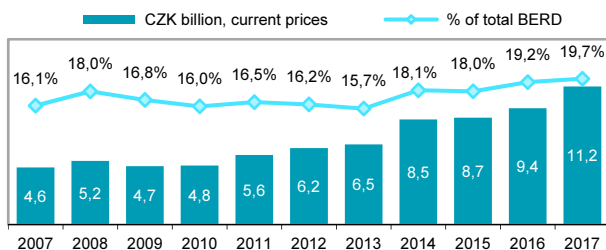
Tab. E4 R&D expenditure in the ICT sector in the Czech Republic

CZK million, current prices

	2015	2016	2017
Total	8 659	9 417	11 180
ICT manufacturing, total	500	532	512
Manuf. of computers & electron. components	161	174	202
Manufacturing of communication equipment and consumer electronics	338	358	310
ICT services, total	8 159	8 885	10 668
ICT wholesale	134	100	87
Telecommunications	630	682	717
IT services*	7 395	8 104	9 863

* Programming, consultancy & related IT activities including data processing

Figure E34 R&D expenditure in the ICT sector



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

Figure E35 R&D expenditure in ICT sector by industry

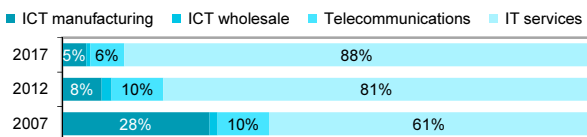


Figure E36 R&D expenditure in ICT sector by ownerships; 2017

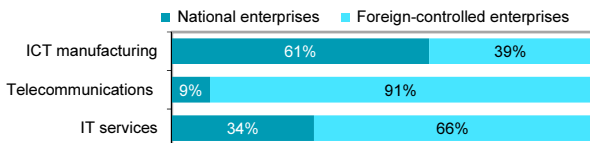
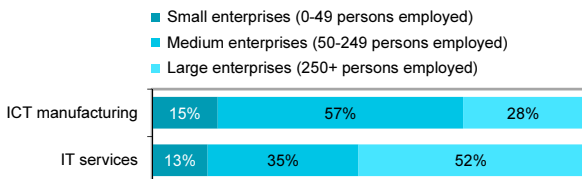


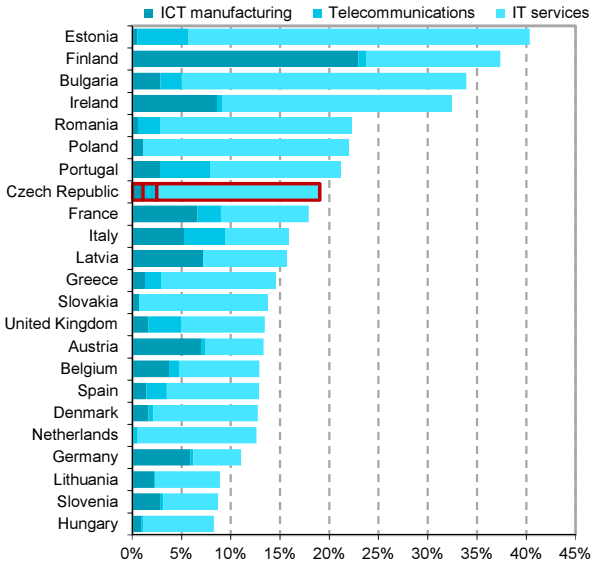
Figure E37 R&D expenditure in ICT sector by size; 2017



Source: CZSO, Annual R&D survey

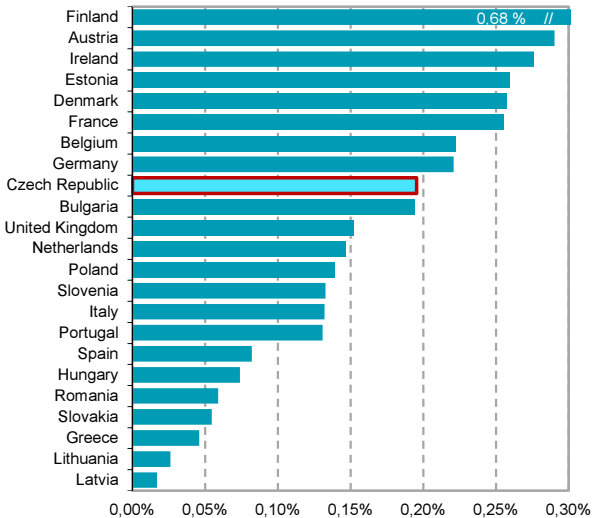
E ICT sector

Figure E38 R&D expenditure in the ICT sector; 2016*
(as a percentage of total BERD)



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

Figure E39 Total R&D expenditure in the ICT sector; 2016*
(as a percentage of GDP)



* Belgium, Ireland, Germany, Greece, Austria - 2015, France - 2014

Source: CZSO calculations based on the Eurostat STI Database

E ICT sector

Figure E40 R&D expenditure in ICT manufacturing

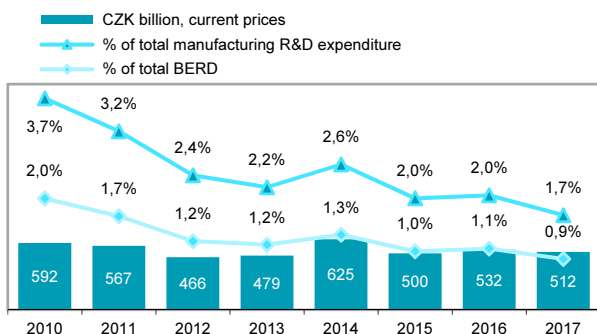


Figure E41 R&D expenditure in Telecommunications

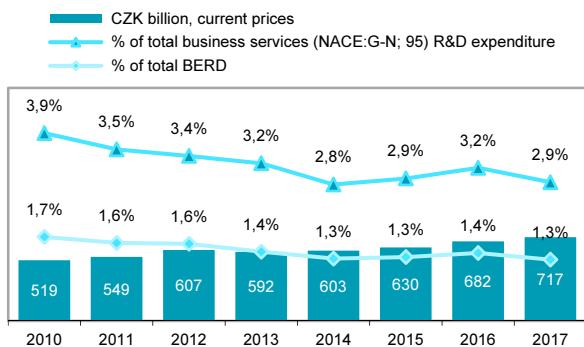
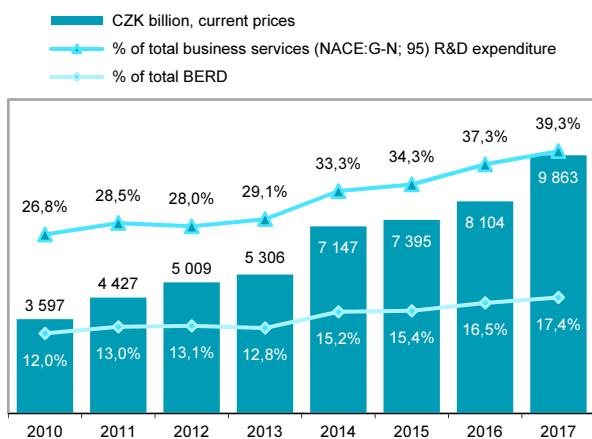


Figure E42 R&D expenditure in IT services



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

Source: CZSO, Annual R&D survey

E ICT sector

Figure E43 R&D expenditure in ICT manufacturing; 2016*
(as a percentage of total manufacturing R&D expenditure)

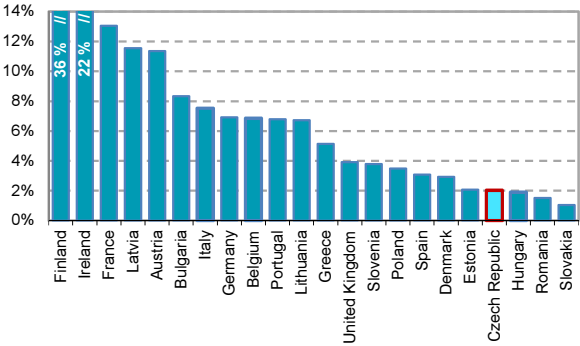


Figure E44 R&D expenditure in Telecommunications; 2016*
(as a percentage of total BERD)

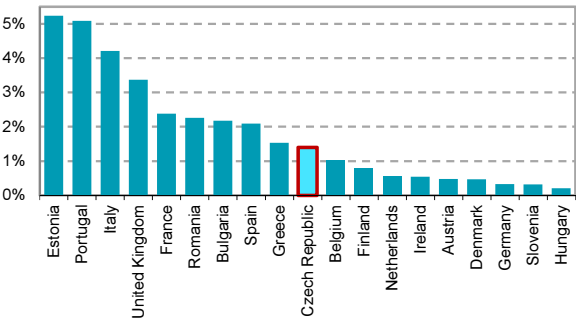
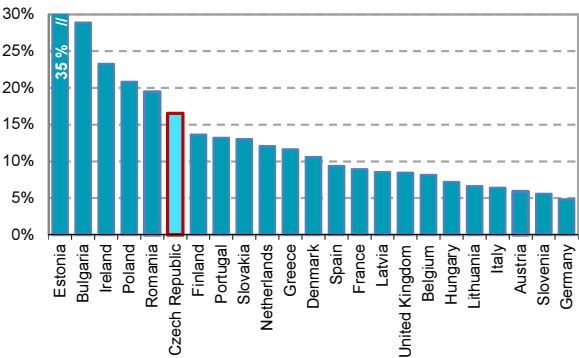


Figure E45 R&D expenditure in IT services; 2016*
(as a percentage of total BERD)



* Belgium, Ireland, Germany, Greece, Austria - 2015, France - 2014

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

Source: CZSO calculations based on the Eurostat STI Database