

A ICT specialists

A.1 ICT specialists

ICT specialists are **defined** as those individuals employed in “tasks related to developing, maintaining and operating ICT systems and where ICTs are the main part of their job”.

The occupations of ICT specialists are subdivided into **two major groups** while their classification is based on the Classification of Occupations (CZ-ISCO) the corresponding national classification in the Czech Republic developed on the basis of the **International Standard Classification of Occupations (ISCO-08)**. The ICT specialists are assigned to the major groups, groups, and subgroups of the CZ-ISO based on recommendations of Eurostat and the International Labour Organisation (ILO) as follows:

- **ICT managers, professionals and engineers** include ICT service managers (133); Software and applications developers and analysts (251); Database and network professionals (252); ICT sales professionals (2434) and Electronics and Telecommunications (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 and telecommunications (ICT) installers and servicers (742).

Data on the **employment** of ICT specialists come from the **Labour Force Sample Survey (LFS)** of the Czech Statistical Office (CZSO). Tables present average annual data for given years. 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 in 2011. Further information on the Czech LFS can be found at:

<https://www.czso.cz/csu/czso/employment-and-unemployment-as-measured-by-labour-force-survey-annual-averages>

The **Eurostat Labour Force Survey Database** was used as a data source for the international comparison. For more information see:

http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_labour_force_survey

Data on **earnings (average monthly gross wages)** of ICT specialists come from the **Structural Earnings Statistics (SES)** and are available in a comparable time series since the ref. year 2012. For further information see: <https://www.czso.cz/csu/czso/structure-of-earnings-survey-2016>

Further information on ICT specialists can be found at (only in Czech):

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

A.2 ICT students and graduates

Education at universities presented in the tables for the Czech Republic belongs to the tertiary level of education and includes a **bachelor** (ISCED level 6), **master** (ISCED level 7), and **doctoral** (ISCED level 8) **study programme** of all public and private universities.

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**.

Data on ICT field of education come from the **Ministry of Education, Youth and Sports (MEYS)** from the Union Information from Students' Registers (the “SIMS”).

Eurostat data sources are used for **international comparisons**.

A ICT specialists

Table A1 ICT specialists in the Czech Republic

	Thousand persons	
	2015	2016
Total	173,9	185,3
of which female ICT specialists	16,6	17,5
Occupation		
ICT managers, professionals and engineers, total	86,3	88,5
of which Software and apps developers and analysts	45,2	46,7
ICT technicians, installers and servicers, total	87,9	96,8
of which ICT operations and user support technicians	48,6	51,9
Age group		
20-29 years	37,3	38,3
30-39 years	63,4	68,1
40-49 years	44,5	45,1
50+ years	28,6	33,5
Highest level of education attainment		
Tertiary	97,7	103,9
Secondary with A-level examination	68,4	70,6
Other (lower)	7,8	10,8

Figure A1 ICT specialists, total

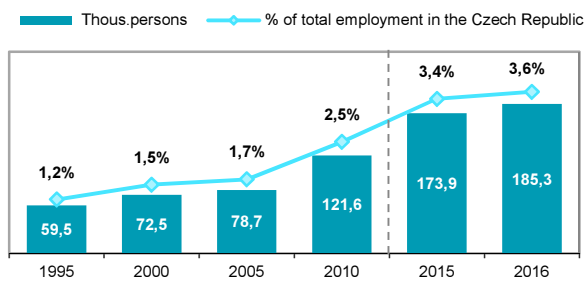
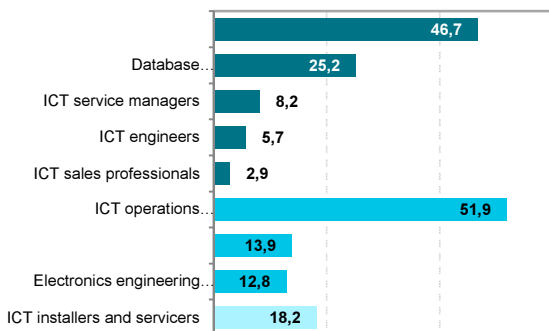
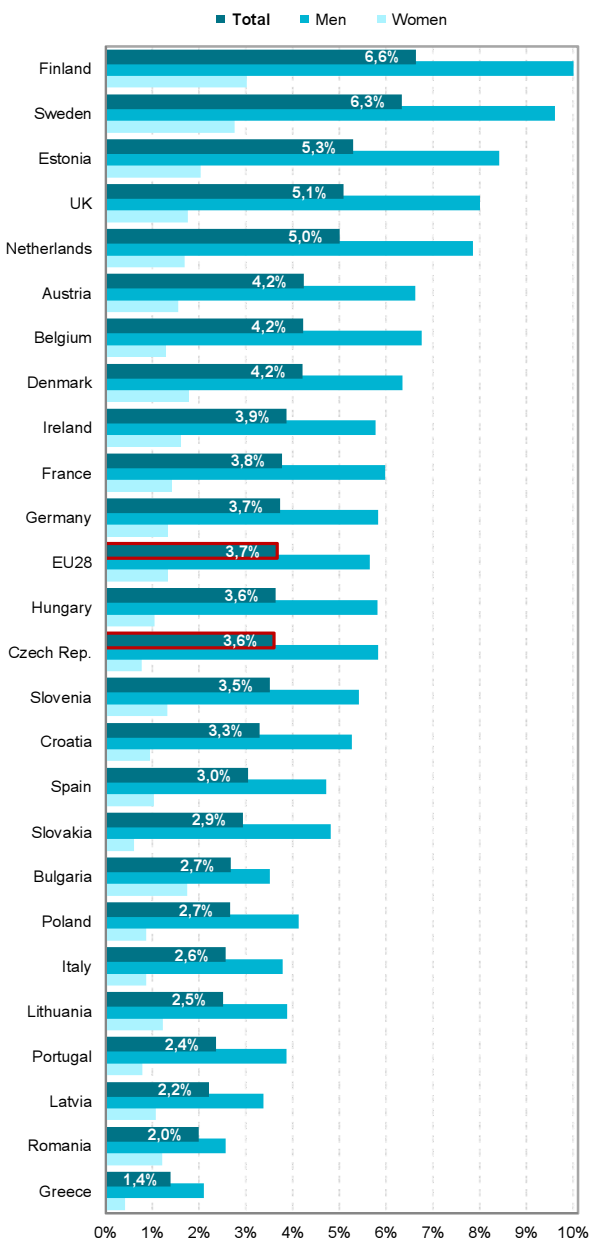


Figure A2 ICT specialists by occupation (thous.); 2016



A ICT specialists

Figure A3 ICT specialists in EU countries; 2016
(as a percentage of total, men and women employment)



Source: CZSO calculation based on Eurostat Labour Force Survey Database

A ICT specialists

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

	Thousand persons		
	2014	2015	2016
Total	84,2	86,3	88,6
Women	8,2	8,8	8,7
Occupation			
ICT professionals, total (ISCO 25)	63,4	66,6	71,9
Software and apps developers and analysts	45,0	45,2	46,7
Database and network professionals	18,4	21,4	25,2
Other ICT managers, profess. and engineers	20,3	19,7	16,7
Age group			
20-29 years	16,0	17,1	17,6
30-39 years	31,8	32,5	35,4
40-49 years	18,9	22,5	21,1
50+ years	17,4	14,3	14,2
Highest level of education attainment			
Master's and Doctoral	59,2	60,9	62,8
Bachelor's and Higher professional	12,4	11,5	11,7
Other (lower)	12,6	13,6	14,0

Figure A4 ICT professionals, total (ISCO 25)

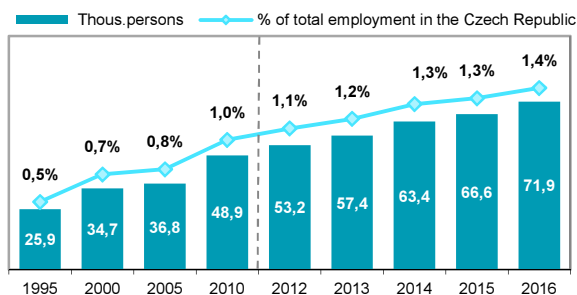


Figure A5 ICT professionals, total (ISCO 25) by sex

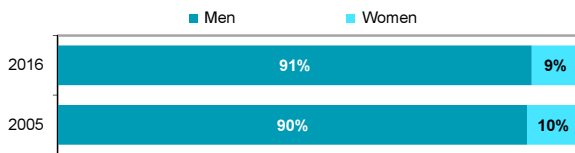
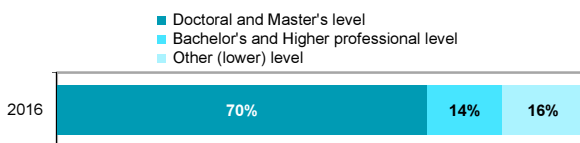


Figure A6 ICT professionals (ISCO 25) by education



Source: CZSO, Labour Force Survey

A ICT specialists

Figure A7 ICT Professionals in EU countries; 2016
(as percentage of total employment)

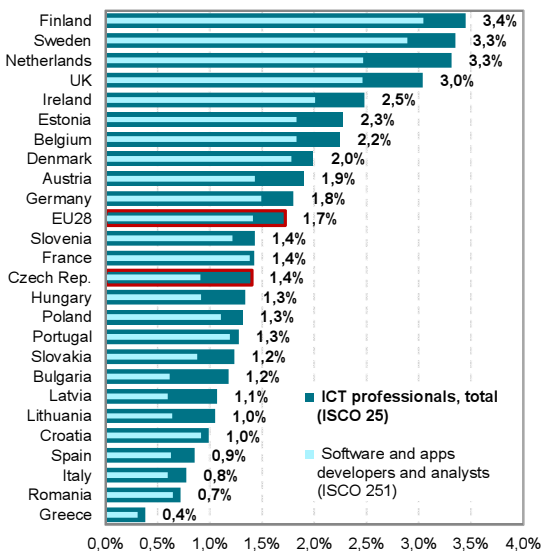
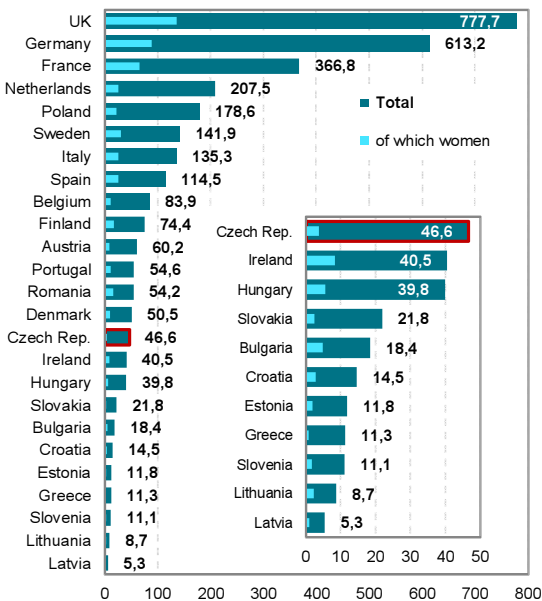


Figure A8 Software and apps developers and analysts; 2016
(Thous.persons)



A ICT specialists

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

	Thousand persons	
	2015	2016
Total	87,9	96,8
of which women	7,9	8,9
Occupation		
ICT technicians, total (ISCO 35)	61,5	65,7
ICT operations and user support technicians	48,6	51,9
Telecommunications and broadcasting technicians	12,9	13,9
Other ICT technicians, installers and servicers	26,4	31,1
Age group		
20-29 years	20,3	20,6
30-39 years	30,9	32,6
40-49 years	22,1	24,0
50+ years	14,6	19,5
Highest level of education attainment		
Tertiary	25,2	29,4
Secondary with A-level examination	55,8	58,2
Other (lower)	6,9	9,2

Figure A9 ICT technicians, total (ISCO 35)

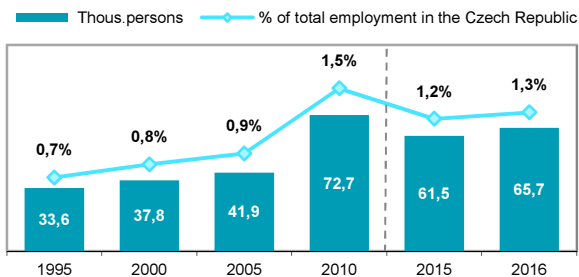


Figure A10 ICT technicians, total (ISCO 35) by sex

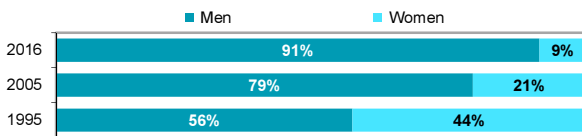
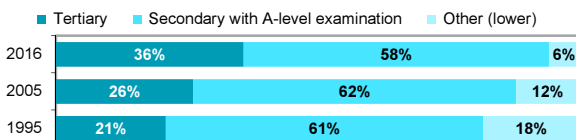


Figure A11 ICT technicians, total by education



A ICT specialists

Figure A12 ICT technicians in EU countries; 2016
(as percentage of total employment)

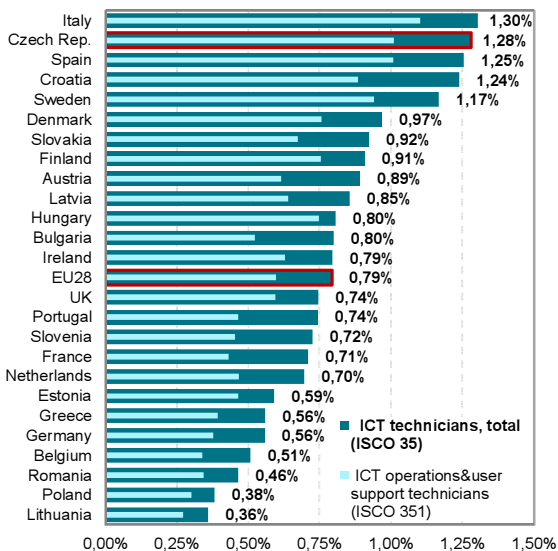
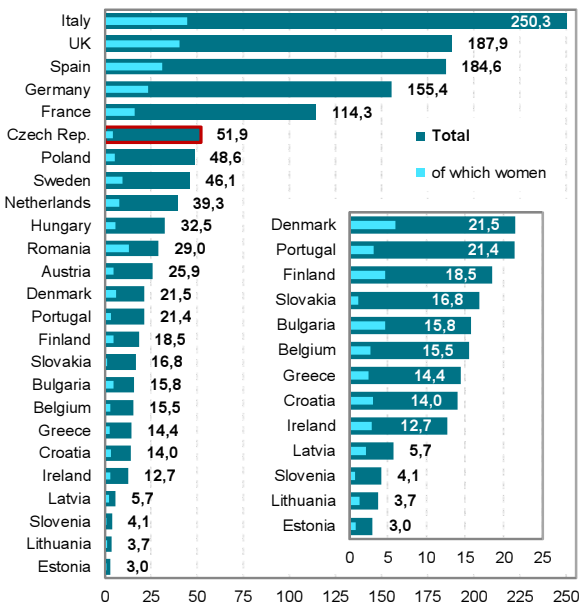


Figure A13 ICT operations and user support technicians; 2016
(Thous. persons)



Source: CZSO calculation based on Eurostat Labour Force Survey Database

A ICT specialists

Table A4 Earnings of ICT professionals in the Czech Republic

average gross monthly earnings (wage) in CZK

	2014	2015	2016
Total (CZ ISCO 25)	49 259	51 319	53 241
Men	50 206	52 296	54 325
Women	42 381	43 701	45 369
Sphere of activity (earnings)			
Business (wage sphere)	50 558	52 643	54 391
Government (salary sphere)	32 006	33 607	35 422
Age group			
under 24 years	27 669	28 393	30 237
25-34 years	45 124	47 296	48 582
35-44 years	56 903	58 751	60 624
45-54 years	50 431	52 543	55 882
55+ years	45 441	46 338	49 522
Highest level of education attainment			
Master's and Doctoral	54 387	56 172	58 831
Bachelor's and Higher professional	43 611	46 238	48 644
Secondary with A-level examination	43 324	44 930	47 751

Figure A14 Earnings of ICT professionals by sphere of activity

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

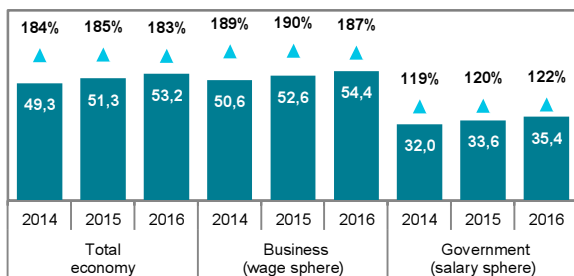
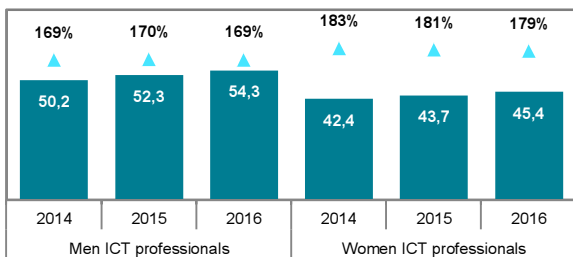


Figure A15 Earnings of ICT professionals by sex

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



A ICT specialists

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

average gross monthly earnings (wage) in CZK

	2014	2015	2016
Total (CZ ISCO 25)	49 259	51 319	53 241
Selected occupation (ISCO unit groups)			
Systems analysts (ISCO 2511)	54 708	56 843	58 868
Software developers (ISCO 2512)	53 722	55 216	58 049
Applications programmers (ISCO 2514)	47 140	49 620	51 210
Database designers and admin.(ISCO 2521)	44 868	47 001	49 319
Systems administrators (ISCO 2522)	43 118	45 306	47 432
Data security specialists (ISCO 2524)	58 068	58 789	61 073
Selected industries (NACE Sections)			
Manufacturing (NACE: C)	43 760	45 769	46 246
Wholesale and retail trade (NACE: G)	40 631	40 868	41 938
Information and communication (NACE: J)	54 238	56 457	57 786
Financial and insurance activities (NACE: K)	59 932	61 962	64 436
Public administration (NACE: O)	33 055	34 929	36 657
Education (NACE: P)	35 442	35 763	37 421
Human health and social work act. (NACE: Q)	35 237	36 649	37 713

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

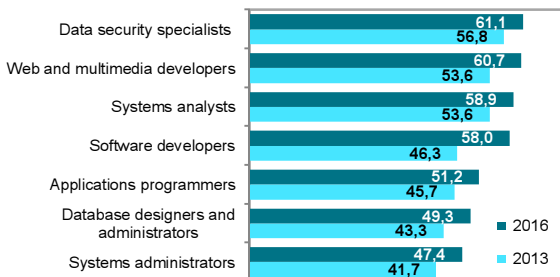
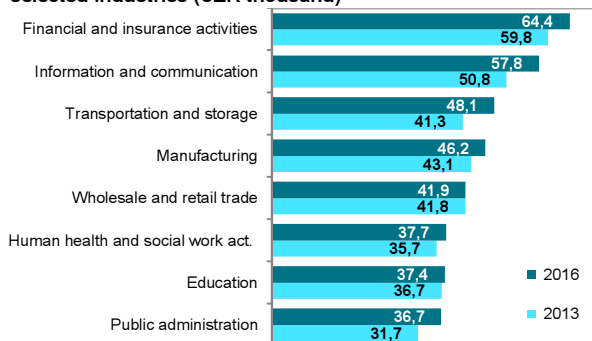


Figure A17 Average gross monthly wage of ICT professionals in selected industries (CZK thousand)



Source: CZSO, Structural Earnings Statistics

A ICT specialists

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

average gross monthly earnings (wage) in CZK

	2014	2015	2016
Total (CZ ISCO 251)	50 909	53 075	55 404
Men	51 923	54 062	56 531
Women	43 596	45 245	47 313
Sphere of activity (earnings)			
Business (wage sphere)	51 493	53 662	55 916
Government (salary sphere)	33 567	35 077	37 206
Age group			
25-34 years	46 621	48 513	50 215
35-44 years	60 253	62 326	65 529
45-54 years	51 282	53 637	58 844
55+ years	45 941	47 162	52 483
Highest level of education attainment			
Master's and Doctoral	55 291	57 285	60 297
Bachelor's and Higher professional	45 064	47 294	50 087
Secondary with A-level examination	44 747	46 164	49 530

Figure A18 Average gross monthly wage of software and apps developers and analysts by sphere of activity (CZK thous.)

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

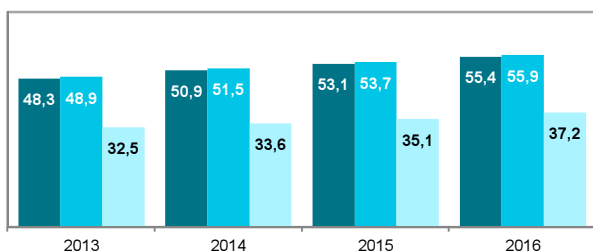
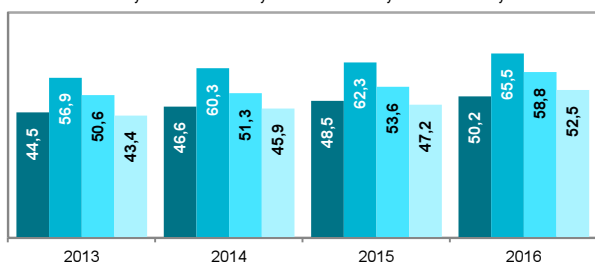


Figure A19 Average gross monthly wage of software and apps developers and analysts by age (CZK thous.)

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



A ICT specialists

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

average gross monthly earnings (wage) in CZK

	2014	2015	2016
Total (CZ ISCO 351)	36 080	36 724	38 376
Men	36 657	37 297	38 953
Women	32 282	32 899	34 574
Sphere of activity (earnings)			
Business (wage sphere)	36 877	37 437	39 126
Government (salary sphere)	27 047	28 377	29 883
Age group			
25-34 years	33 626	33 884	36 006
35-44 years	39 492	40 234	41 894
45-54 years	35 939	37 771	39 979
55+ years	38 587	38 352	38 370
Highest level of education attainment			
Master's and Doctoral	43 325	44 126	46 541
Bachelor's and Higher professional	35 143	37 345	40 499
Secondary with A-level examination	32 936	33 150	34 722
Secondary without A-level examination	29 017	29 781	29 540

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

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

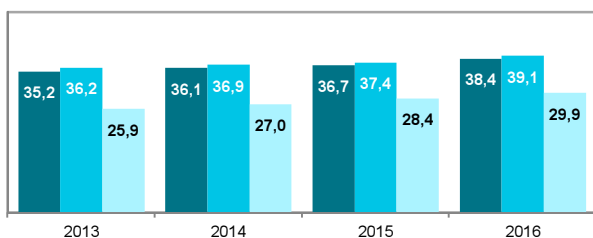
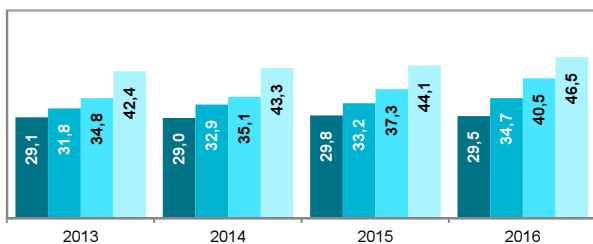


Figure A21 Average gross monthly wage of ICT operations and user support technicians by education (CZK thous.)

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



A ICT specialists

Table A8 University students of ICT in the Czech Republic

	number of students		
	2014	2015	2016
Total	18 175	17 757	17 251
of which 25 years and older	4 441	4 508	4 424
Gender			
Men	15 606	15 162	14 543
Women	2 569	2 595	2 708
Study programme			
Bachelor (ISCED level 6)	12 260	11 994	11 787
Master (ISCED level 7)	4 979	4 811	4 574
Doctoral (ISCED level 8)	945	963	899
Nationality			
Czech	14 365	13 676	12 937
Foreigners	3 810	4 081	4 314

ICT - Information and Communication Technologies field of study refers to the ISCED-F 2013 broad field of education code 06.

Figure A22 University students of ICT field of education

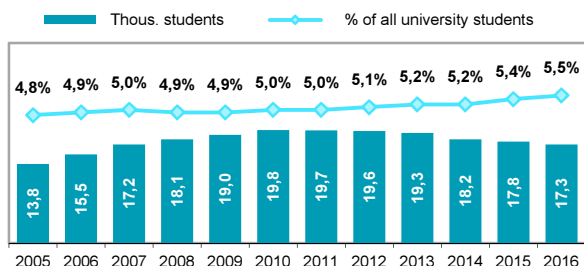


Figure A23 University students of ICT by gender

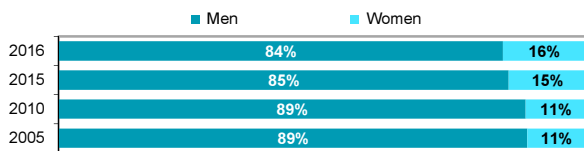


Figure A24 University students of ICT by nationality

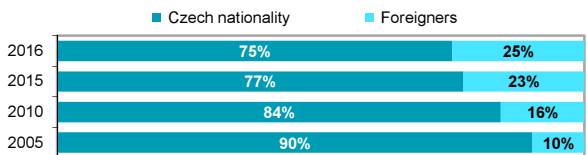
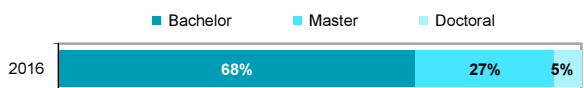


Figure A25 University students of ICT by study programme



Source: CZSO calculation based on MEYS database

A ICT specialists

Figure A26 ICT tertiary students*; 2015
(as a percentage of all tertiary students*)

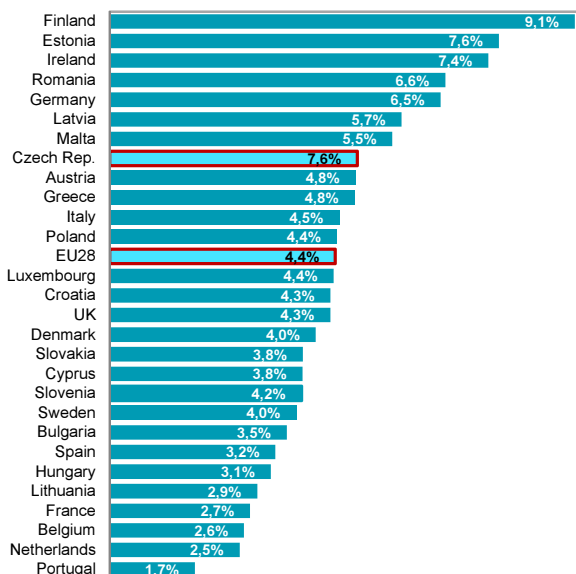
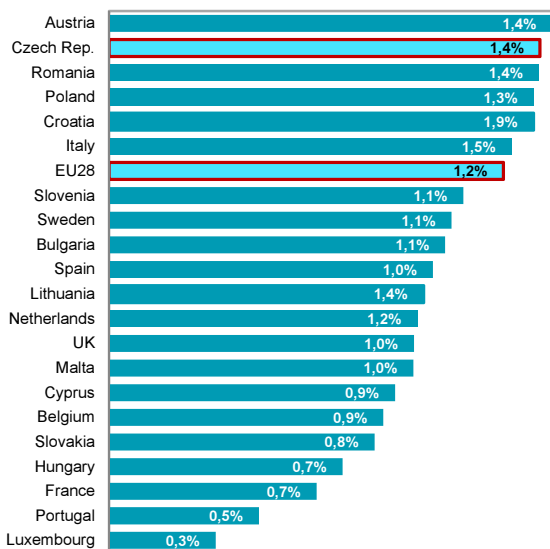


Figure A27 ICT tertiary students*; 2015
(as percentage of population aged 20 to 29 years)



* 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 ICT students in bachelor programmes in the Czech Republic

	number of students		
	2014	2015	2016
Total	12 260	11 994	11 787
of which 25 years and older	1 512	1 643	1 650
Gender			
Men	10 392	10 178	9 878
Women	1 868	1 816	1 909
Nationality			
Czech	9 819	9 355	8 942
Foreigners	2 441	2 639	2 845

Figure A28 Bachelor's students of ICT - Total

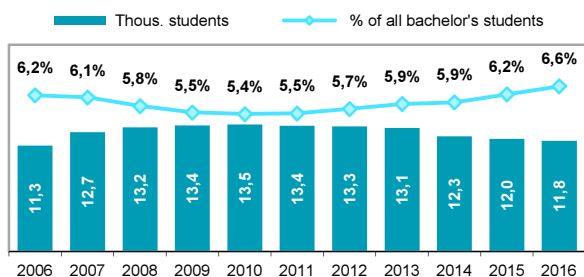


Figure A29 Bachelor's students of ICT - Men

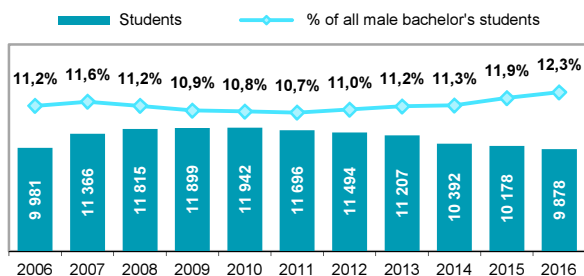
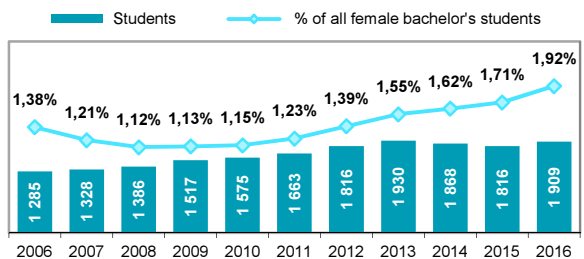


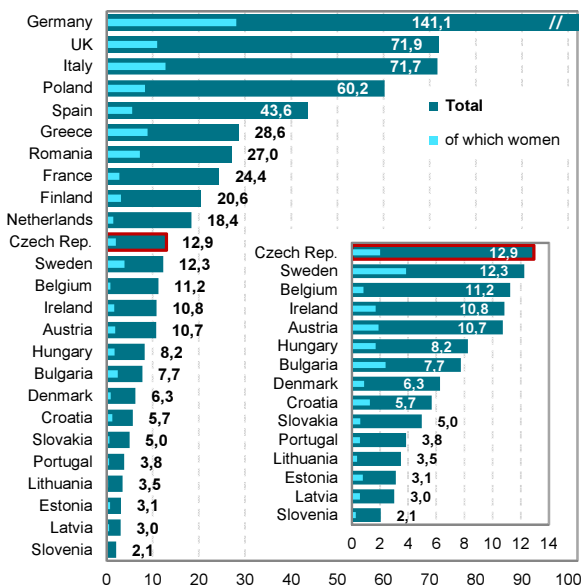
Figure A30 Bachelor's students of ICT - Women



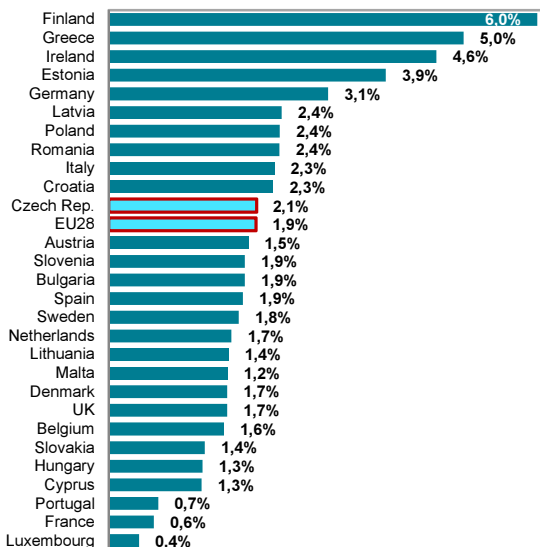
Source: CZSO calculation based on MEYS database

A ICT specialists

**Figure A31 ICT students in bachelor programmes*; 2015
(Thousand students)**



**Figure A32 ICT students in bachelor programmes*; 2015
(% of population aged 20 to 24 years)**



* ISCED level 6

Source: CZSO calculation based on Eurostat database

A ICT specialists

Table A10 ICT students in master programmes in the Czech Republic

	number of students		
	2014	2015	2016
Total	4 979	4 811	4 574
of which 25 years and older	2 038	1 956	1 920
Gender			
Men	4 388	4 149	3 889
Women	591	662	685
Nationality			
Czech	4 058	3 839	3 543
Foreigners	921	972	1 031

Figure A33 Master's students of ICT - Total

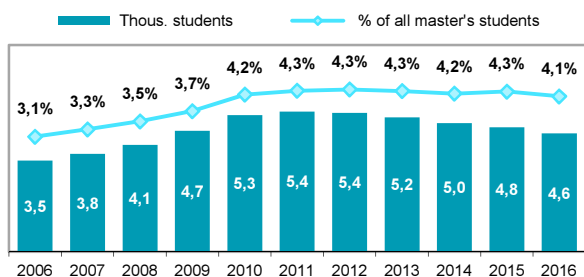


Figure A34 Master's students of ICT - Women

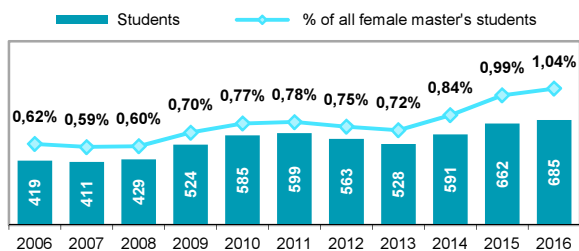
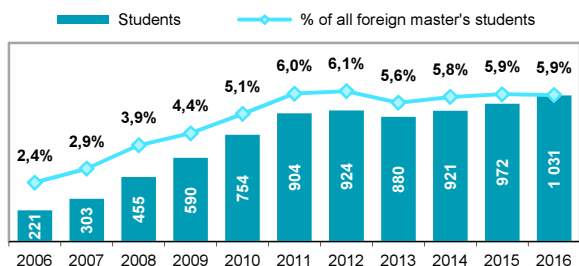


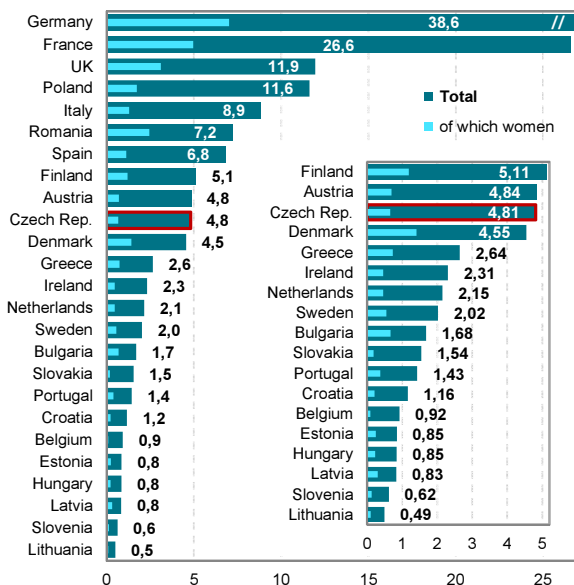
Figure A35 Master's students of ICT - Foreigners



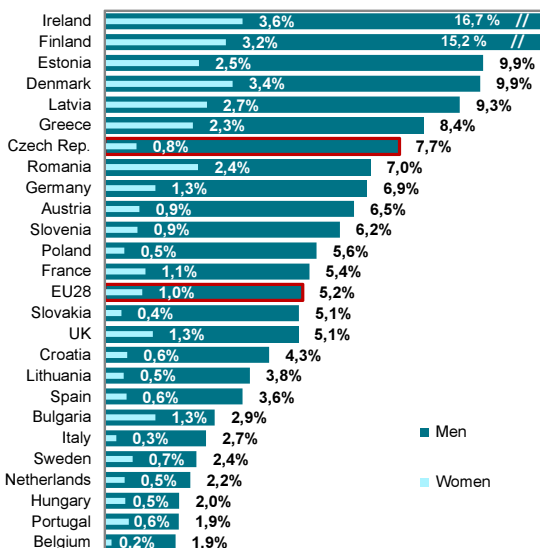
Source: CZSO calculation based on MEYS database

A ICT specialists

**Figure A36 ICT students in master programmes*; 2015
(Thousand students)**



**Figure A37 ICT students in master programmes*; 2015
(% of all students in master programmes)**



* ISCED level 7

Source: CZSO calculation based on Eurostat database

A ICT specialists

Table A11 University graduates in ICT in the Czech Republic

	number of graduates		
	2014	2015	2016
Total	3 764	3 638	3 463
Men	3 314	3 161	2 951
Women	450	477	512
Study programme			
Bachelor (ISCED level 6)	2 107	2 059	1 874
Master (ISCED level 7)	1 589	1 503	1 504
Doctoral (ISCED level 8)	69	76	85
Nationality			
Czech	3 133	2 934	2 750
Foreigners	631	704	713

Figure A38 Graduates in ICT bachelor programmes

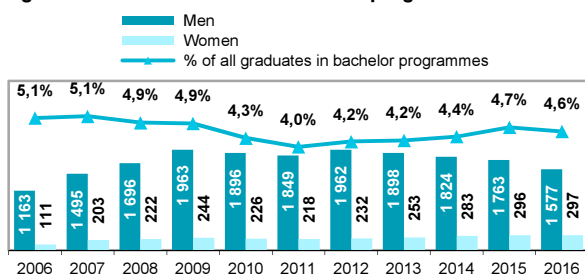


Figure A39 Graduates in ICT master programmes

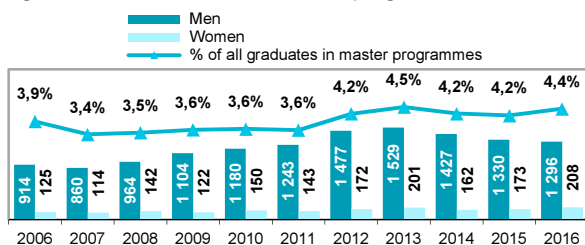
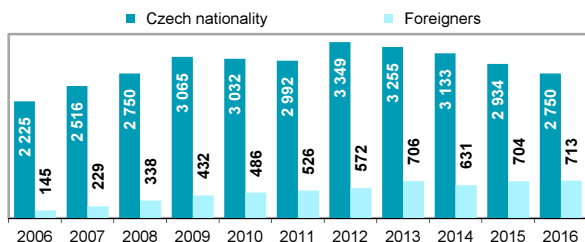


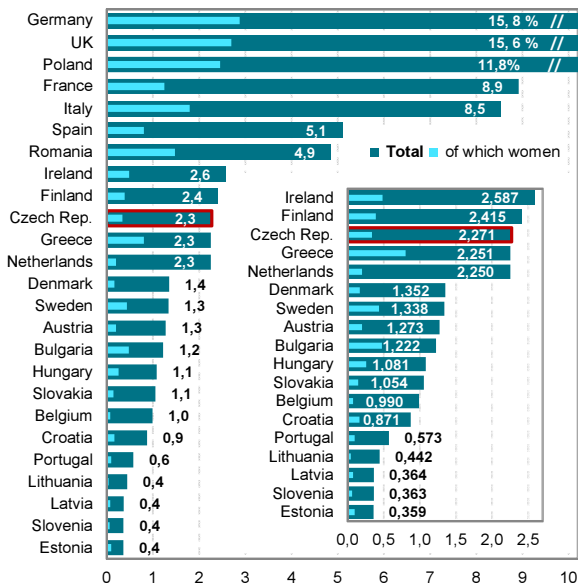
Figure A40 University graduates in ICT by nationality



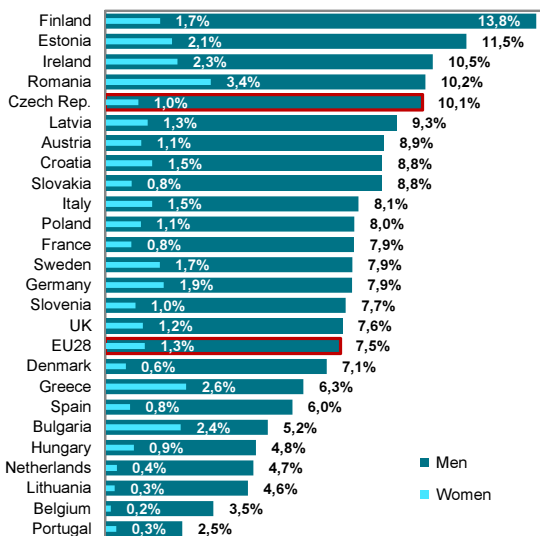
Source: CZSO calculation based on MEYS database

A ICT specialists

**Figure A41 Graduates in ICT bachelor programmes *; 2015
(Thousand persons)**



**Figure A42 Graduates in ICT bachelor programmes *; 2015
(% of all graduates in bachelor programmes)**

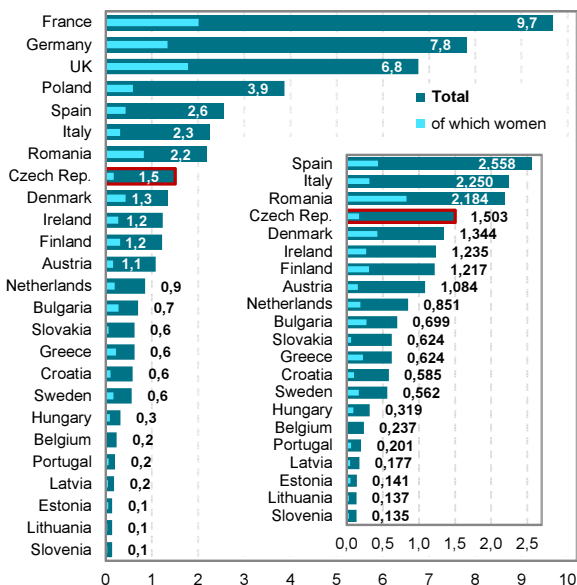


* ISCED level 6

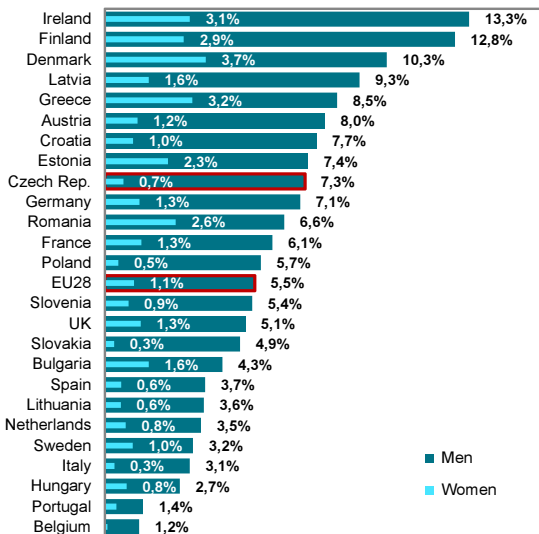
Source: CZSO calculation based on Eurostat database

A ICT specialists

**Figure A43 Graduates in ICT master programmes*; 2015
(Thousand persons)**



**Figure A44 Graduates in ICT master programmes*; 2015
(% of all graduates in master programmes)**



* ISCED level 7

Source: CZSO calculation based on Eurostat database