A ICT specialists and students

ICT specialists

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

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

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

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

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

For further information on the Czech LFS see:
https://www.czso.cz/csu/vykazy/vyberove_setreni_pracovnich_sil

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

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

ICT fields of education

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

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

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

A ICT specialists and students

Table A1 ICT specialists in Czechia

Thousand persons

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

Figure A1 ICT specialists

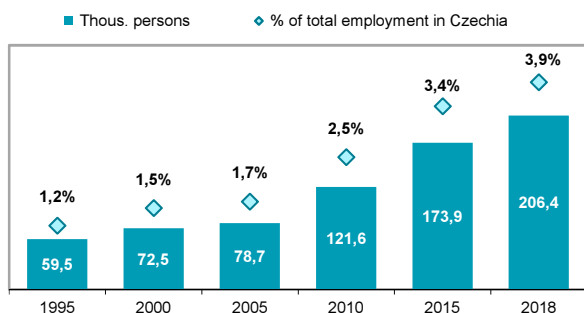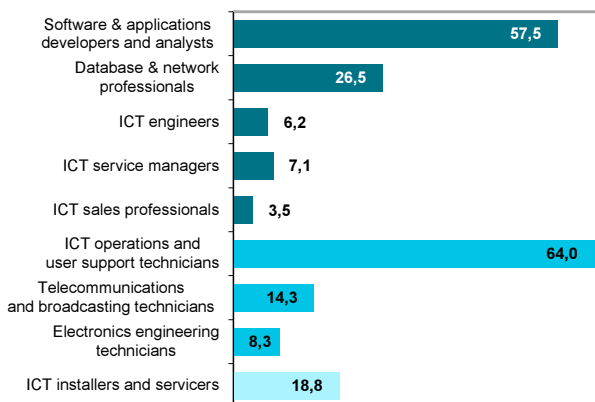## Figure A2 ICT specialists, by occupation (thousands); 2018

A ICT specialists and students

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

Country	%
Finland	7,2%
Sweden	6,8%
Estonia	5,7%
Netherlands	5,4%
United Kingdom	5,0%
Belgium	4,8%
Austria	4,4%
Denmark	4,3%
Ireland	4,3%
Czechia	4,1%
Slovenia	4,0%
France	3,9%
Germany	3,9%
EU28	3,8%
Hungary	3,7%
Croatia	3,5%
Spain	3,2%
Slovakia	3,2%
Bulgaria	3,0%
Poland	3,0%
Italy	2,7%
Lithuania	2,7%
Portugal	2,4%
Romania	2,2%
Greece	1,8%
Latvia	1,7%
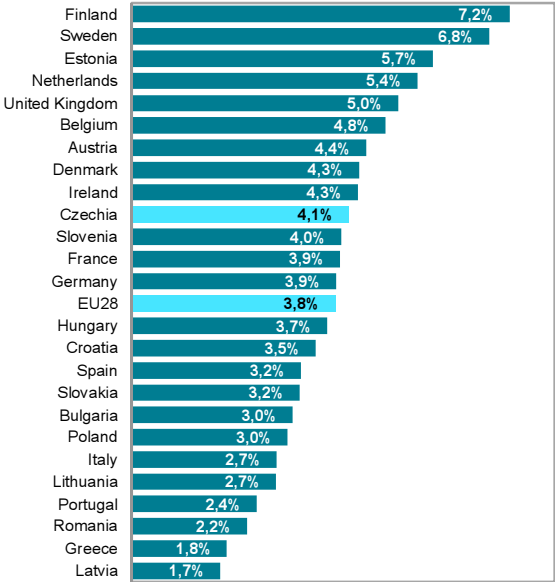
Figure A4 ICT specialists, by gender; 2018

■ Men   ■ Women

Source: CZSO calculation based on Eurostat LFS Database

Table A2 ICT managers, professionals and engineers in Czechia

Thousand persons

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

Figure A5 ICT professionals
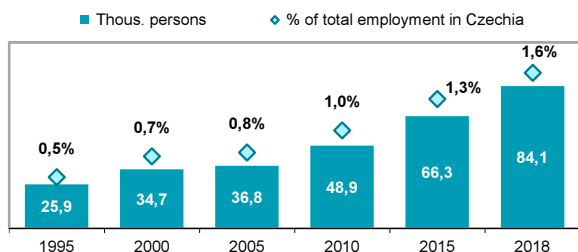
Figure A6 ICT professionals, by gender
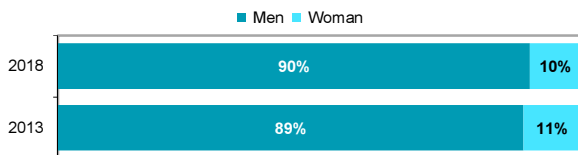
Figure A7 ICT professionals, by level of education

Source: CZSO, Labour Force Survey
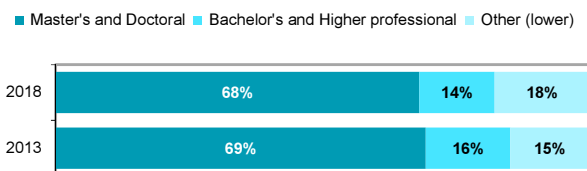
**Figure A8 ICT professionals; 2018
(% of total employment)**

Country	%
Sweden	3,7%
Finland	3,7%
Netherlands	3,5%
United Kingdom	3,1%
Belgium	2,7%
Estonia	2,7%
Denmark	2,7%
Ireland	2,5%
Austria	2,0%
Germany	1,9%
Slovenia	1,9%
EU28	1,9%
France	1,6%
Czechia	1,6%
Poland	1,5%
Bulgaria	1,5%
Hungary	1,4%
Portugal	1,4%
Latvia	1,4%
Slovakia	1,3%
Lithuania	1,3%
Croatia	1,2%
Spain	0,9%
Italy	0,8%
Romania	0,8%
Greece	0,7%
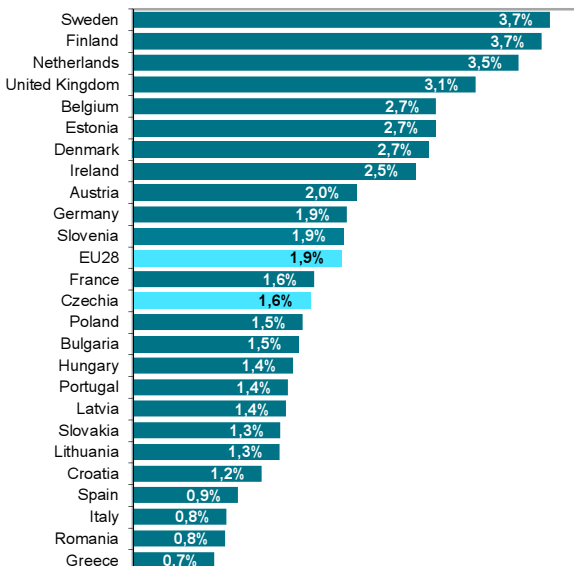
Figure A9 Share of women among all ICT professionals; 2018

Country	%
Bulgaria	32%
Romania	23%
Sweden	23%
Lithuania	23%
Finland	22%
Spain	21%
Ireland	20%
France	19%
Italy	19%
Denmark	18%
Estonia	18%
Portugal	17%
Croatia	17%
EU28	17%
United Kingdom	16%
Belgium	16%
Latvia	15%
Austria	15%
Greece	14%
Netherlands	14%
Germany	14%
Slovakia	14%
Slovenia	14%
Poland	13%
Hungary	12%
Czechia	10%
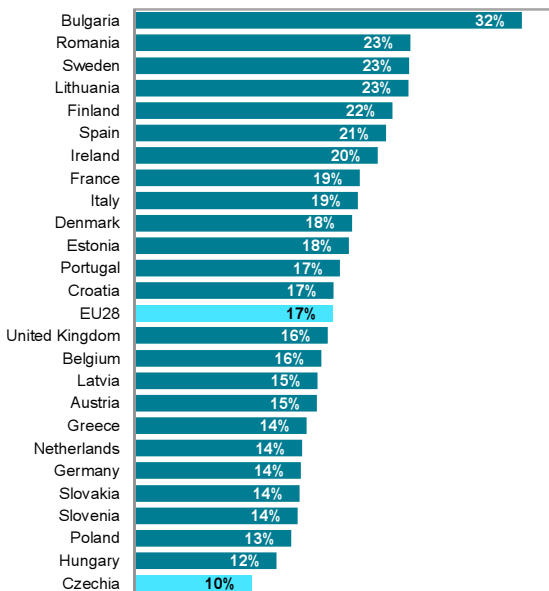
Source: CZSO calculation based on Eurostat LFS Database

A ICT specialists and students

Table A3 ICT technicians, installers and servicers in Czechia

Thousand persons

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

Figure A10 ICT technicians

Legend: ■ Thous. persons ◇ % of total employment in Czechia

1995: 33,6 / 0,7%
2000: 37,8 / 0,8%
2005: 41,9 / 0,9%
2015: 61,5 / 1,2%
2018: 78,5 / 1,5%

Figure A11 ICT technicians, by gender

Legend: ■ Men ■ Women

2018: 92% / 8%
2013: 92% / 8%
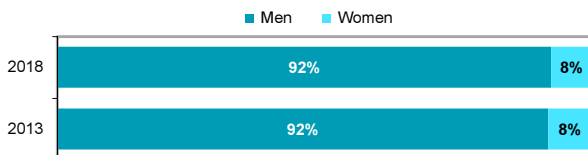
Figure A12 ICT technicians, by level of education

Legend: ■ Tertiary ■ Secondary with A-level examination ■ Other (lower)

2018: 32% / 63% / 5%
2013: 42% / 52% / 6%
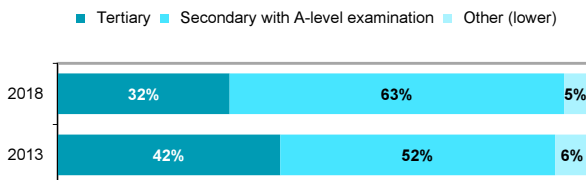
Source: CZSO, Labour Force Survey

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

Country	%
Czechia	1,5%
Denmark	1,5%
Italy	1,4%
Spain	1,4%
Croatia	1,3%
Sweden	1,2%
Estonia	1,1%
Ireland	1,0%
Slovakia	1,0%
Finland	0,9%
Austria	0,9%
EU28	0,9%
United Kingdom	0,8%
Hungary	0,8%
Bulgaria	0,8%
France	0,7%
Netherlands	0,7%
Slovenia	0,7%
Belgium	0,7%
Greece	0,7%
Portugal	0,6%
Germany	0,6%
Romania	0,6%
Latvia	0,5%
Poland	0,4%
Lithuania	0,4%
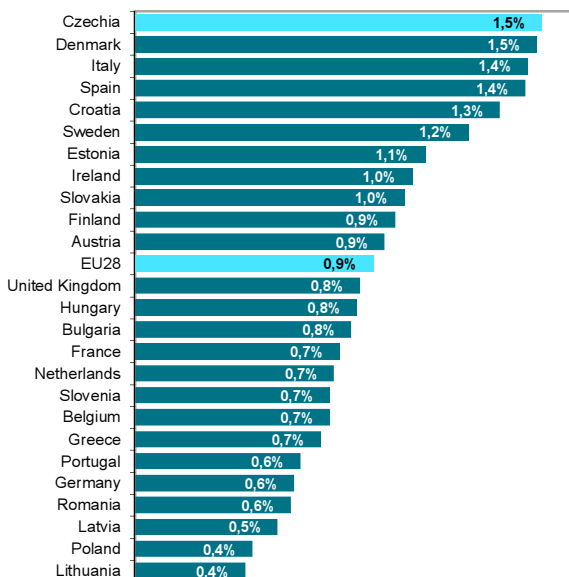
Figure A14 Share of womenamong all ICT technicians; 2018

Country	%
Romania	34%
Lithuania	30%
Bulgaria	24%
Finland	23%
United Kingdom	21%
Belgium	21%
Denmark	21%
Estonia	20%
Ireland	20%
Latvia	20%
Slovenia	19%
Sweden	18%
Croatia	17%
EU28	16%
Spain	16%
Italy	16%
Netherlands	15%
Germany	15%
Austria	15%
France	14%
Greece	13%
Portugal	12%
Poland	11%
Slovakia	8%
Czechia	8%
Hungary	6%

Source: CZSO calculation based on Eurostat LFS Database

Table A4 Wages of ICT professionals in Czechia

Average gross monthly wages in CZK

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

Figure A15 Wages of ICT professionals

- ■ Average gross monthly wages - CZK thousand
- ◆ as % of average gross monthly wages in the total, wage and salary sphere
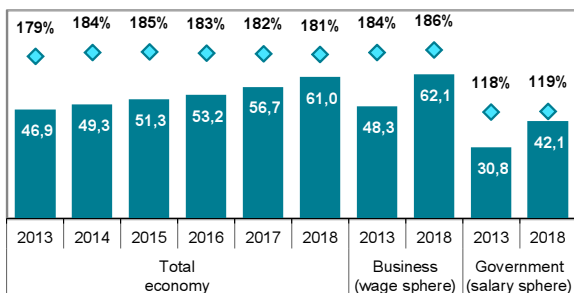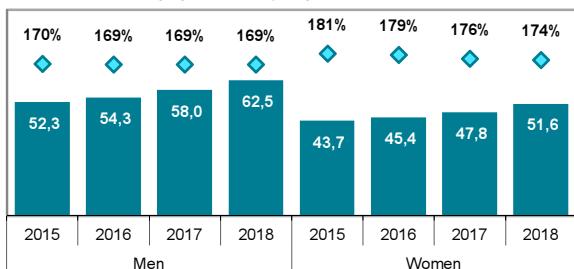

Figure A16 Wages of ICT professionals, by gender

- ■ Average gross monthly wages - CZK thousand
- ◆ as % of average gross monthly wages of all men and women workers

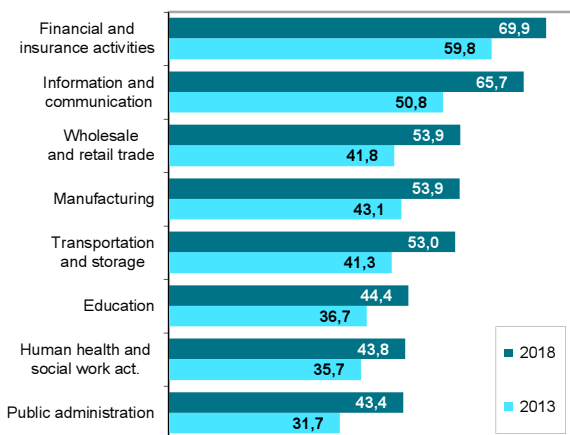*Source: CZSO, Structural Earnings Statistics*

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

Average gross monthly wages in CZK

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

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

Source: CZSO, Structural Earnings Statistics

Table A6 Wages of ICT technicians in Czechia

Average gross monthly wages in CZK

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

Figure A18 Wages of ICT technicians

- Average gross monthly wages - CZK thousand
- as % of average gross monthly wages in the total, wage and salary sphere
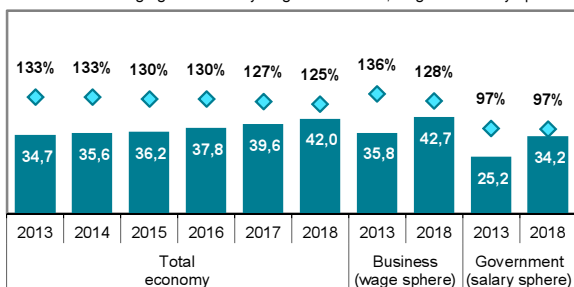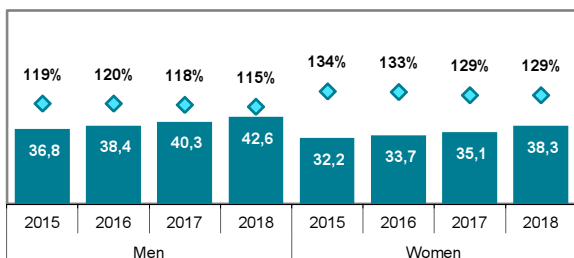

Figure A19 Wages of ICT technicians, by gender

- Average gross monthly wages - CZK thousand
- as % of average gross monthly wages of all men and women workers
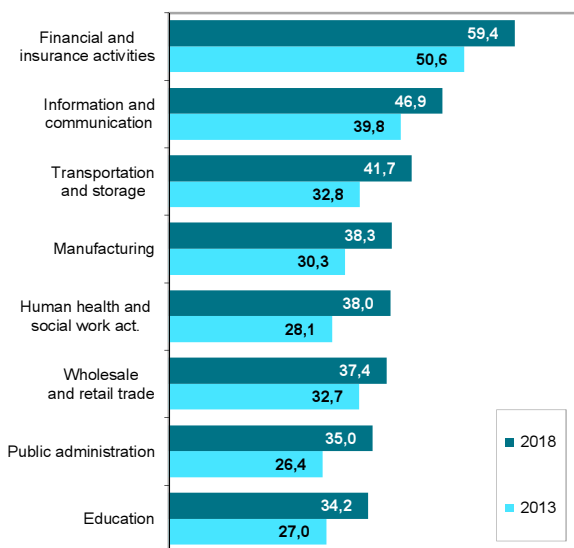

Source: CZSO, Structural Earnings Statistics

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

Average gross monthly wages in CZK

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

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

Industry	2018	2013
Financial and insurance activities	59,4	50,6
Information and communication	46,9	39,8
Transportation and storage	41,7	32,8
Manufacturing	38,3	30,3
Human health and social work act.	38,0	28,1
Wholesale and retail trade	37,4	32,7
Public administration	35,0	26,4
Education	34,2	27,0

Source: CZSO, Structural Earnings Statistics

Table A8 University students of ICT fields of education in Czechia

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

Figure A21 University students of ICT fields of education

Legend: Thous. students ; % of all university students

6,3% 6,4% 6,5% 6,6% 6,6% 6,7% 6,7% 6,6% 6,6% 6,7% 6,9%

23,1 24,8 25,7 25,8 25,2 24,7 23,3 21,5 20,5 20,0 20,1

2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
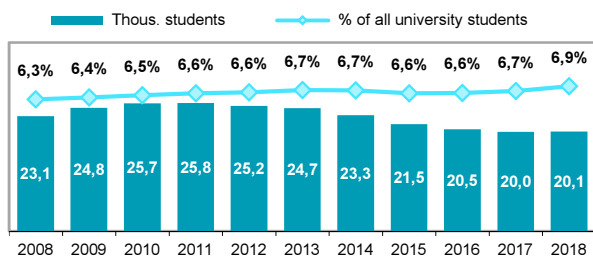
Figure A22 University students of ICT, by gender

Legend: Men ; Women

2018 — 83% — 17%
2013 — 86% — 14%
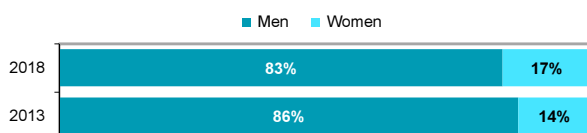
Figure A23 University students of ICT, by nationality

Legend: Czech ; Foreigners

2018 — 74% — 26%
2013 — 84% — 16%
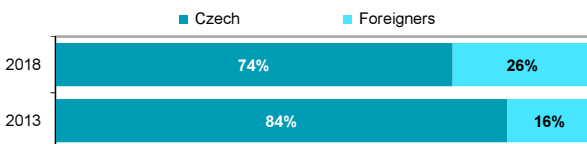
Figure A24 University students of ICT, by study programme
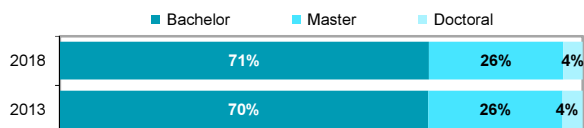
Legend: Bachelor ; Master ; Doctoral

2018 — 71% — 26% — 4%
2013 — 70% — 26% — 4%

Source: CZSO calculation based on MEYS database

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

Country	%
Finland	9,3%
Estonia	8,7%
Ireland	7,7%
Germany	7,0%
Romania	6,7%
Malta	6,6%
Latvia	6,5%
Hungary	6%
Czechia	6,0%
Poland	4,8%
Austria	5,0%
Slovenia	4,7%
Luxembourg	4,6%
United Kingdom	4,5%
Slovakia	4,5%
EU28	4,4%
Bulgaria	4,3%
Lithuania	4,1%
Denmark	4,1%
Croatia	4,2%
Sweden	4,0%
Cyprus	3,6%
Greece	3,3%
Spain	3,3%
Netherlands	3,1%
France	3,0%
Belgium	3,0%
Portugal	1,9%
Italy	1,6%
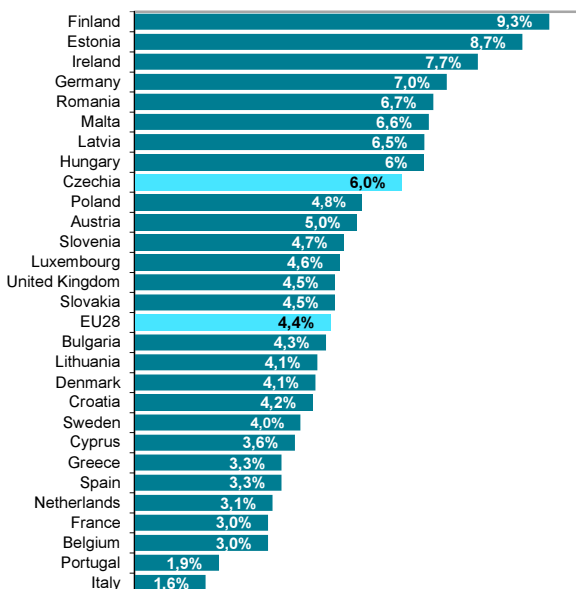
**Figure A26 University students of ICT; 2017
(% of population aged 20 to 29 years)**
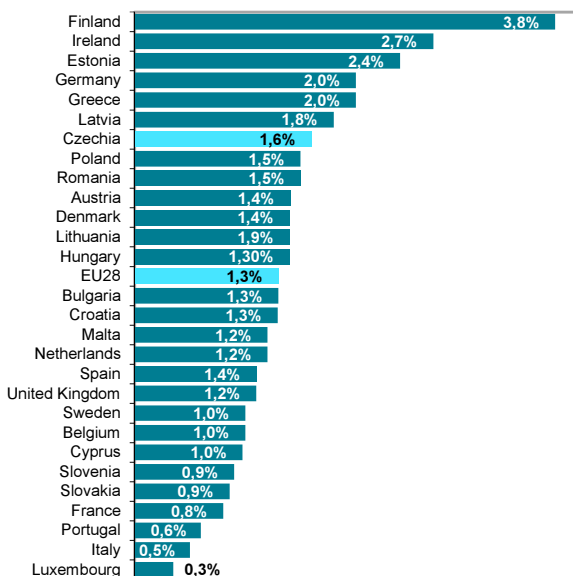
Country	%
Finland	3,8%
Ireland	2,7%
Estonia	2,4%
Germany	2,0%
Greece	2,0%
Latvia	1,8%
Czechia	1,6%
Poland	1,5%
Romania	1,5%
Austria	1,4%
Denmark	1,4%
Lithuania	1,9%
Hungary	1,30%
EU28	1,3%
Bulgaria	1,3%
Croatia	1,3%
Malta	1,2%
Netherlands	1,2%
Spain	1,4%
United Kingdom	1,2%
Sweden	1,0%
Belgium	1,0%
Cyprus	1,0%
Slovenia	0,9%
Slovakia	0,9%
France	0,8%
Portugal	0,6%
Italy	0,5%
Luxembourg	0,3%

Source: CZSO calculation based on Eurostat database

Table A9 University graduates from ICT fields of education in Czechia

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

Figure A27 University graduates from ICT fields of education

Legend: Thous. graduates — % of all university graduates

5,0% 5,2% 4,9% 4,8% 5,2% 5,4% 5,3% 5,5% 5,6% 5,4% 5,5%

3,7 4,3 4,3 4,5 4,9 4,9 4,7 4,5 4,4 3,9 3,8

2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
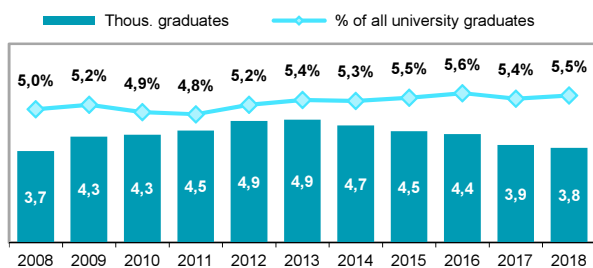
Figure A28 University graduates from ICT, by gender

Legend: Men Women

2018: 84% 16%
2013: 87% 13%
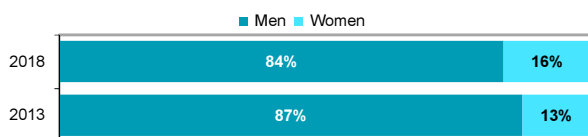
Figure A29 University graduates from ICT, by nationality

Legend: Czech Foreigners

2018: 77% 23%
2013: 85% 15%
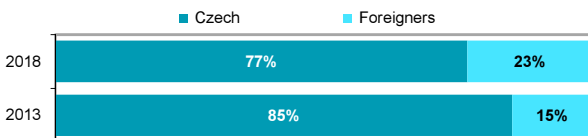
Figure A30 University graduates from ICT, by study programme
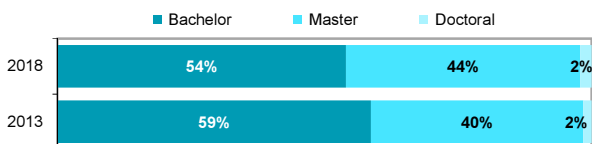
Legend: Bachelor Master Doctoral

2018: 54% 44% 2%
2013: 59% 40% 2%

Source: CZSO calculation based on MEYS database

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

Country	%
Ireland	7,9%
Estonia	7,4%
Malta	7,1%
Finland	6,3%
Romania	5,6%
Croatia	5,6%
Germany	4,8%
Denmark	6%
Czechia	4,6%
Latvia	4,8%
Hungary	4,2%
Austria	4,1%
Bulgaria	3,8%
United Kingdom	3,6%
Poland	3,5%
Slovakia	3,4%
EU28	3,4%
Slovenia	3,3%
Sweden	3,2%
France	4,2%
Luxembourg	4,0%
Greece	2,8%
Lithuania	2,7%
Cyprus	2,7%
Netherlands	2,5%
Spain	2,2%
Belgium	1,9%
Portugal	1,2%
Italy	0,9%
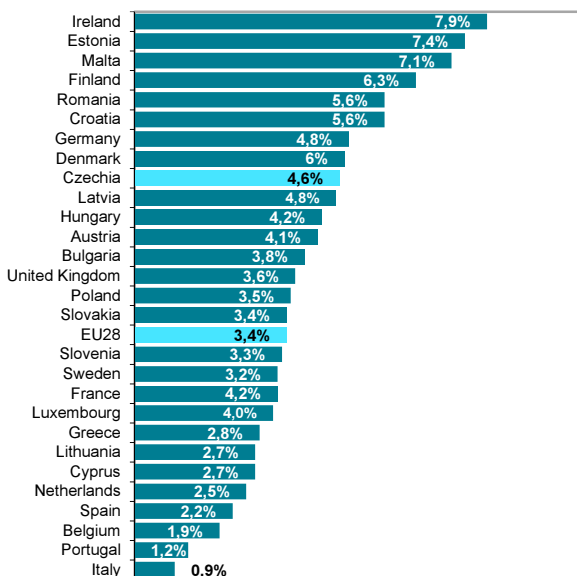
Figure A32 University graduates from ICT; 2017
(% of population aged 20 to 29 years)
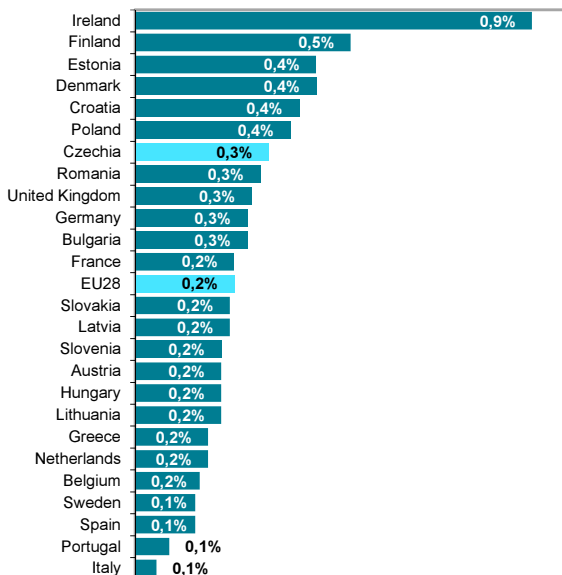
Country	%
Ireland	0,9%
Finland	0,5%
Estonia	0,4%
Denmark	0,4%
Croatia	0,4%
Poland	0,4%
Czechia	0,3%
Romania	0,3%
United Kingdom	0,3%
Germany	0,3%
Bulgaria	0,3%
France	0,2%
EU28	0,2%
Slovakia	0,2%
Latvia	0,2%
Slovenia	0,2%
Austria	0,2%
Hungary	0,2%
Lithuania	0,2%
Greece	0,2%
Netherlands	0,2%
Belgium	0,2%
Sweden	0,1%
Spain	0,1%
Portugal	0,1%
Italy	0,1%

Source: CZSO calculation based on Eurostat database

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

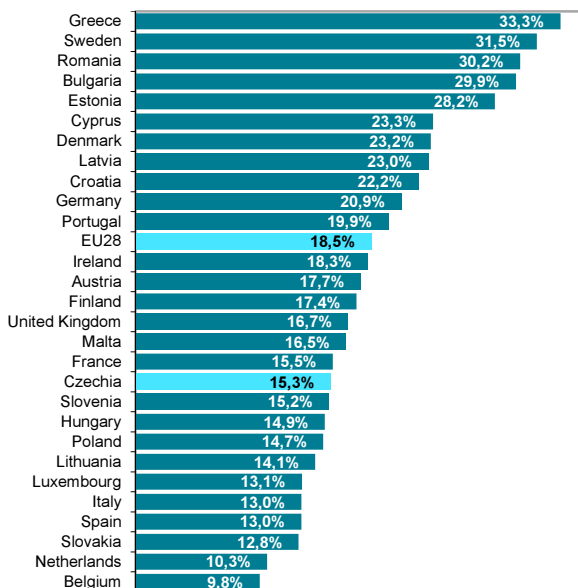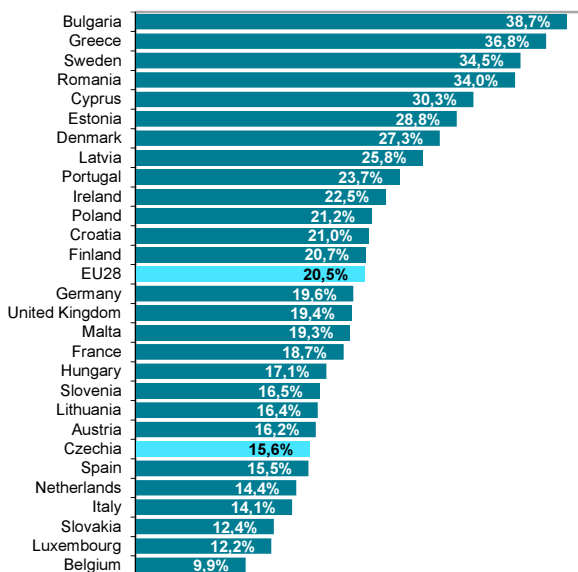| Country	Share
Greece	33,3%
Sweden	31,5%
Romania	30,2%
Bulgaria	29,9%
Estonia	28,2%
Cyprus	23,3%
Denmark	23,2%
Latvia	23,0%
Croatia	22,2%
Germany	20,9%
Portugal	19,9%
EU28	18,5%
Ireland	18,3%
Austria	17,7%
Finland	17,4%
United Kingdom	16,7%
Malta	16,5%
France	15,5%
Czechia	15,3%
Slovenia	15,2%
Hungary	14,9%
Poland	14,7%
Lithuania	14,1%
Luxembourg	13,1%
Italy	13,0%
Spain	13,0%
Slovakia	12,8%
Netherlands	10,3%
Belgium	9,8%

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

Country	Share
Bulgaria	38,7%
Greece	36,8%
Sweden	34,5%
Romania	34,0%
Cyprus	30,3%
Estonia	28,8%
Denmark	27,3%
Latvia	25,8%
Portugal	23,7%
Ireland	22,5%
Poland	21,2%
Croatia	21,0%
Finland	20,7%
EU28	20,5%
Germany	19,6%
United Kingdom	19,4%
Malta	19,3%
France	18,7%
Hungary	17,1%
Slovenia	16,5%
Lithuania	16,4%
Austria	16,2%
Czechia	15,6%
Spain	15,5%
Netherlands	14,4%
Italy	14,1%
Slovakia	12,4%
Luxembourg	12,2%
Belgium	9,9%

Source: CZSO calculation based on Eurostat database