

F ICT in Education and Digital Skills

F.1 ICT at schools

Data on **schools** with the **Internet** by its speed, as well as with a **website** and a **student information system** are taken from the **Czech School Inspectorate (CSI)**. The CSI collected these data in school years 2011/2012 and 2016/2017.

Data on **numbers of computers by device type and age category** that are accessible to pupils/students of respective school grades, as well as on school equipment with other ICTs in the Czech Republic come from data sources of the **Ministry of Education, Youth and Sports (MEYS)**. The Ministry collects these data at all nursery, primary, secondary, and higher professional schools within the annual questionnaire called Report of Schools Headquarters (*R 13-01*). The data are as at **30 September of the reference year**.

F.2 ICT use by students

Publicly available results of the **OECD Programme for International Student Assessment (PISA 2015)** were used to process detailed data on the access of **fifteen-year-old pupils** to selected ICTs at home and at school in the Czech Republic. The 2015 international survey was focusing, among others, on whether 15-year-old pupils in schools have Internet access and on whether they use this opportunity. Detailed information on the PISA 2015 can be found at: <http://www.oecd.org/pisa/>.

An independent annual European statistical survey called **Sample Survey on the ICT Use in Households and by Individuals** (for details see Chapter C) has been a valuable source of information on how **students aged 16+ years use the Internet**.

F.3 ICT skills

The indicators on **selected learning activities** carried out by individuals, regardless their age, to improve **ICT skills** in the last 12 months are based on results from the above-mentioned **European ICT household survey**.

An additional set of questions included in the survey was about using **selected software** (e.g. office or occupation specific software) **at work**.

Definitions

- **Office software** (e.g. Microsoft Word, Microsoft Excel) is used to create and modify electronic documents as texts, tables, presentations, etc.
- **Programming** shall include the use of programming languages as Java, C, Python, for instance, writing of scripts in PHP or JavaScript, for instance, writing of source codes, formatting and generating of tools, binary tools for compatibility analyses, tools for code checking, generators of documentation, generators of interfaces, etc.
- **Occupational specific software**, as accounting or graphic applications, for instance, also includes proprietary applications (in-house developed in enterprises/companies) software.
- The **participation in a computer (ICT) course or training** shall include a participation in official paid courses or training on any computer technology or ICT skills provided by employers, schools, non-profit organizations or government institutions.
- The **acquisition of ICT skills by self-study** may mean, for instance, by reading manuals, searching on the Internet, or watching an instruction video.
- The **acquisition of ICT skills by on-the-job training** shall include non-formal training provided by colleagues, fellows, or managers. *This item asks about cases where the training took place while the worker was performing his/her tasks, within his/her working time, i.e. the so-called on the job training.*

F.4 ICT students and graduates

Students and graduates of **ICT fields of education** (in short ICT students and graduates) are defined based on the International Standard Classification of Education: **Fields of Education and Training 2013 (ISCED-F 2013)**. ICT fields of education correspond to the broad field of **Information and Communication Technologies (code 05)** and include:

- 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 ICTs (0688).

Data were taken from data sources of the Ministry of Education, Youth and Sports (MEYS), more specifically from the **Union Information from Students' Registers (SIMS)**. The source database of SIMS is continually completed and updated, including retrospective corrections. Data published in this publication correspond to the state of processing as at 31 March 2018.

Education **at universities** presented in the tables for the Czech Republic belongs to the tertiary level of education and includes bachelor, master, and doctoral study programmes.

Data on university students are always as at 31 December of the reference year; data on graduates are for the entire school year.

Numbers of students and graduates in the table are given as **headcount**, i.e. each student is included in a particular piece of data only once, including students, who study in more study programmes at the same time.

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

F.5 ICT professionals

Information and communication technology professionals (**ICT professionals**) conduct research, plan, design, write, test, provide advice and improve information technology systems, hardware, software and related concepts for specific applications; develop associated documentation including principles, policies and procedures; and design, develop, control, maintain and support databases and other information systems to ensure optimal performance and data integrity and security.

ICT professionals are defined since 2011 as persons employed in the national economy whose principal activity comes within the two minor groups of occupations expressed in terms of the current Czech version of the **International Standard Classification of Occupations (CZ-ISCO) sub-major group 25**, which are sources of their main income:

- Software and applications developers and analysts (code 251);
- Database and network professionals (code 252).

Data on the **numbers of ICT professionals** (CZ-ISCO sub-major group 25) come from the **Labour Force Sample Survey (LFSS)**. The table presents average annual data for given years.

For more information about the Czech LFSS see: https://www.czso.cz/csu/czso/employment_unemployment_ekon

Data on **earnings of ICT professionals** come from a special processing of data obtained within the **Structural statistics on earnings of employees (SES: Structural Earnings Statistics)**. At present, the SES is a result of merging the databases of the sample survey of the Information System on Average Earnings (ISPV) of the Ministry of Labour and Social Affairs, which covers **the wage sphere**, and of the administrative source of the Salary Information System (ISP) of the Ministry of Finance, which exhaustively covers **the salary sphere**.

For more information about the Czech SES see:

<https://www.czso.cz/csu/czso/structure-of-earnings-survey-2018> or

<https://www.ispv.cz/getdoc/893a792d-72c2-41e9-ab93-8481a1dcadc8/Methodology.aspx>

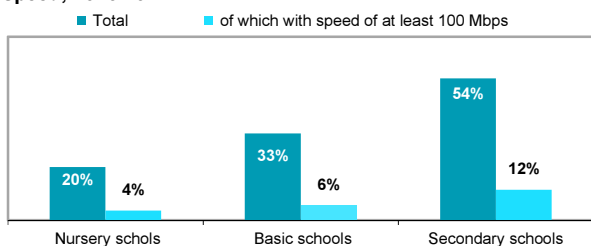
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Tab. F1 Schools in Czechia with the Internet; 2016/2017

	Percentage		
	with maximum download speed		
	less than 30 Mbps	31 to 100 Mbps	at least 100 Mbps
Nursery schools	77,6	16,6	3,6
Basic schools	66,9	27,4	5,6
Secondary schools	45,8	42,5	11,6

as a percentage of all schools of a given type

Figure F1 Schools with at least 31 Mbps Internet download speed; 2016/2017

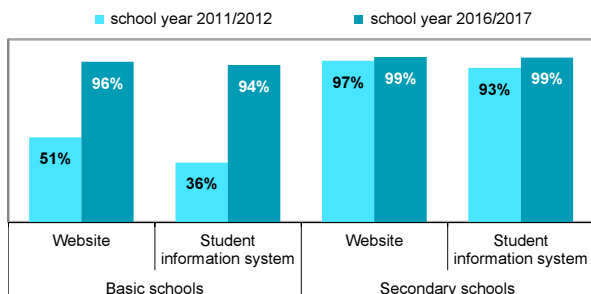


Tab. F2 Schools with a website and a student inform. system

	Percentage	
	School year 2011/2012	School year 2016/2017
Website		
Nursery schools	.	87,1
Basic schools	51,0	96,4
Secondary schools	96,9	99,3
Student information system		
Basic schools	35,8	94,5
Secondary schools	92,7	98,9

as a percentage of all schools of a given type

Figure F2 Basic and secondary schools with a website and a student information system



as a percentage of all schools of a given type

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Tab. F3 Computers in Czech schools; 2018

Number of computers per 100 pupils/students in a given type of school

	Total	Type of used computers		
		Desktops	Laptops	Tablets
Basic schools - first stage	19,1	13,5	2,6	3,0
Basic schools - second stage	28,8	21,0	3,5	4,4
Secondary schools	25,7	20,7	2,8	2,2

Figure F3 Number of tablets per 100 pupils/students

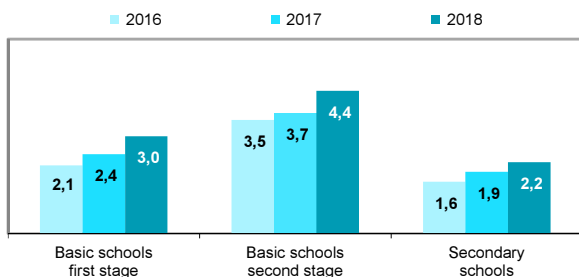


Figure F4 Number of laptops per 100 pupils/students

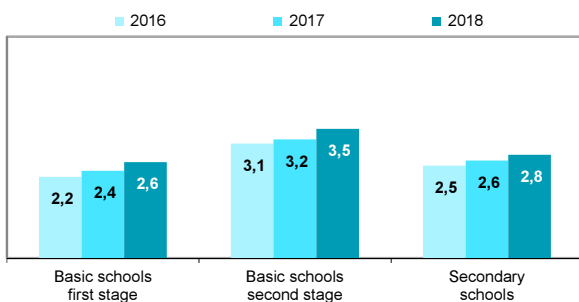
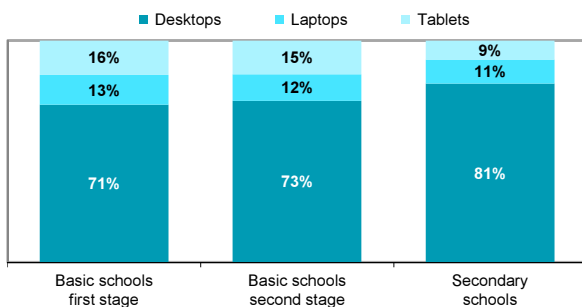


Figure F5 Computers by type that are accessible to pupils/students in different schools; 2018



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Tab. F4 Computers in Czech schools by type and age; 2018

Thousand

	Total	Age categories of computers		
		≤ 2 years old	3-9 years old	≥ 10 years old
Basic schools - 1st stage:				
Computers, total	109,3	19,6	82,8	7,0
Desktops	77,6	11,1	60,0	6,5
Laptops	14,7	3,6	10,7	0,5
Tablets	17,0	5,0	12,0	0,0
Basic schools - 2nd stage:				
Computers, total	105,9	19,9	80,0	6,0
Desktops	77,0	12,1	59,3	5,6
Laptops	12,7	3,1	9,3	0,3
Tablets	16,2	4,7	11,4	0,0
Secondary schools:				
Computers, total	108,3	22,2	78,2	7,9
Desktops	87,2	16,2	63,6	7,5
Laptops	11,7	2,7	8,7	0,4
Tablets	9,3	3,3	6,0	0,0

Figure F6 Different types of computers by age that are accessible to pupils/students in schools; 2018

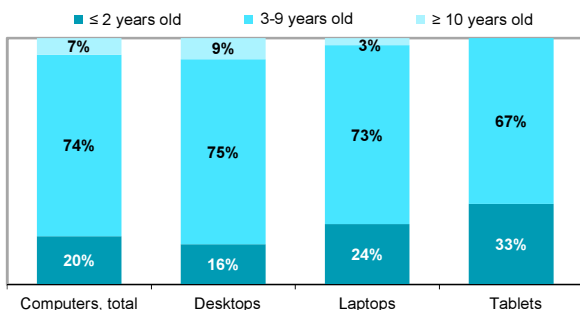
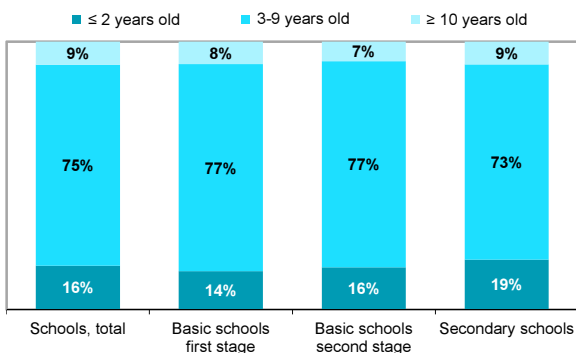


Figure F7 Computers by age that are accessible to pupils/students in different schools; 2018



Source: Ministry of Education, Youth and Sports, 2019

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Tab. F5 Fifteen-year-old students in Czechia with access to different ICT devices at home and at school; 2015

	Percentage	
	at home	at school
Internet	98,7	90,4
Mobile phone	93,1	.
Portable computer (laptop)	87,5	28,6
Desktop computer	82,9	79,5
Tablet	68,4	22,7
E-book reader	26,2	12,9
MP3/MP4 player	70,8	.
Printer	78,1	.

as a percentage of all 15 year old students

Figure F8 Fifteen-year-old students and their access to different ICT devices at home and at school; 2015

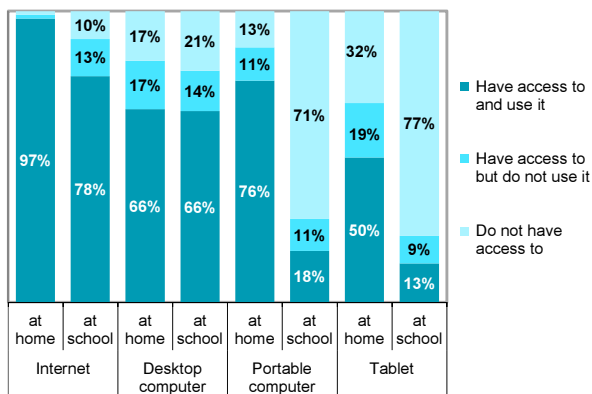
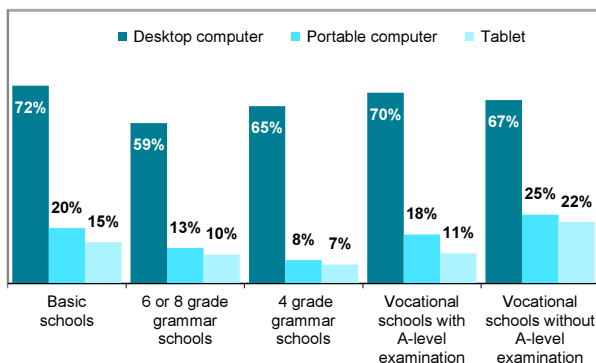


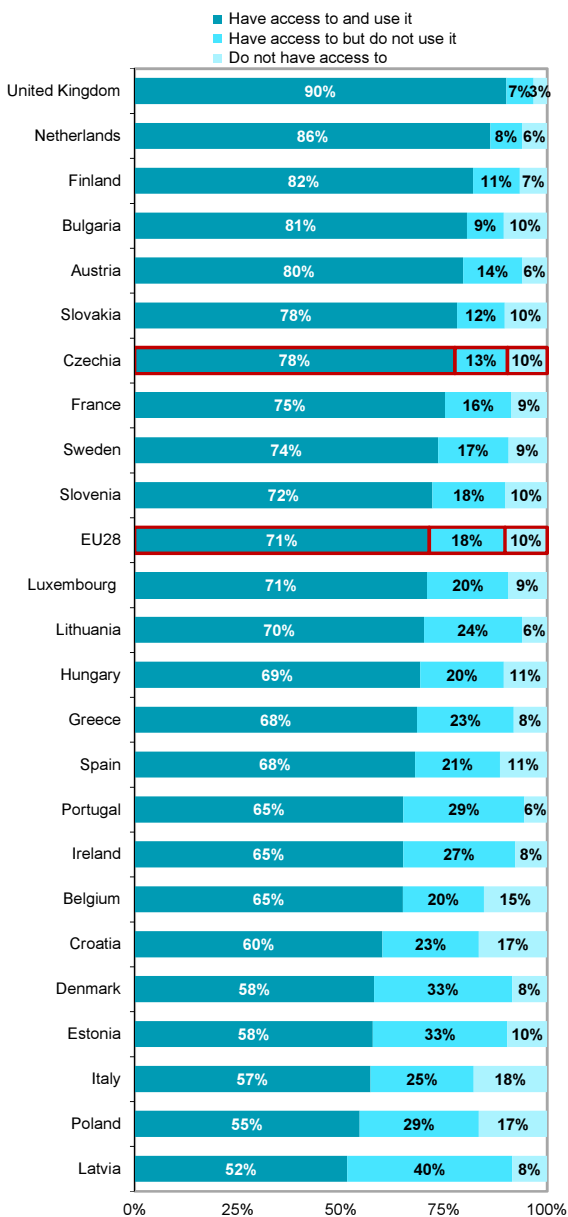
Figure F9 Fifteen-year-old students who use different computers at school by type of school attended; 2015



as a percentage of all 15 year old students at a given type of school

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Figure F10 Fifteen-year-old students in EU countries and their access to the Internet at school; 2015



as a percentage of all 15 year old students in a given country

Source: OECD, survey PISA, 2015

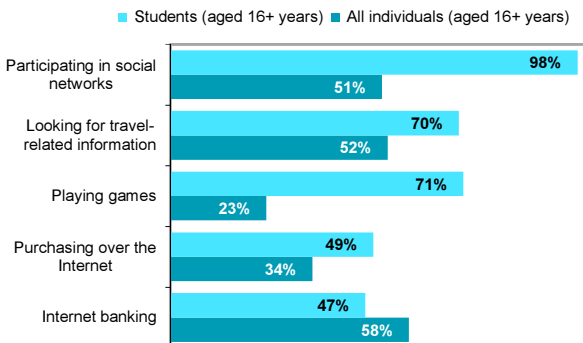
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Tab. F6 Students aged 16+ years in Czechia using the Internet; 2018

	Percentage		
	Total	Men	Women
Total - Internet users	99,8	99,5	100,0
on a mobile phone - mobile Internet users	94,6	93,3	95,8
Using Internet for some other activities			
Participating in online social networks	98,2	97,5	98,9
Watching videos on paid websites	7,6	10,7	4,8
Playing games	70,7	84,9	57,4
Looking for travel-related information	69,6	64,1	74,8
Purchasing over the Internet	49,0	41,1	56,5
Internet banking	47,0	45,5	48,5

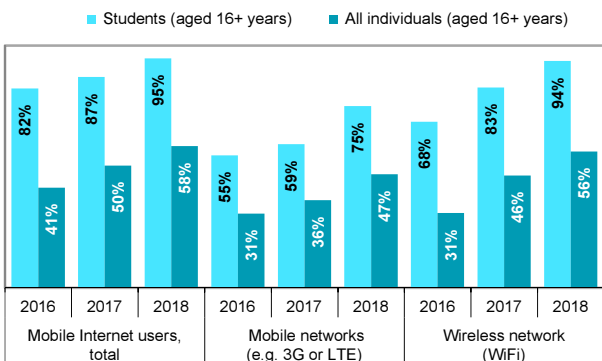
as a percentage of all students aged 16+ years in a given group

Figure F11 Students and individuals aged 16+ years using the Internet for selected activities; 2018



as a percentage of all students/individuals aged 16+ years

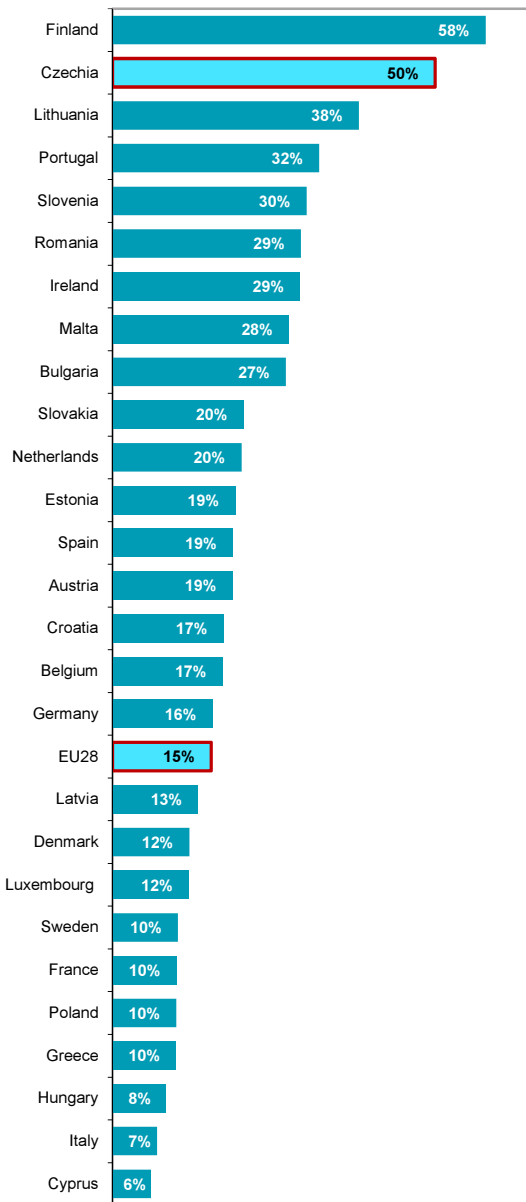
Figure F12 Students and individuals aged 16+ years using the Internet on mobile phone by type of network



as a percentage of all students/individuals aged 16+ years

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Figure F13 Students aged 16+ years in EU countries who used self-study to improve their ICT skills; 2018



as a percentage of all students aged 16+ years in a given country

Source: Eurostat, 2019

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Tab. F7 Individuals in Czechia who carried out selected learning activities to improve their ICT skills; 2018

	Percentage		
	ICT course	Self-study	On-the-job training
All individuals (aged 16+ years)	5,5	22,5	10,6
All individuals (aged 16-74 years)	6,0	24,3	11,6
Sex			
Men (aged 16+ years)	4,9	25,0	10,5
Women (aged 16+ years)	6,0	20,1	10,7
Age group (years)			
16-34	11,0	35,9	13,8
35-54	5,4	24,5	15,5
55+	1,8	11,5	3,8
Educational attainment (of the aged 25+)			
Primary	0,2	5,7	1,1
Secondary without A-level examination	1,1	13,4	6,8
Secondary with A-level examination	5,1	23,0	13,5
Tertiary	11,5	34,6	19,7
Economic activity status			
Women on maternity leave	0,4	17,8	0,9
Students (aged 16+ years)	18,0	50,1	1,0
Pensioners	0,5	7,6	0,4

as a percentage of all individuals in a given socio-demographic group

Figure F14 Individuals who carried out any learning activities to improve their ICT skills by sex and age; 2018

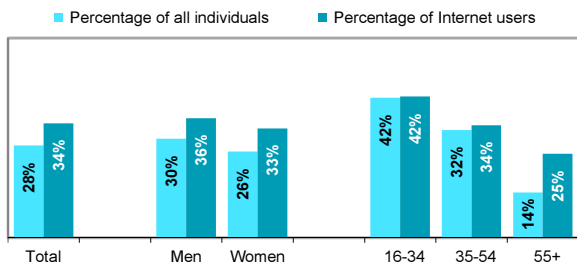
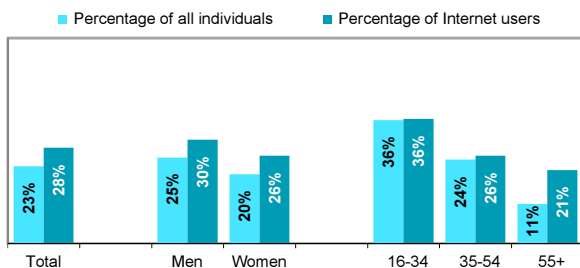


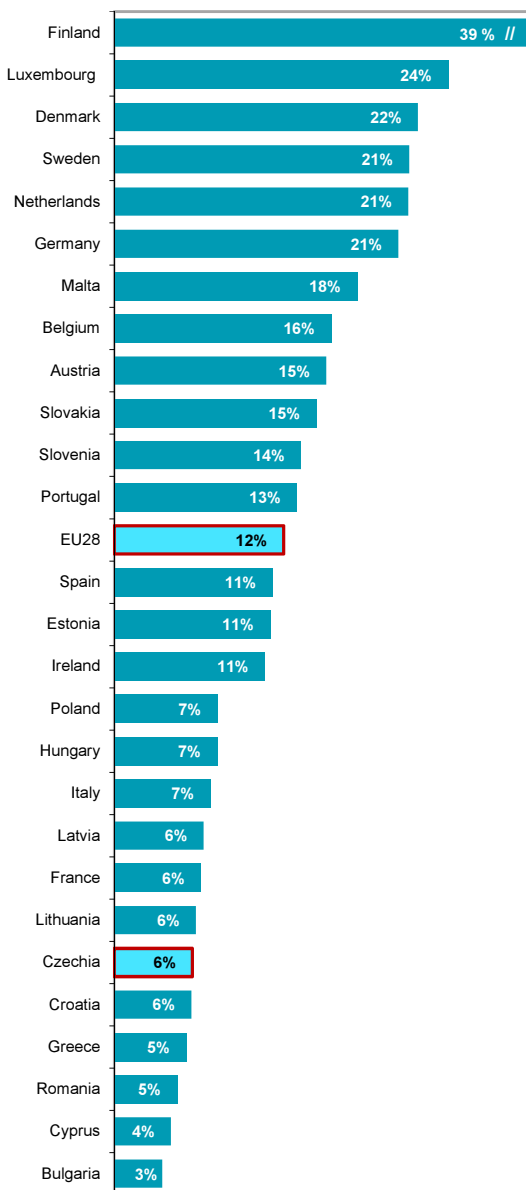
Figure F15 Individuals who used self-study to improve their ICT skills by sex and age; 2018



Source: Czech Statistical Office, ICT use survey in households, 2019

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Figure F16 Persons employed in EU countries who attended any training to develop ICT skills paid or provided by employer; 2018



as a percentage of all persons employed aged 16-74 years in a given country

Source: Eurostat, 2019

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Tab. F8 Persons employed in Czechia using at work selected software at least once per week; 2018

	Percentage		
	Office SW (Word, Excel)	Occupation- specific SW	Program- ming SW
Total (aged 16+ years)	48,6	36,7	5,0
Total (aged 16-74 years)	48,6	36,7	5,0
Sex			
Men (aged 16+ years)	45,9	33,7	7,4
Women (aged 16+ years)	51,9	40,4	2,1
Age group (years)			
16-34	46,8	37,2	7,6
35-54	49,8	36,2	4,3
55+	47,6	37,6	3,4
Educational attainment (of the aged 25+)			
Primary	6,3	8,8	0,0
Secondary without A-level exam.	19,7	15,2	0,7
Secondary with A-level exam.	60,2	44,6	4,8
Tertiary	80,5	59,7	12,6

as a percentage of all persons employed in a given socio-demographic group

Figure F17 Use of office software at work by sex and age; 2018

■ % of all persons employed* ■ % of all persons employed* using PCs at work

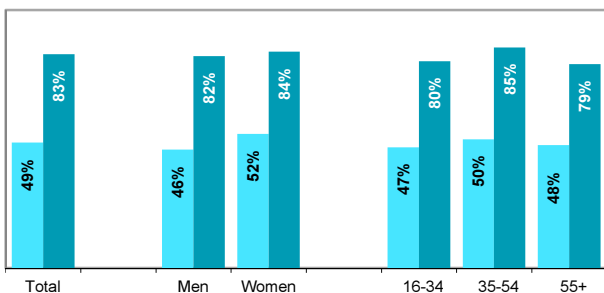
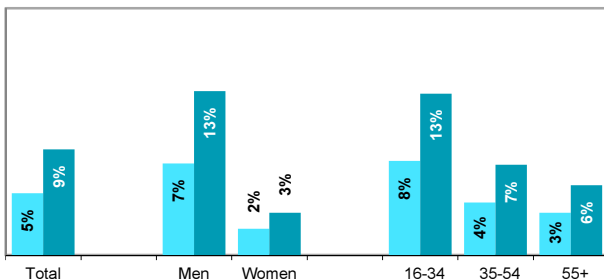


Figure F18 Programming at work by sex and age; 2018

■ % of all persons employed* ■ % of all persons employed* using PCs at work

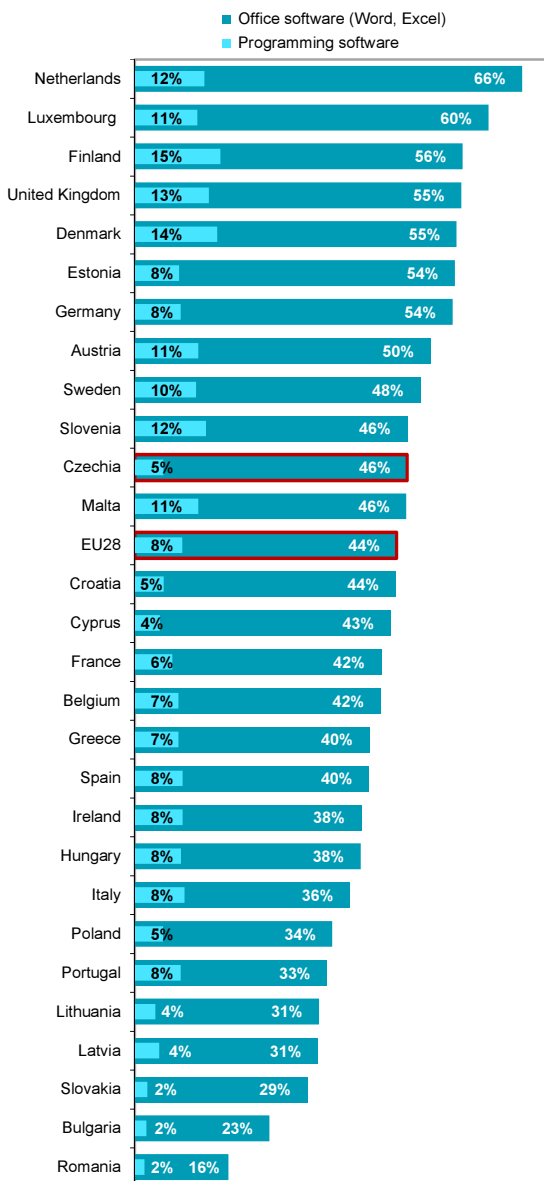


* persons employed category includes employees and self-employed persons

Source: Czech Statistical Office, ICT use survey in households, 2019

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Figure F19 Persons employed in EU countries using at work selected software at least once per week; 2018



as a percentage of all persons employed aged 16-74 years in a given country

Source: Eurostat, 2019

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Tab. F9 University students in Czechia of ICT fields of educat.

	2015	2016	2017
Total	21 482	20 502	19 985
of which aged 25+ years	5 061	4 909	4 814
Sex			
Men	18 390	17 358	16 839
Women	3 092	3 144	3 146
Study programme			
Bachelor (ISCED level 6)	14 424	13 956	13 823
Master (ISCED level 7)	6 119	5 662	5 341
Doctoral (ISCED level 8)	951	893	830
Nationality			
Czech	17 056	15 830	15 137
Foreigners	4 426	4 673	4 857

Figure F20 University students of ICT fields of education, total

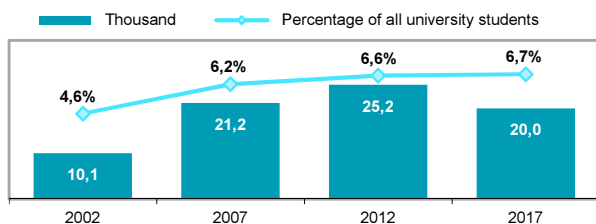


Figure F21 University students of ICT fields of education by sex

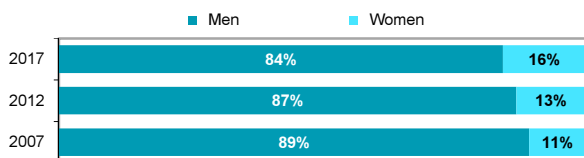


Figure F22 University students of ICT fields by nationality

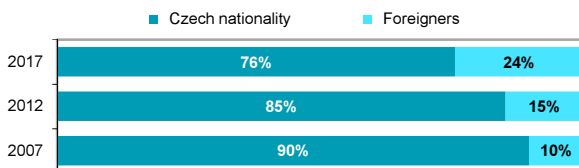
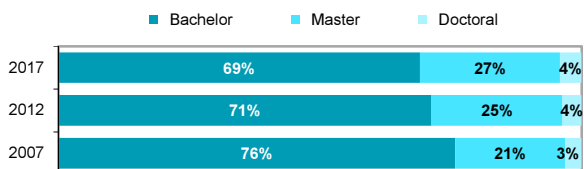


Figure F23 University students of ICTs by study programme



Source: CZSO calculations based on MEYS database, 2019

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Figure F24 Tertiary students in EU countries of ICT fields of education; 2016 (as a percentage of all tertiary students)

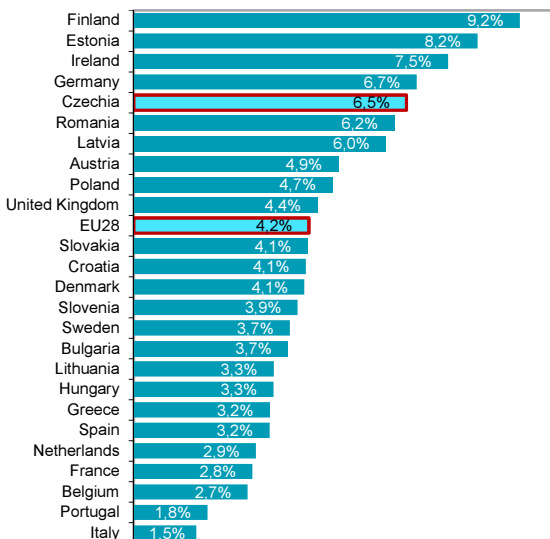
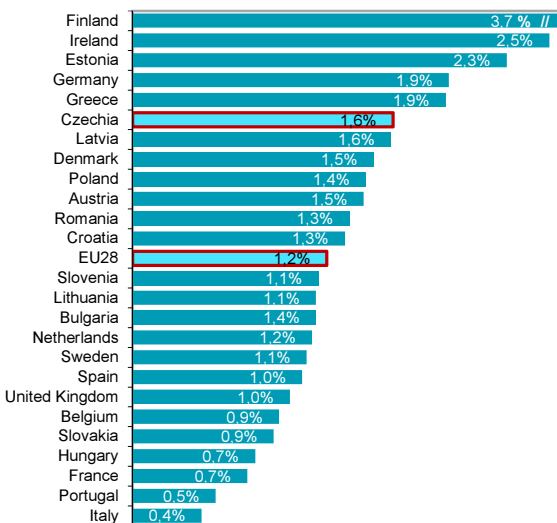


Figure F25 ICT tertiary students in EU countries; 2016 (as a percentage of all population aged 20 to 29 years)



Note 1: Tertiary-level education comprises here only levels 6 (Bachelor or equivalent) and 7 (Master or equivalent) of the ISCED-2011 classification.

Note 2: ICT fields of education (ICT students) are defined by the classification ISCED-F 2013, class 06 Information and Communication Technologies.

Source: CZSO calculations based on Eurostat database, 2019

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Tab. F10 University graduates in Czechia in ICT fields of educ.

	2015	2016	2017
Total	4 479	4 361	3 916
Men	3 815	3 678	3 313
Women	664	683	603
Study programme			
Bachelor (ISCED level 6)	2 579	2 291	2 080
Master (ISCED level 7)	1 828	1 986	1 750
Doctoral (ISCED level 8)	72	84	86
Nationality			
Czech	3 710	3 550	3 131
Foreigners	769	811	785

Figure F26 Bachelor programme graduates in ICT fields

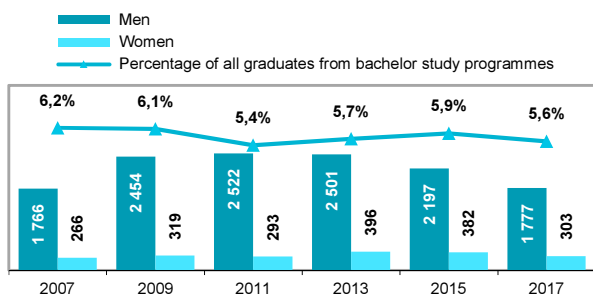


Figure F27 Master programme graduates in ICT fields

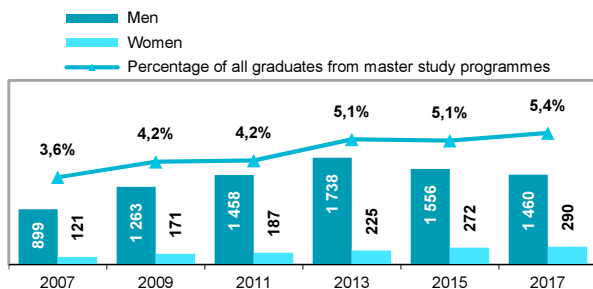
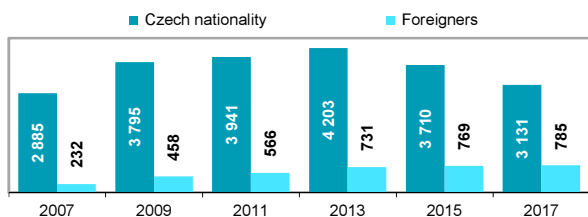


Figure F28 University graduates in ICT fields by nationality



Source: CZSO calculations based on MEYS database, 2019

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Figure F29 Tertiary graduates in EU countries in ICT fields of education; 2016 (thousand)

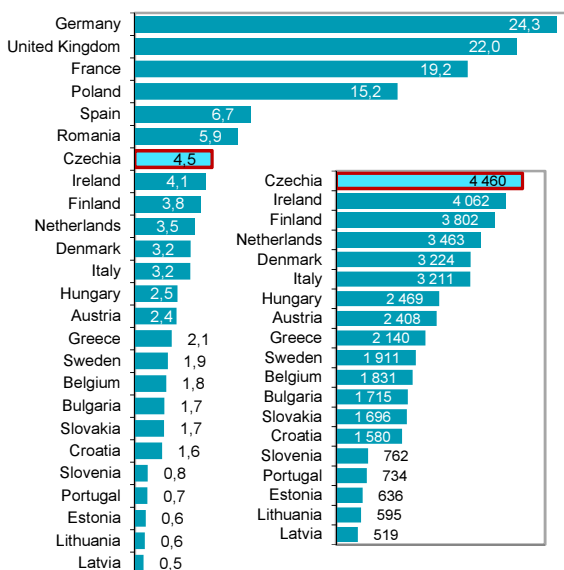
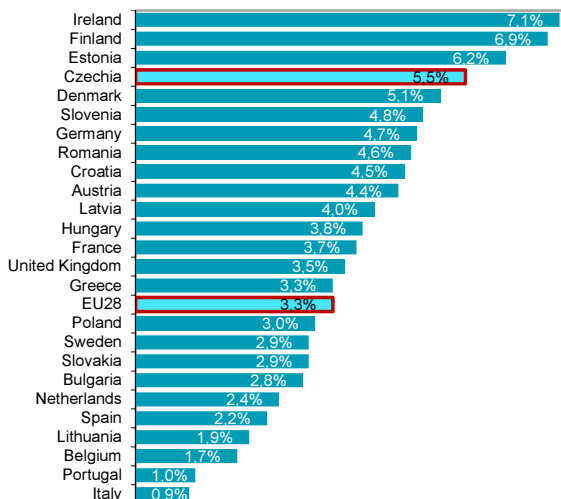


Figure F30 Tertiary graduates in EU countries in ICT fields of education; 2016 (as a percentage of all tertiary graduates)



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

Source: CZSO calculations based on Eurostat database, 2019

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Figure F31 Share of women among all tertiary students of ICT fields of education in EU countries; 2016

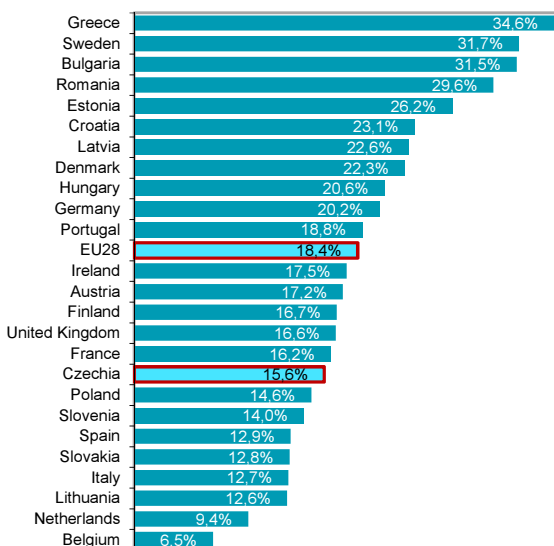
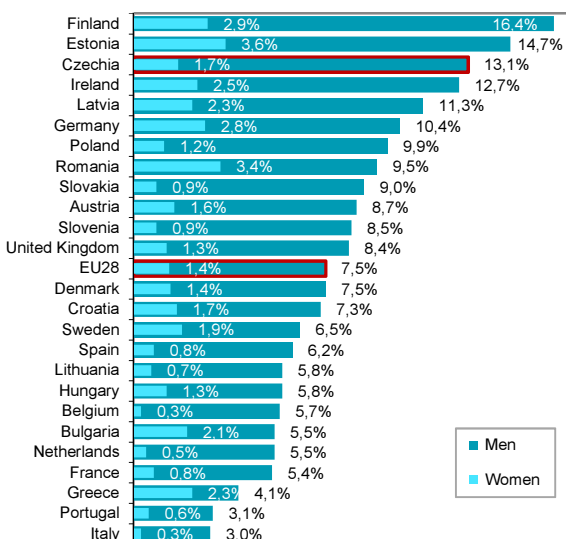


Figure F32 Share of students of ICT fields of education among all tertiary students in EU countries by sex; 2016



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

Source: CZSO calculations based on Eurostat database, 2019

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Figure F33 Share of women among tertiary graduates in ICT fields of education in EU countries; 2016

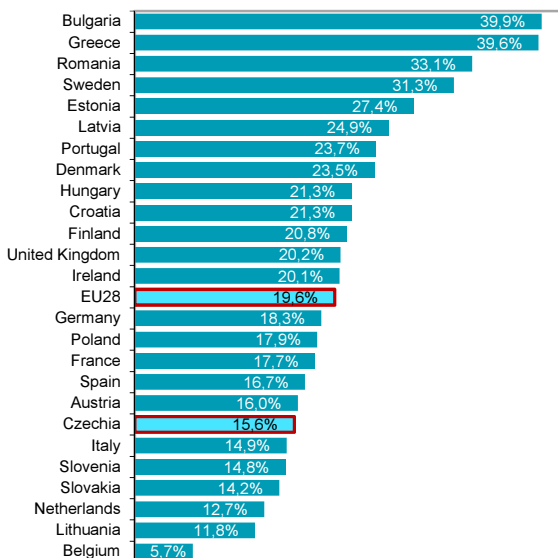
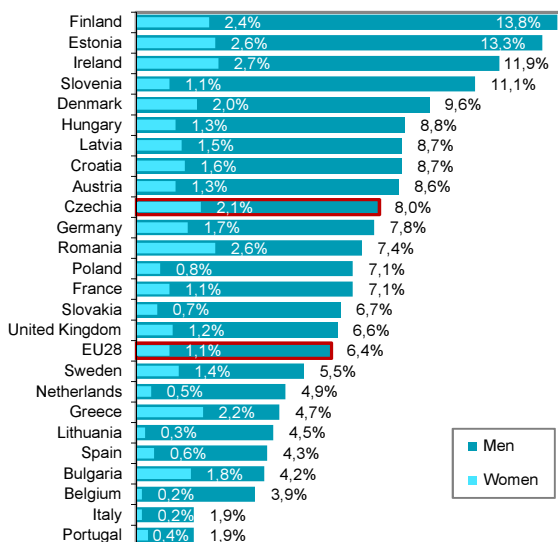


Figure F34 Share of graduates in ICT fields of education among all tertiary graduates in EU countries by sex; 2016



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

Source: CZSO calculations based on Eurostat database, 2019

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Tab. F11 ICT professionals in Czechia

	Thousand		
	2015	2016	2017
Total (CZ-ISCO 25)	66,6	71,9	72,0
Men	59,9	65,4	64,7
Women	6,7	6,6	7,3
Occupation			
Software and apps developers and analysts	44,9	46,6	47,8
Database and network professionals	21,6	25,3	24,2
Status in employment			
Self-employed	12,1	14,2	16,6
Employees	54,5	57,7	55,4
Industry of their employment (NACE category):			
Manufacturing and construction	7,8	10,5	8,5
Information and communication	41,8	45,1	45,9
Public administration, Education, and Healthcare	5,0	4,9	6,7
Other industries	12,0	11,4	10,9
Age group (years)			
up to 29 years	15,8	15,5	14,8
30-39 years	25,5	28,3	28,6
40-49 years	15,3	17,7	17,7
50+ years	10,0	10,4	10,9
Highest level of educational attainment			
Secondary with A-level examination	10,9	11,2	9,6
Bachelor's and higher professional level	9,9	10,3	11,9
Master's and doctoral level	45,7	50,5	50,5

Figure F35 ICT professionals

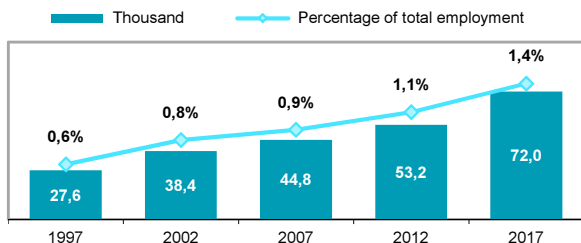


Figure F36 ICT professionals by sex

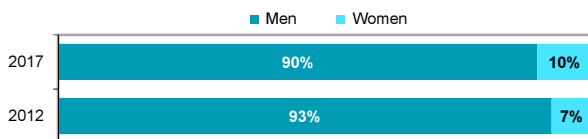
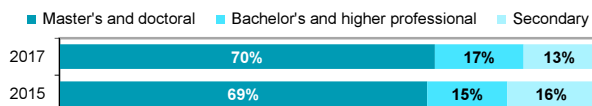


Figure F37 ICT professionals by level of education



F ICT in Education and Digital Skills

Figure F38 ICT professionals in EU countries; 2017
(as a percentage of total employment)

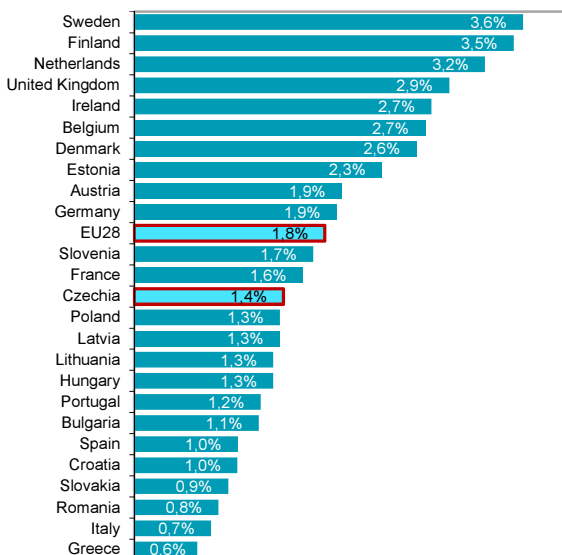
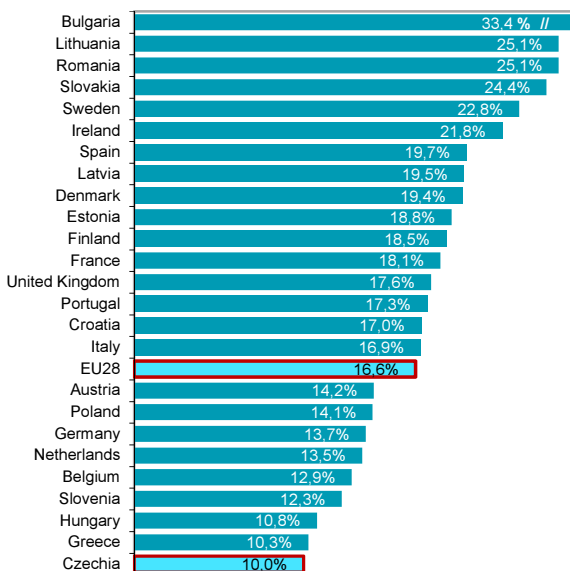


Figure F39 Share of women in EU countries among all ICT professionals; 2017



Source: CZSO calculations based on Eurostat (LFSS database); 2019

F ICT in Education and Digital Skills

Tab. F12 Earnings of ICT professionals in Czechia

Average gross monthly earnings in CZK

	2015	2016	2017
Total (CZ ISCO 25)	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 (years)			
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 educational attainment			
Master's and doctoral level	56 172	58 831	62 809
Bachelor's and higher professional level	46 238	48 644	51 906
Secondary with A-level examination	44 930	47 751	50 723

Figure F40 Earnings of ICT professionals

- Average gross monthly earnings in CZK thousand
- ▲ % of average gross monthly earnings in the total, wage or salary sphere

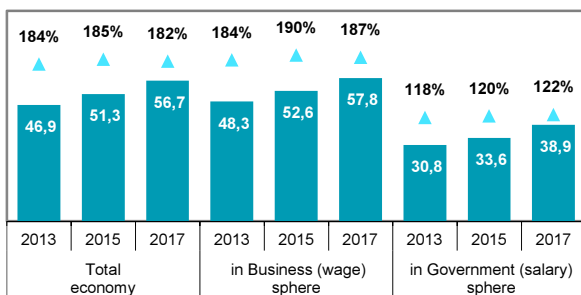
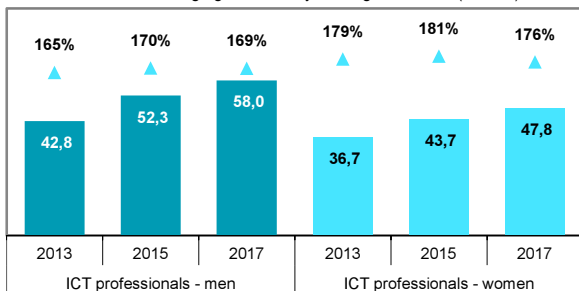


Figure F41 Earnings of ICT professionals by sex

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



Source: CZSO, Structural Earnings Statistics, 2018

F ICT in Education and Digital Skills

Tab. F13 Earnings of ICT professionals in Czechia according to their occupation and industry

Average gross monthly earnings (wage) in CZK

	2015	2016	2017
Total (CZ ISCO 25)	51 319	53 241	56 747
Selected occupation (ISCO unit groups)			
System analysts (ISCO 2511)	56 843	58 868	61 883
Software developers (ISCO 2512)	55 216	58 049	61 157
Application programmers (ISCO 2514)	49 620	51 210	54 343
Database designers and admin.(ISCO 2521)	47 001	49 319	52 646
System 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 F42 Average gross monthly earnings of ICT professionals in selected occupations (CZK thousand)

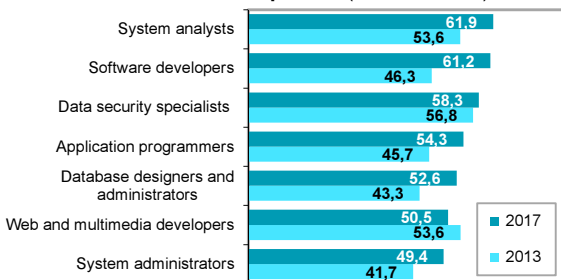
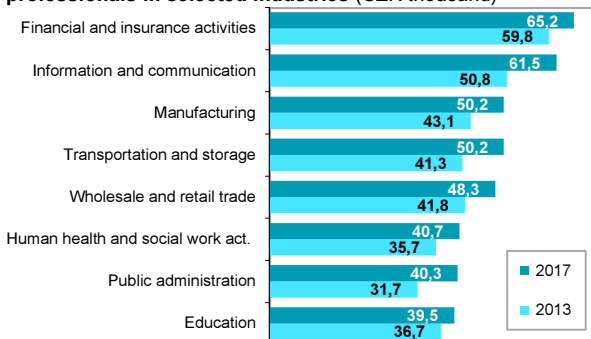


Figure F43 Average gross monthly earnings of ICT professionals in selected industries (CZK thousand)



Source: CZSO, Structural Earnings Statistics, 2018

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Tab. F14 Earnings of Software and application developers and analysts in Czechia

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 (years)			
25-34	48 513	50 215	53 341
35-44	62 326	65 529	69 853
45-54	53 637	58 844	62 380
55+	47 162	52 483	53 017
Highest level of educational attainment			
Master's and doctoral level	57 285	60 297	64 665
Bachelor's and higher professional level	47 294	50 087	53 967
Secondary with A-level examination	46 164	49 530	52 361

Figure F44 Average gross monthly earnings of Software and application developers and analysts (CZK thousand)

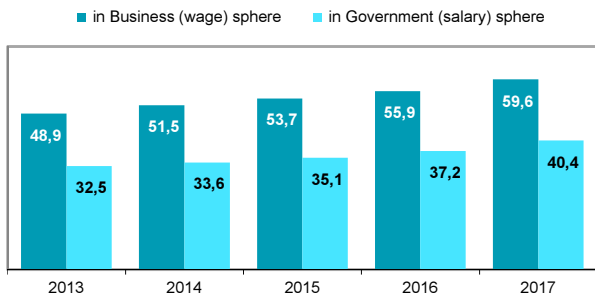
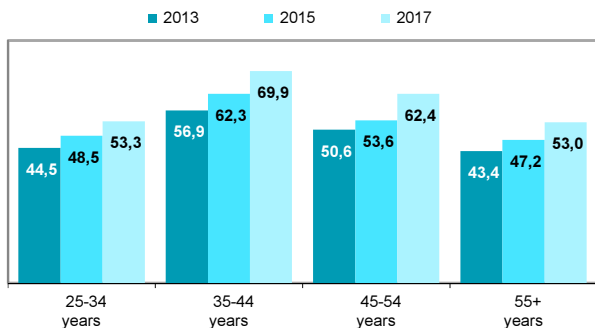


Figure F45 Average gross monthly earnings of Software and apps developers and analysts by age group (CZK thousand)



Source: CZSO, Structural Earnings Statistics, 2018