

C ICT research and development

Research and development (R&D) is a systematic creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of human beings, culture and society.

Data for this chapter coming 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 2002) and Commission Implementing Regulation (EU) No 995/2012.

Further information on the **Czech R&D statistics** can be found at: http://www.czso.cz/csu/redakce.nsf/i/statistika_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 about 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 personnel performed by enterprises with the main economic activity that belongs to the **ICT sector industries**. In general, the term ICT sector includes a combination of **ICT manufacturing** and **ICT services industries** which are associated with the production and/or distribution of information and communication technologies (ICT) and a provision of related services.

ICT sector is divided into the **four main categories**: ICT manufacturing industries, ICT trade industries, Telecommunications and IT services. **For more information see Chapter E ICT sector**

Data on R&D expenditure and number of R&D personnel in ICT sector have less predicative 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.

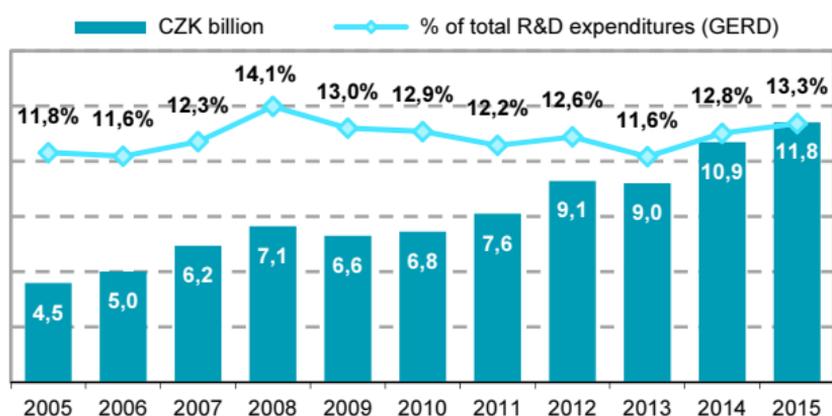
Further information on ICT sector can be found at (only in Czech): <https://www.czso.cz/csu/czso/annual-structural-business-statistics-methodology>

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

	CZK million		
	2013	2014	2015
Total	9 008	10 868	11 763
financed from government funds	1 529	1 491	1 742
ICT products for which R&D is carried out			
ICT equipment	4 328	4 483	5 112
Software	4 680	6 385	6 651
Type of R&D performers			
Enterprises, total	7 953	10 066	10 000
National enterprises	3 894	4 330	3 600
Foreign-controlled enterprises	4 059	5 736	6 400
Public universities	921	759	1 704
Other R&D performers	133	42	59

Figure C1 Total ICT R&D expenditures



GERD - Total Gross Domestic Expenditure on Research and Development

Figure C2 ICT R&D expenditures by products

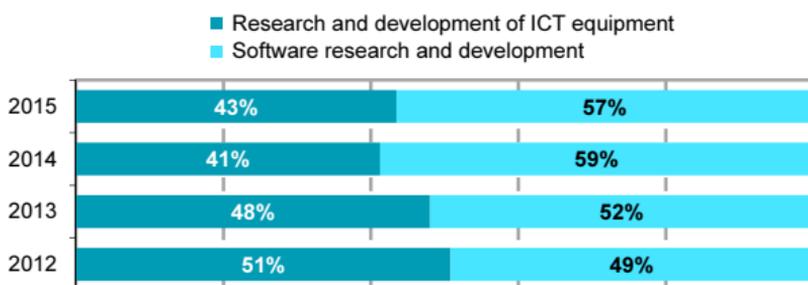
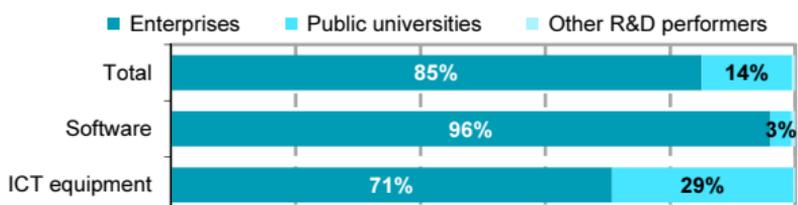


Figure C3 ICT R&D expenditures by type of R&D performers; 2015



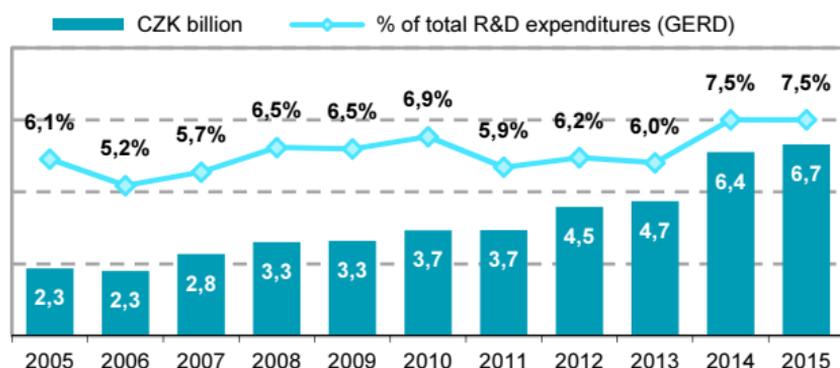
Source: CZSO, Annual R&D survey

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Table C2 Software R&D expenditures in the Czech Republic

	CZK million		
	2013	2014	2015
Total	4 680	6 385	6 651
financed from government funds	402	337	400
Type of R&D performers			
Enterprises, total	4 392	6 146	6 388
National enterprises	2 035	2 438	2 086
Foreign-controlled enterprises	2 356	3 708	4 302
Public universities	280	219	222
Other R&D performers	8	20	41

Figure C4 Software R&D expenditures



GERD - Total Gross Domestic Expenditure on Research and Development

Figure C5 SW R&D expenditures by type of R&D performers; 2015

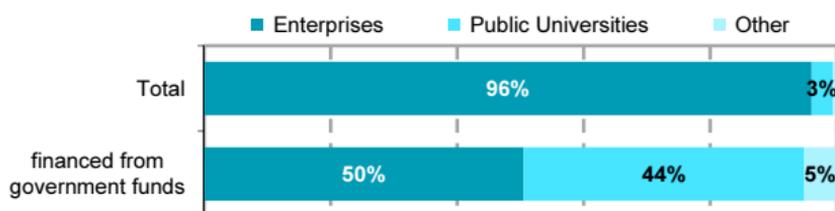
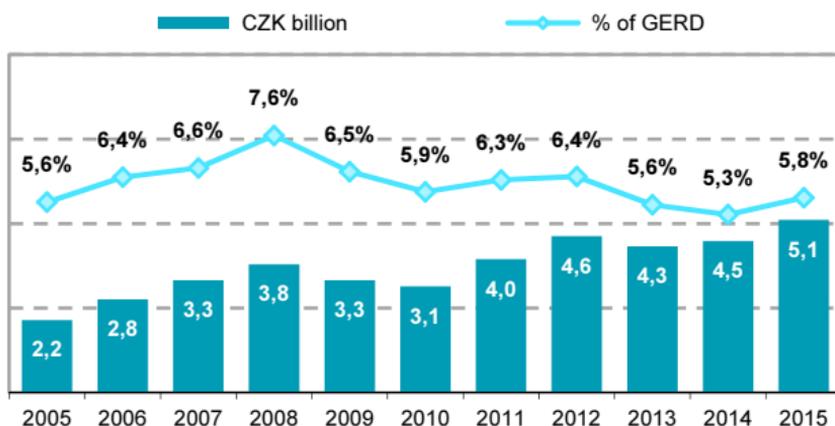


Figure C6 ICT equipment R&D expenditures



GERD - Total Gross Domestic Expenditure on Research and Development

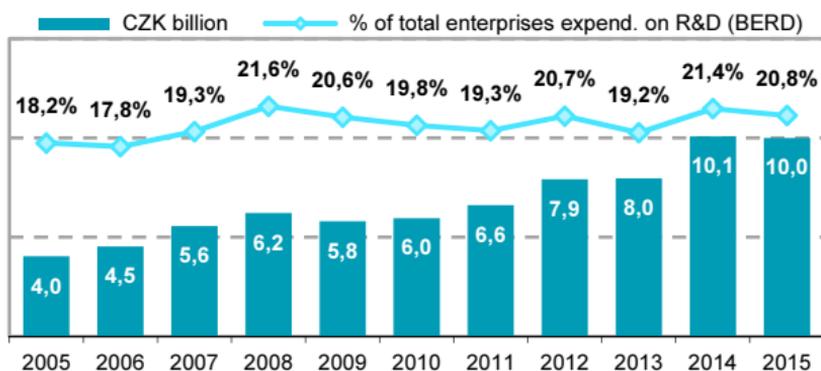
Source: CZSO, Annual R&D survey

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Table C3 Expenditures on R&D of ICT products performed by enterprises in the Czech Republic

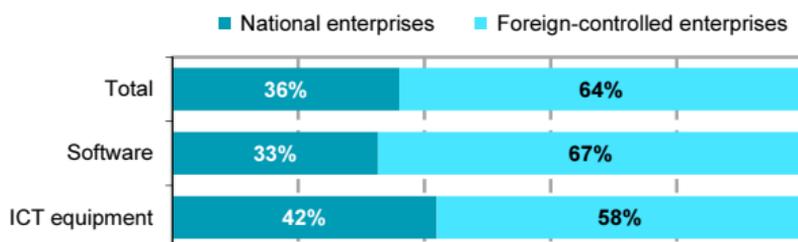
	CZK million		
	2013	2014	2015
Total	7 953	10 066	10 000
financed from government funds	673	951	789
ICT products for which R&D is carried out			
ICT equipment	1 762	1 762	1 762
Software	4 392	6 146	6 388
Enterprise size group			
Small (0-49 employees)	1 296	1 445	1 169
Medium (50-249 employees)	3 835	3 923	3 416
Large (250+ employees)	2 822	4 698	5 415
Ownership of enterprises			
National enterprises	3 894	4 330	3 600
Foreign-controlled enterprises	4 059	5 736	6 400
Main economic activity of enterprises (CZ-NACE)			
ICT sector, total	5 660	7 585	7 302
ICT manufacturing (261-264)	281	271	167
Telecommunications (61)	591	603	622
IT services (465+582+62+631+951)	4 787	6 711	6 514
Other manufacturing	546	573	648
Scientific research and development (72)	570	700	660
Other economic activities	1 177	1 209	1 390

Figure C7 Expenditures on R&D of ICT products performed by enterprises



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

Figure C8 Expenditures on R&D of ICT products by ownership of enterprises; 2015



Source: CZSO, Annual R&D survey

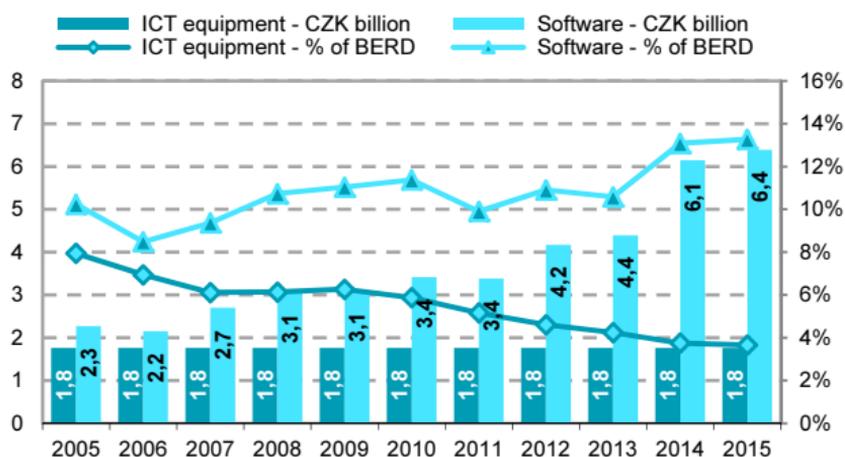
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Table C4 Expenditures on R&D of ICT equipment and software performed by enterprises in the Czech Republic; 2015

CZK million

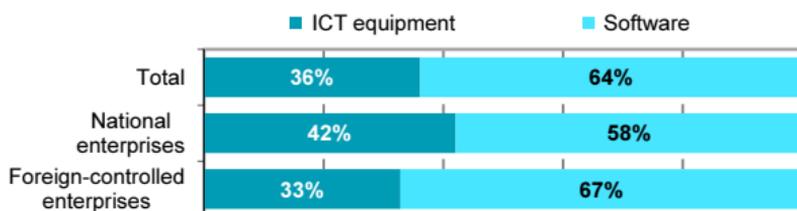
	Total	ICT equipment	Software
Total	10 000	3 612	6 388
financed from government funds	789	587	202
Enterprise size group			
Small (0-49 employees)	1 169	412	757
Medium (50-249 employees)	3 416	1 635	1 781
Large (250+ employees)	5 415	1 651	3 764
Ownership of enterprises			
National enterprises	3 600	1 904	1 696
Foreign-controlled enterprises	6 400	2 098	4 302
Main economic activity of enterprises (CZ-NACE)			
ICT sector, total	7 302	1 886	5 416
ICT manufacturing (261-264)	167	109	58
Telecommunications (61)	622	411	210
IT services (465+582+62+631+951)	6 514	1 366	5 148
Other manufacturing	652	386	266
Scientific research and development (72)	660	630	30
Other economic activities	1 386	709	677

Figure C9 Expenditures on R&D of ICT equipment and software performed by enterprises



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

Figure C10 Expenditures on R&D of ICT equipment and software by ownership of enterprises; 2015



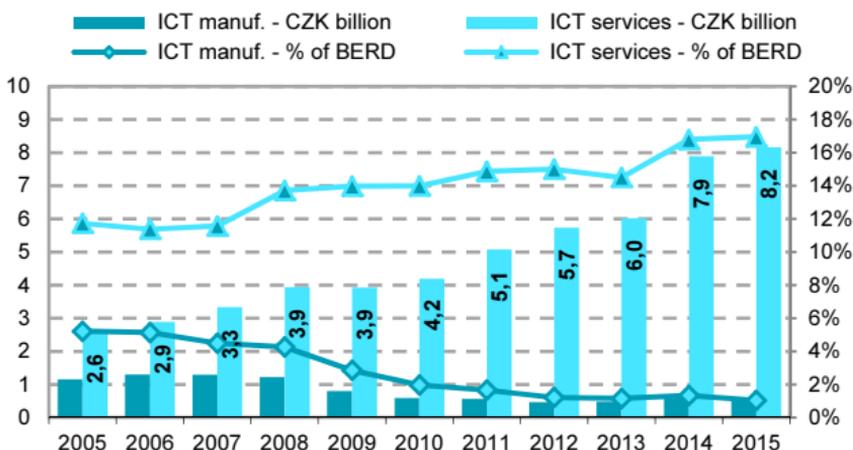
Source: CZSO, Annual R&D survey

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

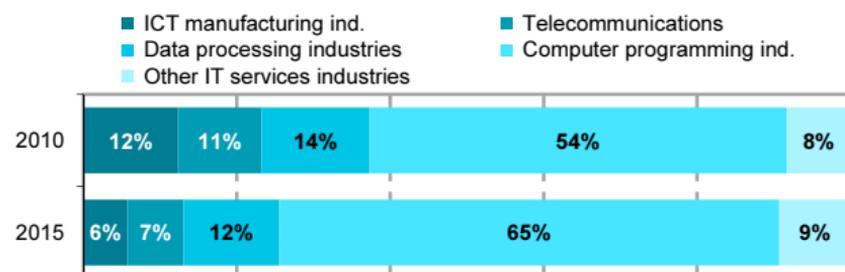
	CZK million		
	2013	2014	2015
Total	6 499	8 515	8 659
financed from government funds	1 089	1 099	1 052
Products for which R&D is carried out			
ICT equipment	2 061	2 306	1 886
Software	3 599	5 279	5 416
Other non ICT related products	839	930	1 357
Enterprise size group			
Small (0-49 employees)	1 132	1 259	1 065
Medium (50-249 employees)	3 209	3 312	3 491
Large (250+ employees)	2 158	3 943	4 103
Ownership of enterprises			
National enterprises	3 236	3 706	3 095
Foreign-controlled enterprises	3 262	4 809	5 564
Main economic activity of enterprises (CZ-NACE)			
ICT manufacturing industries (261-264)	479	625	500
ICT services industries, total	6 019	7 889	8 159
Telecommunications (61)	592	603	630
Computer programming (582+6201)	3 314	4 879	5 643
Data processing and hosting (631)	1 355	1 580	1 080
Other IT services (465+951+62without 6201)	758	827	806

Figure C11 R&D expenditures in the ICT sector industries



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

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Figure C13 R&D expenditures in the ICT sector; 2014*
(as a percentage of GDP)

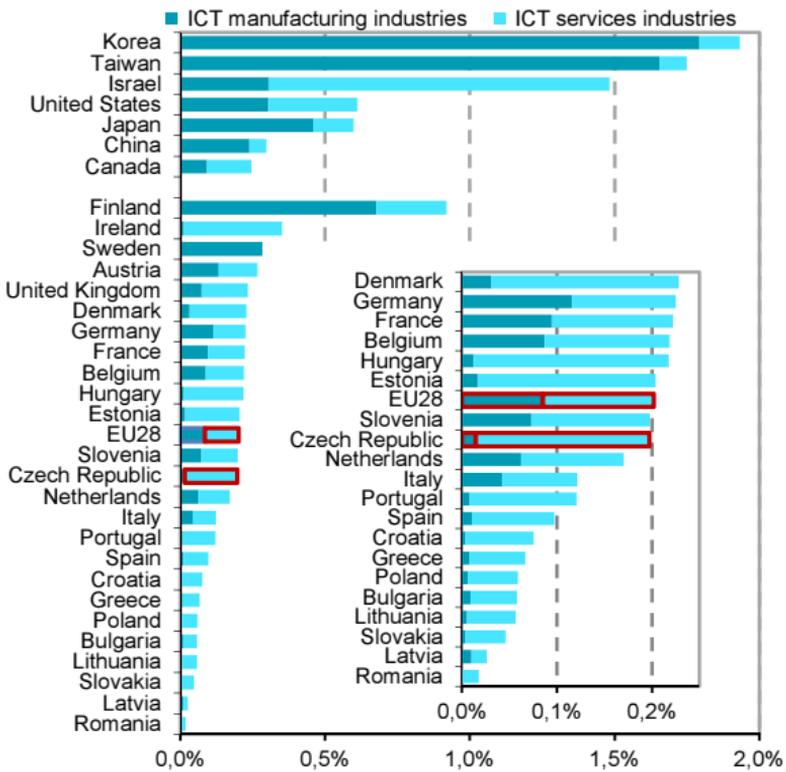
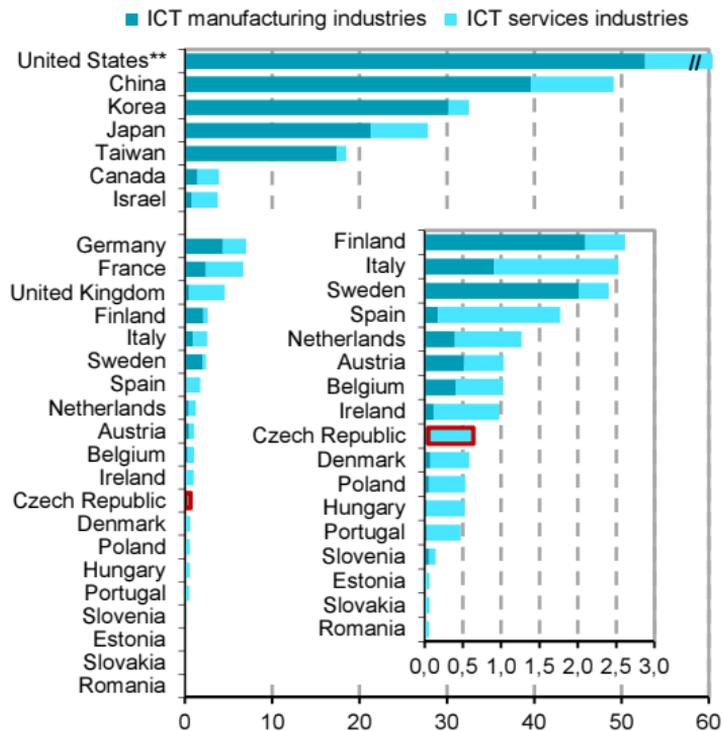


Figure C14 R&D expenditures in the ICT sector; 2014*
(USD billion PPP)



* or the latest year available

**USA: ICT manufacturing 52,7 billion, ICT Services 53,4 billion USD PPP

Source: CZSO calculations based on Eurostat and OECD data, 2016

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Table C6 R&D personnel in the ICT sector in the Czech Rep.

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

	2013	2014	2015
Total	6 174	7 725	7 988
By occupation			
Researchers	3 281	4 480	4 829
Technicians and equivalent staff	2 428	2 648	2 637
Other supporting and administrative staff	465	597	522
Enterprise size group			
Small (0-49 employees)	1 426	1 468	1 356
Medium (50-249 employees)	2 930	2 869	3 062
Large (250+ employees)	1 817	3 388	3 570
Ownership of enterprises			
National enterprises	3 208	3 431	3 202
Foreign-controlled enterprises	2 966	4 294	4 786
Main economic activity of enterprises (CZ-NACE)			
ICT manufacturing industries (261-264)	676	656	523
ICT services industries, total	5 498	7 069	7 465
Telecommunications (61)	143	151	197
Computer programming (582+6201)	3 569	4 831	5 434
Data processing and hosting (631)	701	843	762
Other IT services (465+951+62without 6201)	1 084	1 243	1 072

Figure C15 R&D personnel in the ICT sector industries

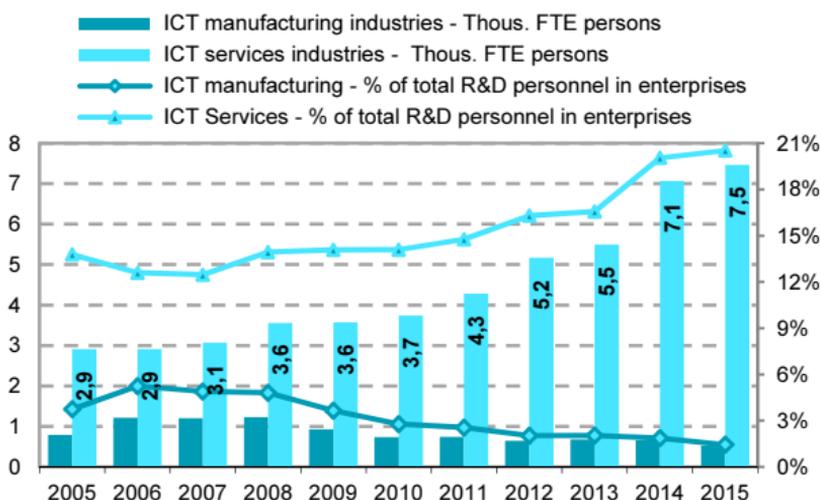
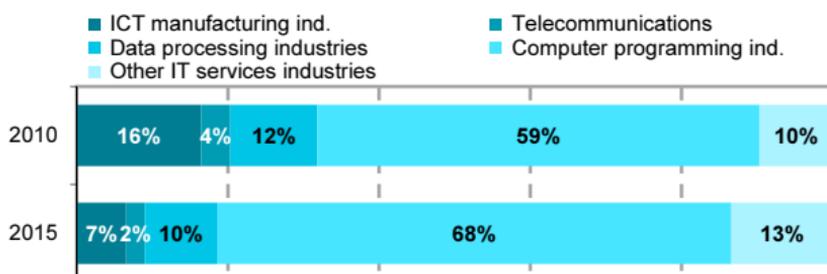


Figure C16 R&D personnel in the ICT sector by industry



Source: CZSO, Annual R&D survey