

## D ICT research and development

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### ICT R&D expenditure

This sub-chapter presents data on financial resources devoted in research and development of ICT equipment and software (hereafter **ICT R&D expenditure**) regardless of the main economic activity and sector of R&D performers. ICT is **classified** here into two main categories according to the groups of the **Classification of Products by Activity (CZ-CPA)** as follows:

- **ICT equipment includes:** 26.1 Electronic components and boards; 26.2 Computers and peripheral equipment; 26.3 Communication equipment; 26.4 Consumer electronics and 26.8 Magnetic and optical media.
- **Software includes:** 58.2 Software publishing; 61 Telecommunications services; 62 Computer programming, consultancy & related services and 63.1 Data processing, hosting & related services; web portals.

Detail description of **CZ-CPA** is available here (*only in Czech*): <https://www.czso.cz/csu/czso/klasifikace-produkce-cz-cpa>

**Research and experimental development (R&D)** comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge.

*Note: 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 considered R&D. For more information see Frascati Manual (OECD, Paris 2015) at: <http://oe.cd/frascati>*

Data in this sub-chapter are based on the results of the **special module** on R&D expenditures in selected **technological areas** that is included in the Czech annual questionnaire on R&D. ICT R&D expenditure figures are **available** by sectors of R&D performance and industry (CZ-NACE) classification. **International comparison is not available** for this data set.

### R&D expenditures and personnel in the ICT sector industries

This sub-chapter focuses on R&D expenditures and R&D personnel in enterprises with the main economic activity that belongs to the **ICT sector**. In general, the term ICT sector includes both: **ICT manufacturing** and **ICT services** which are associated with the production and/or distribution of information and communication technologies (ICT) and a provision of related services.

Industries of ICT sector includes all enterprises with the prevailing economic activity according to the codes of the Classification of Economic Activities (**CZ-NACE**) that fulfill the OECD official definition of ICT sector. For more information, see **Chapter G** or **dedicated website** to the measurement of **information economy industries** (*only in Czech*): <https://www.czso.cz/csu/czso/odvetvi-informacni-ekonomiky>

Data for the **international comparisons** come from the **Eurostat database** and refer to the reported or nearest available year.

*Note: Data on R&D expenditures in the ICT sector has less predictive value than the figures for the total ICT R&D expenditures included in first sub-chapter. Enterprises within the ICT sector can perform their R&D activities in areas other than ICT and vice versa enterprises outside the ICT sector can exercise their R&D activities in the ICT field.*

The both data sets on ICT R&D expenditures come from the results of the **Annual questionnaire on R&D**. For more information, see (*only in Czech*): [https://www.czso.cz/csu/czso/vysledky\\_vyzkumu\\_a\\_vyvoje](https://www.czso.cz/csu/czso/vysledky_vyzkumu_a_vyvoje)

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Table D1 ICT R&D expenditures in Czechia

	CZK million		
	2018	2019	2020
<b>Total</b>	<b>18 720</b>	<b>20 474</b>	<b>22 975</b>
financed from government funds	1 924	1 920	1 828
<b>Type of ICT product</b>			
ICT equipment	5 594	5 791	6 691
Software	13 125	14 683	16 284
<b>Type of R&amp;D performer</b>			
<b>Enterprises, total</b>	<b>17 101</b>	<b>18 830</b>	<b>21 517</b>
National enterprises	5 203	5 915	6 799
Foreign-controlled enterprises	11 898	12 914	14 718
<b>Public universities</b>	<b>1 535</b>	<b>1 576</b>	<b>1 348</b>
<b>Other R&amp;D performers</b>	<b>84</b>	<b>69</b>	<b>111</b>

Figure D1 ICT R&D expenditures

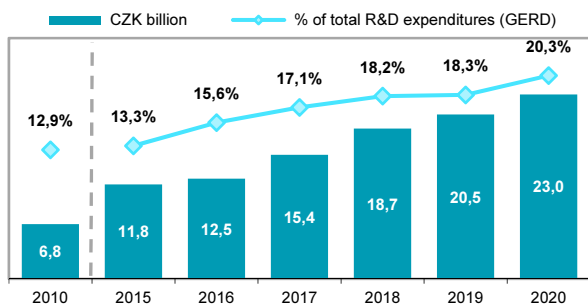


Figure D2 ICT R&D expenditures, by type of product

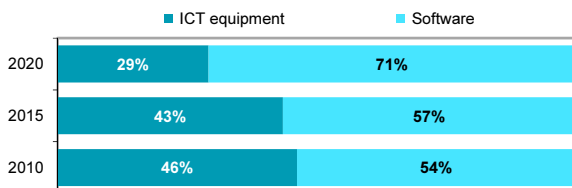
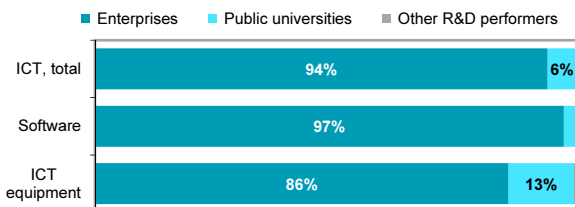


Figure D3 ICT R&D expenditures, by type of performer; 2020



Source: CZSO, Annual R&D survey

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Table D2 Software R&D expenditures in Czechia

	CZK million		
	2018	2019	2020
<b>Total</b>	<b>13 125</b>	<b>14 683</b>	<b>16 284</b>
financed from government funds	751	652	573
<b>Type of R&amp;D performer</b>			
<b>Enterprises, total</b>	<b>12 464</b>	<b>14 041</b>	<b>15 792</b>
National enterprises	3 597	4 302	4 679
Foreign-controlled enterprises	8 867	9 739	11 112
<b>Public universities</b>	<b>630</b>	<b>609</b>	<b>445</b>
<b>Other R&amp;D performers</b>	<b>32</b>	<b>33</b>	<b>48</b>

Figure D4 Software R&D expenditures

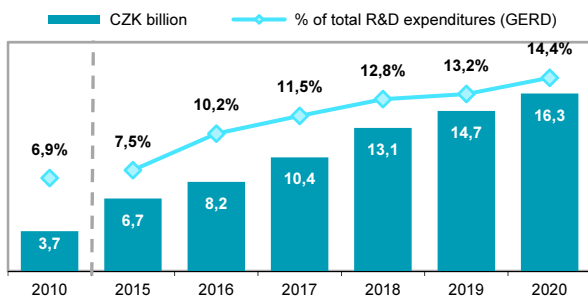


Figure D5 Software R&D expenditures, by performer; 2020

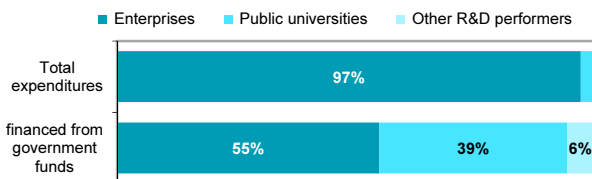
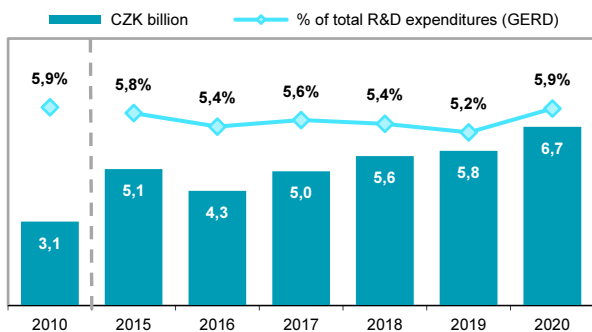


Figure D6 ICT equipment R&D expenditures



Source: CZSO, Annual R&D survey

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Table D3 Business ICT R&D expenditures in Czechia

CZK million

	2018	2019	2020
<b>Total</b>	<b>17 101</b>	<b>18 830</b>	<b>21 517</b>
financed from government funds	861	784	900
<b>Type of ICT product</b>			
ICT equipment	4 637	4 789	5 725
Software	12 464	14 041	15 792
<b>Enterprise size group</b>			
Small (0-49 employees)	1 674	1 968	2 154
Medium (50-249 employees)	3 677	3 845	3 957
Large (250+ employees)	11 749	13 017	15 406
<b>Ownership of enterprises</b>			
National enterprises	5 203	5 915	6 799
Foreign-controlled enterprises	11 898	12 914	14 718
<b>Industry of enterprises (CZ-NACE)</b>			
<b>ICT sector industries, total</b>	<b>12 644</b>	<b>13 286</b>	<b>15 262</b>
ICT manufacturing	295	335	323
Telecommunications	794	366	971
IT services	11 555	12 585	13 968
<b>Other industries</b>	<b>4 457</b>	<b>5 544</b>	<b>6 255</b>

Figure D7 Business ICT R&D expenditures

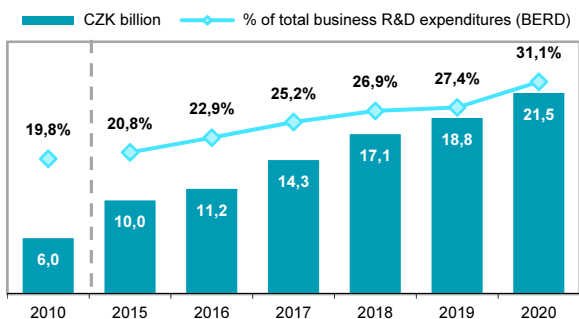
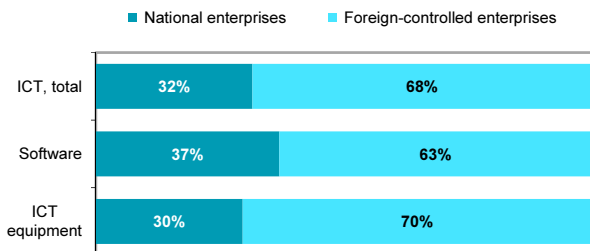


Figure D8 Business ICT R&D expenditures, by ownership; 2020



Source: CZSO, Annual R&D survey

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Table D4 Business ICT R&D expenditures in Czechia; 2020

CZK million

	Total	ICT equipment	Software
<b>Total</b>	<b>21 517</b>	<b>5 725</b>	<b>15 792</b>
financed from government funds	900	586	314
<b>Enterprise size group</b>			
Small (0-49 employees)	2 154	578	1 576
Medium (50-249 employees)	3 957	1 197	2 759
Large (250+ employees)	15 406	3 950	11 456
<b>Ownership of enterprises</b>			
National enterprises	6 799	2 120	4 679
Foreign-controlled enterprises	14 718	3 606	11 112
<b>Industry of enterprises (CZ-NACE)</b>			
<b>ICT sector industries, total</b>	<b>15 262</b>	<b>1 652</b>	<b>13 610</b>
ICT manufacturing	323	206	116
Telecommunications	971	12	959
IT services	13 968	1 434	12 534
<b>Other industries</b>	<b>6 255</b>	<b>4 073</b>	<b>2 182</b>

Figure D9 Business ICT R&D expenditures, by type of product

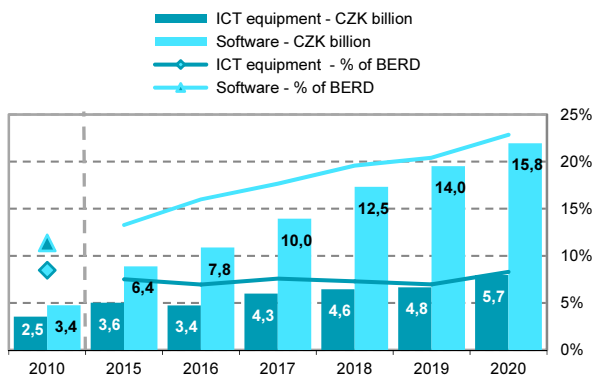
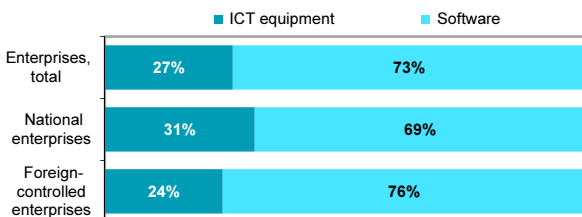


Figure D10 Business ICT R&D expenditures, by ownership of R&D performers and type of product; 2020



Source: CZSO, Annual R&D survey

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Table D5 R&D expenditures in the ICT sector in Czechia

CZK million

	2018	2019	2020
<b>Total</b>	<b>13 495</b>	<b>14 600</b>	<b>16 739</b>
financed from government funds	1 067	983	1 071
<b>Type of product</b>			
ICT equipment	1 802	1 802	1 802
Software	10 842	11 869	13 610
Other non ICT related products	851	928	1 327
<b>Enterprise size group</b>			
Small (0-49 employees)	1 568	1 933	2 031
Medium (50-249 employees)	3 187	3 441	3 329
Large (250+ employees)	8 740	9 225	11 379
<b>Ownership of enterprises</b>			
National enterprises	4 306	4 830	5 454
Foreign-controlled enterprises	9 189	9 770	11 285
<b>Industry of enterprises (ICT sub-sectors)</b>			
ICT manufacturing	591	902	999
<b>ICT services, total</b>	<b>12 903</b>	<b>13 698</b>	<b>15 740</b>
Telecommunications	801	377	983
Computer programming	10 052	10 378	11 867
Data processing and hosting	1 101	1 066	1 236
Other IT services	949	1 877	1 655

Figure D11 R&D expenditures in the ICT sector

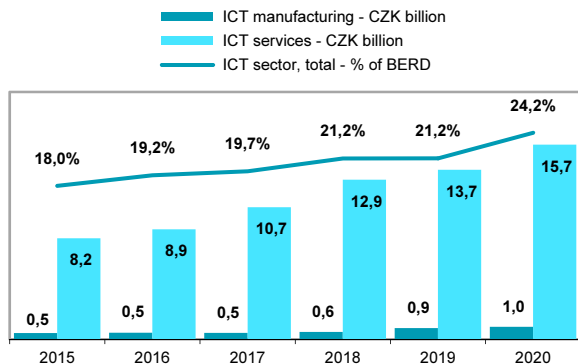
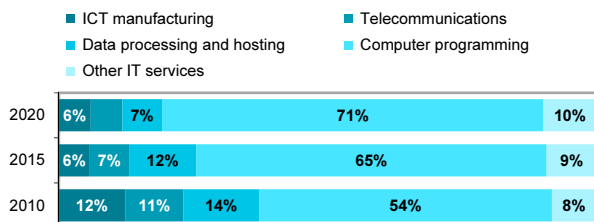


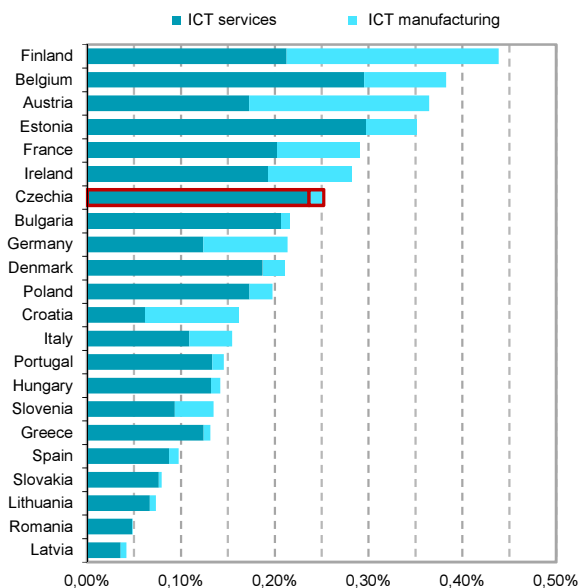
Figure D12 R&D expenditures in the ICT sector, by industry



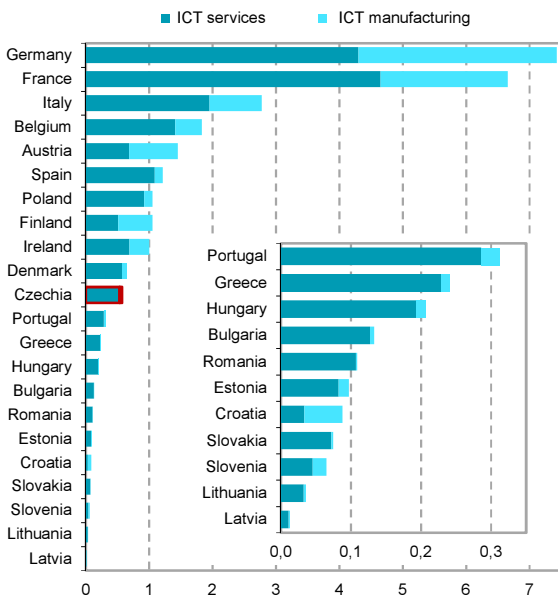
Source: CZSO, Annual R&D survey

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**Figure D13 R&D expenditures in the ICT sector; 2019**  
(% of GDP)



**Figure D14 R&D expenditures in the ICT sector; 2019**  
(EUR billion)



Source: CZSO calculations based on Eurostat data

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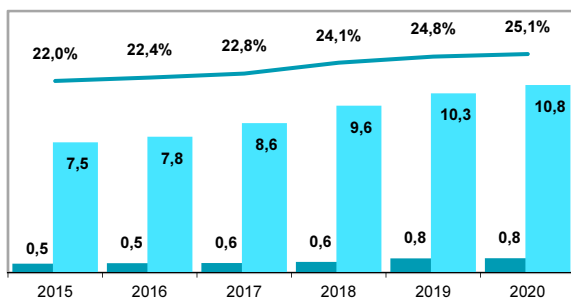
**Table D6 R&D personnel in the ICT sector in Czechia**

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

	2018	2019	2020
<b>Total</b>	<b>10 196</b>	<b>11 102</b>	<b>11 593</b>
Men	1 141	1 363	1 462
Women	9 055	9 739	10 130
<b>Enterprise size group</b>			
Small (0-49 employees)	1 857	2 078	2 021
Medium (50-249 employees)	2 891	2 998	2 838
Large (250+ employees)	5 449	6 026	6 734
<b>Ownership of enterprises</b>			
National enterprises	4 428	4 815	4 937
Foreign-controlled enterprises	5 768	6 287	6 656
<b>Industry of enterprises (ICT sub-sectors)</b>			
ICT manufacturing	623	818	832
<b>ICT services, total</b>	<b>9 573</b>	<b>10 284</b>	<b>10 760</b>
Telecommunications	352	248	223
Computer programming	7 489	7 788	8 493
Data processing and hosting	852	866	1 010
Other IT services	880	1 382	1 034

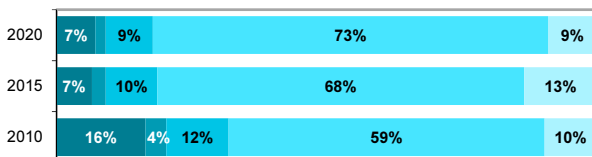
**Figure D15 R&D personnel in the ICT sector**

■ ICT manufacturing - thous. FTE persons  
■ ICT services - thous. FTE persons  
— ICT sector, total - % of total R&D personnel in enterprises



**Figure D16 R&D personnel in the ICT sector, by industry**

■ ICT manufacturing  
■ Data processing and hosting  
■ Telecommunications  
■ Computer programming  
■ Other IT services



Source: CZSO, Annual R&D survey