D Investment and R&D expenditures in ICT

Data on **ICT Investment and R&D expenditures** are based on ICT product definition expressed in terms of CZ-CPA product classification:

- CZ-CPA 30 Office machinery and computers
- CZ-CPA 32 Radio, television and communication equipment
- CZ-CPA 642 Telecommunications services
- CZ-CPA 72 Computer and related services

Note: In the national accounts, expenditure on ICT products is considered investment only if the products can be physically isolated (i.e. ICT embodied in equipment is considered not as investment but as intermediate consumption). This means that ICT investment may be underestimated and the order of magnitude of the underestimation may differ depending on how intermediate consumption and investment are treated in each country's accounts. Data on software investment in the Czech Republic are underestimate.

Data on investment and R&D expenditures in ICT sector (ICT manufacturing and ICT services) are based on ICT industry definition expressed in terms of CZ-NACE industry classification (see chapter B).

Note: Data refer to R&D performed by the ICT sector might be underestimate significantly given that much of ICT R&D may be performed in other industries (for example, software R&D). Figures should also be compared with caution owing to differences in how countries classify R&D by industry: countries which follow a "product group" approach (instead of principal economic activity) will therefore have more accurate estimates of "true" ICT R&D.

A patent is a right granted by a government to an inventor in exchange for the publication of the invention; it entitles the inventor to prevent any third party from using the invention in any way, for an agreed period.

Data on **ICT patents** are classified according to the International Patent Classification (IPC) codes and 2003 OECD definition into four broad categories:

- Telecommunications
- Consumer electronics
- Computers, office machinery
- Other ICT

Data sources:

- ICT investment – Czech Annual National Accounts (table D1)
- Investment in ICT manufacturing and services – Structural Business Survey (CZSO)
- R&D expenditures in ICT manufacturing and services – Czech annual survey on research and development.
- Patents – Industrial Property Office of the Czech Republic
- International data for ICT investment are from OECD sources
- International data for R&D expenditures for selected ICT industries are from OECD's Analytical Business Enterprise R&D Expenditure (ANBERD) database.

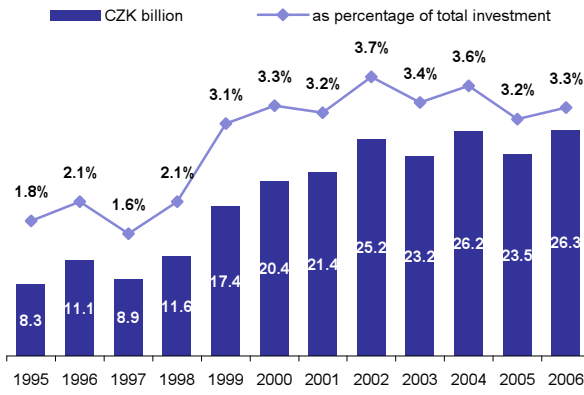
D Investment and R&D expenditures in ICT

Table D1 Software investment

CZK million

	2003	2004	2005	2006
Total	**23 211**	**26 188**	**23 529**	**26 324**
by institutional sectors				
Non-financial enterprises and corporat.	14 710	18 506	15 630	16 399
Public enterprises	1 288	1 974	1 732	1 570
National private enterprises	8 009	9 501	6 859	6 854
Foreign affiliation	5 413	7 031	7 039	7 975
Financial corporations	5 075	4 586	4 363	5 512
Government	2 468	2 465	2 841	2 964
Central government institutions	1 847	1 911	2 138	2 308
Local government institutions	359	356	466	496
Social security and welfare funds	262	198	237	160
Households	890	598	677	1 413
Non-profit institutions	68	33	18	36
by Industry (CZ-NACE)				
Agriculture, Forestry, Fishing	92	60	75	202
Mining and quarrying	98	123	167	545
Manufacturing	3 756	4 563	4 281	5 209
Electricity, gas and water supply	1 537	1 728	1 183	861
Construction	299	382	385	378
Wholesale and retail trade	2 071	1 710	1 815	1 930
Hotels and restaurants	325	98	56	69
Transport, storage and communication	3 790	4 708	4 652	4 647
Financial intermediation	5 091	4 590	4 386	5 605
Real estate and business activities	2 754	3 844	3 238	2 924
Public administration	2 194	2 328	2 355	2 313
Education	142	52	241	269
Health	457	128	463	318
Other community, social and service	605	1 874	232	1 054

Figure D1 Software investment

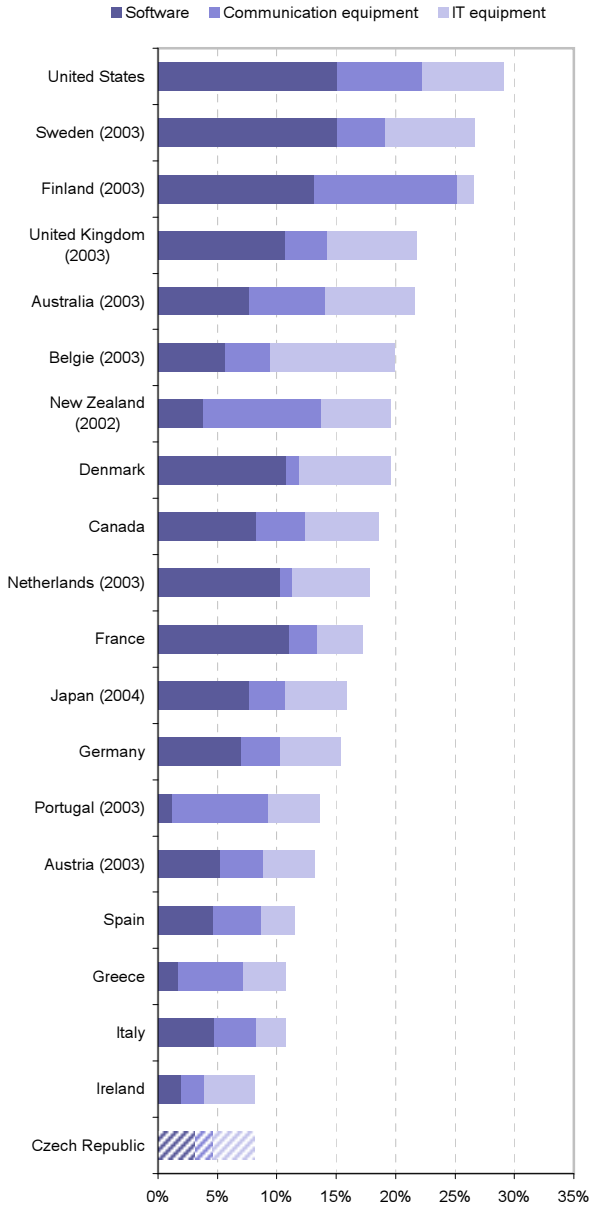


Source: CZSO, Annual National Accounts

D Investment and R&D expenditures in ICT

Figure D2 ICT investment, 2005

(as percentage of total investment)



Source: OECD and CZSO

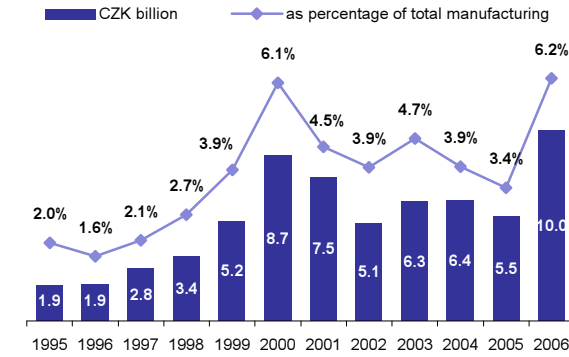
D Investment and R&D expenditures in ICT

Table D2 Investment in ICT Manufacturing

CZK million

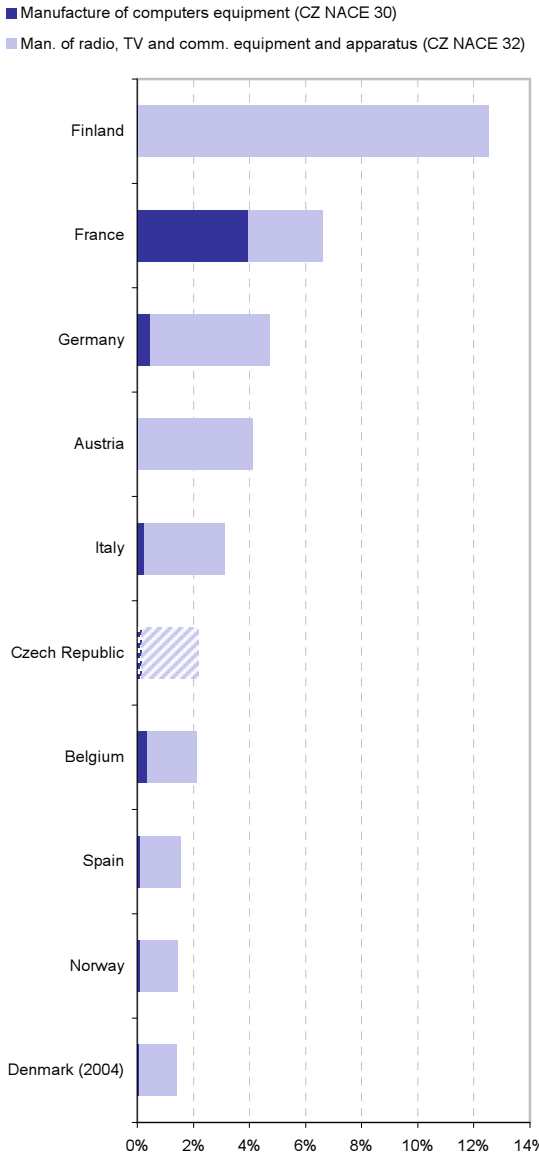
	2003	2004	2005	2006
Total	**6 304**	**6 370**	**5 494**	**10 006**
national enterprises	1 920	975	1 325	2 682
foreign affiliates	4 384	5 395	4 169	7 323
by Industry (CZ-NACE)				
30 Manuf. of computers equipment	654	574	546	1 230
32 M. of radio, TV and commun. equip.	3 931	4 015	3 132	6 442
321 M. of electronic components	2 614	2 616	1 665	2 686
322 M. of communication equipment	897	774	624	1 754
323 M. of consumer electronics	420	626	844	2 001
332 M. of instrum. for measur., testing	1 555	1 501	1 697	1 937
333 M. of ind. process control equip.	164	281	119	396
by size group of enterprise				
0 - 19 employees	1 778	293	284	976
20 - 49 employees	231	138	243	402
50 - 249 employees	696	1 031	1 215	1 399
250 + employees	3 599	4 908	3 752	7 229
by regions				
Praha	838	433	645	1 444
Středočeský	1 203	1 244	1 070	1 456
Jihočeský	255	132	202	247
Plzeňský	403	716	709	1 870
Karlovarský	188	24	71	50
Ústecký	144	96	57	100
Liberecký	54	240	66	110
Královéhradecký	504	374	339	651
Pardubický	797	778	470	550
Vysočina	49	77	28	156
Jihomoravský	785	717	530	1 696
Olomoucký	630	824	210	474
Zlínský	273	707	1 045	910
Moravskoslezský	214	109	61	311

Figure D3 Investment in ICT Manufacturing



Source: CZSO, Structural Business Survey

Figure D4 Investment in selected ICT manufacturing industries (% of total manufacturing), 2005



Source: OECD, STAN Indicators Database

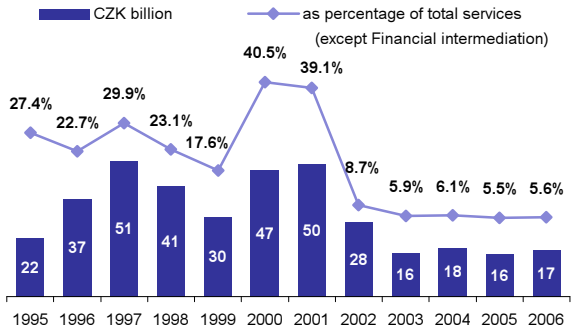
D Investment and R&D expenditures in ICT

Table D3 Investment in ICT Services

CZK million

	2003	2004	2005	2006
Total	**16 466**	**18 325**	**16 143**	**17 466**
national enterprises	10 322	7 594	8 069	3 401
foreign affiliates	6 145	10 730	8 074	14 065
by Industry (CZ-NACE)				
642 Telecommunications	14 255	12 768	12 028	13 711
72 Computer and related activities	2 211	5 557	4 115	3 755
721 Hardware consultancy	52	65	84	90
722 Software consultancy and supply	1 637	4 873	3 417	2 684
723 Data processing	362	458	264	374
724 Data base activities	23	40	17	225
725 Repair of computing machinery	119	103	322	377
726 Other computer related activities	18	17	12	6
by size group of enterprise				
0 - 19 employees	1 059	1 083	1 192	1 317
20 - 49 employees	659	751	662	642
50 - 249 employees	1 606	2 704	1 776	2 077
250 + employees	13 142	13 786	12 512	13 430
by regions*				
Praha	10 476	12 515	8 915	9 903
Středočeský	704	645	832	762
Jihočeský	547	604	576	704
Plzeňský	579	535	845	1 545
Karlovarský	142	270	204	249
Ústecký	793	790	527	748
Liberecký	224	459	353	391
Královéhradecký	686	461	300	330
Pardubický	350	443	325	477
Vysočina	190	172	195	374
Jihomoravský	1 527	1 146	2 790	2 828
Olomoucký	279	260	374	436
Zlínský	200	266	363	463
Moravskoslezský	1 097	1 019	815	1 000

Figure D5 Investment in ICT Services

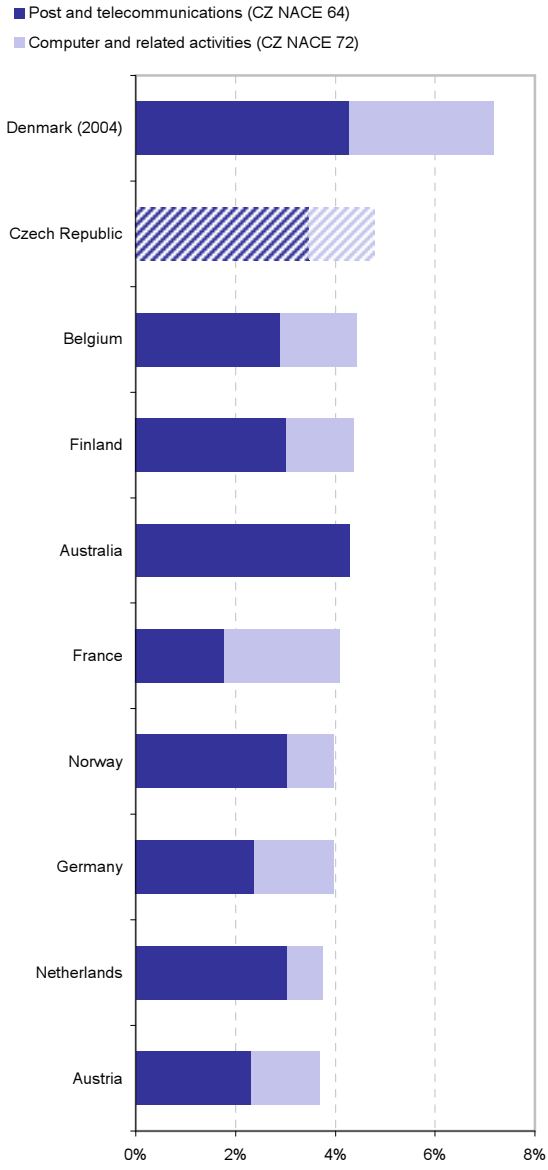


** includes also CZ-NACE 641*

Source: CZSO, Structural Business Survey

D Investment and R&D expenditures in ICT

Figure D6 Investment in ICT Services*, 2005
(as percentage of total services)



** includes also CZ-NACE 641*

Source: OECD, STAN Indicators Database

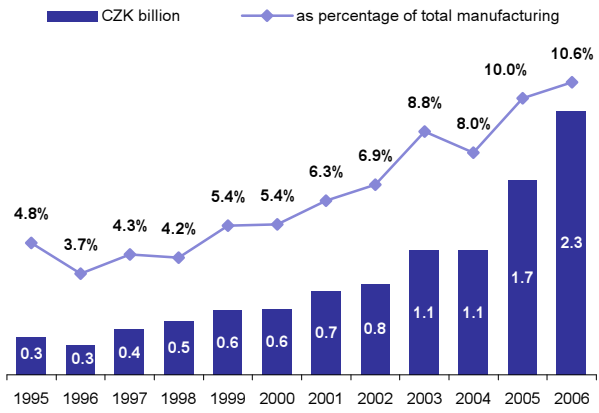
D Investment and R&D expenditures in ICT

Table D4 R&D Expenditures in ICT Manufacturing

CZK million

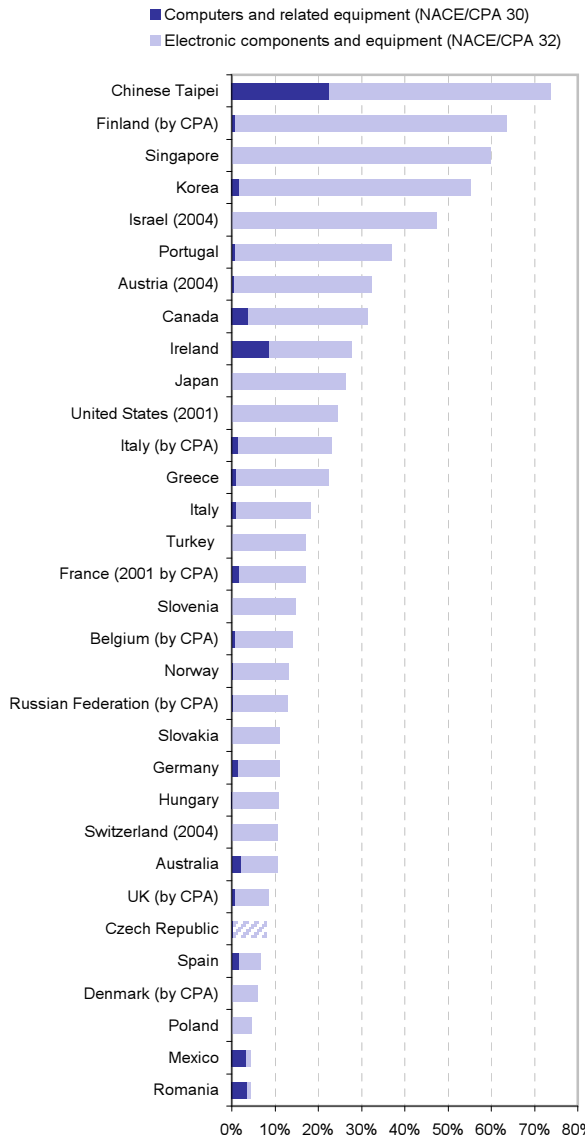
	2003	2004	2005	2006
Total	**1 097**	**1 096**	**1 711**	**2 319**
national enterprises	561	535	656	700
foreign affiliates	537	561	1 055	1 619
by Industry (CZ-NACE)				
30 Manuf. of computers equipment	26	40	46	19
32 M. of radio, TV and commun. equip.	737	755	1 320	1 357
321 M. of electronic components	104	166	186	137
322 M. of communication equipment	466	456	926	1 028
323 M. of consumer electronics	167	133	208	192
332 M. of instrum. for measur., testing	214	221	244	563
333 M. of ind. process control equip.	120	80	101	380
by size group of enterprise				
0 - 19 employees	13	28	24	31
20 - 49 employees	94	104	75	66
50 - 249 employees	729	709	605	648
250 + employees	261	256	1 008	1 573
by regions				
Praha	189	464	943	1 321
Středočeský	313	48	42	274
Jihočeský	13	12	9	11
Plzeňský	105	75	77	91
Karlovarský	1	1	1	1
Ústecký	2	6	11	3
Liberecký	25	27	13	28
Královéhradecký	27	32	50	41
Pardubický	169	145	225	162
Vysočina	-	0	6	6
Jihomoravský	172	136	160	210
Olomoucký	1	22	39	10
Zlínský	70	118	128	148
Moravskoslezský	11	11	8	12

Figure D7 R&D expenditures in ICT Manufacturing



Source: CZSO, R&D Database

Figure D8 R&D expenditures in selected ICT manufacturing industries, (% of total manufacturing), 2005



NACE = by economic activity (industry) of R&D unit

CPA = by product field of R&D unit

Source: OECD and CZSO calculations

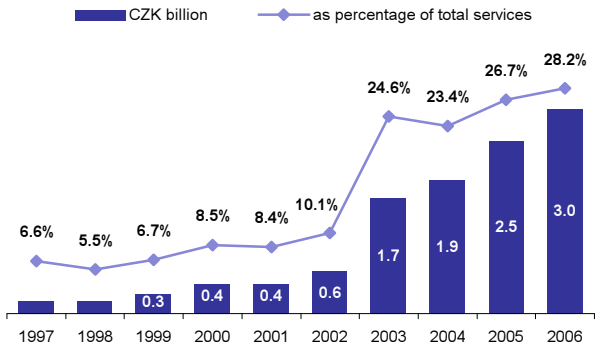
D Investment and R&D expenditures in ICT

Table D5 R&D Expenditures in ICT Services

CZK million

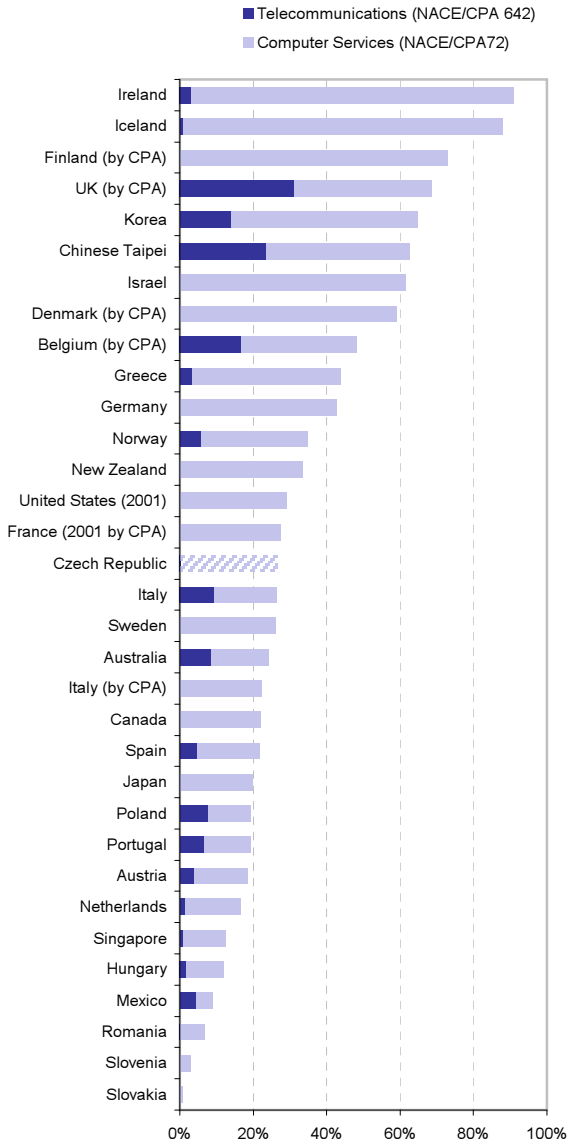
	2003	2004	2005	2006
Total	**1 675**	**1 936**	**2 494**	**2 964**
national enterprises	946	1 155	1 240	1 137
foreign affiliates	729	780	1 254	1 827
by Industry (CZ-NACE)				
642 Telecommunications	6	14	13	356
72 Computer and related activities	1 669	1 921	2 481	2 608
721 Hardware consultancy	3	21	22	21
722 Software consultancy and supply	1 258	1 451	1 864	2 101
723 Data processing	402	439	594	485
724 Data base activities	-	-	-	0
725 Repair of computing machinery	5	11	0	1
726 Other computer related activities	-	-	-	-
by size group of enterprise				
0 - 19 employees	241	265	212	284
20 - 49 employees	370	401	517	616
50 - 249 employees	1 062	1 033	1 326	1 302
250 + employees	1	237	439	762
by regions				
Praha	1 078	1 253	1 748	2 346
Středočeský	47	24	29	14
Jihočeský	26	29	33	32
Plzeňský	61	82	79	92
Karlovarský	-	-	-	-
Ústecký	36	39	48	51
Liberecký	38	42	28	30
Královéhradecký	22	23	35	24
Pardubický	24	21	21	48
Vysočina	40	36	46	
Jihomoravský	154	278	347	206
Olomoucký	38	30	32	61
Zlínský	39	19	24	27
Moravskoslezský	72	59	24	33

Figure D9 R&D expenditures in ICT Services



Source: CZSO, R&D Database

Figure D10 R&D expenditures in ICT Services, 2005
(as percentage of total services)



NACE = by economic activity (industry) of R&D unit
SKP = podle produkce kam výdaje na VaV směřují

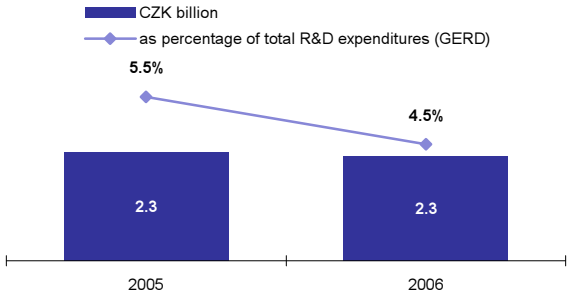
Source: OECD and CZSO calculations

Table D6 Software R&D expenditures

CZK million

	2005		2006	
	total	public funds	total	public funds
Total	**2 342**	**173**	**2 258**	**225**
by sector of performance				
Business Enterprise sector	2 271	108	2 152	138
Government sector	10	10	14	13
Higher education sector	61	56	90	72
Private non-profit sector	0	0	2	2
by Industry (CZ-NACE)				
Manufacturing	826	21	598	58
Electricity, gas and water supply	6	0	0	0
Construction	75	0	75	0
Wholesale and retail trade	33	9	30	8
Transport and storage	0	0	0	0
Post and telecommunications	0	0	80	0
Financial intermediation	179	3	142	0
Computer related activities	1 107	62	1 129	62
Research and Development	29	9	49	6
Other business activities	20	9	27	7
Public administration	1	1	9	9
Education	61	56	90	72
Health	0	0	27	0
Other social service	4	4	3	2
by regions				
Praha	1 707	64	1 664	137
Středočeský	24	8	28	6
Jihočeský	29	8	21	5
Plzeňský	76	2	77	12
Karlovarský	0	0	0	0
Ústecký	5	1	6	0
Liberecký	1	0	14	0
Královéhradecký	47	1	27	2
Pardubický	46	1	44	5
Vysočina	14	0	5	0
Jihomoravský	209	26	202	28
Olomoucký	63	6	57	22
Zlínský	39	3	48	4
Moravskoslezský	83	52	64	4

Figure D11 Software R&D expenditures



Source: CZSO, R&D Database

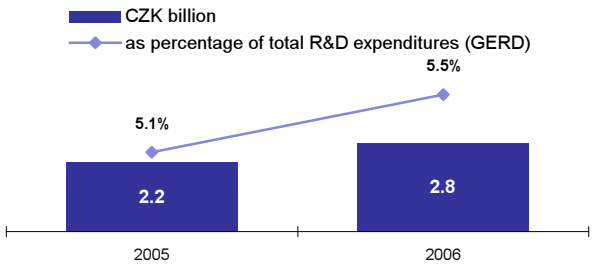
D Investment and R&D expenditures in ICT

Table D7 ICT (other than software) R&D expenditures

CZK million

	2005		2006	
	total	public funds	total	public funds
Total	**2 150**	**788**	**2 758**	**850**
by sector of performance				
Business Enterprise sector	1 763	452	2 376	521
Government sector	178	151	230	207
Higher education sector	203	183	143	116
Private non-profit sector	6	2	10	7
by Industry (CZ-NACE)				
Manufacturing total	697	77	974	111
Electricity, gas and water supply	5	3	1	0
Construction	175	7	173	11
Wholesale and retail trade	19	7	29	7
Transport and storage	1	1	4	2
Post and telecommunications	10	7	274	7
Financial intermediation	51	0	59	0
Computer related activities	557	273	563	296
Research and Development	297	162	264	154
Other business activities	79	18	161	36
Public administration	23	23	48	48
Education	204	183	144	116
Health	2	2	1	1
Other social service	31	26	63	62
by regions				
Praha	1 299	595	1 999	681
Středočeský	23	7	29	7
Jihočeský	68	52	18	3
Plzeňský	83	7	108	0
Karlovarský	6	3	4	2
Ústecký	3	3	5	1
Liberecký	3	0	45	9
Královéhradecký	21	4	11	3
Pardubický	148	24	106	25
Vysočina	38	15	7	1
Jihomoravský	188	46	223	58
Olomoucký	139	3	33	24
Zlínský	68	2	149	31
Moravskoslezský	63	27	21	5

Figure D12 ICT related (other than software) R&D expenditures



Source: CZSO, R&D Database

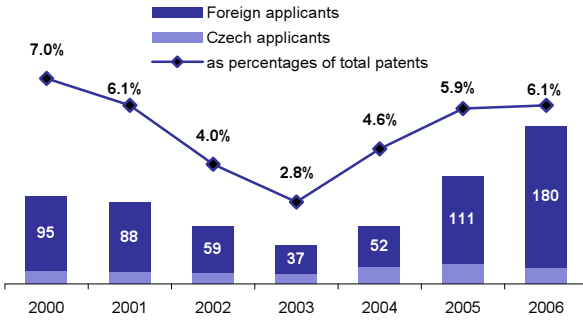
D Investment and R&D expenditures in ICT

Table D8 ICT patents granted in Czech Republic

	2003	2004	2005	2006
Total	**50**	**74**	**137**	**201**
by country of patent applicant				
Czech applicants	13	22	26	21
Foreign applicants	37	52	111	180
Germany	14	19	38	68
United States (US)	7	13	16	16
Netherlands	2	2	4	15
Switzerland	1	2	11	14
France	3	5	5	12
Japan	2	5	8	10
others	8	6	29	45
by ICT patent category				
Telecommunications	-	7	1	4
Audio and video equipment	-	1	1	1
Computer and related equipment	2	4	6	3
Other ICT	11	10	18	13
by Institutional sectors*				
Enterprises	6	14	10	9
Private persons	4	5	10	7
Public research institutes	2	-	2	-
Universities	1	3	4	5
by regions*				
Praha	9	8	17	6
Středočeský	1	2	2	3
Jihočeský	-	1	-	-
Plzeňský	-	1	2	1
Karlovarský	-	-	-	-
Ustecký	-	2	1	-
Liberecký	1	-	1	1
Královéhradecký	-	1	-	-
Pardubický	-	-	-	-
Vysočina	-	1	-	-
Jihomoravský	1	4	2	6
Olomoucký	-	2	1	1
Zlínský	-	-	-	1
Moravskoslezský	1	-	-	2

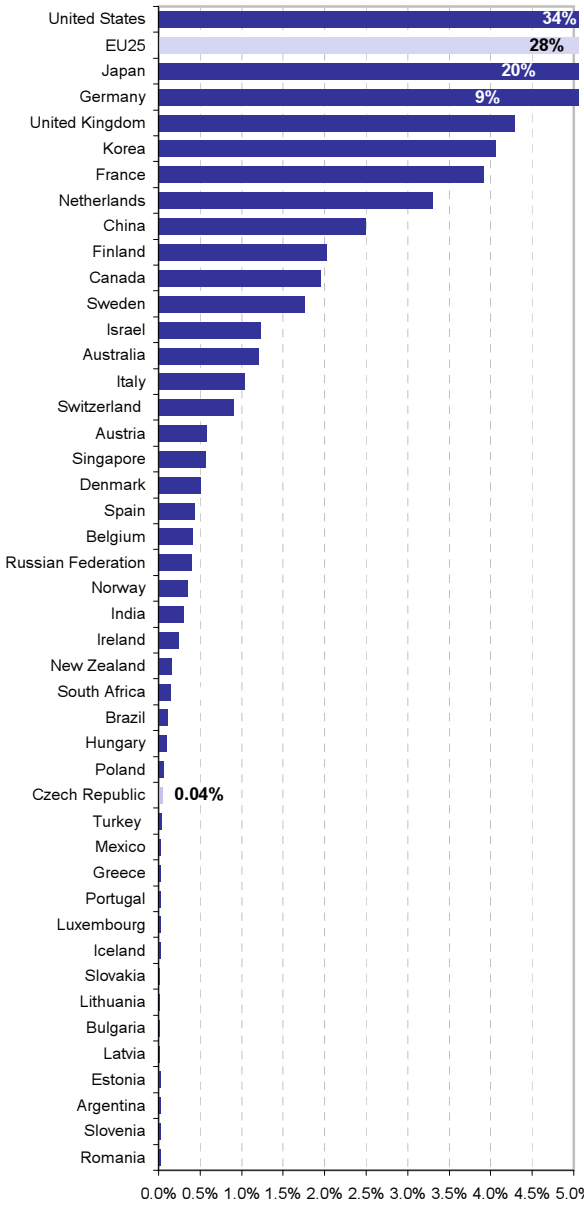
** only for Czech patent applicants*

Figure D13 ICT patents granted in Czech Republic



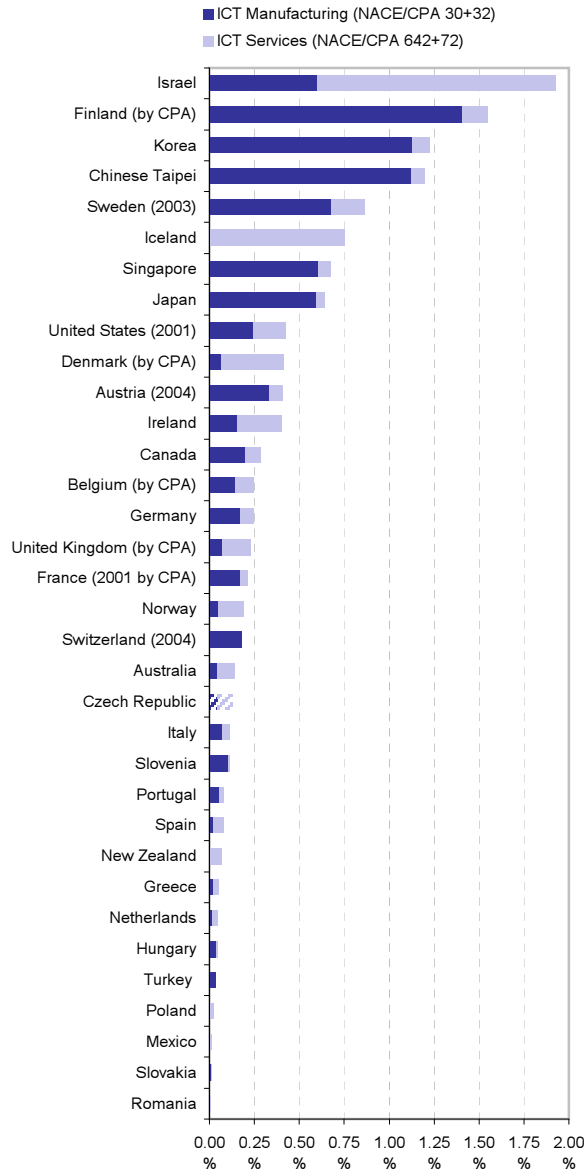
Source: Patent Office of the Czech Republic and CZSO calculations

Figure D14 Share of countries in ICT-related patents filed under the PCT at EPO, 2004



Source: OECD

Figure D15 R&D expenditures in ICT sector, 2005 (as a percentage of GDP)



NACE = by economic activity (industry) of R&D unit
CPA = by product field of R&D unit

Source: OECD and CZSO calculations