II. Expenditure on Research and Development in the Czech Republic

II.1 Total expenditure on research and development in the Czech Republic (GERD)

Among crucial indicators measuring activities in research and development belong expenditure (intramural) on research and development.[1] **In 2005, total domestic expenditure on research and development (GERD) in the Czech Republic measured in current prices reached value of 42 198 million CZK.** Compared with the previous Year 2004 the total R&D expenditures (GERD) in the Czech Republic has increased by 20,3 %, from value of 35 083 million CZK in 2004. The share of total R&D expenditure (GERD) on GDP **(R&D intensity) in 2005 was about 1,42 % in the Czech Republic**.

Figure 2.1 Total R&D expenditure (GERD) in the Czech Republic in 1995- 2005

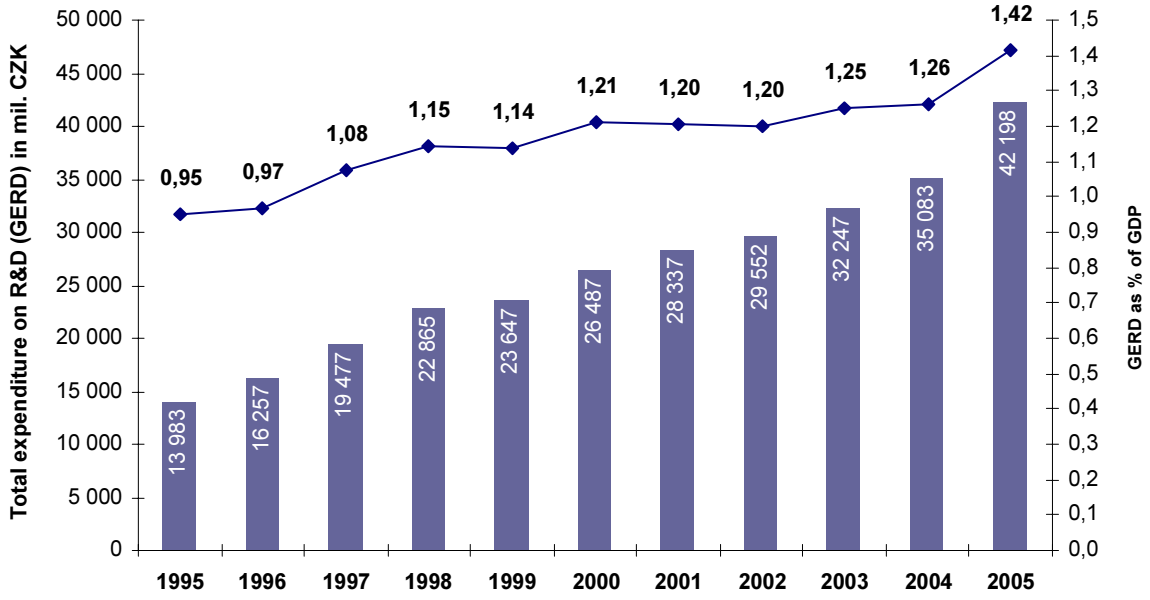


Table 2.1 Total R&D expenditures (GERD) in the Czech Republic in 1995-2005

Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total R&D expenditure (GERD) in million CZK (current prices)	**13 983**	**16 257**	**19 477**	**22 865**	**23 647**	**26 487**	**28 337**	**29 552**	**32 247**	**35 083**	**42 198**
Annual growth (%)	*x*	*16,3*	*19,8*	*17,4*	*3,4*	*12,0*	*7,0*	*4,3*	*9,1*	*8,8*	*20,3*
Total R&D expenditure (GERD) in million CZK (at 2000 prices)	**20 873**	**21 143**	**23 543**	**25 072**	**24 878**	**26 487**	**26 373**	**26 251**	**27 392**	**27 616**	**31 019**
Annual growth (%) in real terms	*x*	*1,3*	*11,4*	*6,5*	*-0,8*	*6,5*	*-0,4*	*-0,5*	*4,3*	*0,8*	*12,3*

Compared to the Year 1995, the total R&D expenditure (GERD) in the Czech Republic has increased by three folds. In real terms the total R&D expenditure related to the price level of the Year 2000, has increased in the same period (since 1995 until 2005) by 48,6 %. Compared to the year 2004 the total R&D expenditure in current prices has increased by 20,3 % and in fixed prices based on 2000 has increased by 12,3 %.

[1] In the international terminology of OECD and Eurostat are total expenditures on R&D known as **GERD (Gross Expenditure on R&D**), which mean, in line with the methodology of Frascati manual 2002, total (gross) national expenditures on R&D.

II.2 Financial sources for research and development

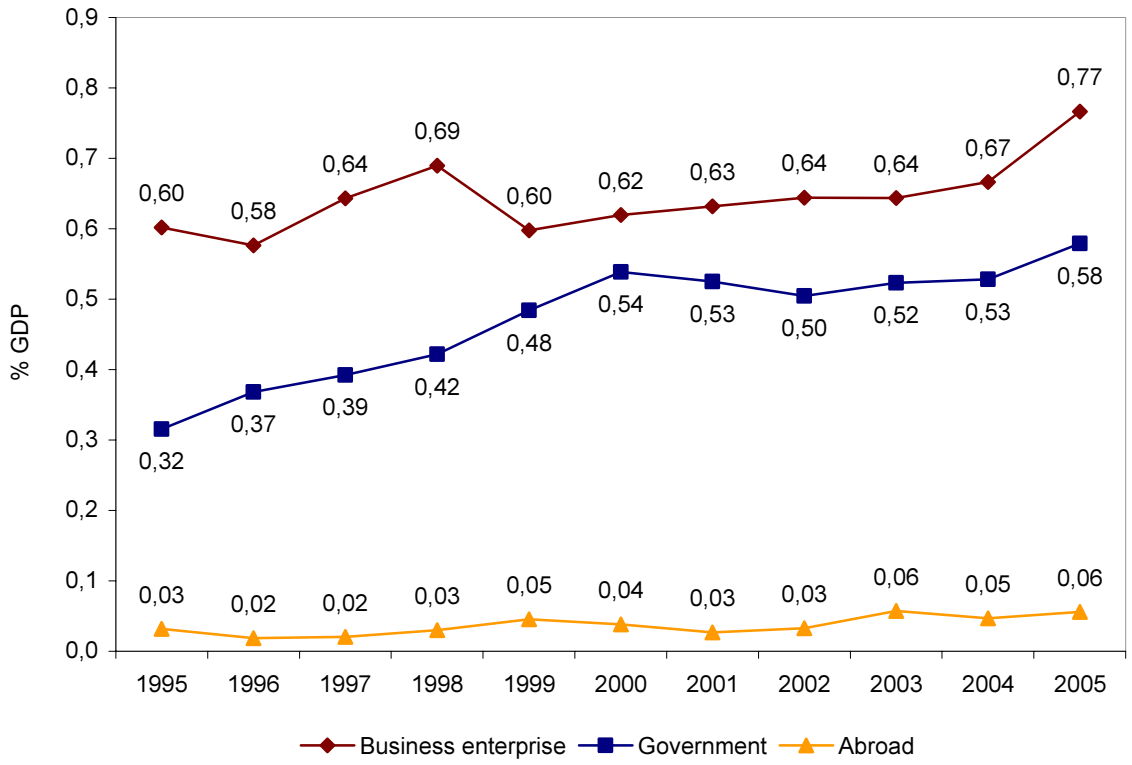
II.2.1 Total R&D expenditure according to the source of funds (sectors of financing)

In 2005, the business enterprise sector was the main source of funds (sector of financing) of total R&D expenditure (GERD) in the Czech Republic. Business enterprise sector R&D expenditures as source of R&D funds reached 22 825 million CZK in 2005, or about 0,77 % of overall gross domestic product (GDP). Government sources provided 17 248 million CZK for R&D activities. Public expenditures, in line with government conception of financing R&D in the Czech Republic, reached 0,58 % GDP. Financial sources from abroad devoted to R&D, reached the above mentioned share 0,06 % GDP.

According to the Lisbon strategy (see document Action plan for Europe) approved for EU Member States, should the total support to R&D (total R&D expenditure regardless of the source of finance-GERD) in the Czech Republic reached 3 % of GDP by 2010. Research and development expenditure financed from public sources (by government sector), should then reach in the same Year 1 % of GDP.

Trend of total R&D expenditure (GERD) in the Czech Republic according to the source (sectors) of funds in 1995-2005 shows following figure 2.2.

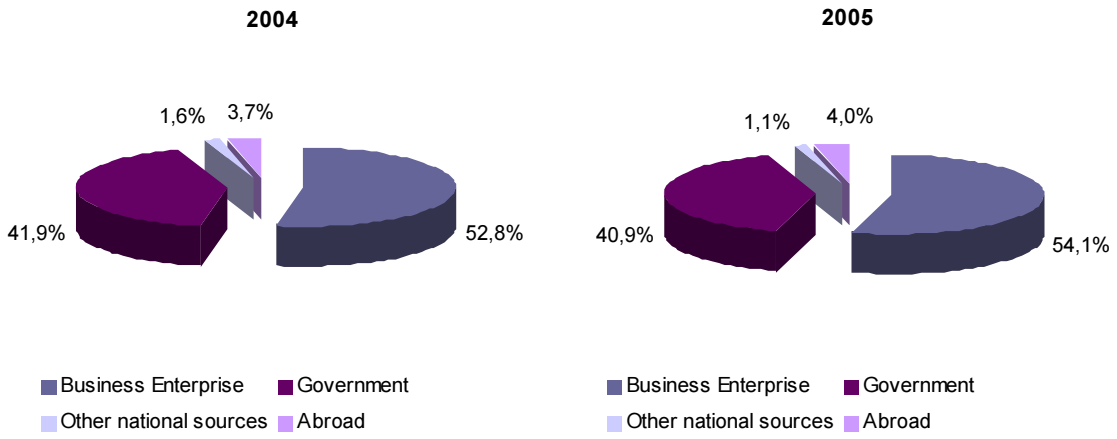
Figure 2.2 GERD in the Czech Republic by its sector of financing in 1995-2005 (as %GDP)



Note: In addition to the sectors illustrated in above figure 2.2, the other sources of funds are: high education sector, private non-profit sector and abroad.

In 2005, the most important financial source supporting research and development activities in the Czech Republic was, like in the previous Years, business enterprise sector, which contributed to the total R&D expenditure (GERD) in the Czech Republic by 54,1 %. The second most important provider of financial sources was government sector, with 40,9 % share. In 2005 the share of expenditure on R&D financed from abroad compared to previous Year 2004 increased from 3,7 % to 4,0 %. Structure and value of the total R&D expenditure according to the source (sectors) of funds in the Czech Republic in 2004 and 2005 shows following figure and table.

Figure 2.3 Structure of GERD in the Czech Republic by source of funds in 2004 and 2005 (%)



Increase in the financial sources from business enterprise sector, government sector and source from abroad for R&D activities was recorded. The highest year-on-year increase (by 28,7 %) was recorded in 'sources from abroad'. A considerable increase in the source of funds by 23,2 % was found in the business sector. And in government sector the same increase by 17,4 % was found. On the contrary, a decrease in the financial sources from private non-profit sector from 19 million CZK to 2 million CZK was recorded. In absolute numbers business enterprise sector recorded in year on year comparison the biggest increase of financial sources for R&D, for almost 4,3 billion CZK.

Table 2.2 GERD in the Czech Republic by its sector of financing in 2004 and 2005

SECTOR	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Business Enterprise	18 530	*52,8*	22 825	*54,1*	1,2318
Government	14 695	*41,9*	17 248	*40,9*	1,1738
Higher Education	542	*1,5*	454	*1,1*	0,8369
Private Non-profit	19	*0,1*	2	*0,0*	0,1133
Abroad	1 297	*3,7*	1 669	*4,0*	1,2870
Total	**35 083**	***100,0***	**42 198**	***100***	**1,2028**

Another look on evaluation of R&D expenditure, except for above mentioned breakdown according to the financial sources of R&D expenditure, provides breakdown according to the use of R&D expenditure, i.e. according to the sector of R&D performance (see Chapter II.3) Following table enables combined look at R&D expenditure both from the point of view of individual sectors and from the point of view of its using (performance).

Table 2.3 GERD in the Czech Republic by its sector of financing and performance in 2005 (million CZK)

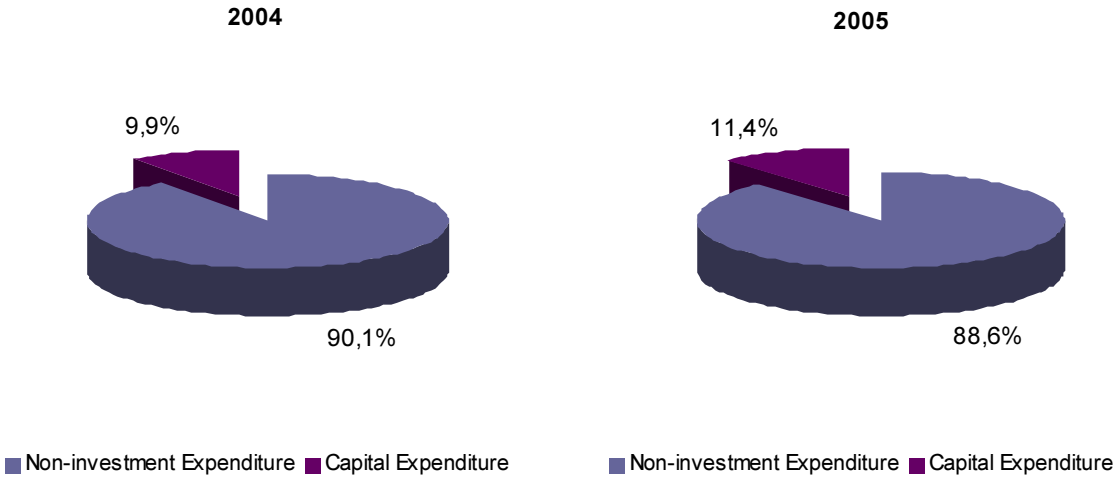
SOURCE OF FUNDS	SECTOR OF PERFORMANCE				
	Business Enterprise	Government	Higher Education	Private Non-profit	Total
Business Enterprise	21 983	765	58	20	**22 825**
Government	3 987	6 762	6 341	159	**17 248**
Higher Education	21	112	318	3	**454**
Private Non-profit	0	0	0	2	**2**
Abroad	1 218	250	191	11	**1 669**
Total	**27 209**	**7 889**	**6 907**	**194**	**42 198**

Note: see table no. 3 for complete breakdown of GERD in the Czech Republic in sectors of performance by sources of funds during 2004 and 2005.

II.2.2 Total R&D expenditure (GERD) by the type of expenditure

In 2005 the share of non-investment expenditure in total R&D expenditure reached 88,6 %. The investment expenditure shares the rest (11,4 %). Personnel costs formed 41,5 % of total non-investment (current) expenditures and the rest 58,5 % other non-investment expenditures. In investment (capital) costs formed the biggest item with 82,1 % share other long-term tangible property, among which are included e.g. equipment and machinery. In 2005 17,9 % of total investment costs was spent for land, building, halls and tangible property.

Figure 2.4 GERD in the Czech Republic by type of expenditure (costs) in 2004 and 2005 (%)



Minor changes were observed in the year-on-year comparison of the R&D expenditure by type of costs. A decrease (by 1,5 %) in the current costs and the same amount of increase in the capital expenditure was recorded. Share of personnel costs in total non-investment expenditure (current costs) increased from 40,2 % in 2004 to 41,5 % in 2005.

Compared with the previous Year 2004 both current costs and capital expenditures observed an increase. The current costs increased by 18,2 % and capital expenditures increased by 39,3 %. From non-investment expenditure, the costs on wages increased the most in year-on-year comparison, it was by 21,4 %, and rewards for contracts of services in research and development increased for 46,6 %. From investment expenditure (costs) increased the most (by 58,5 %) the item of tangible property (land, building, etc.)

Table 2.4 GERD in the Czech Republic by type of expenditure (costs) in 2004 and 2005

TYPE OF EXPENDITURE		2004		2005		Index 05/04
		million CZK	%	million CZK	%	
Current costs		**31 617**	***90,1***	**37 369**	***88,6***	**1,1819**
Incl.	Labour costs	12 428	*35,4*	15 092	*35,8*	1,2144
	Labour costs for short term contract	277	*0,8*	406	*1,0*	1,4662
	Other current costs	18 912	*53,9*	21 871	*51,8*	1,1564
Capital expenditure		**3 466**	***9,9***	**4 829**	***11,4***	**1,3933**
Incl.	Lands and buildings	545	*1,6*	864	*2,0*	1,5850
	Instruments and equipment	2 921	*8,3*	3 965	*9,4*	1,3576
Total		**35 083**	***100,0***	**42 198**	***100,0***	**1,2028**

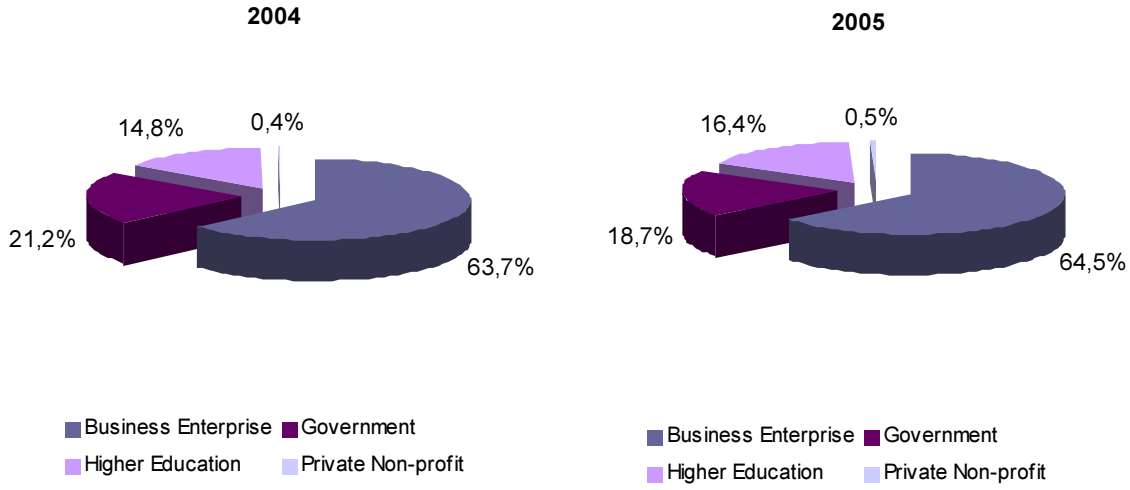
Note: see table no. 4 for complete breakdown of GERD in the Czech Republic by sectors of performance and type of costs during 2004 and 2005.

II.3 Using financial sources in Research and Development

II.3.1 Total R&D expenditure according to the sectors of performance

In 2005, business enterprise sector is, as in case of sector of financing R&D activities, the most important sector performing R&D activities in the Czech Republic. In 2005 this sector spent 27 209 million CZK on R&D activities, which means about 64,5 % of GERD. The second most important sector of R&D performance is according to the criterion using of financial sources government sector. This sector was spent on R&D 7 889 million CZK in 2005 or about 18,7 % of GERD. The sector of higher education spent 6 907 million CZK from the total R&D expenditure, which means share of 16,4 %. This higher education sector gets, most of the financial sources, with regard to the system of financing R&D at universities, from government sector.

Figure 2.5 GERD in the Czech Republic by sectors of performance in 2004 and 2005 (%)



From year-on-year comparison the private non-profit sectors recorded the highest share of expenditure spent on R&D. The year-on-year increase of expenditure reached 45,5 % and the share in the total R&D expenditure increased just from 0,4 % in 2004 to 0,5 % in 2005. There is a considerable increase in the share of higher education sector in total expenditure on R&D. Between 2004 and 2005 the business enterprise sector recorded an increase of expenditure on R&D by 21,8 %. In 2005 the government sector recorded the lowest increase in the expenditure on R&D i.e. by 6,2 % comparing to the previous year 2004.

Table 2.5 GERD in the Czech Republic by sectors of performance in 2004 and 2005

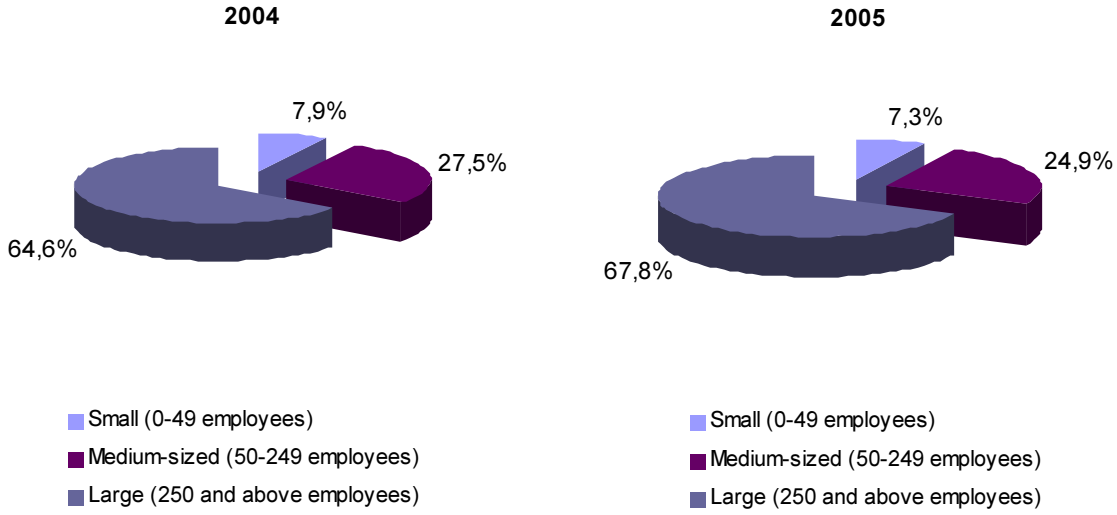
SECTOR OF PERFORMANCE	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Business Enterprise	22 344	*63,7*	27 209	*64,5*	1,2177
Government	7 425	*21,2*	7 889	*18,7*	1,0625
Higher Education	5 181	*14,8*	6 907	*16,4*	1,3332
Private Non-profit	133	*0,4*	194	*0,5*	1,4550
Total	**35 083**	***100,0***	**42 198**	***100,0***	**1,2028**

Note: see table no. 4 for detailed breakdown of total expenditures on R&D in the Czech Republic by sectors and type of costs during 2004 and 2005.

II.3.2 Total R&D expenditure according to the size of R&D units (subjects)

In 2005 like in previous Years large economic subjects with more than 250 employees mainly contributed to the total R&D expenditure in the Czech Republic. Their share on total R&D expenditure was 67,8 %. In the sector of higher education reached these large economic subjects on total R&D expenditure within this sector almost 100 %, in 2005. Economic subjects with 50-249 employees (medium-size classed economic subjects) reached the share 24,9 % and subjects with less than 49 employees (small) 7,3 % within all R&D units in the Czech Republic.

Figure 2.6 GERD in the Czech Republic by size classes of R&D units in 2004 and 2005 (%)



With regard to year-on-year comparison between 2004 and 2005 expenditures increased in all above mentioned size classes except in size group 0-9 employees. The highest increase was at large economic subjects, where the increase reached 26,3 %. Shares of individual size-classes on the total R&D expenditure changed between Years 2004 and 2005. Large economic subjects recorded an increase by 3,2 percent points, medium-sized and small economic subjects recorded a decrease by 2,6 percent points and 0,6 percent points respectively.

Table 2.6 GERD in the Czech Republic by size classes of R&D subjects in 2004 and 2005

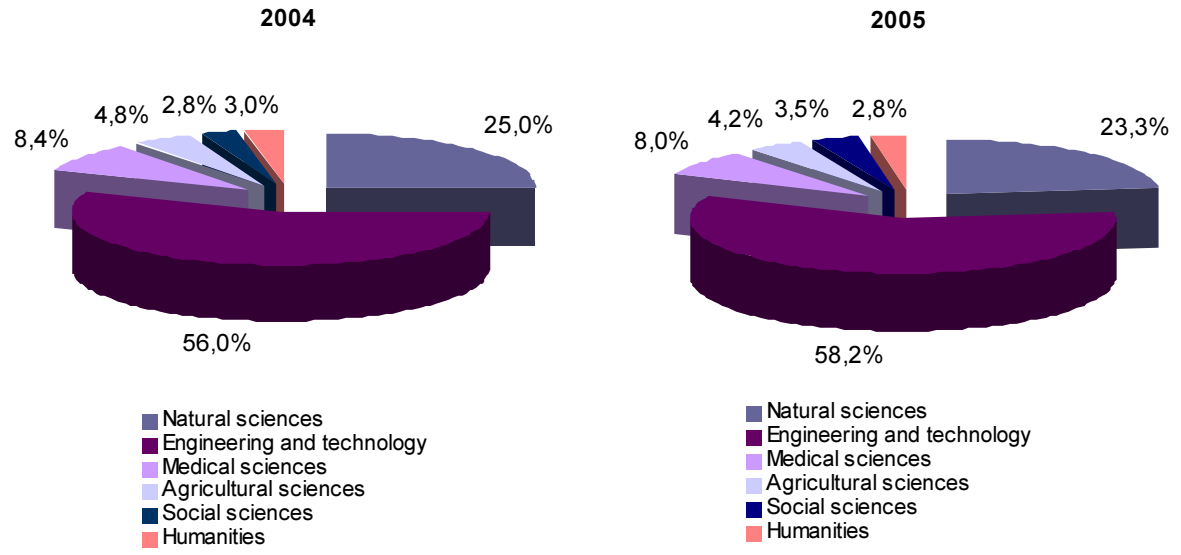
SIZE-CLASS	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Small (0-49 employees)	**2 775**	***7,9***	**3 068**	***7,3***	**1,1056**
0-9 employees	569	*1,6*	524	*1,2*	0,9208
10-49 employees	2 206	*6,3*	2 544	*6,0*	1,1532
Medium-sized (50-249 employees)	**9 659**	***27,5***	**10 524**	***24,9***	**1,0895**
Large (250 and above employees)	**22 649**	***64,6***	**28 607**	***67,8***	**1,2631**
250-499 employees	4 767	*13,6*	6 010	*14,2*	1,2607
500 and above employees	17 882	*51,0*	22 597	*53,5*	1,2637
Total	**35 083**	***100,0***	**42 198**	***100,0***	**1,2028**

Note: For complete breakdown of expenditure on R&D by size classes of economic subject see table annex (table 8).

II.3.3 Total R&D expenditure by fields of science

The largest amount of R&D expenditure was as usual spent in the field of engineering and technology, which has the evident connection to the most important sector of R&D performance i.e. business enterprise sector, where major dominate technical sciences. In 2005 the expenditures on R&D in this field were 24 566 million CZK, i.e. share 58,2 % from total R&D expenditure. The second most important field of science with R&D expenditures at the level of 9 845 million CZK and share 23,3 % were natural sciences. In 2005 the share of Natural sciences and engineering (sum of natural sciences, engineering and technology, medical and agricultural sciences) in total R&D expenditure was 93,7 % and the rest of fields i.e., social sciences and humanities were below 10 % (see fig. 2.7). In the government sector the most important field of science are natural sciences with the share of 53,9 %.

Figure 2.7 GERD in the Czech Republic by the main fields of science in 2004 and 2005



In year-on-year comparison between 2005/2004, the highest increase was in the field of social sciences (46,4 %). Their share in the total R&D expenditure increased from 2,8 % in 2004 to 3,5 % in 2005. Second highest increase 25,1 % was recorded in the field of engineering and technology i.e., year-on-year increase was 2,2 percent points. In 2005 the shares of the remaining fields, natural sciences, agricultural sciences, medical sciences and humanities decreased slightly.

Table 2.7 GERD in the Czech Republic by the main fields of science in 2004 and 2005

FIELDS OF SCIENCE	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Natural sciences and Engineering	**33 041**	***94,2***	**39 542**	***93,7***	**1,1968**
Natural sciences	8 777	*25,0*	9 845	*23,3*	1,1217
Engineering and technology	19 632	*56,0*	24 566	*58,2*	1,2513
Medical sciences	2 940	*8,4*	3 374	*8,0*	1,1475
Agricultural sciences	1 692	*4,8*	1 757	*4,2*	1,0385
Social science and Humanities	**2 042**	***5,8***	**2 656**	***6,3***	**1,3007**
Social science	995	*2,8*	1 457	*3,5*	1,4641
Humanities	1 047	*3,0*	1 199	*2,8*	1,1454
Total	**35 083**	***100,0***	**42 198**	***100,0***	**1,2028**

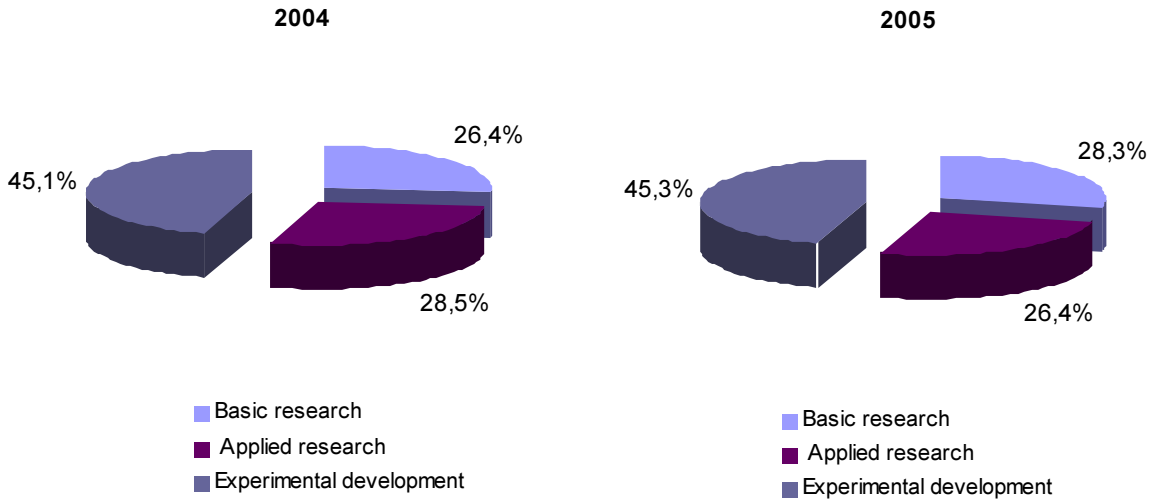
Note: For complete breakdown of expenditure on R&D by sectors and field of science, see (table 6).

II.3.4 Total R&D expenditure by type of R&D activity

In 2005 the highest amount on R&D was spent for experimental development. The total amount was 19 123 million CZK, which means share of 45,3 % in the total R&D expenditure (GERD) in the Czech Republic. Applied research contributed to the total R&D expenditure with the amount of 11 123 million CZK or about 26,4 % share. Share of basic research in the total R&D expenditure reached 28,3 % i.e.11 952 million CZK.

In business enterprise sector, most of R&D is realized in the form of experimental development (67,3 %). As regards government sector and sector of higher education, the highest share on the total R&D expenditure belong to the basic research. In 2005 this share in government sector was 74,7 % and in the sector of higher education 58,9 %. The share of experimental development in 2005 in the above mentioned two sectors was 4,1 % and 6,2 % respectively.

Figure 2.8 GERD in the Czech Republic by the type of R&D activity in 2004 and 2005



Comparing Years 2005 and 2004, the slight increase in the share of expenditure on experimental development was reached (from 45,1 % in 2004 to 45,3 % in 2005) as well as on basic research (from 26,4 % in 2004 to 28,3 % in 2005). Share of applied research decreased from 28,5 % in 2004 to 26,4 % in 2005. The highest year-on-year increase in expenditure was recorded in basic research, i.e. 29,2 %.

Table 2.8 GERD in the Czech Republic according to the type of R&D activity in 2004 and 2005

TYPE OF R&D ACTIVITY	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Basic research	9 251	*26,4*	11 952	*28,3*	1,2920
Applied research	9 992	*28,5*	11 123	*26,4*	1,1132
Experimental development	15 839	*45,1*	19 123	*45,3*	1,2073
Total	**35 083**	***100,0***	**42 198**	***100,0***	**1,2028**

Note: For complete breakdown of expenditure on R&D by sectors and type of activity, see (table 5).

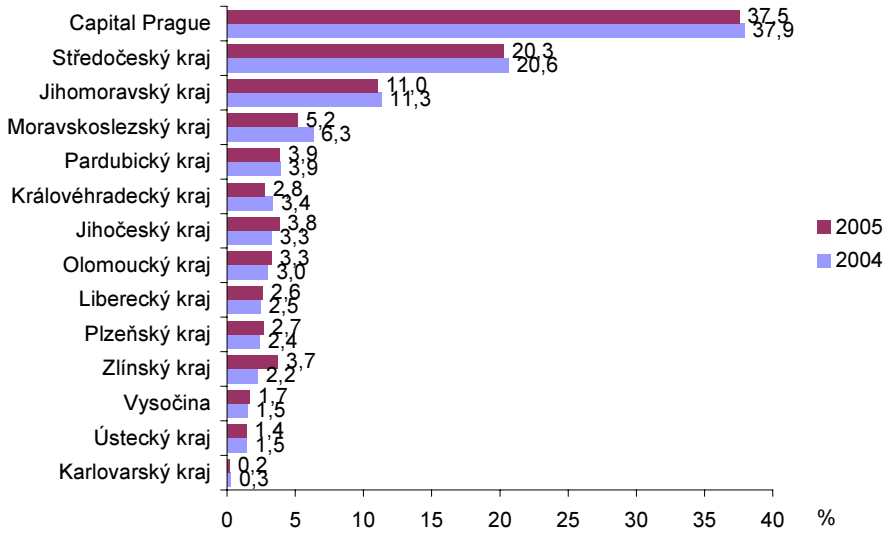
II.3.5 Total R&D expenditure by regions (at NUTS 3 level)

In 2005 most of the financial sources on research and development were spent in the capital city of Prague, it was 37,5 % of the total R&D expenditure, i.e., 15 835 mil. CZK. Středočeský region was in the second place, with an important share of 20,3 %. In Moravia the highest share in total GERD was recorded in Jihomoravský region (11,0 %). Only these three above mentioned regions realized shares exceeding 10 %. Karlovarský region had the lowest expenditure 76 million CZK (0,2 %) of all regions.

In year-on-year comparison stable shares were recorded at individual regions. Comparison to 2004 the share of R&D expenditure increased in Zlínský region and Jihočeský region. On the other hand, the biggest decrease in share of R&D expenditure was realized in Královéhradecký region and Moravskoslezský region.

The highest increase of R&D expenditure in between Years 2004 and 2005 was in region Zlínský (99,6 %), followed by Jihočeský region (40,5 %) and Plzeňský region (35,1 %). The biggest decrease in between the abovementioned years was in Karlovarský region (-20,6 %) and Moravskoslezský region (-1,4 %).

Figure 2.9 GERD according to the regions (at NUTS 3 level) in 2004 and 2005



The main reason for the highest R&D expenditure, that are as usual recorded in the capital city of Prague, is the high concentration of subjects carrying out R&D in the capital city, which are locally registered to perform their economic activity. To this situation also contributes concentration of most of the universities and Academy of sciences in Prague.

Table 2.9 GERD in the Czech Republic according to the regions (at NUTS 3 level) in 2004 and 2005

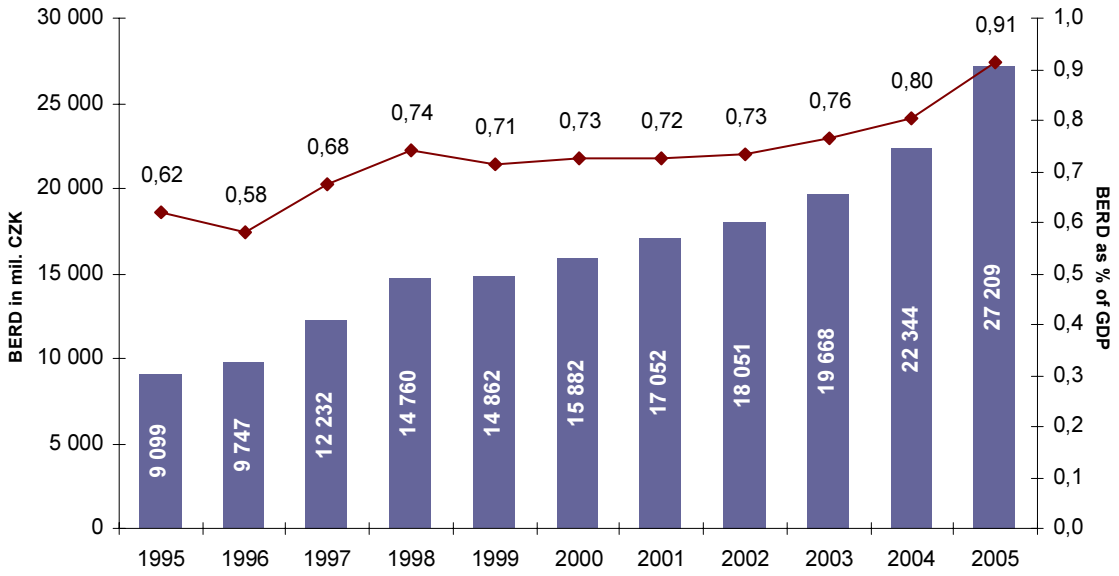
REGIONS (NUTS 3)	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Capital Prague	13 300	*37,9*	15 835	*37,5*	1,1906
Středočeský kraj	7 238	*20,6*	8 561	*20,3*	1,1828
Jihočeský kraj	1 146	*3,3*	1 610	*3,8*	1,4053
Plzeňský kraj	836	*2,4*	1 130	*2,7*	1,3512
Karlovarský kraj	96	*0,3*	76	*0,2*	0,7935
Ústecký kraj	510	*1,5*	589	*1,4*	1,1557
Liberecký kraj	868	*2,5*	1 110	*2,6*	1,2784
Královéhradecký kraj	1 177	*3,4*	1 169	*2,8*	0,9935
Pardubický kraj	1 365	*3,9*	1 632	*3,9*	1,1957
Vysočina	529	*1,5*	707	*1,7*	1,3362
Jihomoravský kraj	3 964	*11,3*	4 654	*11,0*	1,1740
Olomoucký kraj	1 054	*3,0*	1 372	*3,3*	1,3019
Zlínský kraj	787	*2,2*	1 571	*3,7*	1,9963
Moravskoslezský kraj	2 213	*6,3*	2 182	*5,2*	0,9860
Total	**35 083**	***100,0***	**42 198**	***100,0***	**1,2028**

Note: For complete breakdown of expenditure on R&D by sectors and regions, see (table 7).

II.4 R&D expenditure in business enterprise sector (BERD)[2]

As it was already mentioned in the previous text, business enterprise sector is the most important source of finance of R&D activities as well as the most important sector of R&D performance (using of financial sources for R&D activities**). In 2005, in the Czech business enterprise sector spent 27 209 million CZK on the activities connected with R&D, i.e., share of 0,91 % GDP.**

Figure 2.10 Business enterprise expenditure on R&D (BERD); 1995-2005 (% GDP)



In year-on-year comparison of 2004 and 2005 increase of R&D expenditure spent in business enterprise sector (BERD) by 21,8 % was observed. Share in GDP went up from 0,80 % in 2004 to 0,91 % in 2005. Research and development expenditures in business enterprise sector (BERD) have been increasing, each year, since 1995 (except for the year 1999).

Table 2-10 BERD in the Czech Republic in 1995-2005

INDICATOR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
R&D expenditure (BERD) in million CZK (current prices)	**9 099**	**9 747**	**12 232**	**14 760**	**14 862**	**15 882**	**17 052**	**18 051**	**19 668**	**22 344**	**27 209**
Annual growth (%) in current prices	*x*	*7,1*	*25,5*	*20,7*	*0,7*	*6,9*	*7,4*	*5,9*	*9,0*	*13,6*	*21,8*
R&D expenditure (BERD) in million CZK (at 2000 prices)	**13 583**	**12 676**	**14 785**	**16 185**	**15 636**	**15 882**	**15 870**	**16 035**	**16 707**	**17 589**	**20 000**
Annual growth in real terms (at 2000 prices)	*x*	*-6,7*	*16,6*	*9,5*	*-3,4*	*1,6*	*-0,1*	*1,0*	*4,2*	*5,3*	*13,7*

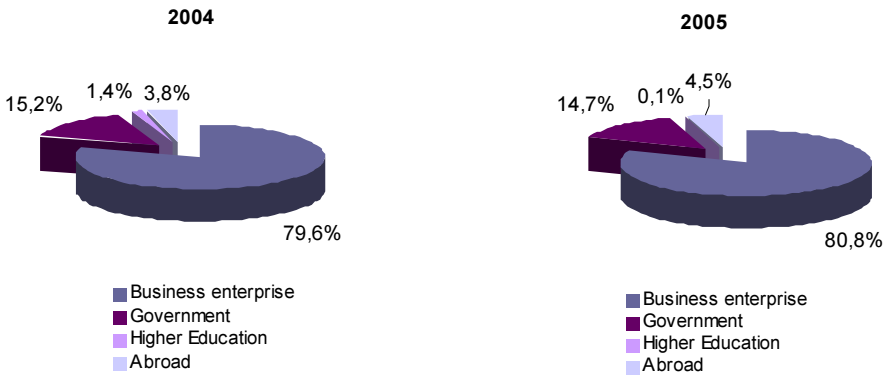
Compared to the Year 1995, the total R&D expenditure in business enterprise sector (BERD) has increased by 199 %. In real terms the total R&D expenditure related to the price level of the Year 2000, has increased in the same period (since 1995 until 2005) by 47,0 %.

[2] In the international terminology of OECD and Eurostat have R&D expenditure in business enterprise sector in line with methodology of Frascati manual the abbreviation **BERD (Business Expenditure on R&D**).

II.4.1 Business enterprise expenditure on R&D according to its source of funds

In 2005 the total amount used for R&D in business enterprise sector was 80,8 % (21 982 million CZK) i.e., from own sources 21 419 mil. CZK and from other business firms: 563 million CZK and 14,7 % (3 987 million CZK) from government sources. The business enterprise sector received 4,5 % (1 218 million CZK of which 966 million CZK from own sources and 252 million CZK from European commission and NATO etc.) for their research and development activities from abroad. Whereas the higher education sector financed just 0,1 % R&D in business enterprise sector.

Figure 2.11 BERD in the Czech Republic by source of funds in 2004 and 2005 (%)

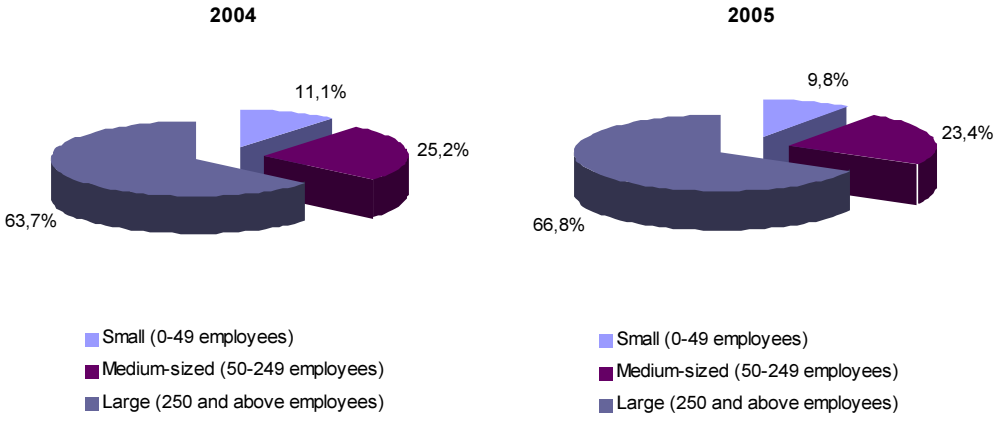


Share of own sources slightly increased from 79,6 % in 2004 to 80,8 % in 2005. In 2004 the financial sources from government sector were 3 395 million CZK (15,2 %) and in 2005 were 3 987 million CZK (14,7 %). Share of sources from abroad increased in between Years 2004 and 2005 by 0,7 % points (from 3,8 % in 2004 to 4,5 % in 2005).

II.4.2 Business enterprise expenditure on R&D by size-classes

In 2005 most of the R&D expenditures were recorded in large enterprises with more than 250 employees. Share of the large size-class on the total R&D expenditure in business enterprise sector reached 66,8 %, i.e. 18 182 million CZK in absolute number. The second most important group was medium size-classed firms with 50-249 employees. Their share on total R&D expenditure in business enterprise sector reached 23,4 %. Small enterprises (0-49 employees) contributed 9,8 %. Large enterprises recorded the highest year-on-year increase, 27,8 %. In medium-sized enterprises this year-on-year, between 2005 and 2004, increase was 7,6 %.

Figure 2.12 BERD in the Czech Republic by size-classes in 2004 and 2005



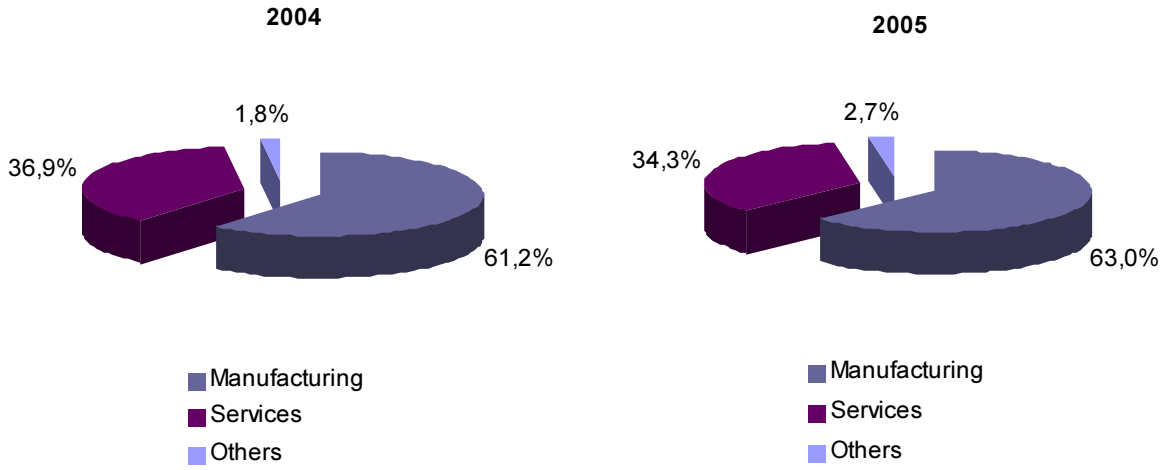
Note: see table 13 for R&D expenditure by source and size classes during 2004 and 2005.

II.4.3 Business enterprise expenditure on R&D by industries (NACE branches) [3]

In 2005 most of R&D expenditures in business enterprise sector, by classification of economic activities (NACE), were spent in manufacturing industries. The share of manufacturing industries in total BERD reached 63,0 %. Research and development in services reached a share of 34,3 %. R&D expenditure in other industries was only 2,7 % of total R&D expenditure in the Czech Business enterprise sector, of which Construction reached a share of 1,2 %. Shares in remaining industries did not exceed level of 1 %. For more details see figure 2.13 and table no. 2.11.

In 2005 compared to the Year 2004 BERD in the Czech Republic observed a change in shares in manufacturing industries and services. In manufacturing industries the share rose from 61,2 % in 2004 to 63,0 % in 2005, where as in services the share decreased from 36,9 % in 2004 to 34,3 % in 2005.

Figure 2.13 BERD in the Czech Republic by main industries in 2004 and 2005



The highest increase between 2004 and 2005 was realized in Electricity, gas and water industry, where R&D expenditure went up 18 times, nevertheless share of this industry in BERD slightly increased from 0,048 % in 2004 to 0,7 % in 2005. Important year-on-year increase (by 21,3 %) appeared in services. Year-on-year increase, three times, was observed in mining and quarrying industries where as in manufacturing industries it was 25,3 %.

Table 2.11 BERD in the Czech Republic by main industries in 2004 and 2005

NACE	CZ-NACE	2004		2005		Index 05/04
		million CZK	%	million CZK	%	
A+B	Agriculture, forestry and fishing	87	*0,4*	82	*0,3*	0,9440
C	Mining and quarrying	37	*0,2*	122	*0,4*	3,3203
D	Manufacturing	13 685	*61,2*	17 145	*63,0*	1,2528
E	Electricity, gas and water supply	11	*0,0*	199	*0,7*	18,3762
F	Construction	273	*1,2*	336	*1,2*	1,2331
G-O	Services sector	8 252	*36,9*	9 324	*34,3*	1,1299
A-O	**Total**	**22 344**	***100,0***	**27 209**	***100,0***	**1,2177**

Note: see table 14 and 17 for BERD in industries by type of costs and source of funds during 2004 and 2005.

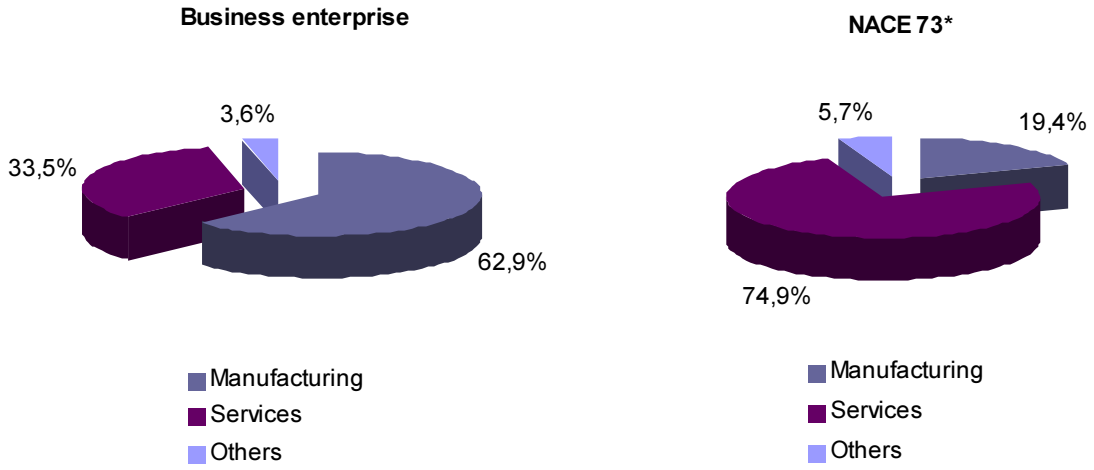
[3] NACE means branch classification of economic activities. Classification of expenditure according to detailed NACE structure is available in table Annex (table no.14).

II.4.4 Business enterprise expenditure on R&D by industries and R&D activity

Since 2005 the respondents fill in a new section in the questionnaire where the intramural expenditure is broken down by R&D activities as main, ancillary and other R&D activities.

The business enterprise sector spent 62,9 % of its expenditure on manufacturing industries, 33,5 % for services and the remaining 3,6 % for other NACE branches. Industries with NACE activity 73 spent 74,9 % on R&D activities in services, 19,4 % in manufacturing industries and finally 5,7 % in other NACE activities.

Figure 2.14 BERD in the Czech Republic by R&D activities in 2005 (%)



In 2005 the R&D firms in business enterprise sector shared 15,7 % of BERD. These firms with NACE activity 73 shared 68,4 % R&D activities in the branches of Agriculture, forestry and fishing. The same branches shared 1,1 % of BERD. Firms with NACE activity 73 spent 35,0 % of BERD in services. The service industries spent 33,5 % of total BERD on R&D activities.

Mining and quarrying industries with NACE activities 73 spent 33,4 % on R&D activities where as the total expenditures of these industries were just 0,3 % total BERD. The manufacturing industries with NACE activities 73 spent 4,8 % on R&D activities where as the total expenditures of these industries reached 62,9 % of total BERD.

Table 2.12 BERD in the Czech Republic by R&D activities in 2005

CODE	THE MODIFICATION OF CZ-NACE	Business enterprise		of which NACE 73		Index BES/73
		million CZK	%	million CZK	%	
A+B	Agriculture, forestry and fishing	310	*1,1*	212	*5,0*	0,6845
C	Mining and quarrying	70	*0,3*	24	*0,6*	0,3343
D	Manufacturing	17 116	*62,9*	829	*19,4*	0,0484
E	Electricity, gas and water supply	211	*0,8*	6	*0,1*	0,0267
F	Construction	375	*1,4*	1	*0,0*	0,0017
G-O	Services sector	9 125	*33,5*	3 196	*74,9*	0,3502
A-O	**Total**	**27 209**	***100,0***	**4 267**	***100,0***	**0,1568**

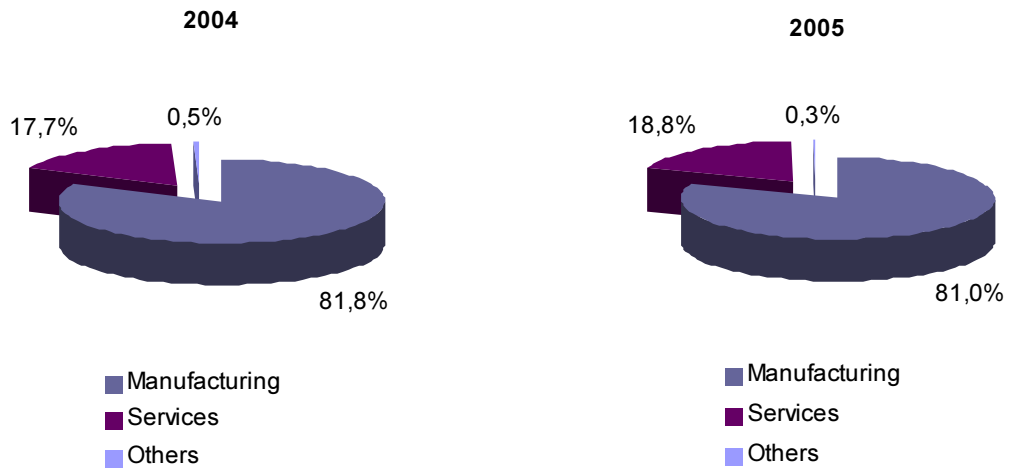
Note: for detailed breakdown of BERD by R&D activities see table 20 and 21.

II.4.5 Business enterprise expenditure on R&D in foreign controlled firms in the Czech Republic

Expenditures on R&D in business enterprise sector in foreign controlled firms were identified as the indicators of globalisation of R&D. If more than 50 % of the voting rights in these firms belong to the foreign investor (foreign parent company) then these firms are know as foreign affiliations.

In 2005 the foreign affiliations shared 48,7 % of total expenditures on R&D. The highest share (65, %) of expenditures on R&D, in foreign affiliations, was registered in the manufacturing industries. Here the share, between 2005 and 2004, slightly dropped from 81,8 % in 2004 to 81,0 % in 2005. Share of service industries with foreign affiliation in the Czech Republic increased from 17,7 % in 2004 to 18,8 % in 2005. Shares of other branches decreased from 0,5 % in 2004 to 0,3 % in 2005.

Figure 2.15 BERD in foreign controlled firms in the Czech Republic by main NACE branches in 2004 and 2005



In 2005 expenditures on R&D in foreign affiliations reached 14 007 million CZK, which is 51,5 % of total BERD. Total year-on-year increase of expenditures on R&D performed by foreign affiliations reached 28,8 %. The highest, year-on-year, increase 47,1 % was registered in agriculture, forestry and fishing industries. Second highest year-on-year increase 36,6 % was in services then followed the manufacturing industries with 27,4 %. Negligible increase was recorded in electricity, gas and water industries. Considerable decrease 97,4 % was recorded in mining and quarrying industries. Slight, year-on-year, decrease (-2,9 %) was recorded in the case of construction industries.

Table 2.13 BERD in foreign controlled firms in the Czech Republic by main NACE branches in 2004 and 2005

million CZK

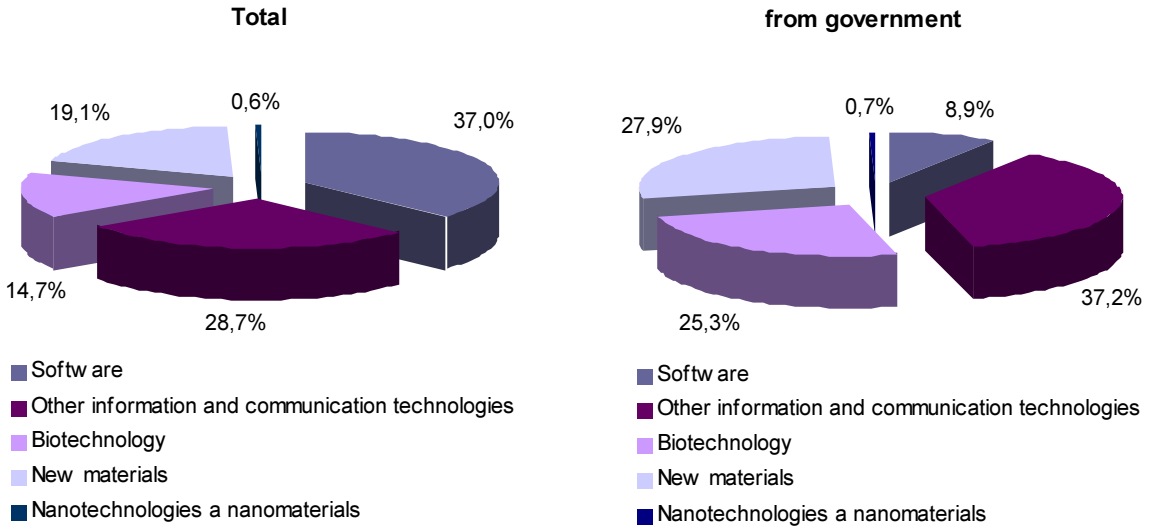
CZ-NACE	2004			2005			Index 05/04 for affiliated companies
	Expenditure of firms total	of which exp. of affiliated companies	*% exp. of affiliated companies*	Expenditure of firms total	of which exp. of affiliated companies	*% exp. of affiliated companies*	
Agriculture, forestry and fishing	87	15	*17,3*	82	22	*27,0*	1,4708
Mining and quarrying	37	20	*54,2*	122	1	*0,4*	0,0261
Manufacturing	13 685	8 897	*65,0*	17 145	11 340	*66,1*	1,2745
Electricity, gas and water supply	11	0	*0,0*	199	0	*0,2*	.
Construction	273	16	*6,0*	336	16	*4,7*	0,9710
Services sector	8 252	1 924	*23,3*	9 324	2 628	*28,2*	1,3664
Total	**22 344**	**10 872**	***48,7***	**27 209**	**14 007**	***51,5***	**1,2883**

Note: for detailed breakdown of BERD in foreign controlled firms in the Czech Republic, see table 22.

II.4.6 Business enterprise expenditure on R&D in the selected fields (the so-called new technologies)

Since 2005 expenditures on R&D in selected fields were surveyed. These fields include: information and communication technology of which include software, biotechnology, new materials, nano-technology and nano-materials.

Figure 2.16 BERD in the selected fields of R&D in 2005 (%)



In 2005 the reporting units in business enterprise sector reported that 6 144 million CZK were invested on R&D activities in the selected fields. From this amount 1 215 million CZK came from government sources. The highest share 67,7 % of total expenditure was spent on R&D in the filed of information and communication technology, 2 271 million CZK on software and 1 763 million CZK on other information and communication technology, then followed new materials with 19,1 % share and biotechnology with 14,7 % share. The lowest share 0,6 % was registered in the field nano-technology and nano-materials.

R&D activities in the field of information and communication technology were financed by government sources, 46,1 %. On other information and communication technology field the government invested about 452 million CZK and on software 108 million CZK. New materials followed with 27,9 % and biotechnology with 25,3 % of R&D expenditures. The field, nano-technology and nano-materials received the lowest support 0,7 % for its R&D activities.

Table 2.14: Business enterprise expenditure on R&D in the selected fields in 2005

SELECTED AREAS OF R&D		Total expenditure		of which from government		Index: government / total
		million CZK	%	million CZK	%	
Information and communication technologies		4 034	*65,7*	560	*46,1*	0,1389
of which	software	2 271	*37,0*	108	*8,9*	0,0477
	other information and communication technol.	1 763	*28,7*	452	*37,2*	0,2563
Biotechnology		901	*14,7*	308	*25,3*	0,3415
New materials		1 173	*19,1*	339	*27,9*	0,2890
Nanotechnologies and nanomaterials		36	*0,6*	8	*0,7*	0,2311
Total		**6 144**	***100,0***	**1 215**	***100,0***	**0,1978**

Note: for detailed breakdown of expenditure on R&D in selected fields, see table 23 and 24.

II.4.7 Business enterprise expenditure on R&D by socio-economic objectives [4]

The most important socio-economic direction, where the biggest amount of R&D expenditure was spent within business enterprise sector in 2005 was manufacturing production and technology. Share of this socio-economic direction reached 63,9 % of the total R&D expenditure in business enterprise sector. Share of other socio-economic directions, infrastructure and landscape planning reached 10,3 %. The socio-economic direction, protection and improvement of human health, follows with 7,7 % share. Complete summary of amounts and shares of individual socio-economic directions shows table 2-15.

Table 2-15 BERD in the Czech Republic by socio-economic objectives in 2004 and 2005

SOCIO-ECONOMIC OBJECTIVES	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
1. Exploration and exploitation of the Earth	82	0,4	77	0,3	0,9346
2. Infrastructure and general planning of land-use	2 065	9,2	2 798	10,3	1,3549
3. Protection of the environment	371	1,7	392	1,4	1,0564
4. Protection and improvement of human health	2 061	9,2	2 086	7,7	1,0120
5. Production, distribution and rational utilisation of energy	1 114	5,0	1 363	5,0	1,2234
6. Agricultural production and technology	491	2,2	614	2,3	1,2513
7. Industrial production and technology	14 697	65,8	17 400	63,9	1,1839
8. Social structures and relationships	242	1,1	473	1,7	1,9558
9. Exploration and exploitation of space	16	0,1	15	0,1	0,9548
10. Research financed from Ministry of Education	6	0,0	7	0,0	1,2342
11. Non-oriented research	554	2,5	698	2,6	1,2594
12. Other civil research	200	0,9	398	1,5	1,9883
13. Defence	445	2,0	888	3,3	1,9961
Total	**22 344**	**100,0**	**27 209**	**100,0**	**1,2177**

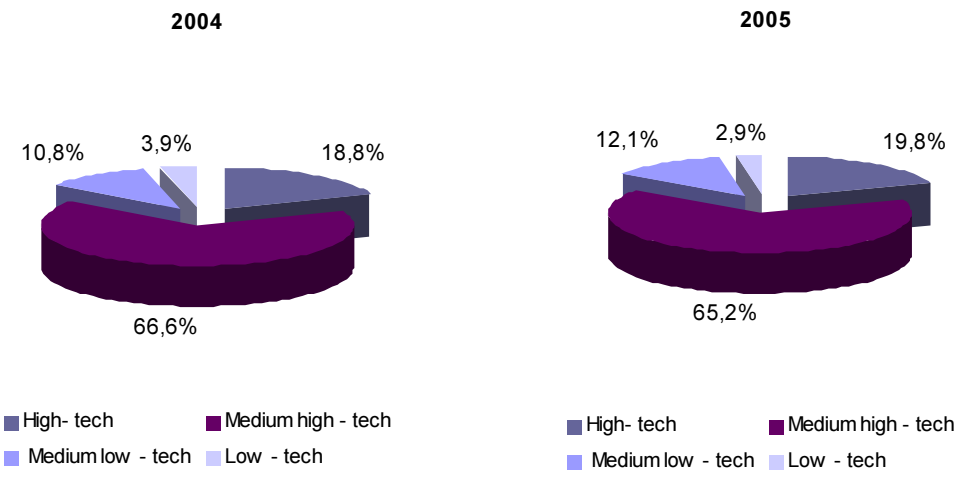
The highest recorded, year-on-year, increase 99,6 % in business enterprise sector was in the field defence. The share increased from 2,0 % to 3,3 % in 2005. 98,8 % increase was recorded in other civil research. The year-on-year share increased from 0,9 % in 2004 to 1,5 % in 2005. The social structure and relationships also observed an increase, 95,6 %, where the year-on-year share increased from 1,1 % in 2004 to 1,7 % in 2005. Increase was observed in R&D expenditure in most of the socio-economic fields except the field exploration and exploitation of the earth and exploration and exploitation of space.

[4] Breakdown by main socio-economic directions is in line with OECD methodology (version compatible with NABS).

II.4.8 Business enterprise expenditure on R&D by technological intensity of industries

The technological intensity in business enterprise sectors based on industries is defined in manufacturing industries. The most of the R&D expenditure, 11 176 million CZK, was used in medium technology intensive manufacturing industries (medium high-tech). Share of these industries reached 65,2 % on BERD in the Czech Republic in 2005. The most important industry in this field was "Manufacture of motor vehicles, trailers and semi-trailers" NACE branch 34 with 7 255 million CZK for R&D activities. The second most important technological group of manufacturing industries was high-tech with share of 19,8 % in total BERD. The most important industry in this field was "Manufacture of radio, television and communication equipment and apparatus" NACE branch 32 with 1 320 million CZK for R&D activities.

Figure 2.17 BERD in Czech Republic in manufacturing by technological intensity in 2004 and 2005 (%)



The biggest increase of R&D expenditure in between 2004 and 2005 was recorded in low-tech (41,0 %) followed by high-tech (32,3 %) manufacturing. For more details, see table 2.16.

Table 2.16 BERD in manufacturing in the Czech Republic by technological intensity in 2004 and 2005

TECHNOLOGICAL INTENSITY	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
High- tech	2 567	*18,8*	3 396	*19,8*	1,3231
Medium high - tech	9 114	*66,6*	11 176	*65,2*	1,2263
Medium low - tech	1 473	*10,8*	2 077	*12,1*	1,4099
Low - tech	531	*3,9*	496	*2,9*	0,9341
Manufacturing total	**13 685**	***100,0***	**17 145**	***100,0***	**1,2529**

II.4.9 Business Enterprise Expenditure on R&D by regions (at NUTS 3 level)

In 2005 the highest amount of the R&D expenditure was spent in Středočeský region and Prague, The shares of these regions on total R&D expenditure in business enterprise sector reached, identically, 27,3 %. The third region with the highest amount of R&D expenditure was Jihomoravský region (8,4 %). For more details, please figure 2.18.

Comparing 2004 and 2005 the highest, twofold, increase of share of R&D expenditure was in Zlínský region followed by Jihočeský region with 57,6 % increase and Vysočina region with 34,1 % increase. On the other hand Královéhradecký region (18,4 %), Moravskoslezský region (4,5 %) and Karlovarský region (3,2 %) recorded a decrease of share of R&D expenditure.

Figure 2.18 BERD in the Czech Republic by regions at NUTS 3 level in 2004 and 2005

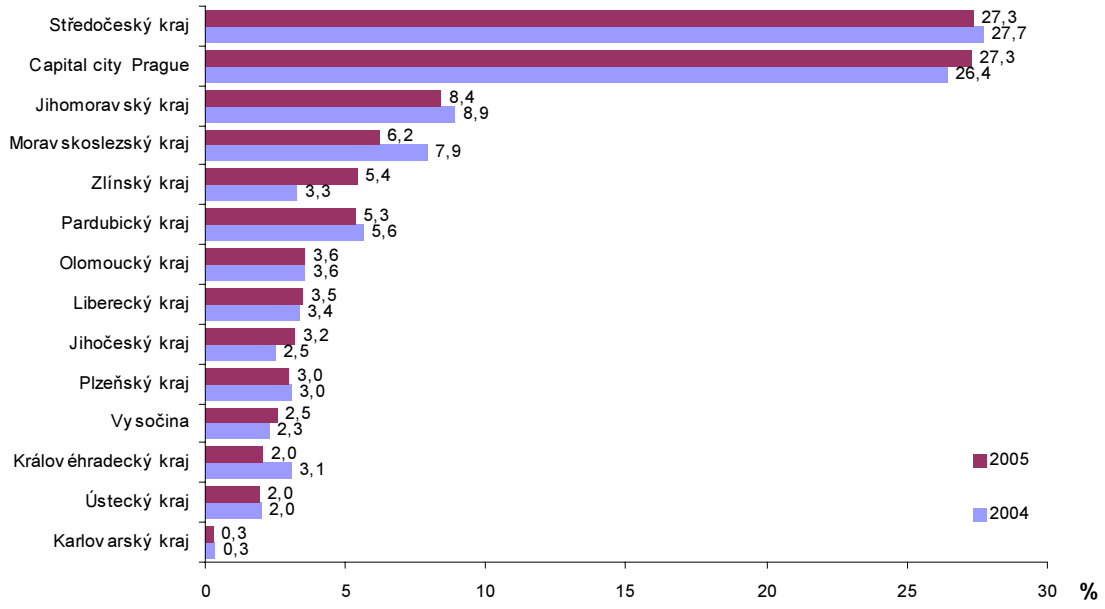


Table 2.17 BERD in the Czech Republic according to the regions (at NUTS 3 level) in 2004 and 2005

REGIONS	2004		2005		Index 05/04
	million CZK	%	million CZK	%	
Capital city Prague	5 903	*26,4*	7 433	*27,3*	1,2593
Středočeský kraj	6 193	*27,7*	7 438	*27,3*	1,2009
Jihočeský kraj	550	*2,5*	867	*3,2*	1,5756
Plzeňský kraj	678	*3,0*	812	*3,0*	1,1977
Karlovarský kraj	74	*0,3*	72	*0,3*	0,9682
Ústecký kraj	452	*2,0*	532	*2,0*	1,1767
Liberecký kraj	755	*3,4*	949	*3,5*	1,2571
Královéhradecký kraj	683	*3,1*	557	*2,0*	0,8161
Pardubický kraj	1 256	*5,6*	1 445	*5,3*	1,1505
Vysočina	516	*2,3*	691	*2,5*	1,3407
Jihomoravský kraj	1 990	*8,9*	2 289	*8,4*	1,1505
Olomoucký kraj	802	*3,6*	966	*3,6*	1,2044
Zlínský kraj	730	*3,3*	1 473	*5,4*	2,0182
Moravskoslezský kraj	1 762	*7,9*	1 683	*6,2*	0,9553
Total	**22 344**	***100,0***	**27 209**	***100,0***	**1,2177**