Knowledge intensity differences between foreign and domestic sectors: the case of the Czech Republic

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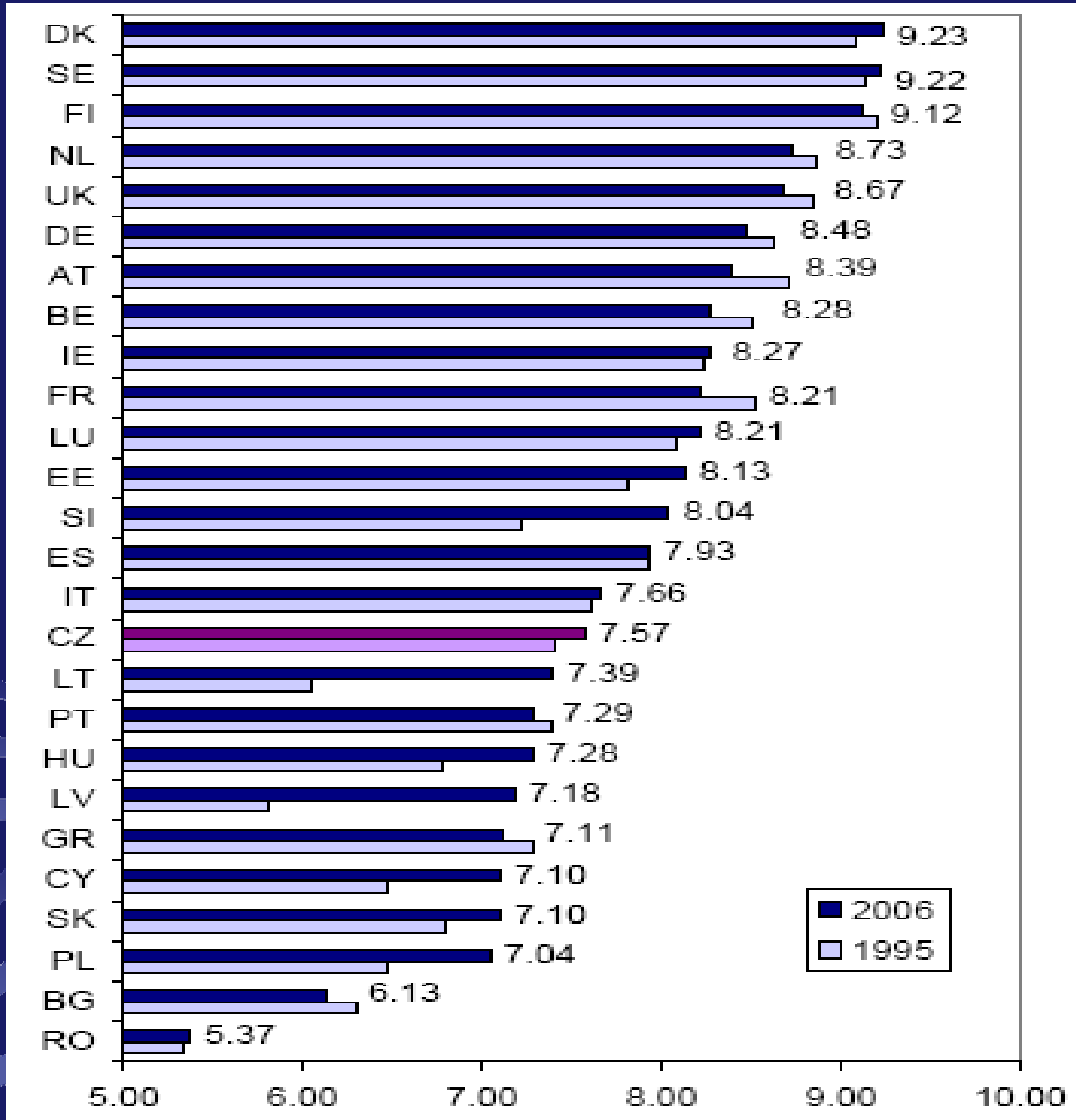
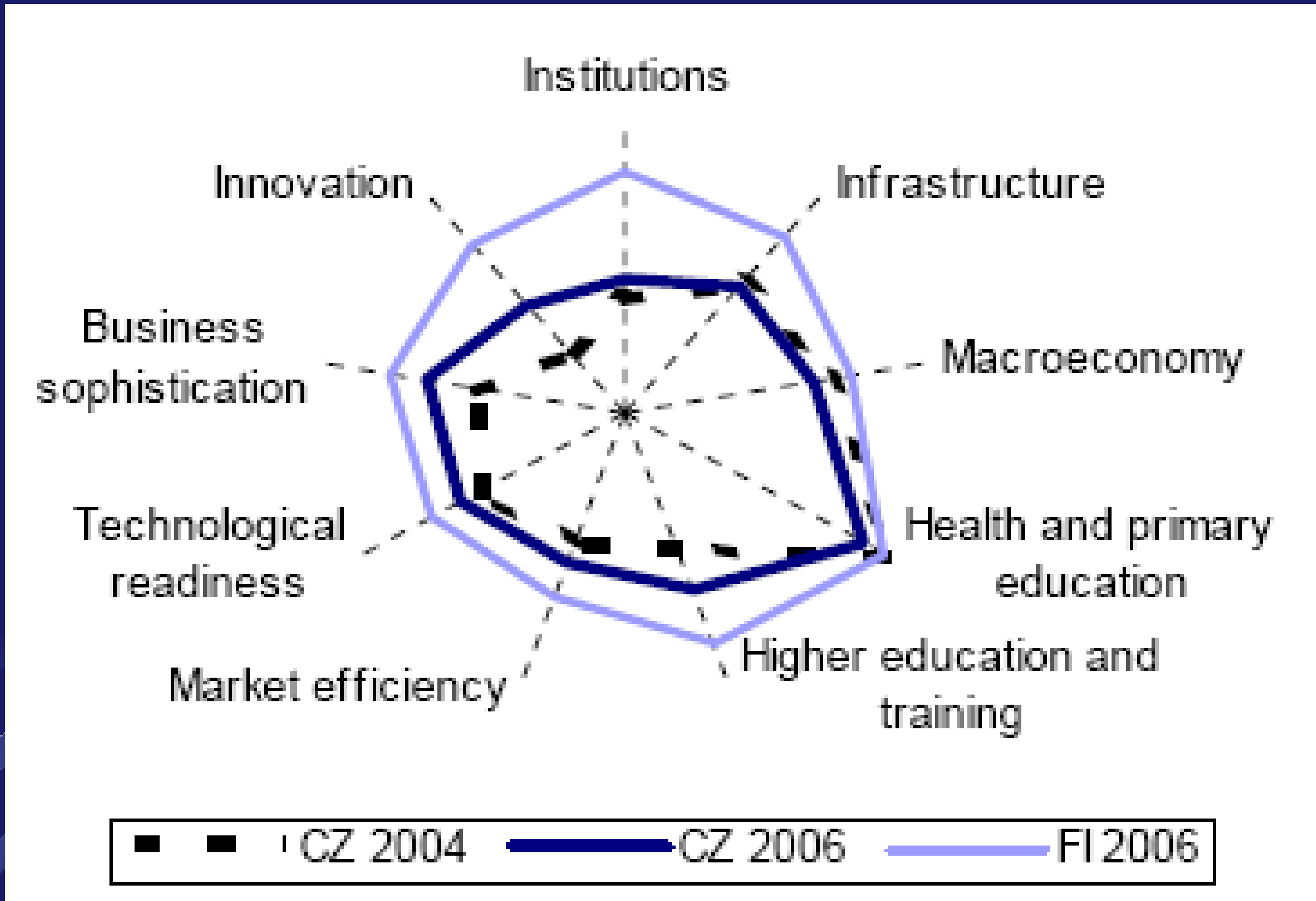
Presentation Structure

- Quality-based competitiveness of the CR
- R&D intensity and innovation performance
- Industrial competitiveness
- FDI and the role of foreign sector
- Position in the global value chain

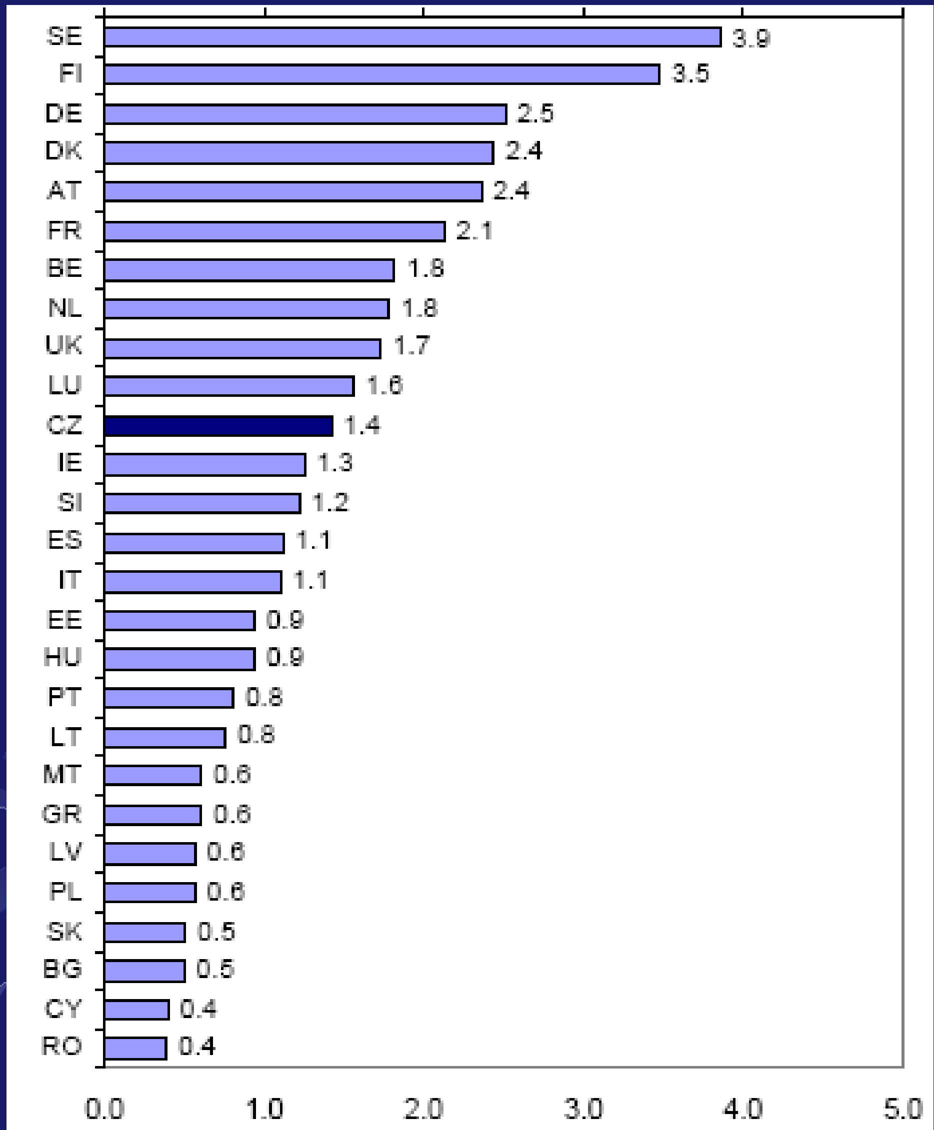
Values of knowledge economy index



Pillars of Global Competitiveness Index



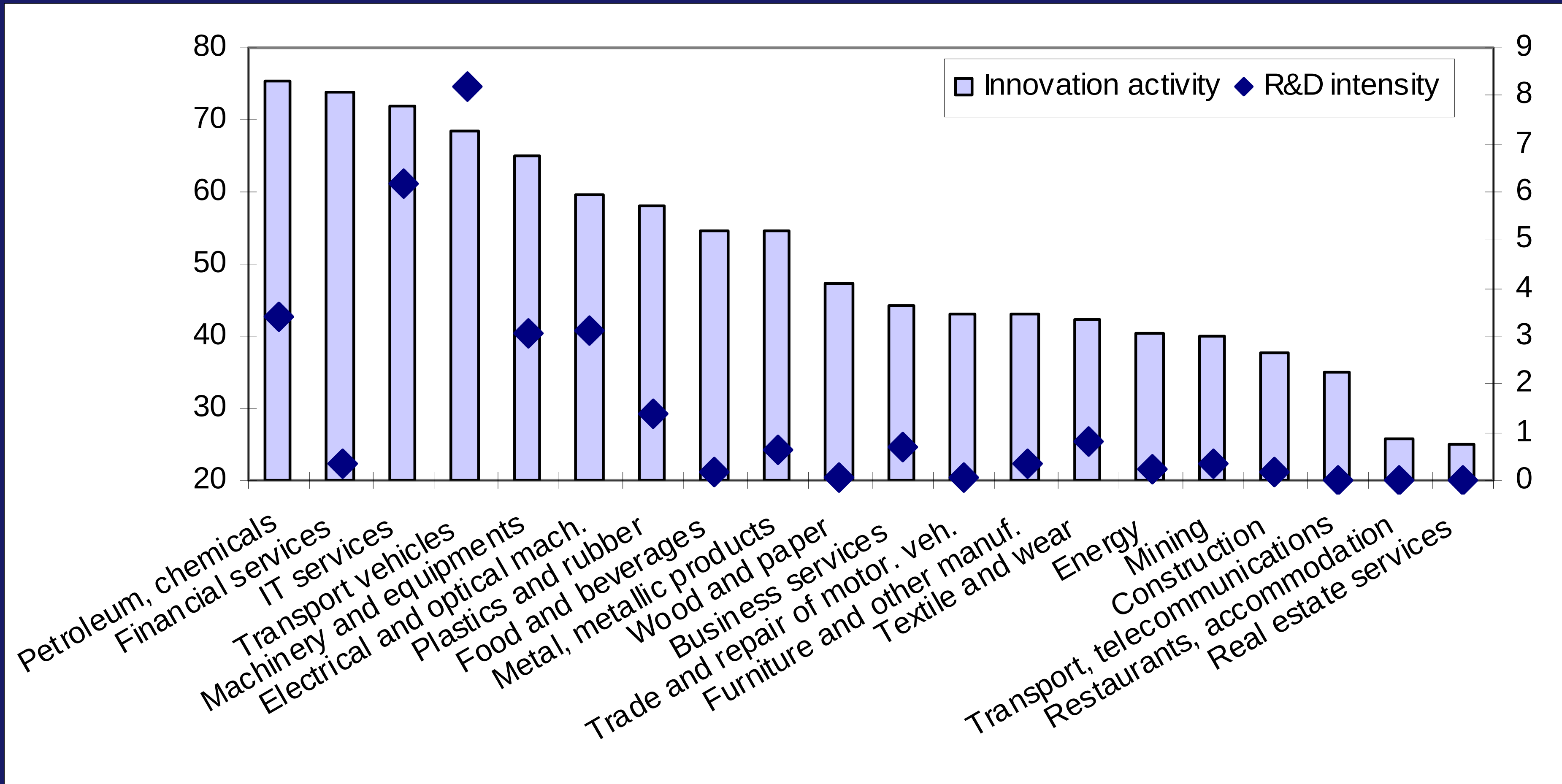
Gross expenditure on research and development as % of GDP (year 2005)



Quality-based competitiveness

- Between 1995 and 2006 the Czech Republic noticed only slight progress in terms of knowledge economy
- Main differences between the best countries lie in innovation performance, institutional environment and infrastructure.
- Average R&D expenditure in the middle of the scale of EU-27, but the best of NMS.

Share of innovating firms (%, 2003-2005), GERD (% of GVA, 2005)



R&D intensity of value added by technological intensity, 2001 – 2003 (%)

	CZ	SE	FI	DE	UK	ES	IE
Total	2,1 (2,4)	15,2	10,4	7,7	6,9	2,4	1,9
High	3,0 (5,2)	62,5	28,1	24,1	26,0	16,3	5,3
M-high	5,0 (4,9)	14,9	10,6	10,4	8,2	3,6	0,5
M-low	0,8 (1,0)	2,7	3,6	1,8	1,8	1,0	1,7
Low	0,2 (0,3)	1,5	2,0	0,8	0,7	0,6	0,7

Value in brackets = year 2005

Structure of economic activities by technological and knowledge intensity (2005)

	Output	GVA	Employment
HT	10.6	6.4	6.9
MHT	35.1	35.0	30.3
MLT	29.4	30.9	28.4
LT	24.8	27.7	34.4
Total Manufacturing	100.0	100.0	100.0
KIS_HT	7.5	8.1	4.9
KIS_MS	23.5	20.7	15.2
KIS_FS	6.5	5.5	2.9
KIS_OS	13.4	16.7	21.2
LKIS_MS	38.6	36.7	41.4
LKIS_OS	10.5	12.3	14.4
Total Services	100.0	100.0	100.0

Manufacturing: HT – high-tech, MHT – medium high-tech, MLT – medium low-tech, LT – low-tech

Knowledge intensive services (KIS): HT – high-tech, MS – market, FS – financial, OS – other. Knowledge less intensive services (LKIS): MS – market, OS – other.

Technology and knowledge intensity

- The most innovating industries in manufacturing are chemicals, transport vehicles, machinery and equipment, i.e. *medium high-tech industries*
  - 1/3 of total manufacturing GVA
  - high level and dynamics of labor productivity
- In service sector are the most innovating IT services and financial services

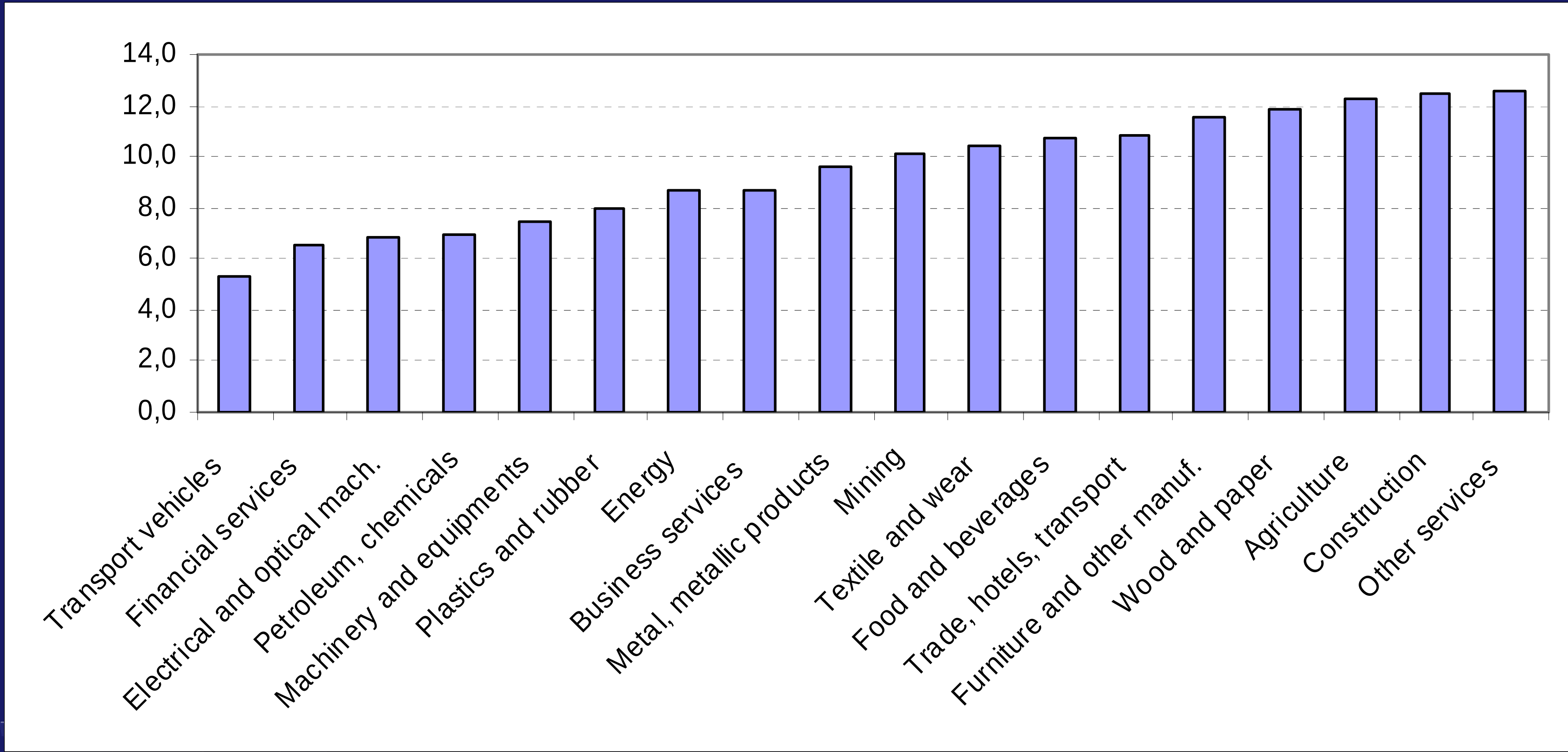
Competitiveness of industries

- Competitiveness of industries is evaluated on the basis of a wide spectrum of indicators of economic performance with an emphasis on qualitative aspects.
- Quality-based competitive advantage is characteristic by relatively high level of R&D expenditure or/and high innovation performance or/and high share of skilled employees
- Cost-based competitive advantage is characteristic by low level and dynamics of unit labour costs.

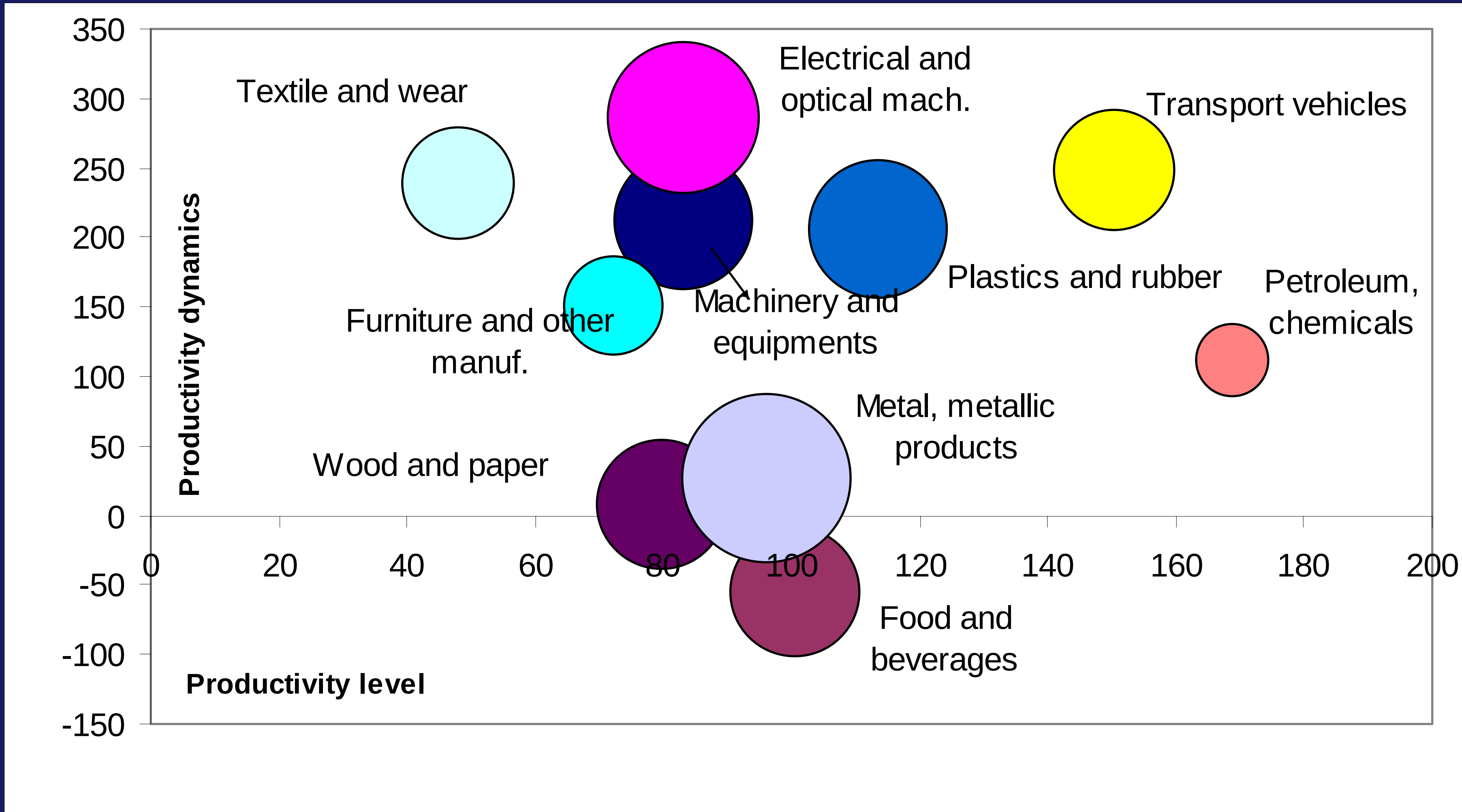
- The overall indicator of industrial competitiveness (OIIC) is constructed on the basis of seven partial indicators
  - level and dynamics of productivity
  - share of exports in production
  - share of highly qualified employees
  - share of cost of research and development in revenues
  - share of businesses under foreign control in value added
  - output multiplier
- On the basis of OIIC the position of the industries within Czech economy has been specified

Overall Indicator of Industrial Competitiveness

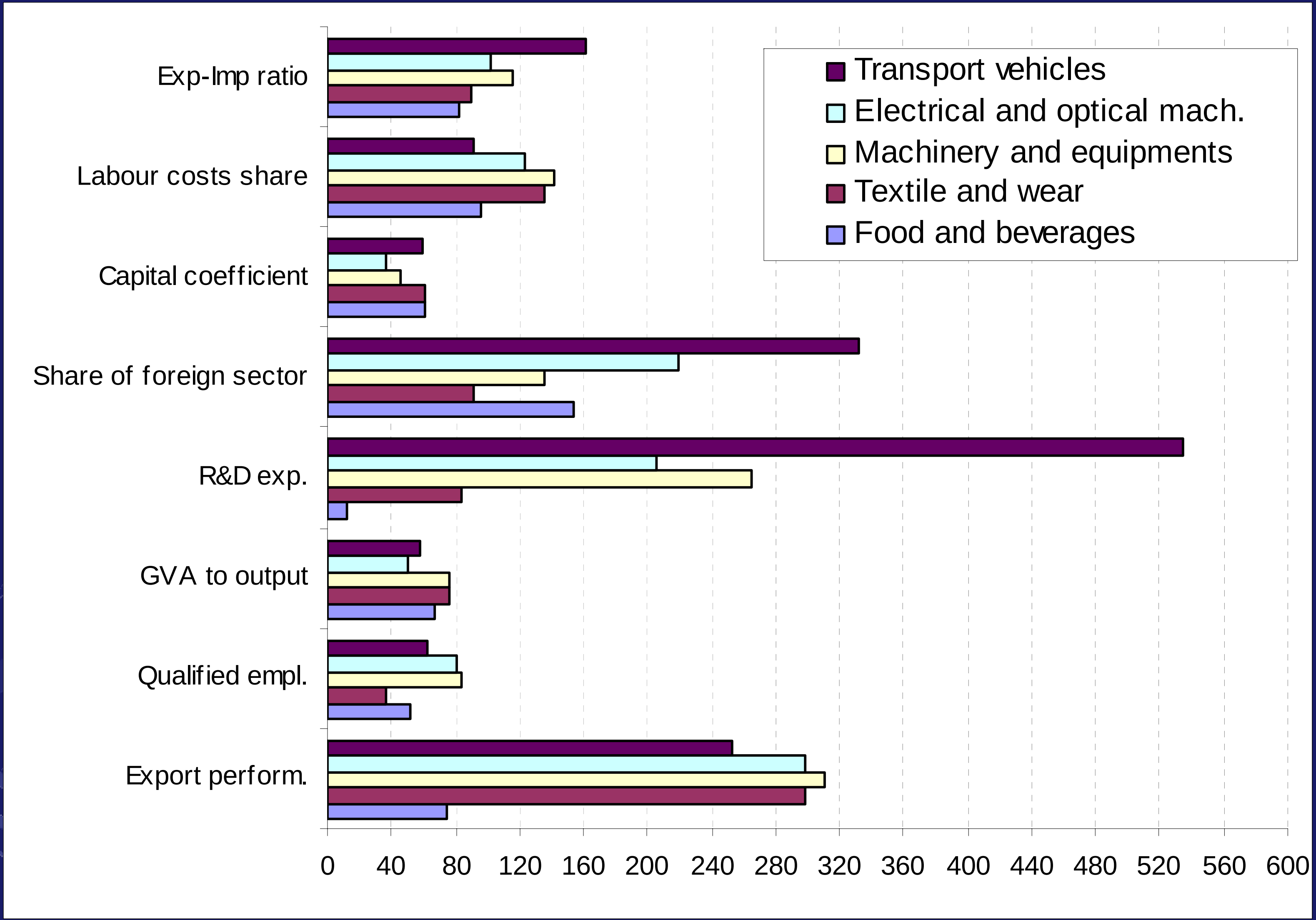
(average ranking of individual sub-indicators)



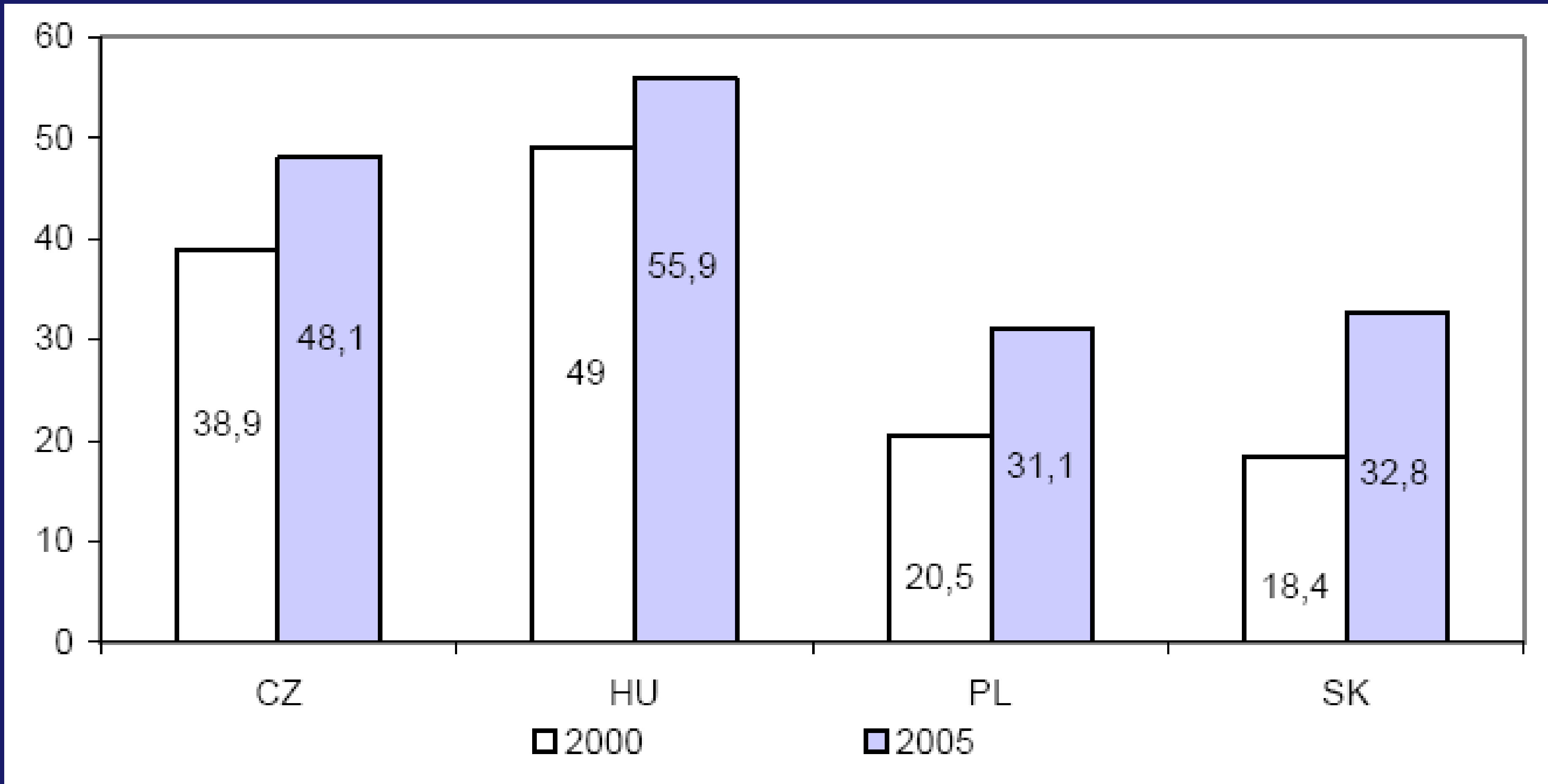
Productivity level, dynamics and employment in manufacturing (CR = 100)



Comparison of selected manufacturing industries (CR = 100)



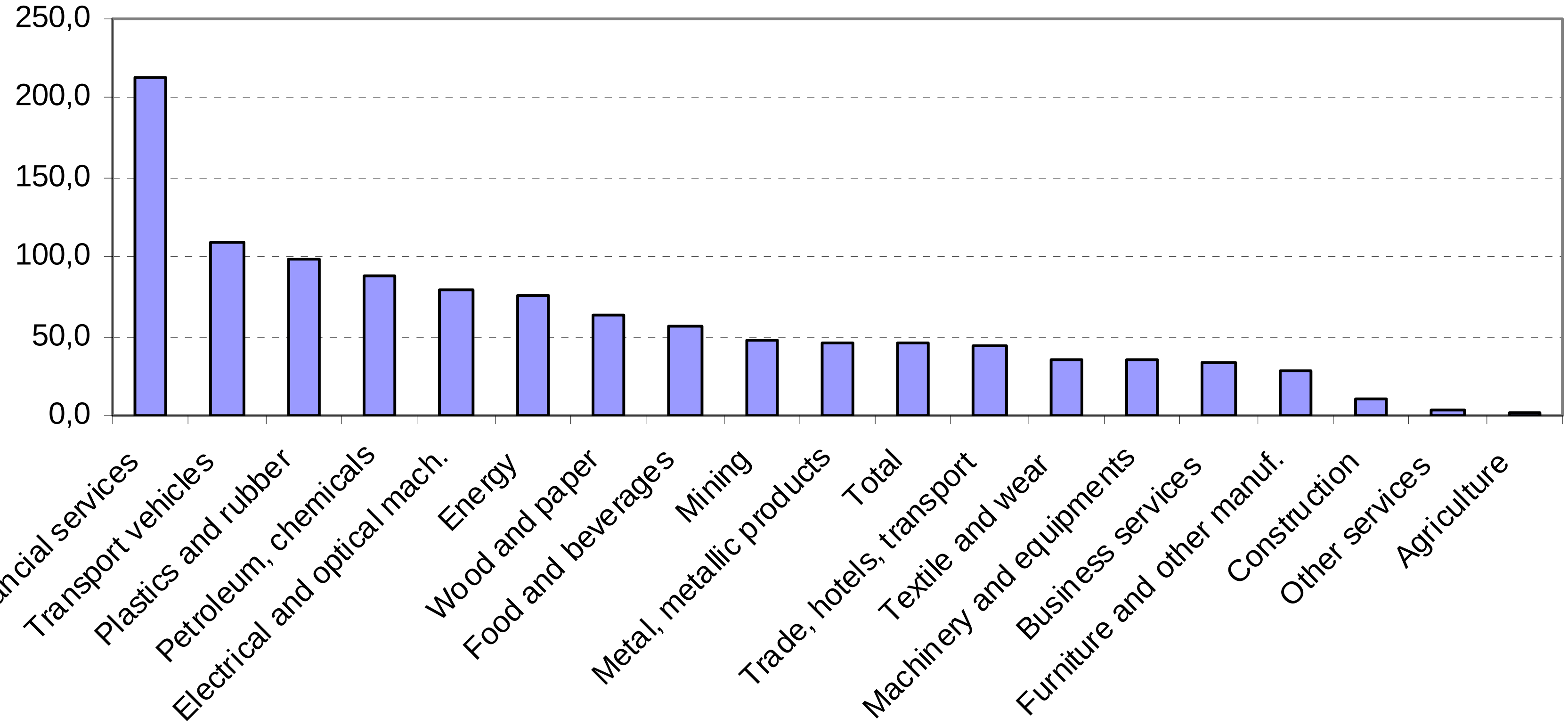
FDI as % of GDP


60
50
40
30
20
10
0
38,9
48,1
49
55,9
20,5
31,1
18,4
32,8
CZ
HU
PL
SK
2000
2005

FDI inflow by industries (% of total)

	1998	1999	2000	2001	2002	2003	2004	2005
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Agriculture	0,2	0,1	0,2	0,2	0,1	0,0	0,2	0,2
Mining	6,8	0,5	1,9	1,7	1,4	1,2	1,3	0,4
Food and beverages	2,7	6,4	4,8	4,4	4,2	4,6	4,3	3,6
Textile and wear	0,7	1,2	1,3	1,3	1,4	1,0	0,9	0,7
Wood and paper	5,4	3,9	3,1	3,3	2,6	3,0	3,3	2,9
Petroleum, chemicals	4,6	3,5	4,2	3,2	3,3	3,1	3,3	3,2
Plastics and rubber	10,5	9,0	8,2	7,6	6,8	7,6	6,6	6,2
Metal, metallic products	3,9	3,6	3,6	3,4	3,2	4,6	5,3	4,8
Machinery and equipments	0,0	1,2	1,7	1,6	2,0	2,2	2,4	2,6
Electrical and optical mach.	11,2	3,8	4,0	5,2	5,0	5,8	5,7	4,3
Transport vehicles	0,7	5,6	6,5	7,1	6,2	9,5	8,0	9,2
Furniture and other manuf.	4,3	0,6	0,6	0,4	0,8	0,4	0,4	0,4
Energy	1,2	7,7	6,6	6,1	6,9	7,2	6,7	5,7
Construction	1,9	1,0	1,5	1,5	1,9	2,3	1,9	1,2
Trade, hotels, transport	37,4	28,9	26,6	26,1	26,6	19,1	20,1	22,6
Financial services	4,8	15,1	14,7	14,8	15,9	16,8	16,5	18,8
Business services	2,8	7,4	9,2	11,4	9,3	9,0	11,3	12,3
Other services	0,8	0,6	1,2	0,6	2,6	2,5	2,0	0,8

FDI inflow by industries (% of GVA, 1998 - 2005)



Foreign sector in the Czech economy
(% of GVA)

	1995	1997	1999	2001	2003	2005
Total	**5,0**	**7,9**	**11,2**	**20,4**	**22,7**	**25,7**
Agriculture	0,2	0,2	0,2	0,5	0,5	1,2
Mining	0,9	0,9	1,3	20,4	18,7	6,0
Food and beverages	8,3	7,3	19,5	33,6	38,9	39,6
Textile and wear	4,4	9,0	14,7	22,7	24,0	23,5
Wood and paper	6,7	16,5	19,3	32,3	38,1	34,8
Petroleum, chemicals	6,4	6,2	6,4	31,7	38,2	43,7
Plastics and rubber	19,6	19,0	24,5	50,9	56,1	57,5
Metal, metallic products	5,2	7,5	15,4	22,8	24,0	35,3
Machinery and equipments	11,6	8,9	13,6	25,4	30,9	34,9
Electrical and optical mach.	10,6	16,5	34,0	55,0	58,3	56,5
Transport vehicles	29,2	48,3	66,9	71,0	78,4	85,5
Furniture and other manuf.	9,8	17,0	18,4	25,2	28,1	34,1
Energy	0,3	0,8	4,5	13,3	21,8	24,7
Construction	2,5	1,8	3,1	7,4	8,1	9,3
Trade, hotels, transport	6,2	8,9	10,9	17,7	20,3	23,6
Financial services	4,9	11,1	12,7	73,6	78,4	77,0
Business services	4,5	9,2	8,9	12,9	14,3	19,3
Other services	1,1	1,1	0,8	1,5	1,4	1,9

R&D intensity in domestic and foreign sector

(% of GERD to gross output)

	1995		2000		2003		2005	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Total	**0,33**	**0,75**	**0,31**	**0,46**	**0,29**	**0,48**	**0,33**	**0,54**
Agriculture	0,01	0,00	0,03	1,14	0,04	0,83	0,04	0,64
Mining	0,59	0,00	0,10	0,00	0,02	0,16	0,20	0,01
Food and beverages	0,02	0,03	0,03	0,03	0,02	0,04	0,02	0,08
Textile and wear	0,08	0,00	0,14	0,00	0,20	0,08	0,26	0,11
Wood and paper	0,03	0,00	0,01	0,00	0,03	0,03	0,02	0,00
Petroleum, chemicals	1,67	1,68	0,66	0,85	0,67	1,27	0,37	1,62
Plastics and rubber	0,43	0,01	0,28	0,16	0,59	0,11	0,58	0,28
Metal, metallic products	0,47	0,13	0,33	0,09	0,18	0,12	0,19	0,12
Machinery and equipme	1,03	0,46	0,93	0,54	0,82	0,70	0,97	0,72
Electrical and optical ma	0,81	0,05	0,69	0,15	1,00	0,31	1,07	0,41
Transport vehicles	4,29	3,80	2,08	1,74	1,98	1,68	2,46	1,63
Furniture and other man	0,35	0,00	0,35	0,00	0,18	0,07	0,13	0,06
Energy	0,02	0,00	0,00	0,00	0,00	0,00	0,12	0,00
Construction	0,02	0,00	0,04	0,04	0,05	0,03	0,06	0,02
Trade, hotels, transport	0,00	0,00	0,04	0,01	0,03	0,14	0,03	0,10
Financial services	0,00	0,00	0,00	0,00	0,04	0,01	0,15	0,14
Business services	0,63	0,44	0,78	0,61	0,83	0,93	0,94	1,06
Other services	0,00	0,00	0,46	0,00	0,24	0,00	0,25	0,02

FDI and the role of foreign sector

- FDI is important channel of knowledge transfer into the Czech Republic
- Between 2000 and 2005 rapid increase of FDI (more than other NMS in absolute values)
- FDI flew mainly to high and medium high-tech manufacturing and financial services
- R&D intensity in foreign sector generally higher than in domestic sector, but duality of foreign and domestic sectors in terms of productivity, profitability, etc. tends to decrease

Globalization indicators of the Czech Republic in terms of technology intensity

		Export share		Import penetration	
		1995	2005	1995	2005
Total manufacturing		41	60	44	58
High-tech	Office machinery	106	96	101	95
	Pharmaceuticals	34	60	63	82
	Aircraft and spacecraft	90	82	87	91
	Radio, TV, comm. equip.	63	93	80	94
	Medical, optical instrum.	45	65	72	72
Medium high-tech	Electrical machinery	53	79	54	74
	Chemicals	79	72	82	80
	Railroad equipment	61	53	47	44
	Motor vehicles	57	71	56	57
	Machinery, equip. n.e.c.	49	92	61	91
Medium low-tech	Fabricated metal prod.	37	49	29	39
	Other mineral products	45	44	27	29
	Coke, refined petr. prod.	13	25	17	45
	Ships and boats	97	73	93	45
	Rubber and plastic prod.	52	50	58	52
	Basic metals	46	52	41	58
Low-tech	Food and tobacco	12	18	14	22
	Textile prod., footware	61	88	54	89
	Paper, publish., printing	32	40	37	42
	Wood, prod. of wood	43	32	19	19
	Manufacturing n.e.c.	38	63	32	50

Globalization indicators of the Czech Republic in terms of technology intensity

	HT		MHT		MLT		LT	
	1995	**2005**	**1995**	**2005**	**1995**	**2005**	**1995**	**2005**
Contribution to trade balance	-5.3	-2.1	-1.9	3.3	4.2	-0.9	3.0	-0.3
Export/import ratio	34.9	85.3	80.4	127.1	124.0	100.9	115.6	104.6

Position in the global value chain

- Between 1999 and 2005 share of CR in EU-27 imports doubled (from 1,4 to 2,7)
- highest contribution to trade balance came from the group of medium high-tech industries
- Between 1995 and 2005 the export-import ratio in high-tech industries grew considerably
- Predominant part of the production of high-tech industries is assembly-based, value added remains relatively low (especially in the office and computer equipment).