



## COUNTRY SPECIALISATION REPORT

**Country: Croatia**

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## COUNTRY SPECIALISATION REPORT - CROATIA

### MAIN FINDINGS

Croatia is one of the countries with little information available regarding technological and scientific specialisation and also marginal information regarding economic specialisation expressed by value added, employment and exports. This restriction on the availability of data creates leads to a presentation of a very fragmented picture for the country.

During 2003, basic research accounted for the largest share of BERD, with 36.4% share which is one of the largest in the EU. Despite that there is no long range data for GERD by type of research (Figure 2), the fact that basic research accounts for the largest share of GERD is perhaps unique in the EU.

In addition, the research and development sector in Croatia accounted for almost three quarters (73.5%) of business enterprise intramural expenditure on R&D during 2003 (Figure 6), while the IT services accounted also for a large share (14.3%).

Government funding of business enterprise intramural expenditure in Croatia is concentrated in only four sectors, with research and development and other business activities receiving the bulk (92.5%) of the funding. In terms of scientific specialisation (Figure 9), Croatia exhibits strong specialisation in social sciences and it is also specialised in agriculture, chemistry, physics, microbiology and pharmacology. However, if we also observe the citation profile (Figure 11) of Croatia, a clearer picture emerges with strong specialisation in natural sciences including mathematics.

Finally, in terms of exports (Figure 18), Croatia exhibits a specialisation profile in several low R&D intensity sectors such as furniture, shipbuilding, textiles and electrical machinery. This profile does not change over the 1993-2003 period since Croatia became specialised during this time in sectors such as agriculture, mining and non metallic mineral products that are also of low R&D intensity.

### MAIN R&D FIGURES – TOTAL R&D EXPENDITURE

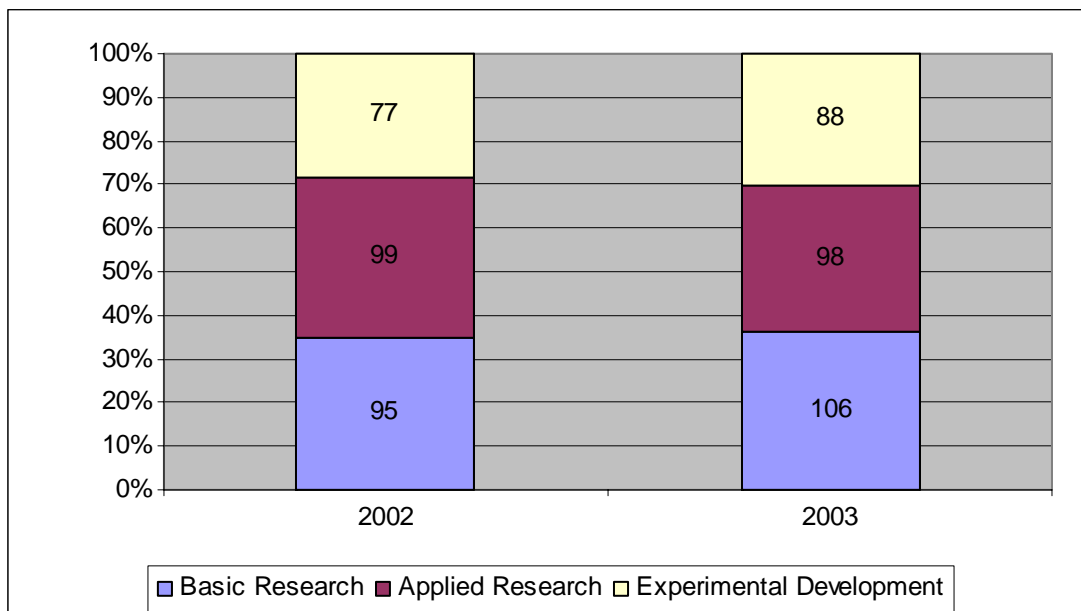
Figure 1. R&D expenditure by performing sector as per cent of GDP (left axis). GDP in million Euros (right axis). Croatia. 1993-2003.

Not Available

Table 1. R&D expenditure by sector of performance and source of funds . Croatia. 1993 and 2004. Million Euros. Current prices.

Not Available

Figure 2. GERD by type of research. Croatia. 2002 and 2003



Source: Eurostat Database, S & T Data, 2005

## **PUBLIC R&D STATISTICS**

### **GBAORD by socioeconomic objective**

*Figure 3. Government Budget Appropriations or Outlays for R&D (GBAORD) by socio-economic objective. Specialisation profile. Croatia. 1993 and 2003.*

Not Available

### **HERD by field of science**

*Figure 4. Expenditure on R&D in the Higher Education Sector (HERD) by field of science. Croatia. 2000 and 2001. Per cent of total HERD and in million Euro.*

Not Available

*Figure 5. Expenditure on R&D in the Government sector (GOVERD) by field of science. Specialisation profile. Croatia. 1999, 2000 and 2001.*

Not Available

**BUSINESS ENTERPRISE INTRAMURAL EXPENDITURE ON R&D (BERD)**

Figure 6. Business enterprise intramural expenditure on R&D by industrial sector. 31 sectors. Shares. Croatia. 2003

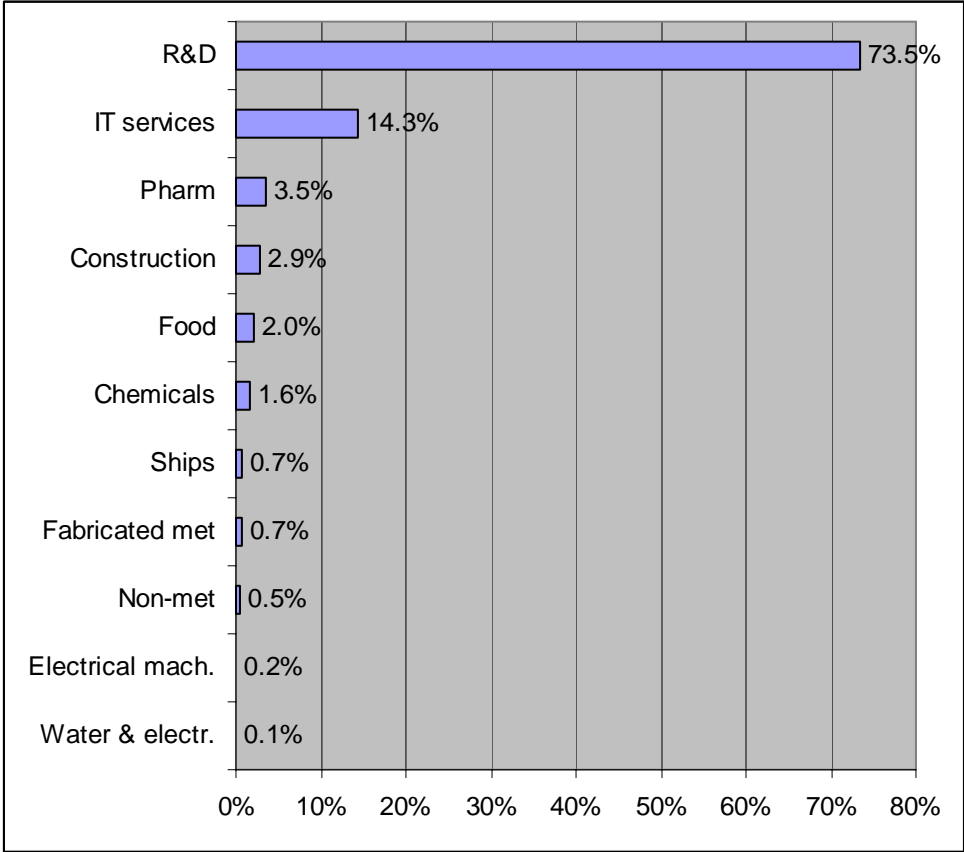
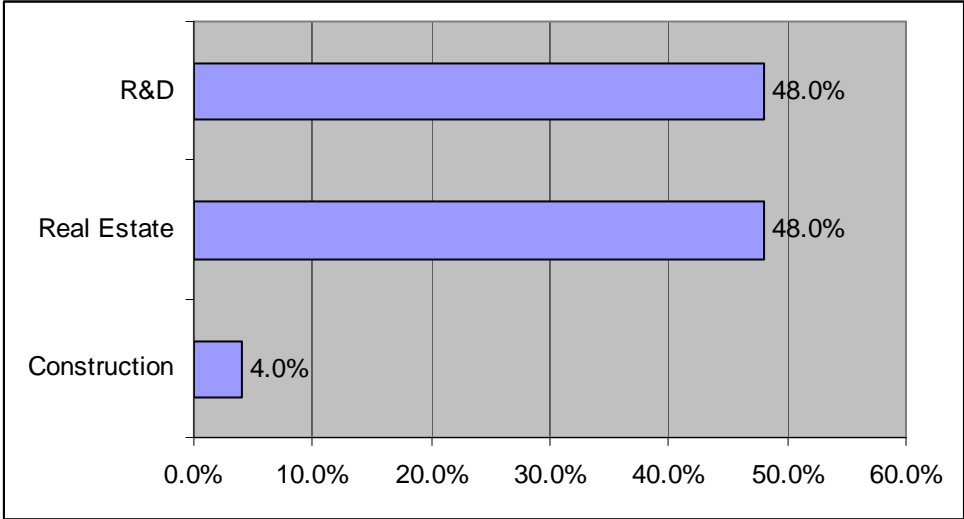




Figure 7. Shares of Business enterprise intramural expenditure on R&D (BERD) in the sectors funded by government.

Not Available

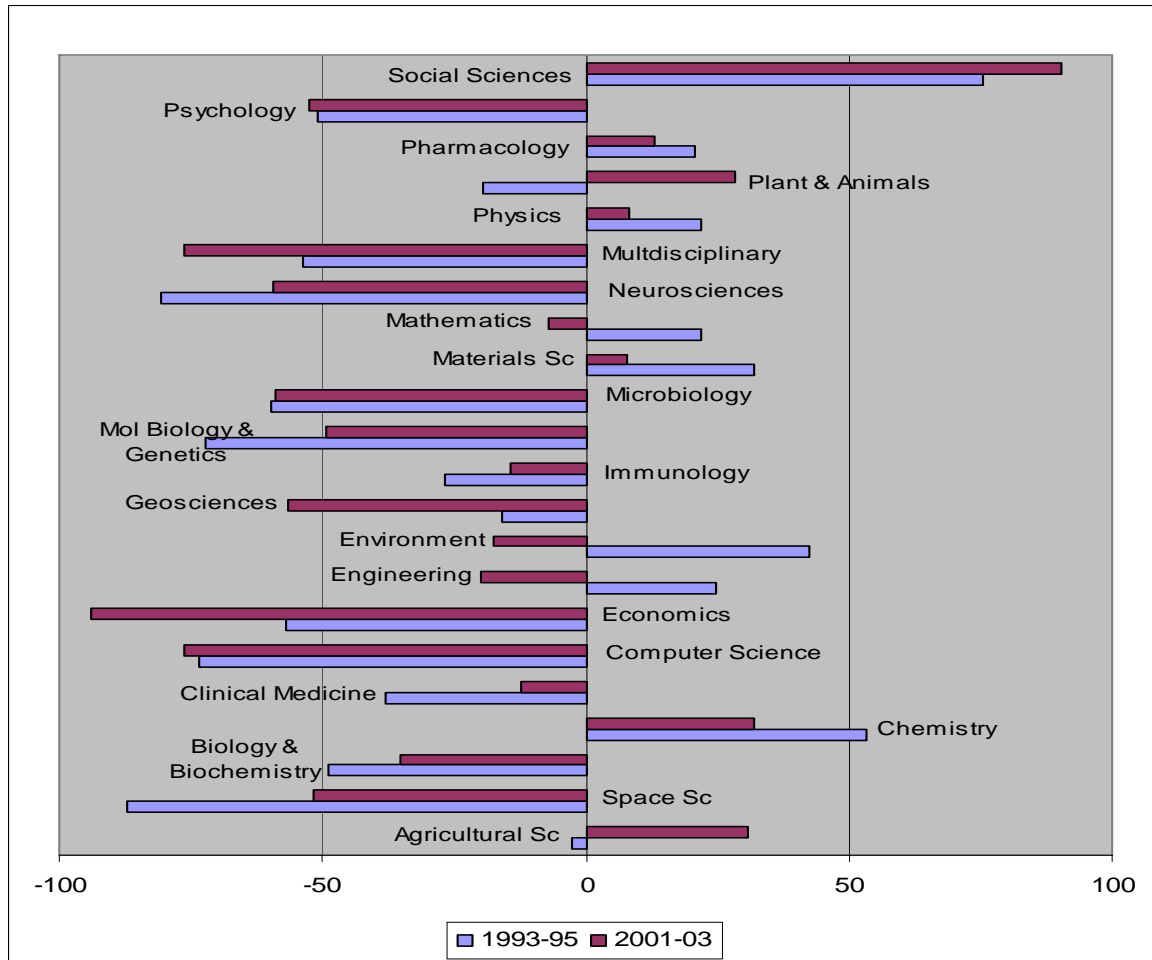
Figure 8. Shares of total government funding of Business enterprise intramural expenditure on R&D (BERD) by industrial sectors. 2003



Source: Eurostat Database, S & T Data, 2005, own calculations

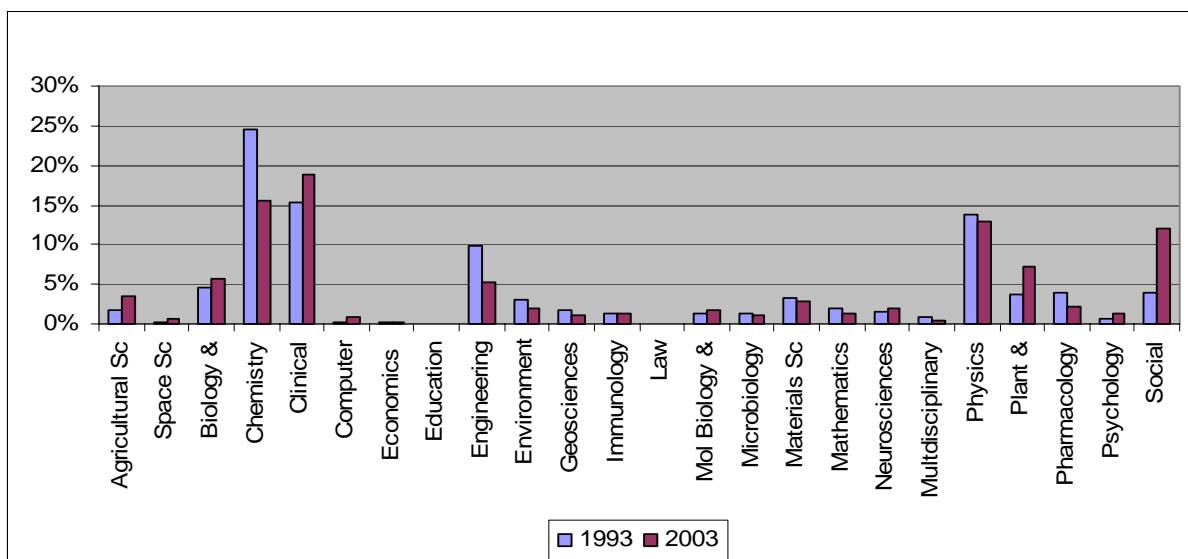
**BIBLIOMETRICS**

Figure 9. Number of publications by scientific field. 25 Scientific fields. Specialisation profile. Croatia. Averages 1993-1995 and 2001-2003.



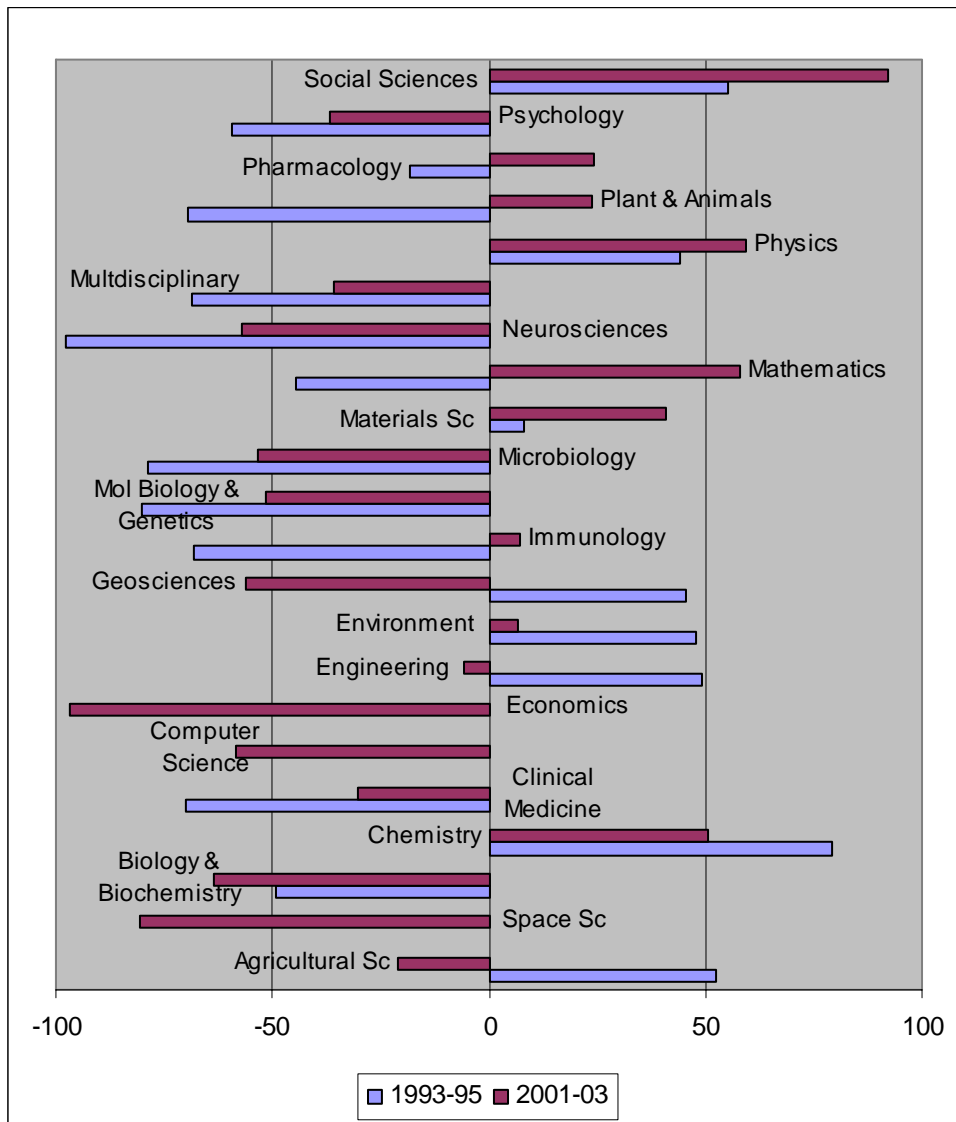
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Thomson ISI, NSIODE 2005, own calculations.

Figure 10. Shares of total publications by scientific field. 25 Scientific fields. Croatia. 1993 and 2003.



Source: Thomson ISI, NSIODE 2005, own calculations.

Figure 11. Number of citations by scientific field. 25 scientific fields. Specialisation profile. Croatia. Averages 1993-1995 and 2001-2003. Five years citation window. (i.e. citations to papers published in the period 1989-1991 and in the period 1997-1999).



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
 Source: Thomson ISI, NSIODE 2005, own calculations.

## **PATENTS**

*Figure 12. Number of patents by industrial sector. 18 sectors in manufacturing. Specialisation profile. Croatia. Averages 1993-1995 and 2001-2003. Based on correspondence matrix ISI-SPRU-OST.*

### **Not available**

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: European Patent Office 2005, own calculations.*

*Figure 13. Shares of total patents by industrial sector. 18 sectors in manufacturing. Croatia. Averages 1993-1995 and 2001-2003. Based on correspondence matrix ISI-SPRU-OST.*

### **Not available**

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: European Patent Office 2005, own calculations.*

## **ECONOMIC SPECIALISATION**

*Figure 14. Value added by industrial sector. 34 sectors. Specialisation profile. Croatia. Averages 1993-1995 and 2001-2003. Million Euros. Current prices.*

**Not available**

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: OECD, STAN 2005, own calculations.*

*Figure 15. Shares of total value added by industrial sector. 34 sectors. Croatia. 1993 and 2003. Million Euros. Current prices.*

**Not available**

*Source: OECD, STAN, 2005.*

*Figure 16. Employment by industrial sector. Specialisation profile. Croatia. 34 sectors. Averages 1993-1995 and 2001-2003. Numbers engaged – hundreds.*

**Not available**

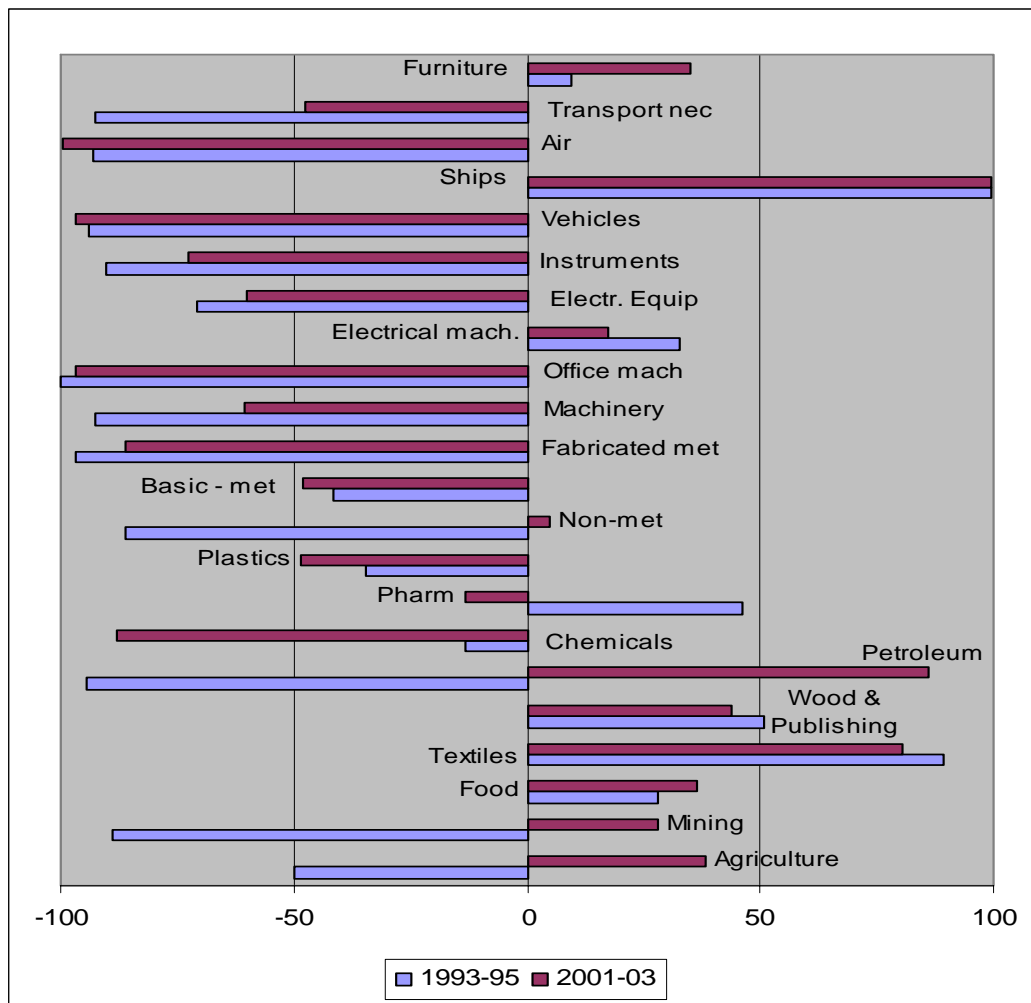
*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: OECD, STAN, 2005, own calculations.*

*Figure 17. Shares of total employment by industrial sector. 34 sectors. Croatia. 1993 and 2003. Numbers engaged – hundreds.*

**Not available**

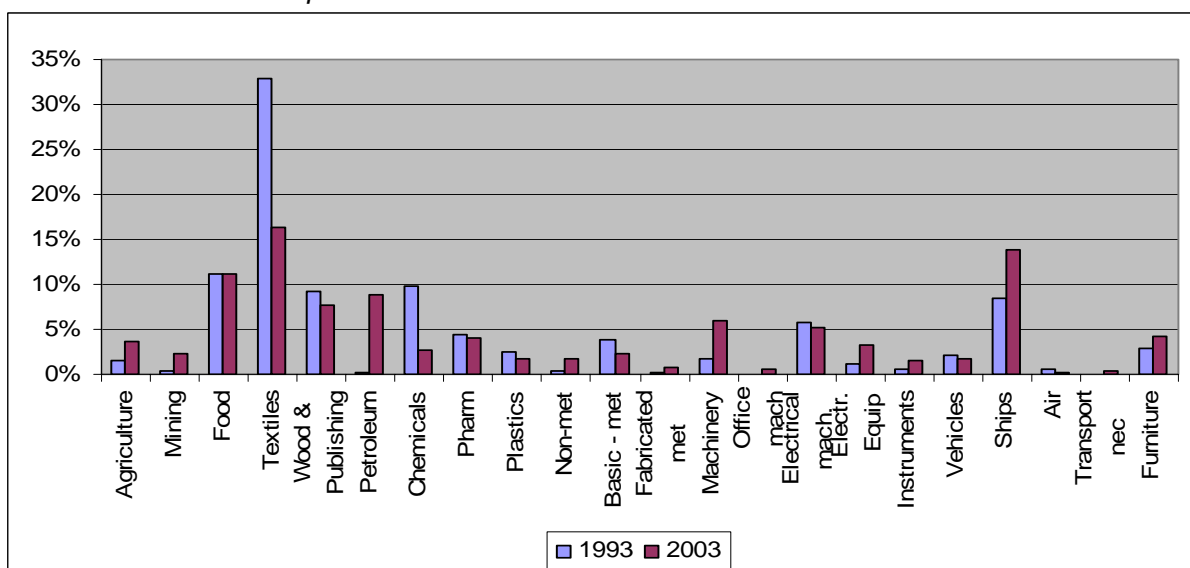
*Source: OECD, STAN, 2005.*

Figure 18. Exports by industrial sector. Specialisation profile. Croatia. 34 sectors. Averages 1993-1995 and 2001-2003. Thousand USD. Current prices.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
 Source: UNIDO, INDSTAT4 2005, ISIC Rev3 and COMTRADE, 2005, own calculations.

Figure 19. Shares of total exports by industrial sector. 34 sectors. Croatia. 1993 and 2003. Thousand USD. Current prices.



Source: UNIDO, INDSTAT4 2005, ISIC Rev3 and COMTRADE, 2005, own calculations.

## **CORRELATION ANALYSIS**

*Table 2. Correlation analysis. Specialisation indexes BERD, Value added, Employment, Exports and patents. Croatia. Averages 1993-1995 and 2001-2003.*

**Not available**

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

*Figure 20. BERD versus Value added specialisation in the primary and secondary industrial sectors. Croatia. Based on average values 2001- 2003.*

Not Available

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations*

*Figure 21. BERD versus Value added in services. Specialisation indexes. Croatia. Based on average values 2001- 2003.*

Not Available

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations*

*Figure 22. BERD versus patents. Specialisation indexes. Croatia. Based on average values 2001- 2003.*

Not Available

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations*

*Figure 23. BERD versus exports. Specialisation indexes. Croatia. Based on average values 2001- 2003.*

Not Available

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations*



Table 3: Specialisation Profile

Areas of specialisation	Fast growing sectors >4.9%			Medium-Low growth sectors =<4.9%			Declining sectors <0		
	Increase Specialisation	Stable Specialisation	Losing Specialisation	Increase Specialisation	Stable Specialisation	Losing Specialisation	Increase Specialisation	Stable Specialisation	Losing Specialisation
Specialisation BERD									
Specialisation Patents									
Specialisation Value Added									
Specialisation Employment									
Specialisation Exports	23;		2423;	01-05; 10-14; 15-16; 26; 351; 36		20-22; 24ex2423; 31;			17-19

Red numbers: Decrease specialisation from specialised to non specialised

Blue numbers: Increase specialisation from non specialised to specialised

## EXPLANATORY NOTES

### ISIC v3 codes and sector description

Agriculture	01-05
Mining	10-14
Food	15-16
Textiles	17-19
Wood & Publishing	20-22
Petroleum	23
Chemicals excluding pharmaceuticals	24ex2423
Pharmaceuticals	2423
Plastics	25
Non-metallic minerals	26
Basic metals	27
Fabricated metals	28
Machinery nec	29
Office machinery	30
Electrical mach.	31
Electrical. equip.	32
Instruments	33
Motor vehicles	34
Ships	351
Aerospace	353
Transport nec	352+359
Furniture & recycling	36-37
Water & Electricity	40-41
Construction	45
Trade	50-52
Hotels	55
Transport	60-63
Telecoms	64
Financial intermediation	65-67
IT services	72
R & D	73
Other Business activities	74
Community services	75-99

**How to read specialisation profile figures**

Plotting specialisation indexes against each other is a method for visualising differences in specialisation patterns. The most interesting analytical dimension in this report is comparing business enterprise intramural R&D expenditure specialisation patterns with specialisation patterns in value added, employment, exports and technological specialisation (patents). The result of the plots is four distinct specialisation quadrants showing:

1. Sectors with **neither specialisation in BERD nor in the other analytical dimension** (lower left quadrant)
2. Sectors with **a specialisation in BERD and in the other analytical dimension** (upper right quadrant)
3. Sectors with a **specialisation in BERD but none in the other analytical dimension** (lower right quadrant)
4. Sectors that display a **specialisation in the other analytical dimension but not in BERD** (upper left quadrant)

If there is a good match between BERD and, say, value added specialisation patterns we expect to find all sectors either in the lower left or in the upper right quadrant. Sectors in the upper left or in the lower right of the graphs indicate anomalies, that is, specialisation in one dimension and non-specialisation in the other. If there are many sectors in these quadrants the graph indicates lack of correlation between BERD and, say, economic specialisation.

*Figure 24: BERD and Value Added specialisation – an example*

