



COUNTRY SPECIALISATION REPORT

Country: Estonia

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COUNTRY SPECIALISATION REPORT - ESTONIA

MAIN FINDINGS

Estonia is one of the countries with little information available regarding technological and scientific specialisation, but with enough information regarding economic specialisation expressed by value added, employment and exports. This restriction on the availability of data creates difficulties in presenting a coherent profile of the country thus the analysis will be based on the available data.

By examining GERD by type of research (Figure 2) in Estonia over the 1998-2003 period it appears that the share of basic research remained stable, accounting for 36.4% of GERD during 2003, a share which is significantly higher compared to the EU15 average. Over the same period, a redistribution of the shares between applied and experimental research took place and during 2003 their respective shares were 28.2% and 35.3%.

Moreover, during 2003 the sectors with the higher shares of BERD (Figure 6) were those of motor vehicles, IT services, research and development, other business activities, telecommunications and constructions. At the same time, the sectors that received the highest public support for research and development activities were the services sectors (Figure 8). In terms of scientific specialisation (Figure 9), Estonia presents a peculiar profile with high specialisations in geosciences and the environment, and social sciences but appears under-specialised in natural sciences. Furthermore, in terms of technological specialisation (Figure 12), Estonia was highly specialised during the 2001 -2003 period in pharmaceuticals and instruments and at a lesser extent in wood and publishing.

Finally, in terms of economic specialisation (Figures 14,16 &18), Estonia presents a relative coherent profile with areas of strength concentrated in the telecommunications and transportations services, in shipbuilding, wood and publishing, textiles, the food industry and agriculture.

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). Estonia. 1993-2003.

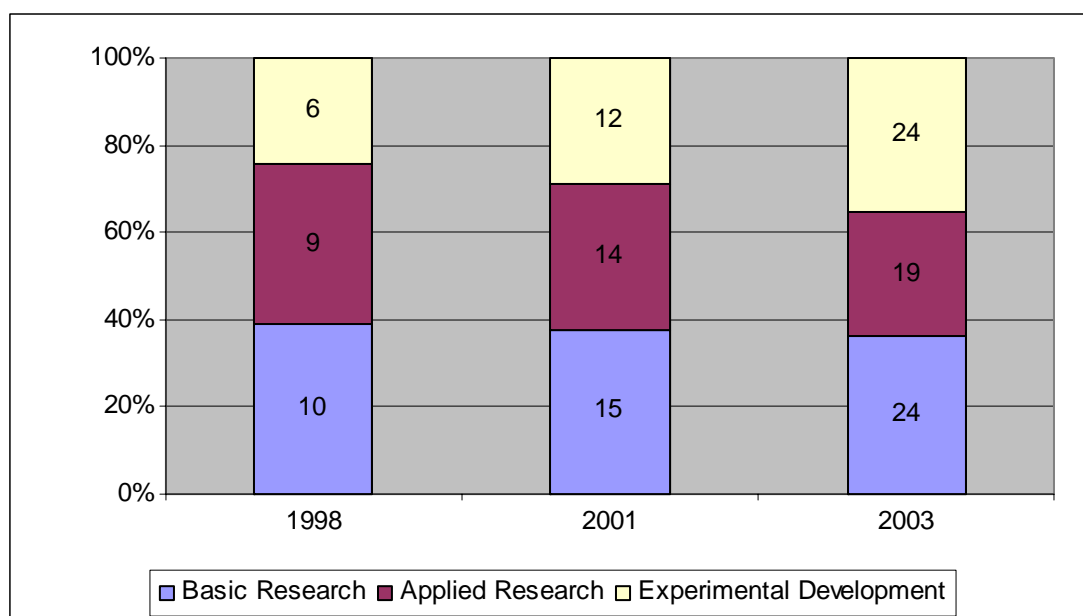
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Table 1. R&D expenditure by sector of performance and source of funds . Estonia. 1993 and 2002. Million Euros. Current prices.

Not Available

Source: OECD OFFBERD 2005

Figure 2. GERD by type of research. Estonia. 1998, 2001 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. Estonia. 1993 and 2003.

Not Available

*Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: OECD Basic Science and Technology Statistics 2005, own calculations.*

HERD by field of science

Figure 4. Expenditure on R&D in the Higher Education Sector (HERD) by field of science. Estonia. 1993, 1998 and 2002. Per cent of total HERD and in million Euro.

Not Available

Source: OECD Basic Science and Technology Statistics 2005.

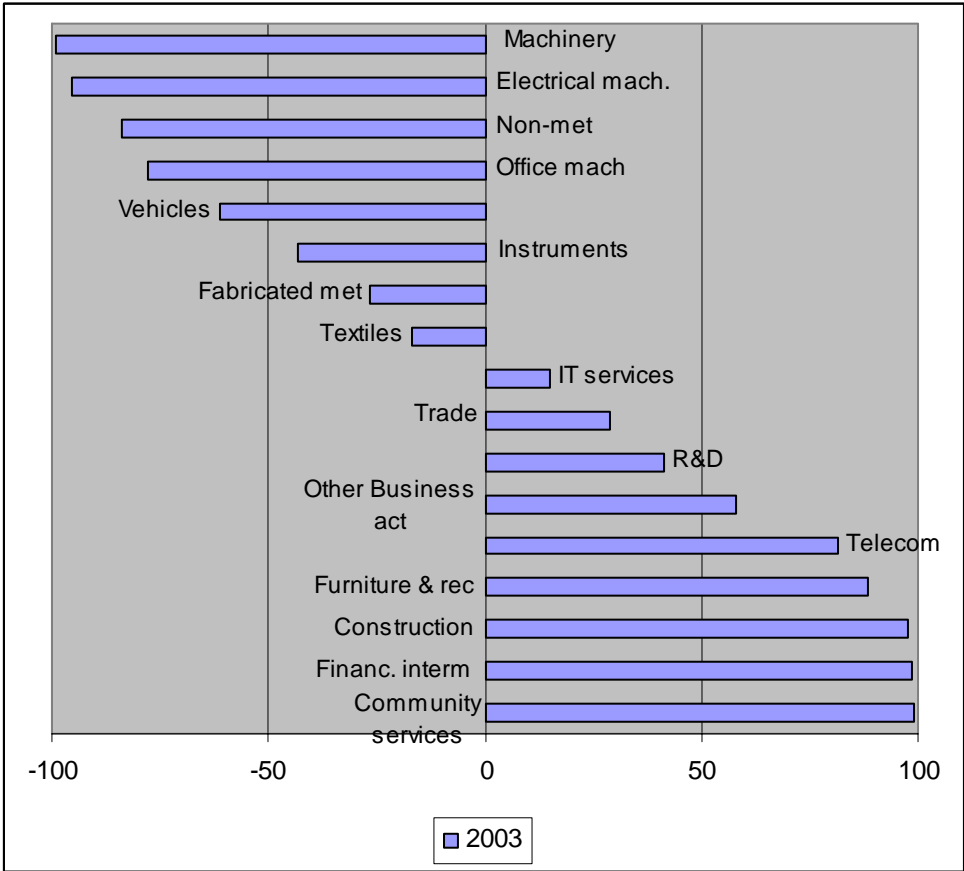
Figure 5. Expenditure on R&D in the Government sector (GOVERD) by field of science. Specialisation profile. Estonia. 1993, 1998 and 2002.

Not Available

Source: OECD Basic Science and Technology Statistics 2005

BUSINESS ENTERPRISE INTRAMURAL EXPENDITURE ON R&D (BERD)

Figure 6. Business enterprise intramural expenditure on R&D by industrial sector. Specialisation profile. Estonia. Available year 2003.

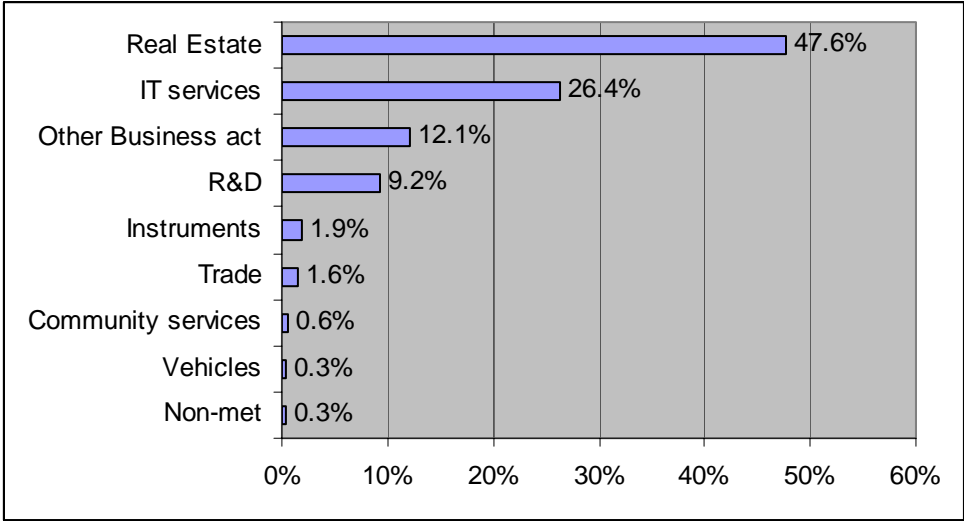


Source: Eurostat Database, S & T Data, 2005, own calculations

Figure 7. Shares of Business enterprise intramural expenditure on R&D (BERD) in the sectors funded by government in 2003

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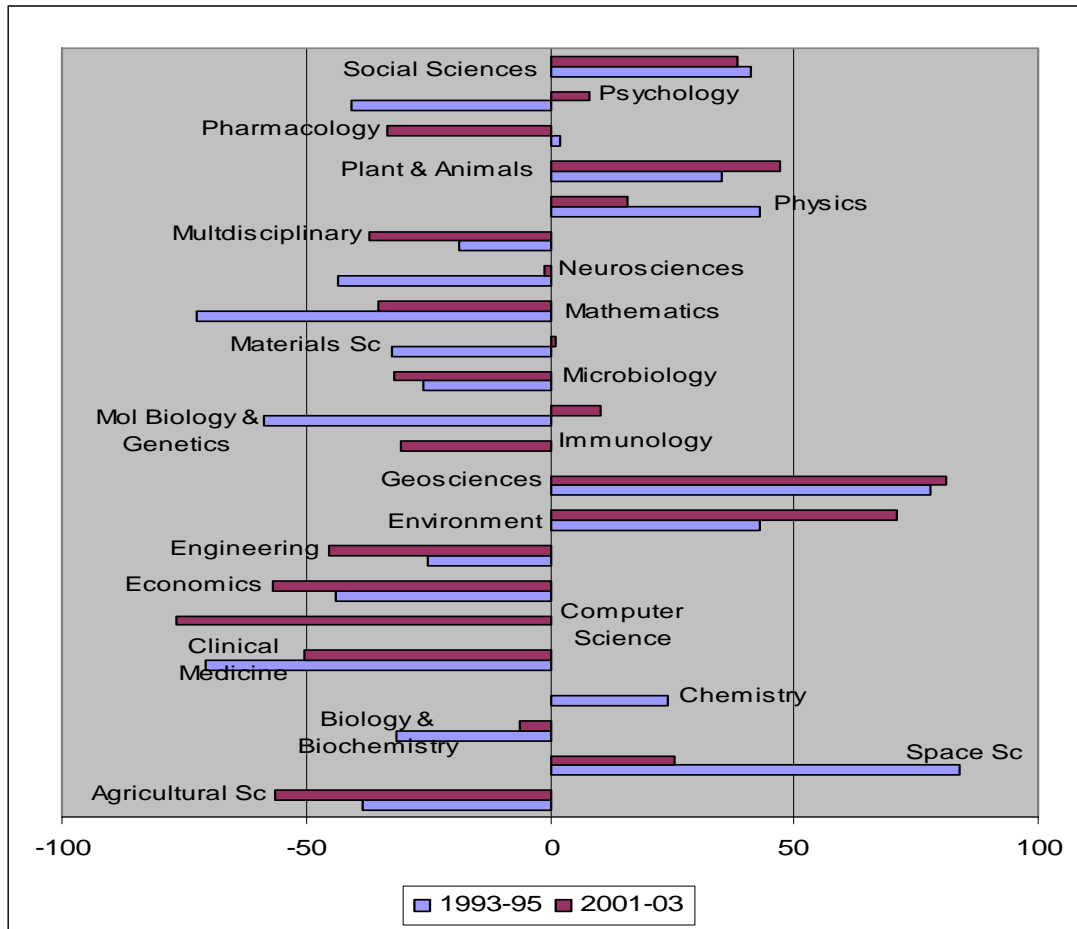
Figure 8. Shares of total government funding of Business enterprise intramural expenditure on R&D (BERD) by industrial sectors. 2003 last available year in EUROSTAT Database.



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

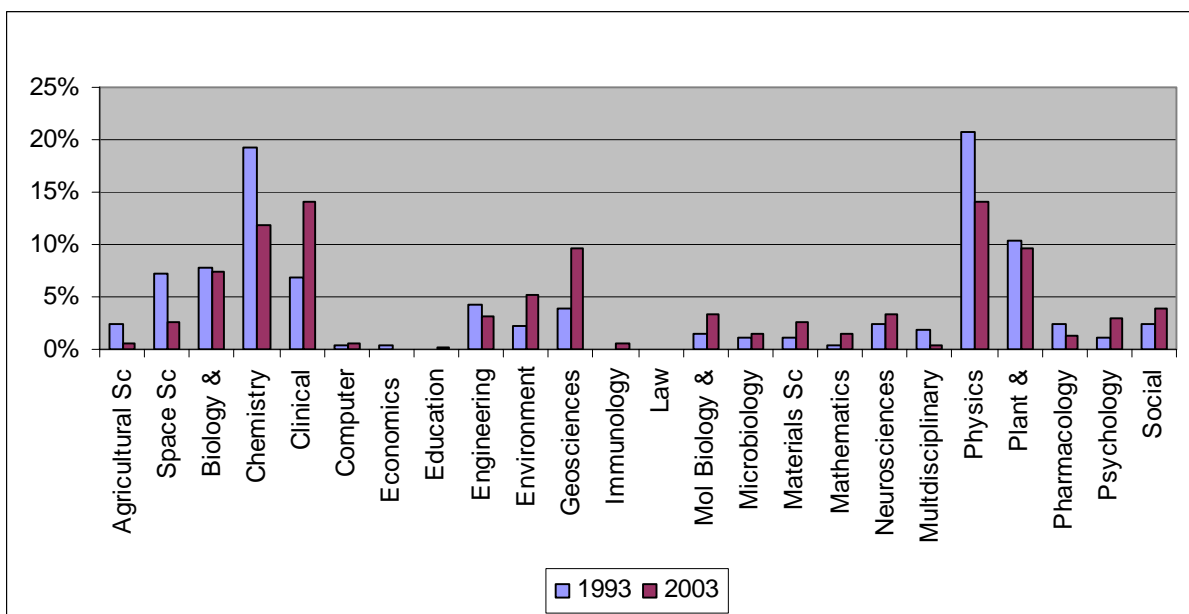
BIBLIOMETRICS

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



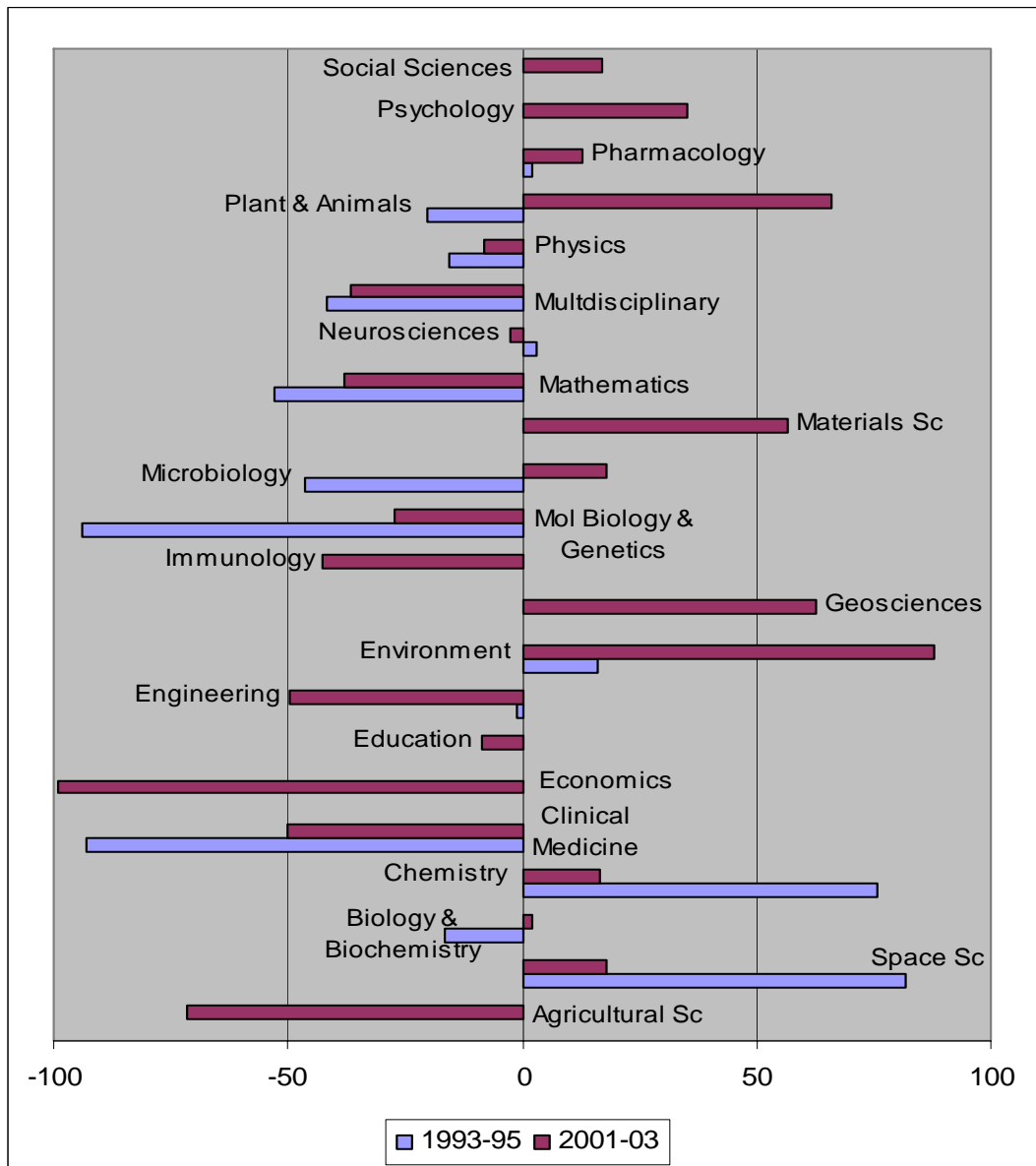
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: Thomson ISI, NSIODE 2005, own calculations.

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



Source: Thomson ISI, NSIODE 2005.

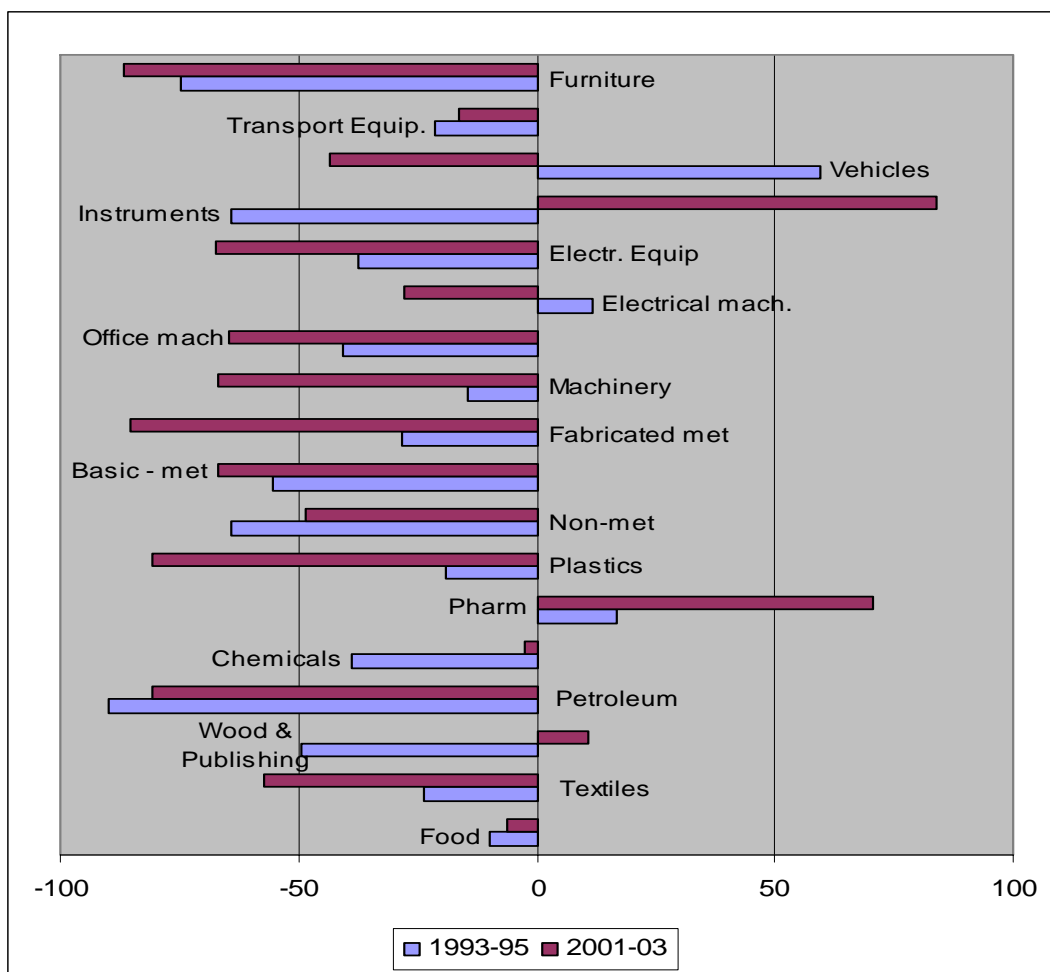
Figure 11. Number of citations by scientific field. 25 scientific fields. Specialisation profile. Estonia. Averages 1993-1995 and 2001-2003. Five years citation window. (i.e. citations to papers published in the period 1989-1991 and in the period 1997-1999).



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

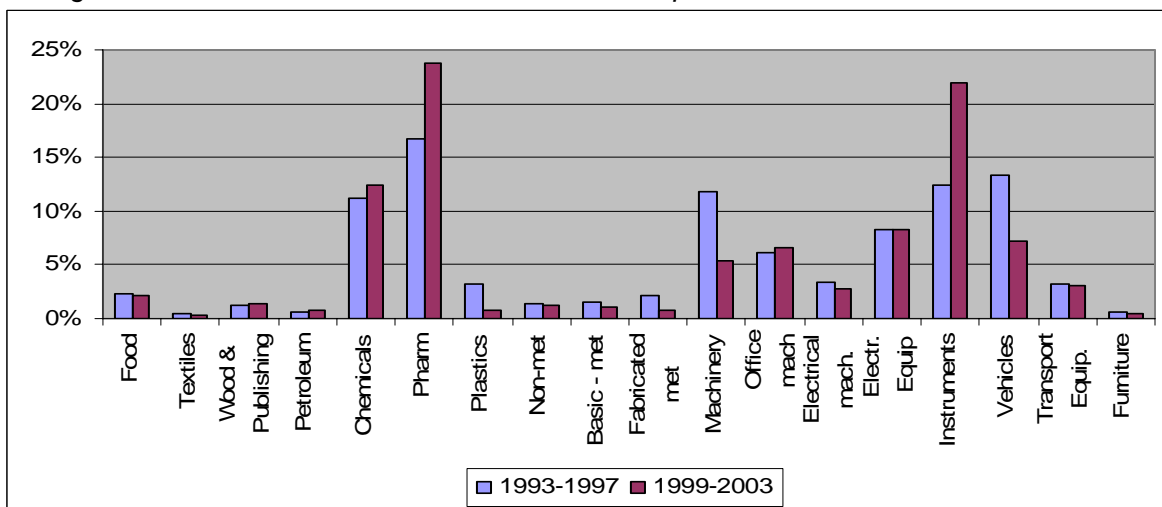
PATENTS

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



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

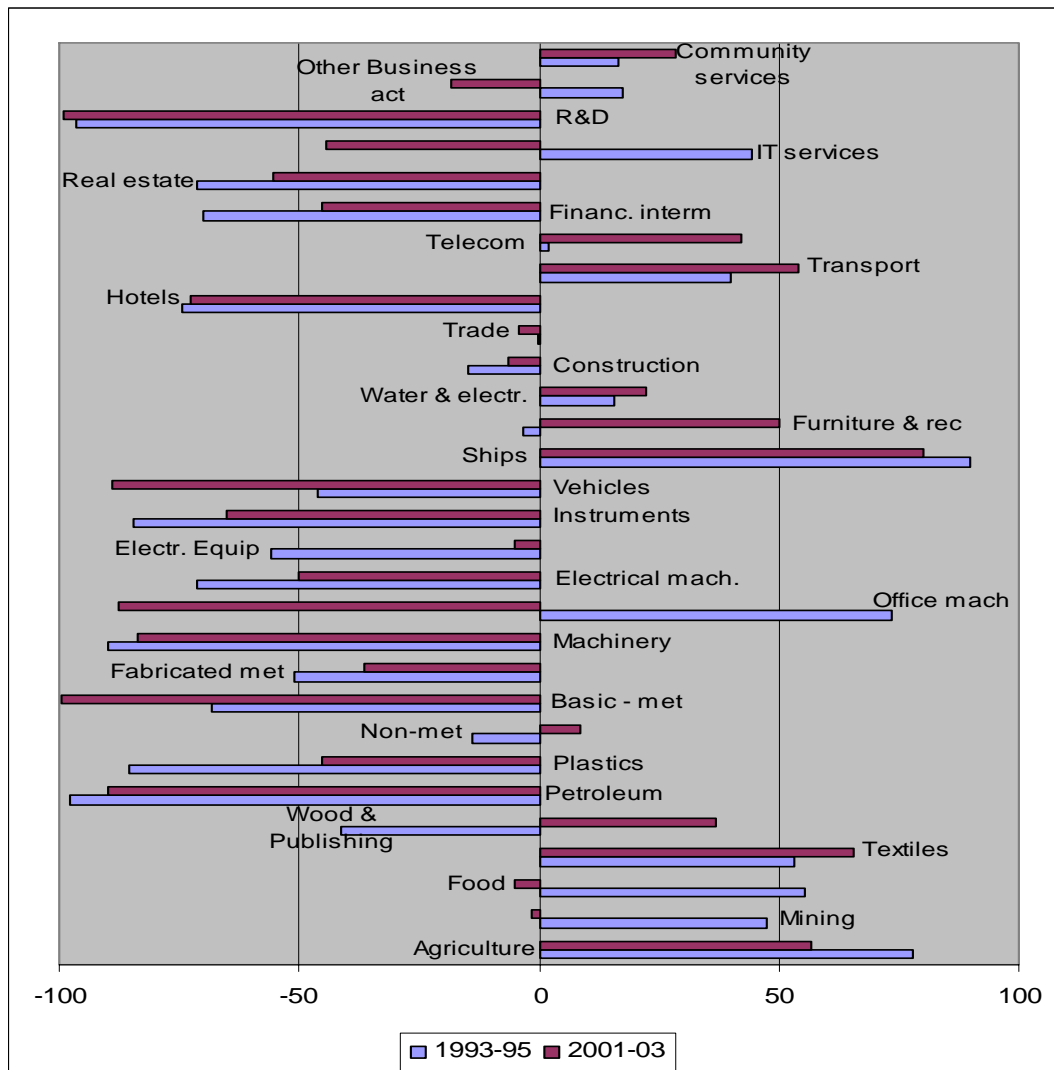
Figure 13. Shares of total patents by industrial sector. 18 sectors in manufacturing. Estonia. Averages 1993-1997 and 1999-2003. Based on correspondence matrix ISI-SPRU-OST.



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

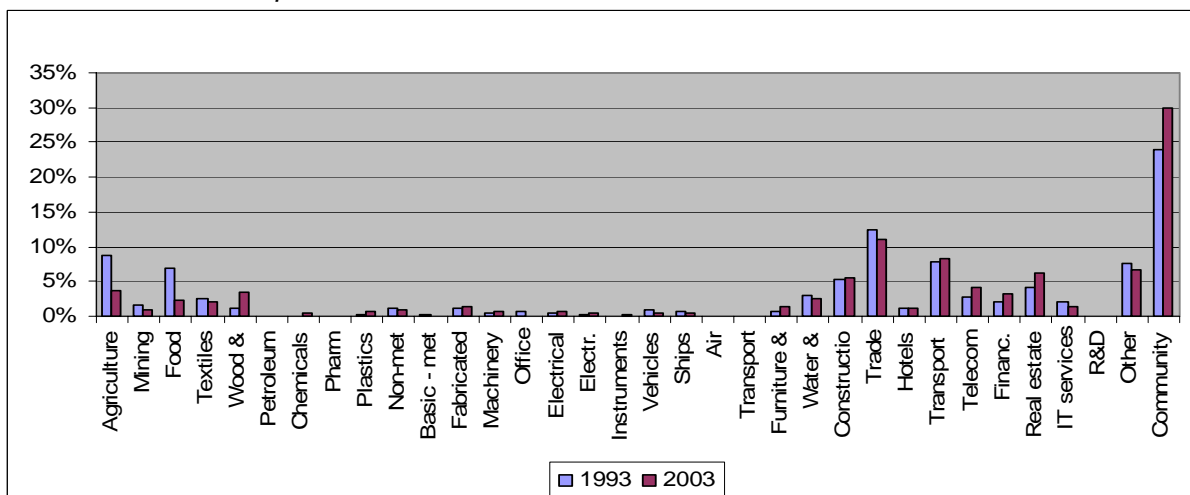
ECONOMIC SPECIALISATION

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



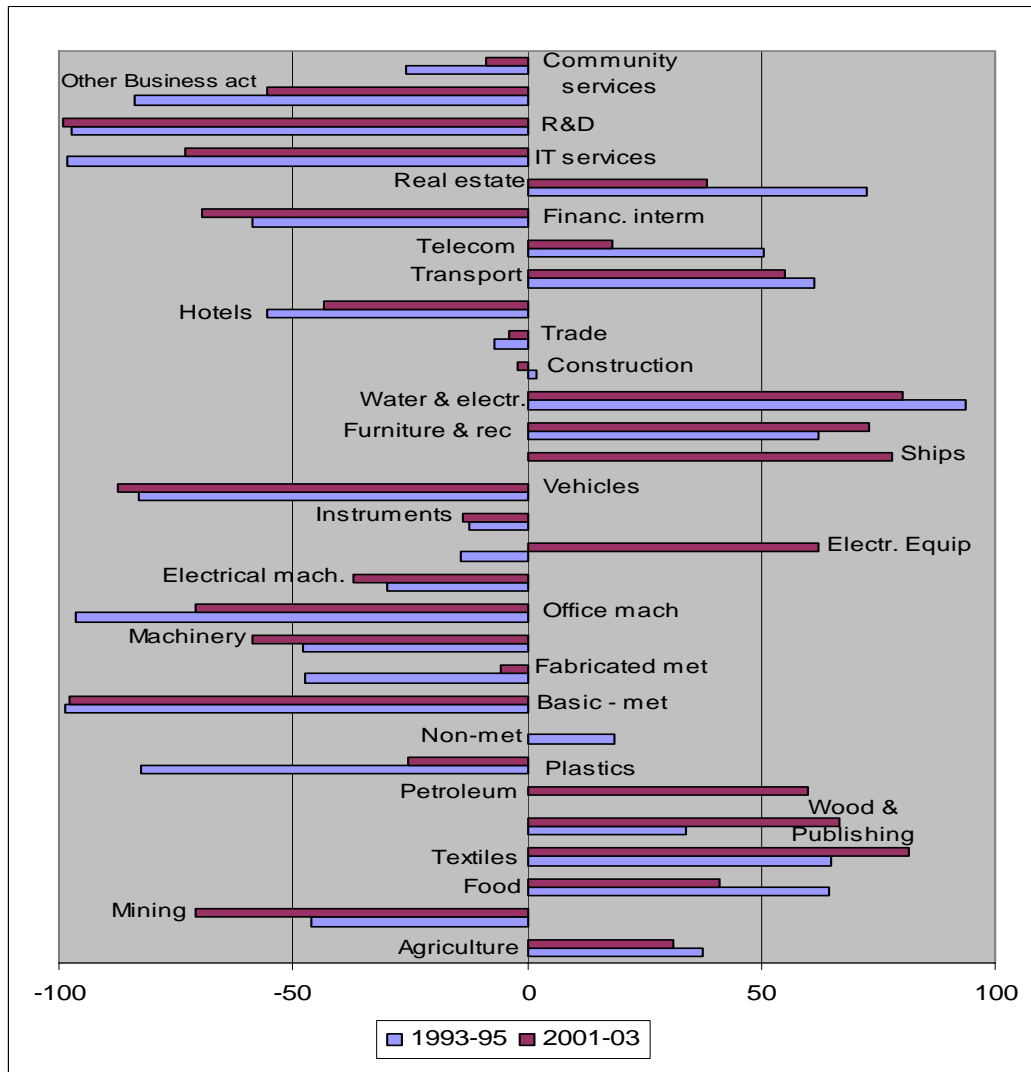
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: OECD, STAN 2005, own calculations.

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



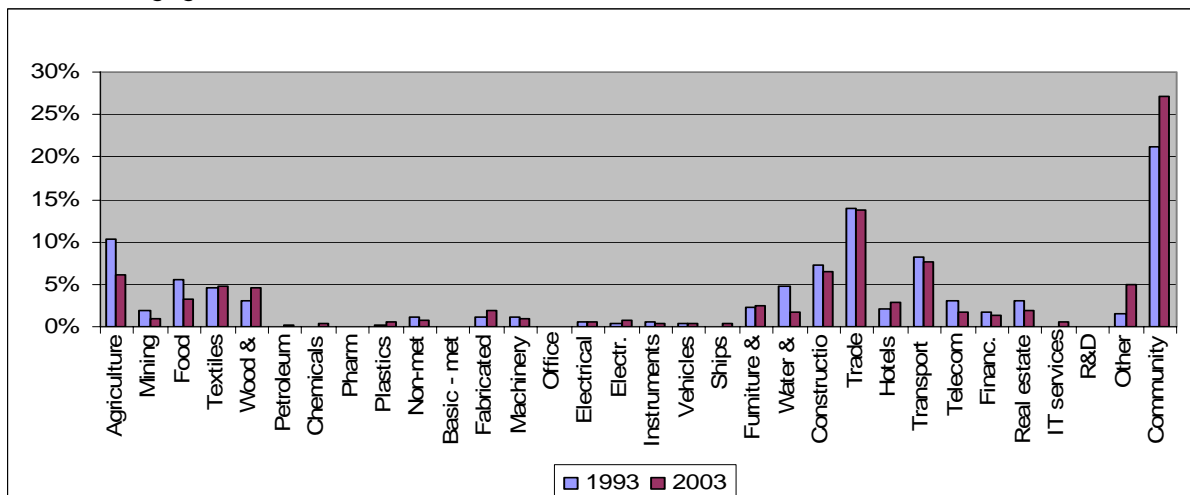
Source: OECD, STAN, 2005.

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



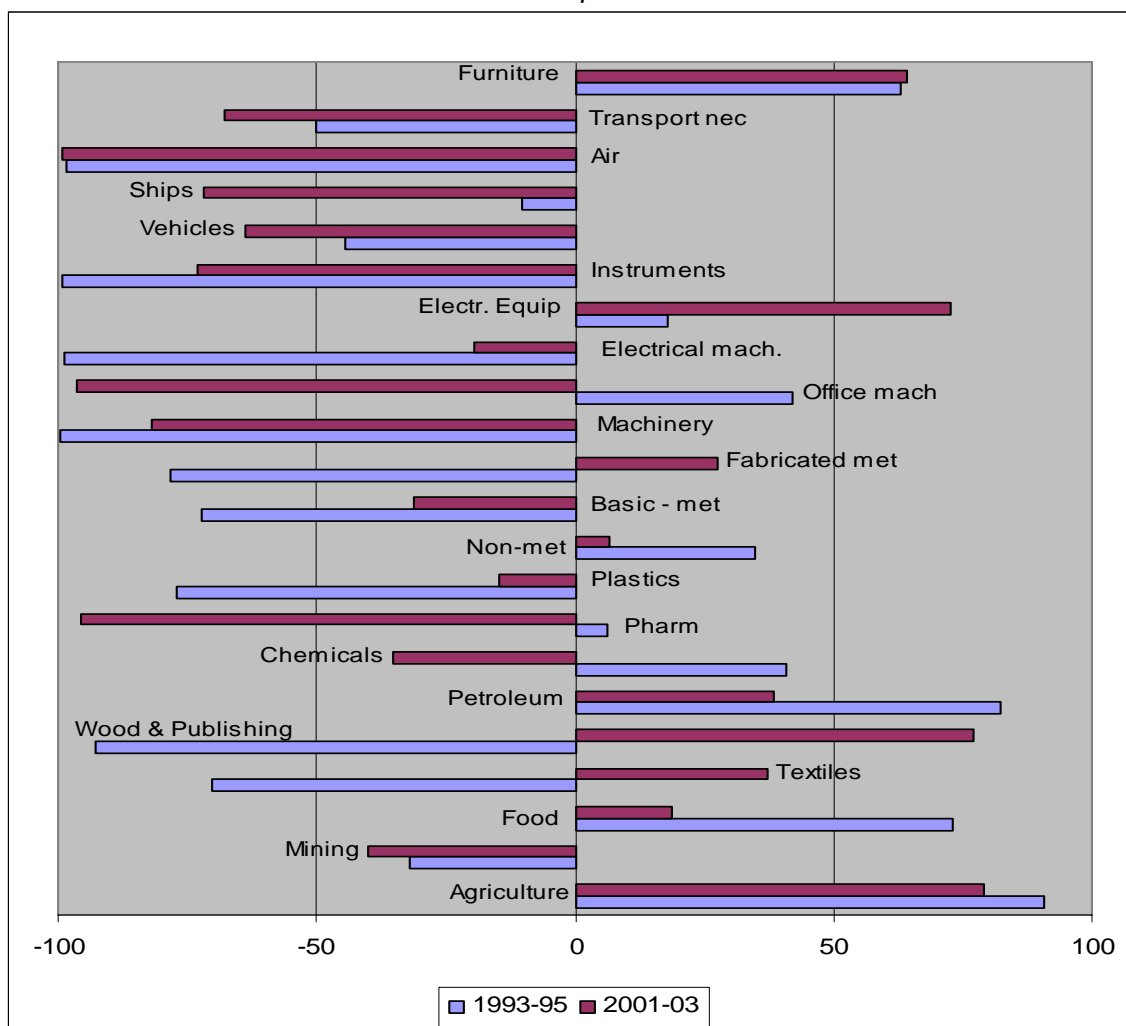
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: OECD, STAN, 2005, own calculations.

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



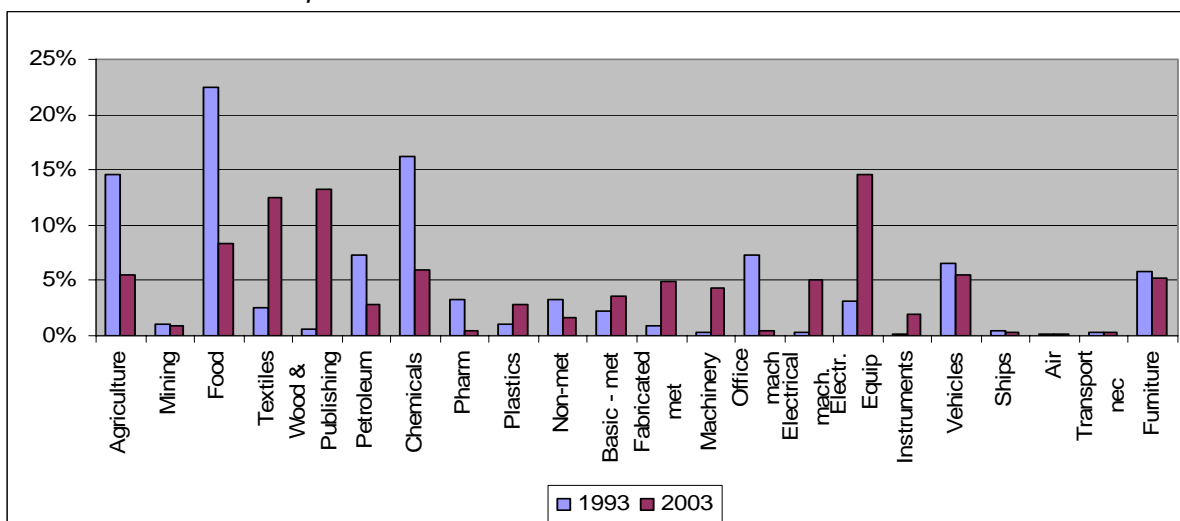
Source: OECD, STAN, 2005.

Figure 18. Exports by industrial sector. Specialisation profile. Estonia. 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. Estonia. 1993 and 2003. Thousand USD. Current prices.



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

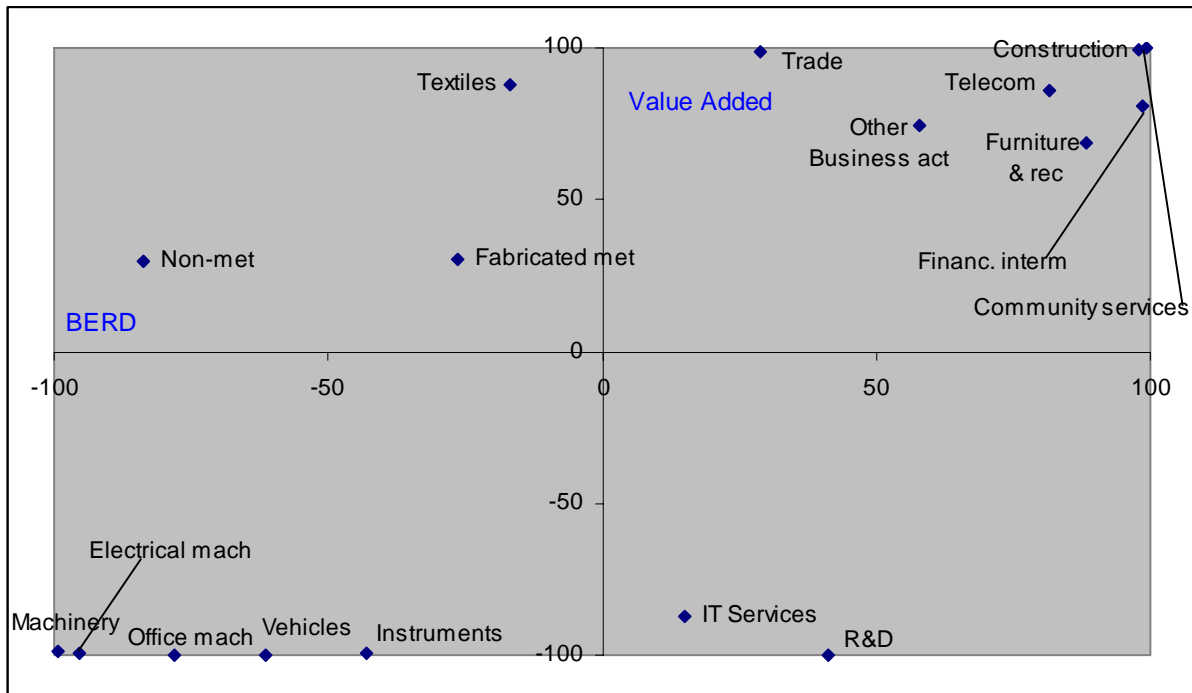
CORRELATION ANALYSIS*Table 2. Correlation analysis. Specialisaion indexes BERD, Value added, Employment, Exports and patents. Estonia. Averages 1993-1995 and 2001-2003.*

		EE_BERD03	EE_PAT9395	EE_PAT0103	EE_VA9395	EE_VA0103	EE_EMP9395	EE_EMP0103	EE_EXP9395	EE_EXP0103
EE_BERD03	Pearson Correlation Sig. (2-tailed)	1 .	-,135 ,750	,098 ,818	,179 ,493	,482 ,050	,202 ,436	,222 ,392	-,208 ,620	,528 ,179
EE_PAT9395	Pearson Correlation Sig. (2-tailed)	-,135 ,750	1 .	,111 ,683	,114 ,699	-,068 ,819	-,191 ,531	-,376 ,185	-,231 ,389	-,359 ,172
EE_PAT0103	Pearson Correlation Sig. (2-tailed)	,098 ,818	,111 ,683	1 .	,000 ,999	,158 ,590	,410 ,164	,122 ,677	-,059 ,828	-,319 ,228
EE_VA9395	Pearson Correlation Sig. (2-tailed)	,179 ,493	,114 ,699	,000 ,999	1 .	,662(**) ,000	,399(*) ,039	,322 ,089	,486(*) ,048	,001 ,998
EE_VA0103	Pearson Correlation Sig. (2-tailed)	,482 ,050	-,068 ,819	,158 ,590	,662(**) ,000	1 .	,831(**) ,000	,750(**) ,000	,182 ,485	,480 ,051
EE_EMP9395	Pearson Correlation Sig. (2-tailed)	,202 ,436	-,191 ,531	,410 ,164	,399(*) ,039	,831(**) ,000	1 .	,910(**) ,000	,314 ,254	,669(**) ,006
EE_EMP0103	Pearson Correlation Sig. (2-tailed)	,222 ,392	-,376 ,185	,122 ,677	,322 ,089	,750(**) ,000	,910(**) ,000	1 .	,318 ,213	,654(**) ,004
EE_EXP9395	Pearson Correlation Sig. (2-tailed)	-,208 ,620	-,231 ,389	-,059 ,828	,486(*) ,048	,182 ,485	,314 ,254	,318 ,213	1 .	,290 ,202
EE_EXP0103	Pearson Correlation Sig. (2-tailed)	,528 ,179	-,359 ,172	-,319 ,228	,001 ,998	,480 ,051	,669(**) ,006	,654(**) ,004	,290 ,202	1 .

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

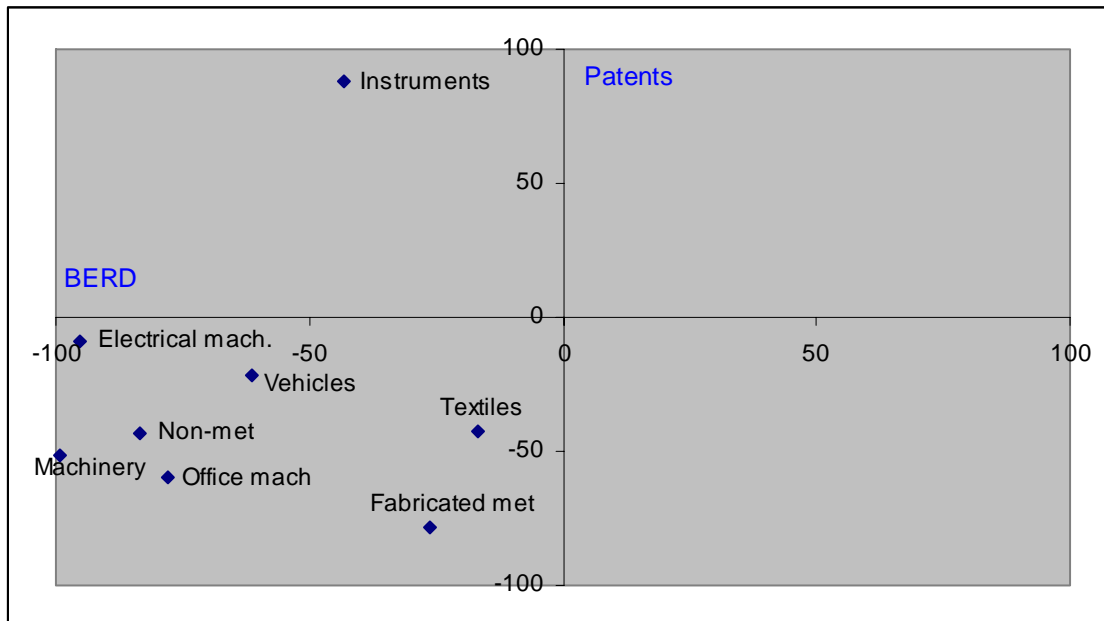
* Correlation is significant at the 0.05 level (2-tailed).

Figure 20. BERD versus Value added specialisation in all sectors. Estonia. Based on values of 2003.



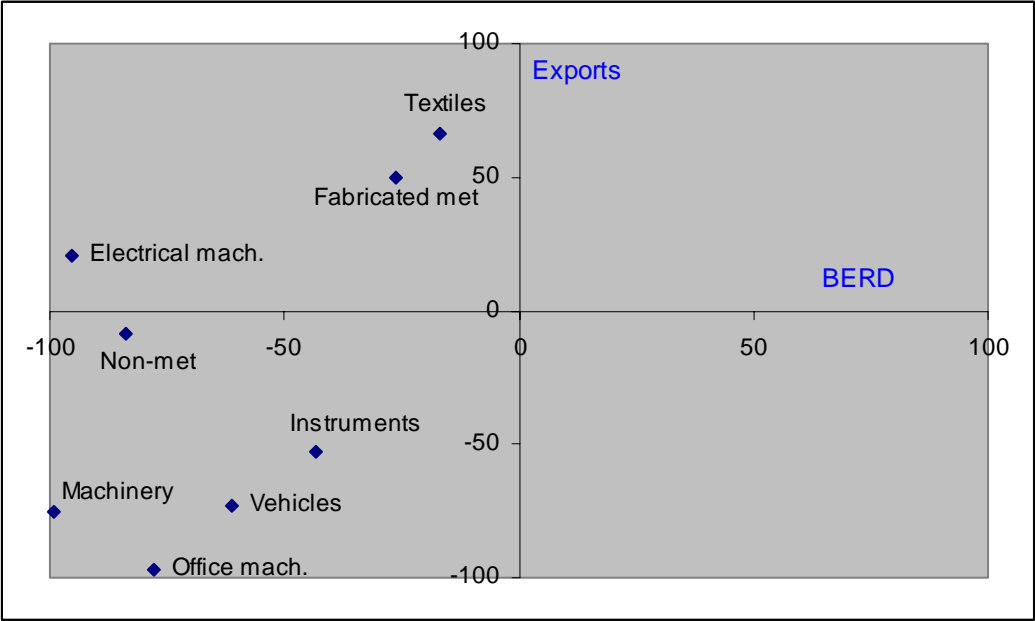
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: Own calculations

Figure 21. BERD versus patents. Specialisation indexes. Estonia. Based on values of 2003.



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

Figure 22. BERD versus exports. Specialisation indexes. Estonia. Based on values of 2003.



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	2423;			20-22;					
Specialisation Value Added	60-63; 75-99		50-52; 72; 74;	20-22; 26; 36-37; 40-41; 64; 33;		01-05; 10-14; 15-16; 30; 351; 31; 34;	17-19;		
Specialisation Employment			45; 60-63;	20-22; 32; 36-37;	01-05;	15-16; 26; 40-41; 64; 70-71;	17-19;		
Specialisation Exports			23; 2423;	20-22; 28; 32;	36	01-05; 15-16; 24ex2423; 26; 30;	17-19;		

Red numbers: Decrease specialisation from specialised to non specialised

Blue numbers: Increase specialisation from non specialised to specialised

*: No Specialization BERD can be presented due to unavailability of time series data.

NOTE: The ISIC sectors 23 and 351 are employment specialized but due to non availability of time series data, they are not presented in the table.

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-metal minerals	26
Basic metals	27
Fabricated metals	28
Machinery nec	29
Office machinery	30
Electrical mach.	31
Electronic equip.	32
Instruments	33
Motor vehicles	34
Ships	351
Air	353
Transport nec	352+359
Furniture & recycling	36-37
Water & electr.	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.

BERD and Value Added specialisation – an example

