COUNTRY SPECIALISATION REPORT

Country: Netherlands

Date: June 2006

ERAWATCH Network asbl: Project team: NIFU STEP, University of Sussex (SPRU), Joanneum Research, Logotech, FhG-ISI

Website: http://cordis.europa.eu/erawatch/

Index

Index of tables and figures

COUNTRY SPECIALISATION REPORT - NETHERLANDS

MAIN FINDINGS

Netherlands present a relative disambiguate picture regarding their specialisation, in the primary, secondary and tertiary economic sectors. Thus as sectors of strength emerge the community services, business activities and the ICT sectors, electronic equipment and office machinery industries, the chemicals and the food industry and the primary sector, i.e mining and agriculture.

In addition, some relative important correlations appear to exist between economic, technological and BERD specialisations. In more detail, exports for the period 1993-95 and are correlated with patents and value added for both periods, while exports for the period 2001-03 are also correlated with patents for both periods. Equally important is the correlation that exists between value added for the period 1993-95 and BERD for both periods. The most consistent correlation however appears to be that between BERD and patents for both periods. Finally employment during the period 1993-95 is correlated only to value added for both periods.

GERD as a percentage of GDP in the Netherlands was slightly reduced during the 1993-2003 period, starting from 1.9% and reaching 1.8%. This reduction was mainly the result of a decline in public expenditure of 0.2% in GDP equally distributed between HERD and GOVERD (Figure 1). On the contrary, BERD increased marginally from 1.0% of GDP in 1993 to 1.1% in 2003.

These marginal changes in shares however mark more steep changes in the sources of funding of research (Table1). Thus while the goverment was the most important funding source for R&D during 1993, accounting for almost half of R&D funding, its contribution was reduced by 2003 to 36.2% of total GERD. What is impotant to note is that goverment shares in funding research were reduced not only in firms but also in PRO's and HEIs. Enteprises are now the major source of funding with 51.1% share in 2003. Moreover, funding from abroad constitutes a significant part of total reseach expenditure with 11.3% share in 2003. Finally, during 2003, BERD accounted for 57.4% of GERD.

In terms of GBAORD specialisation, Netherlands are highly specialised in civil research and land use, while there are also specialised in a large number of socioeconomic objectives such as energy, space, industrial technologies, agriculture and the environemt (Figure 3).

In terms of scientific specialisation, Netherlands are specialised in a number of fields with the exception of most natural sciences (Figure 9). Moreover, with the exception of molecular biology and genetics where it became underspecialised during the 1993-2003 period, Netherlands are specialised in all medical related fields. This specialisation profile is also validated by the citations profile (Figure 11).

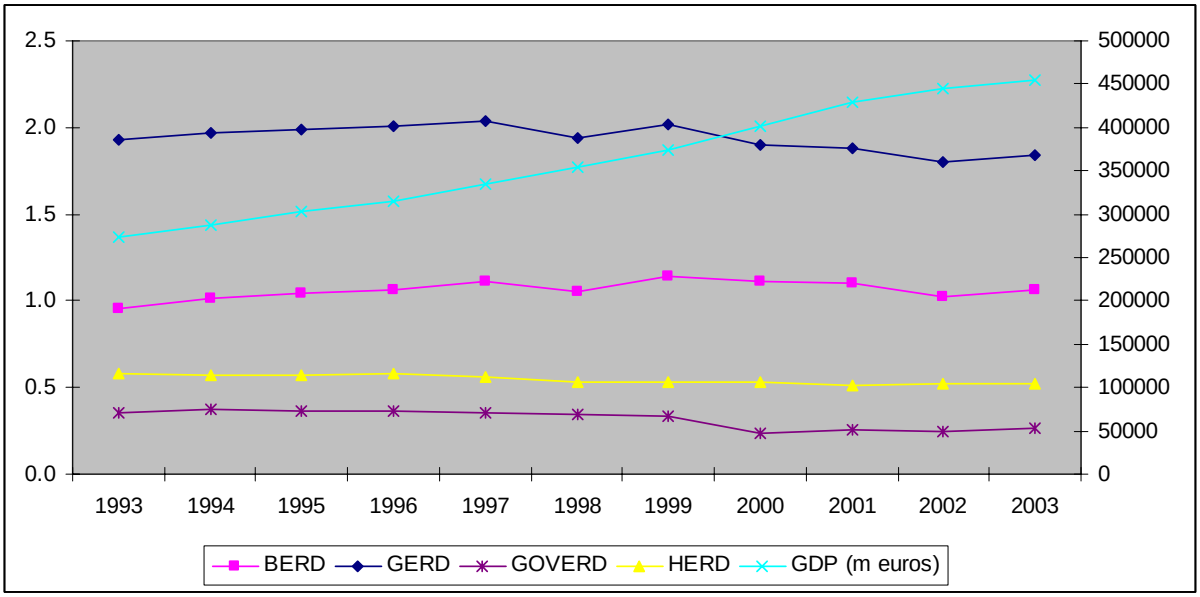
Despite the high quality of research conducted in a large number of sectors, as exhibited by GBAORD and scientific specialiasations, this dispersion of research resources could posible hamper the creation of a critical mass in these fields.

When we turn to the technological specialisation (measured by patents) of Netherlands, what is suprising is the fact that the country is specialised in only three sectors, namely the electronic equipment, office machinery and the food industry. Particularly for the first two industries, the specialisation increased during the 1993-2003 period, while in all other sectors Netherlands became less specialised. This increase in specialisation in the above industries is can most

probably be attributed to large enteprises such as Philips, for whom pateting activities became increasingly important by the end of the 1990's.

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). Netherlands.1993-2003.



Source : OECD, Main Science and Technology Indicators, November 2005

Table 1. R&D expenditure by sector of performance and source of funds .Netherlands. 1993 and 2003. Million Euros. Current prices.

	GOVERD		BERD		HERD		Non profit		Total	
	1993	2003	1993	2003	1993	2003	1993	2003	1993	2003
Business	132.5	196.0	2154.5	3920.0	24.1	160.8	20.0		2331.1	4276.8
Government	748.3	825.4	202.4	161.2	1523.3	2046.6	88.0	1.7	2562.0	3034.9
Higher Education	5.0	12.3	0.0		0.9		1.8		7.7	12.3
Non profit	10.4	45.0	46.7	4.6	34.9	57.2	10.4	1.1	102.6	107.9
From Abroad	60.4	134.3	205.1	718.6	4.5	91.4	11.8	0.2	281.8	944.5
Total	956.6	1213.0	2608.8	4804.4	1587.8	2356.0	132.0	3.0	5285.2	8376.4

Pre-EMU euro and EURO

Source: OECD OFFBERD 2005

Figure 2. GERD by type of research. Netherlands

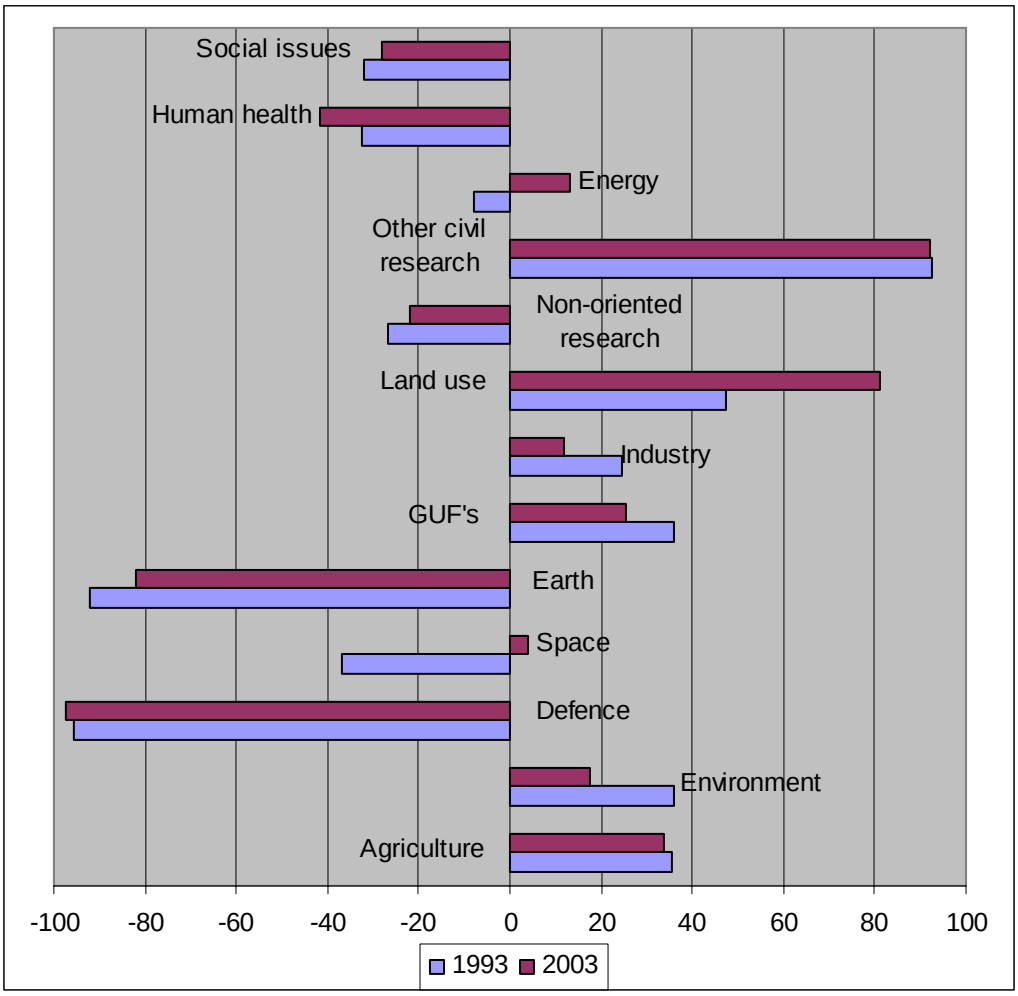
No data available

Source: OECD OFFBERD 2005

PUBLIC R&D STATISTICS

GBAORD by socioeconomic objective

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



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

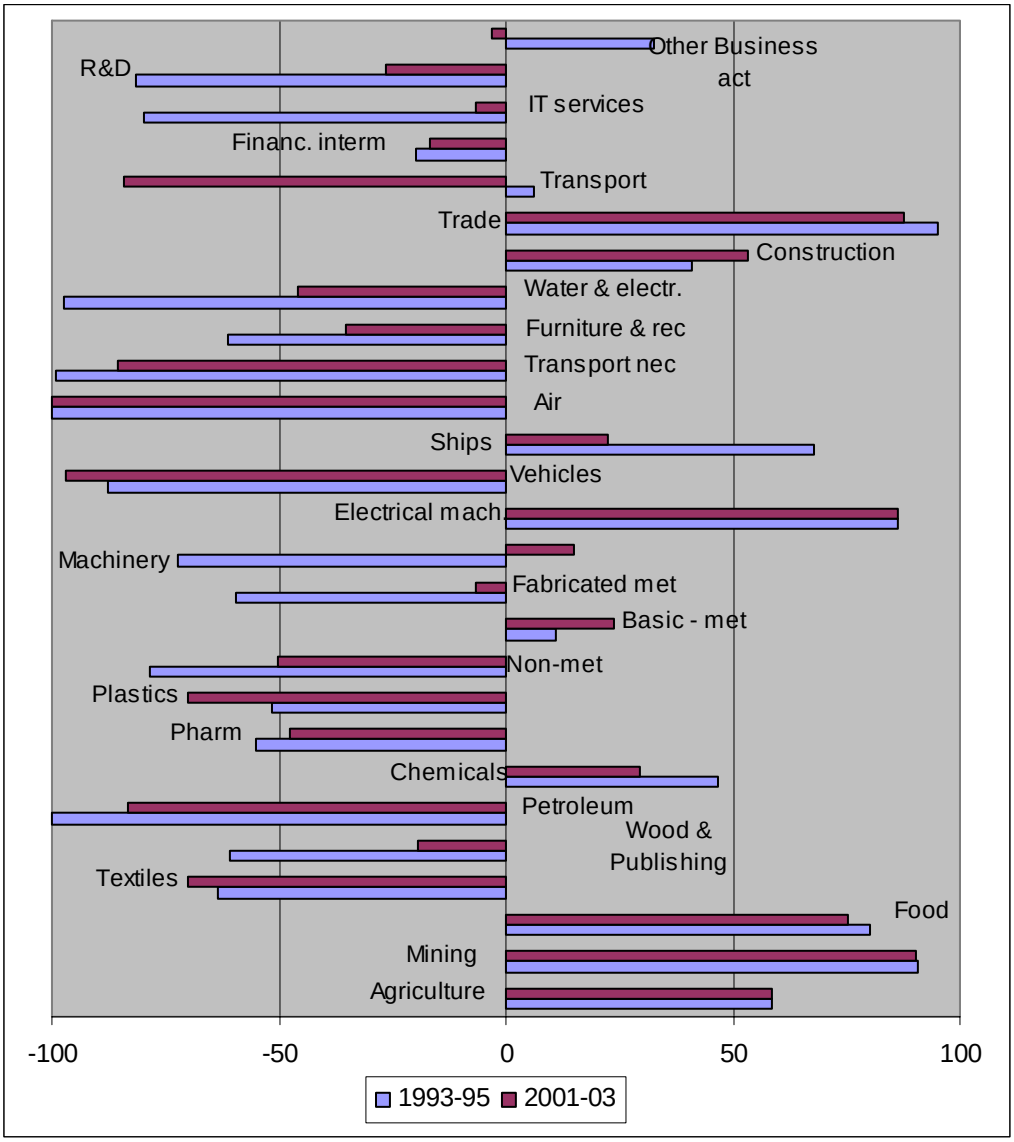
HERD by field of science

Figure 4. Expenditure on R&D in the Higher Education Sector (HERD) by field of science. Netherlands. 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. Netherlands. 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. 31 sectors. Specialisation profile. Netherlands. Averages 1993-1995 and 2001-2003.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: OECD Basic Science and Technology Statistics 20052005, ANBERD 2005, own calculations

Figure 7. Shares of Business enterprise intramural expenditure on R&D (BERD) in the sector funded by government. 1999 last available year in OECD statistics.

Not Available

Source:OECD Basic Science and Technology Statistics 2005, own calculations

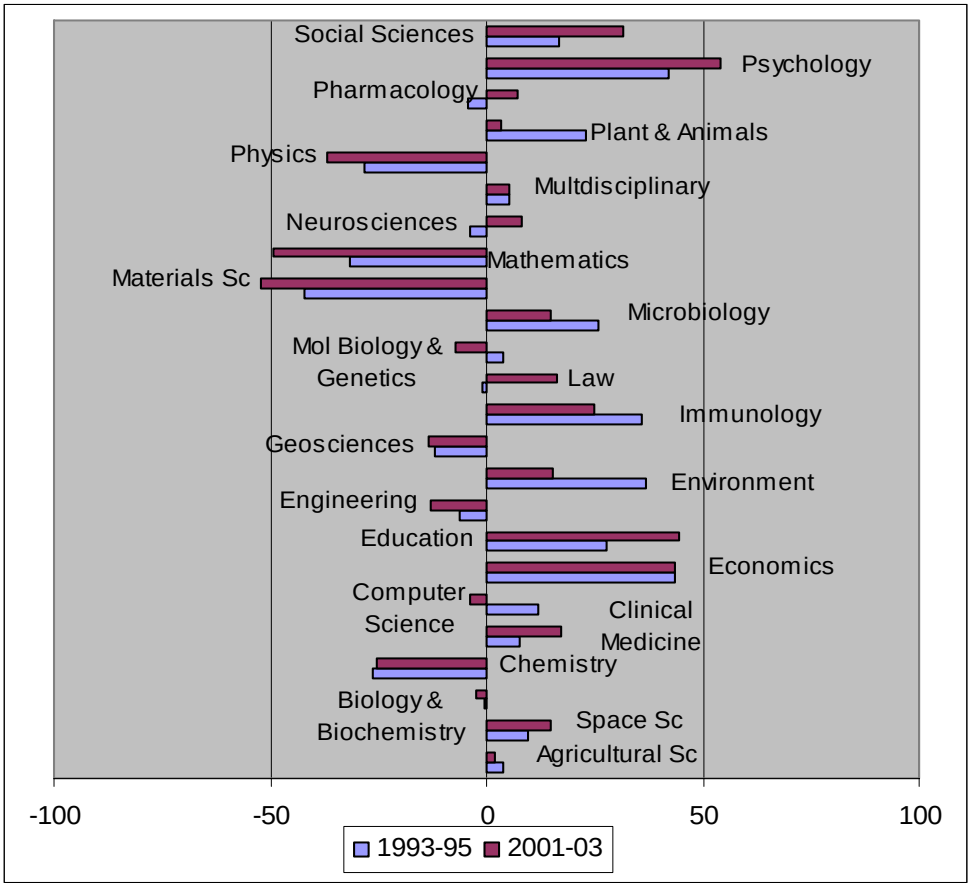
Figure 8. Shares of total government funding of Business enterprise intramural expenditure on R&D (BERD) by industrial sectors. 1999 last available year in OECD statistics.

Not available

Source: OECD Basic Science and Technology Statistics 2005, own calculations

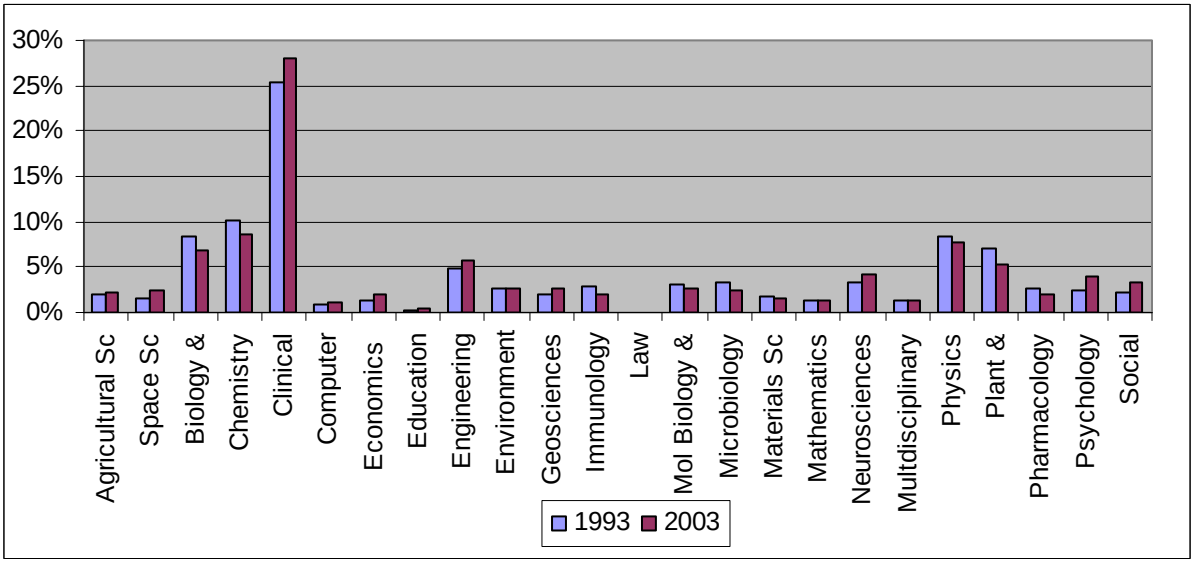
BIBLIOMETRICS

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



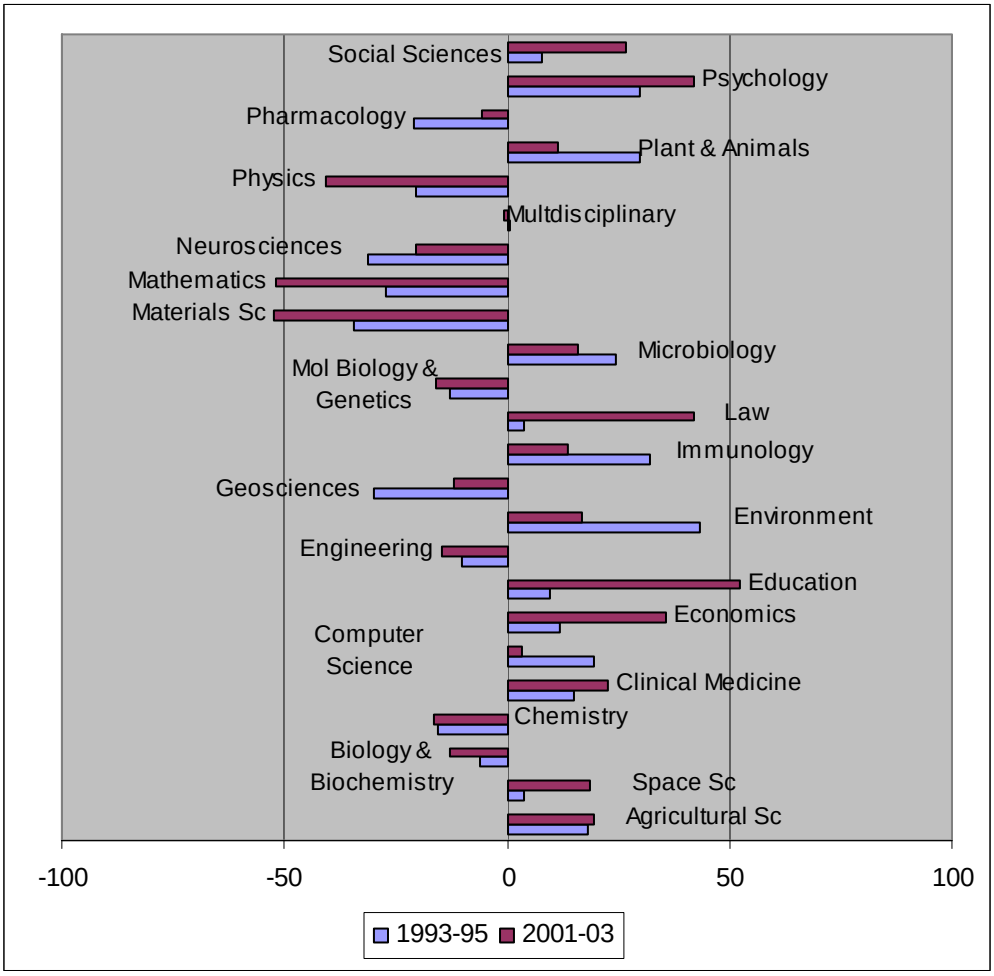
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: Thomson ISI, NSIODE 2005, own calculations.

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



Source: Thomson ISI, NSIODE 2005.

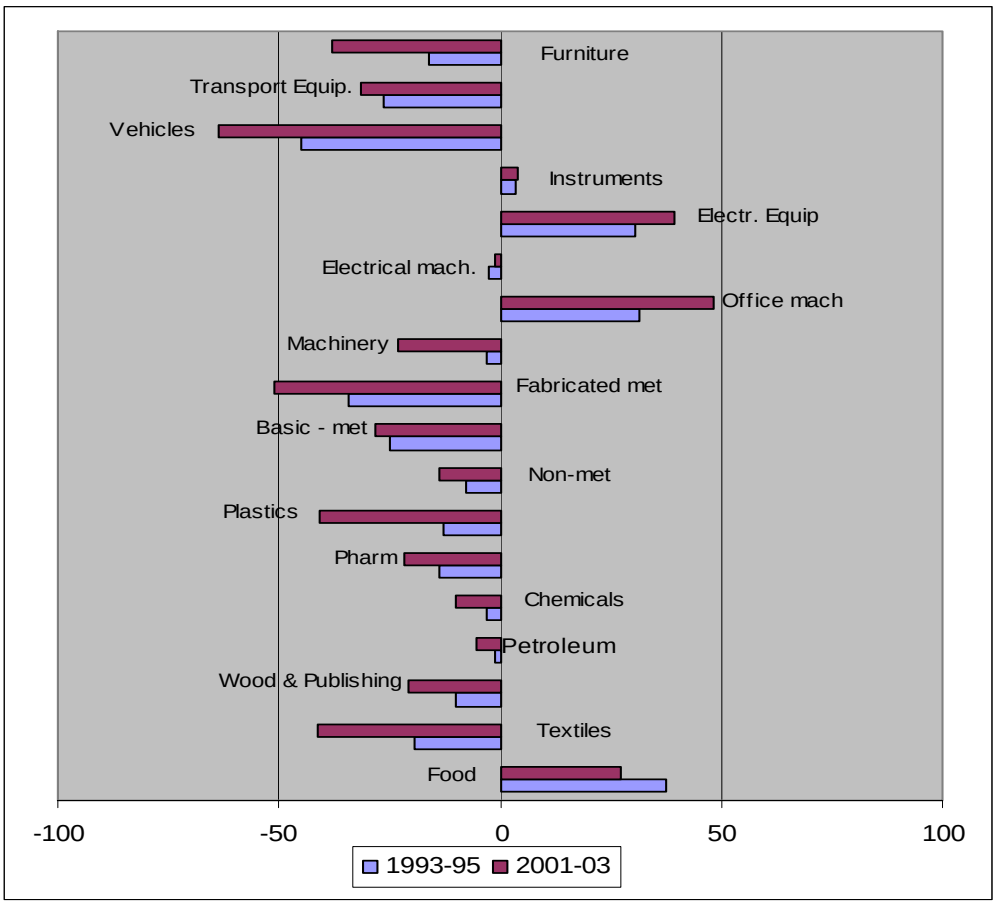
Figure 11. Number of citations by scientific field. 25 scientific fields. Specialisation profile. Netherlands. Averages 1993-1995 and 2001-2003. Five years citation window. (i.e. citations to papers published in the period 1989-1991 and in the period 1997-1999 .



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

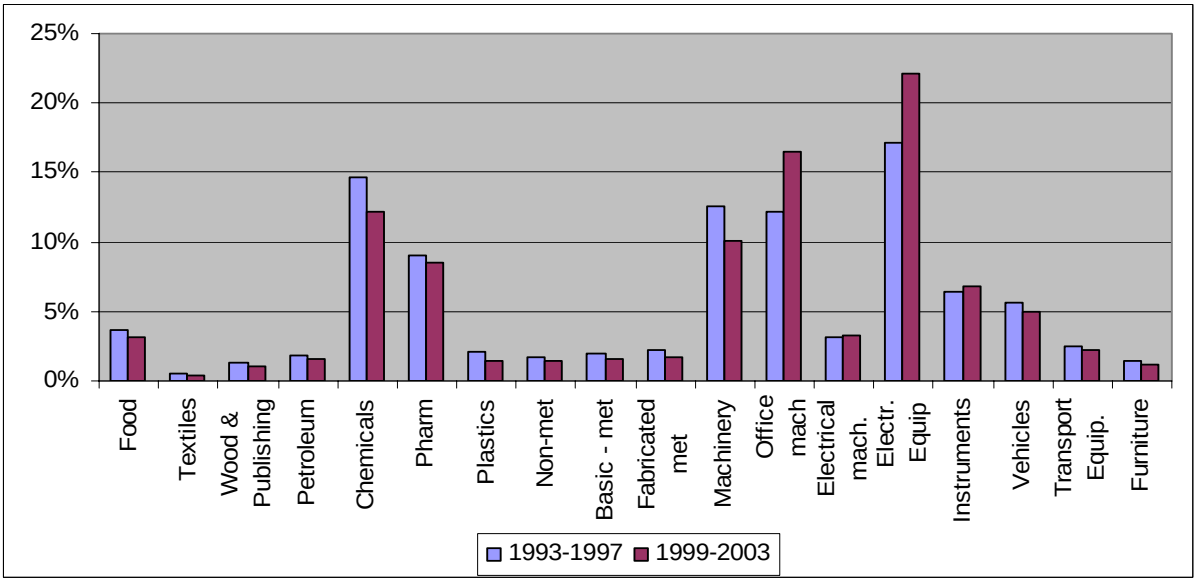
PATENTS

Figure 12. Number of patents by industrial sector. 18 sectors in manufacturing. Specialisation profile. Netherlands. 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.

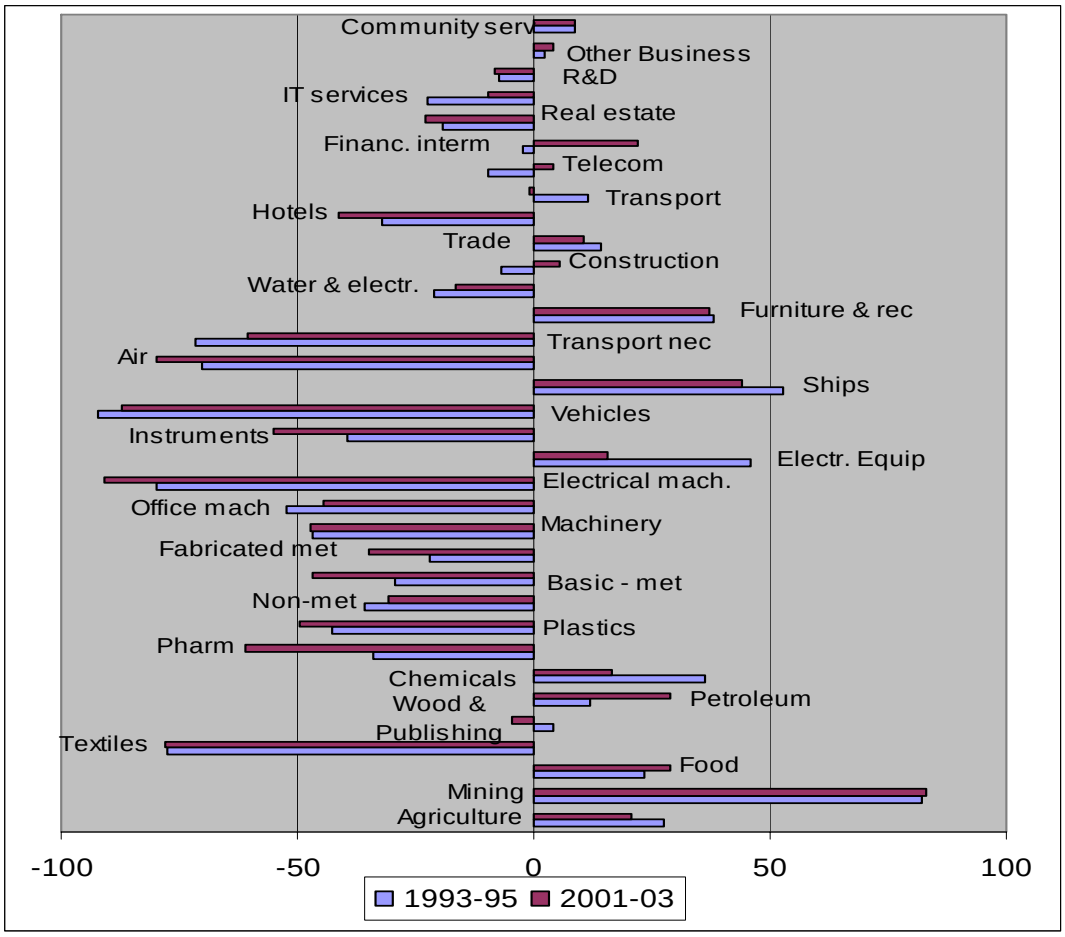
Figure 13. Shares of total patens by industrial sector. 18 sectors in manufacturing. Netherlands. Averages 1993-1997 and 1999-2003. Based on correspondence matrix ISI-SPRU-OST.



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

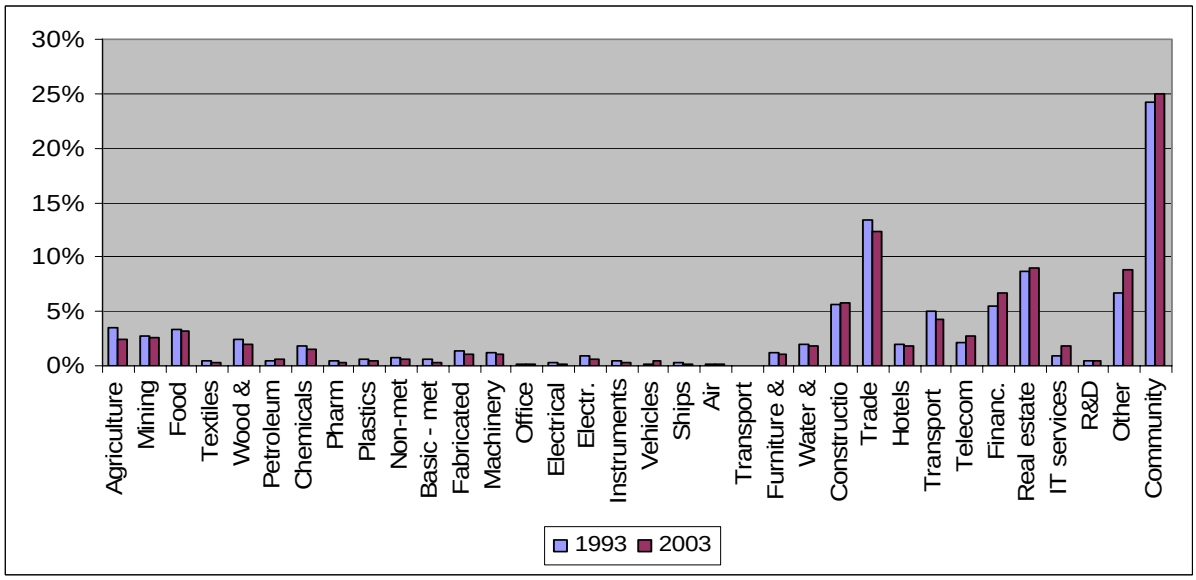
ECONOMIC SPECIALISATION

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



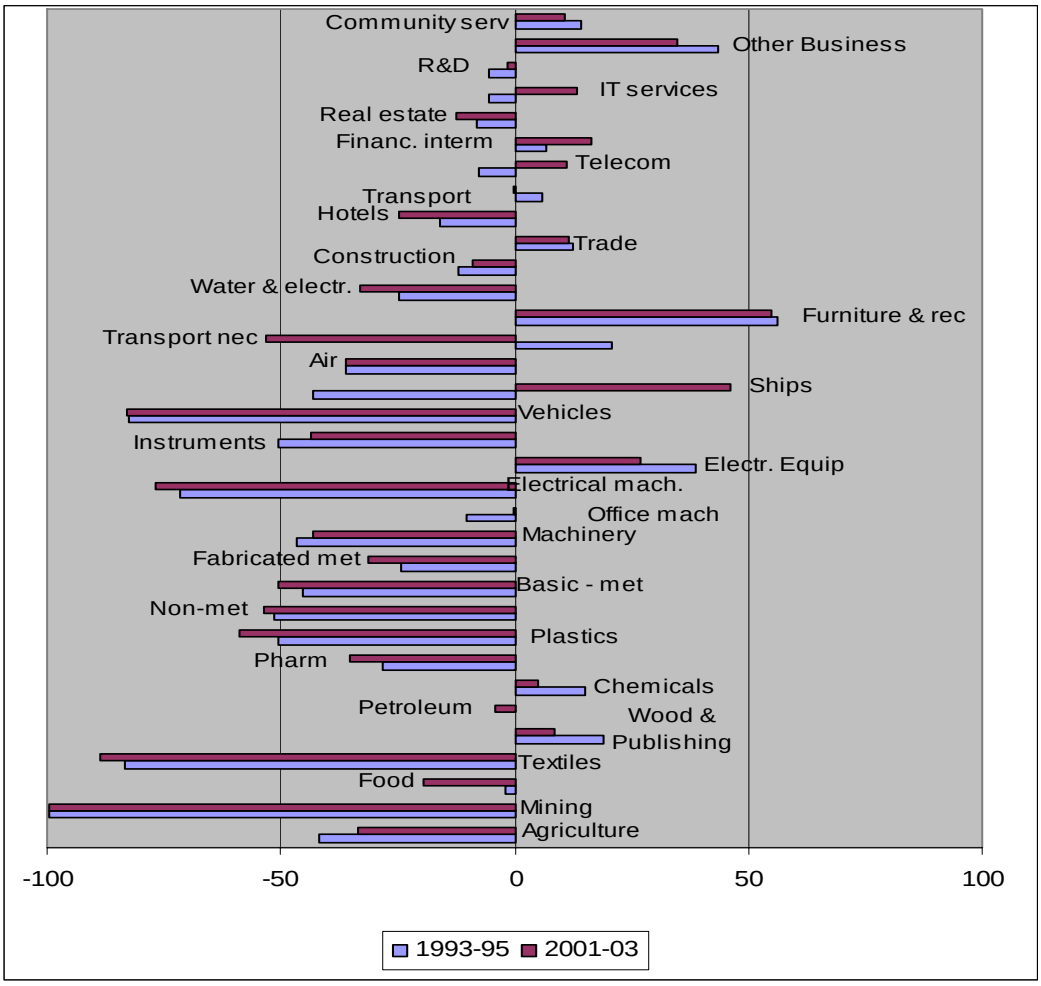
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: OECD, STAN 2005, own calculations.

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



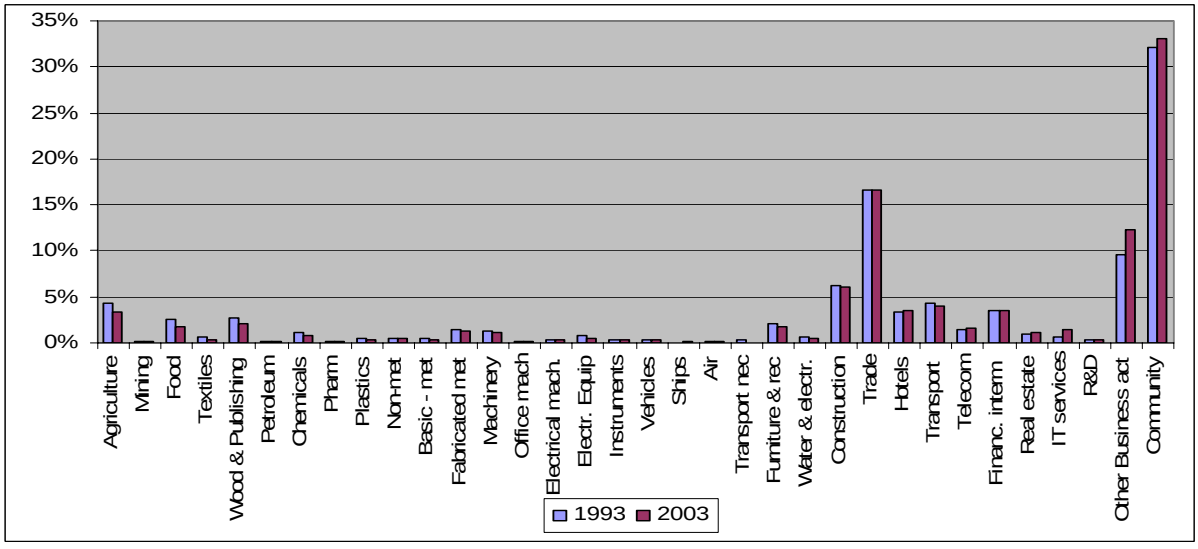
Source: OECD, STAN, 2005.

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



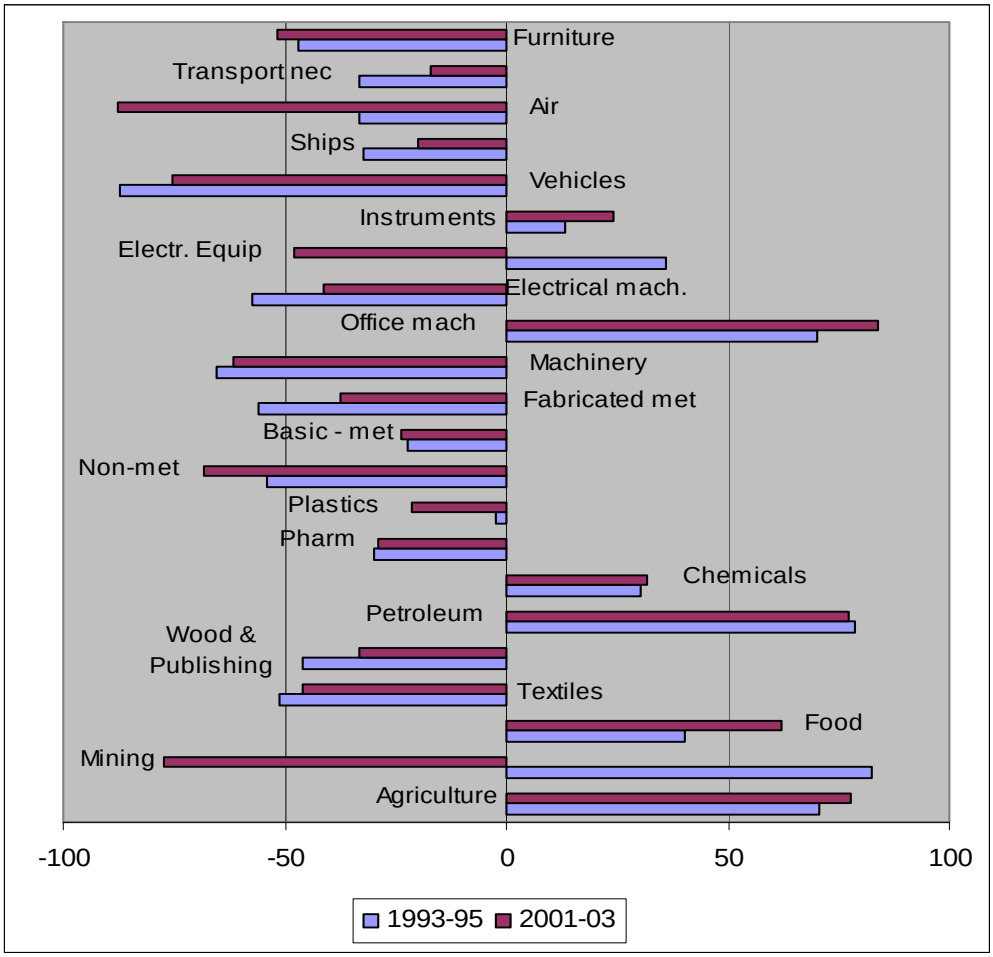
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: OECD, STAN, 2005, own calculations.

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



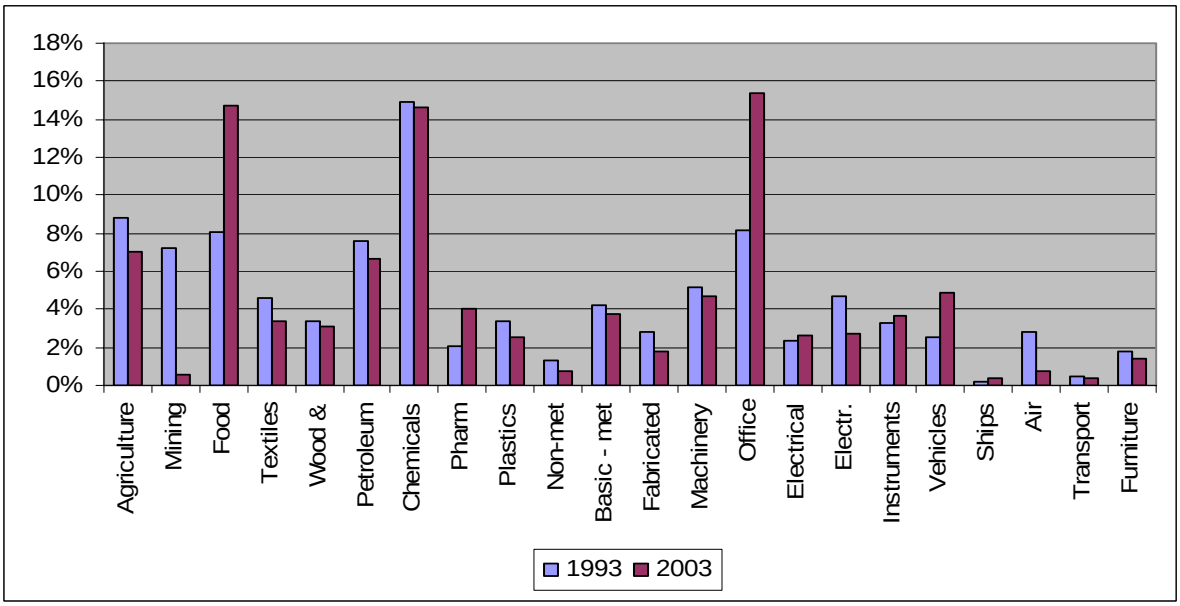
Source: OECD, STAN, 2005.

Figure 18. Exports by industrial sector. Specialisation profile. Netherlands. 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. Netherlands. 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. Netherlands. Averages 1993-1995 and 2001-2003.

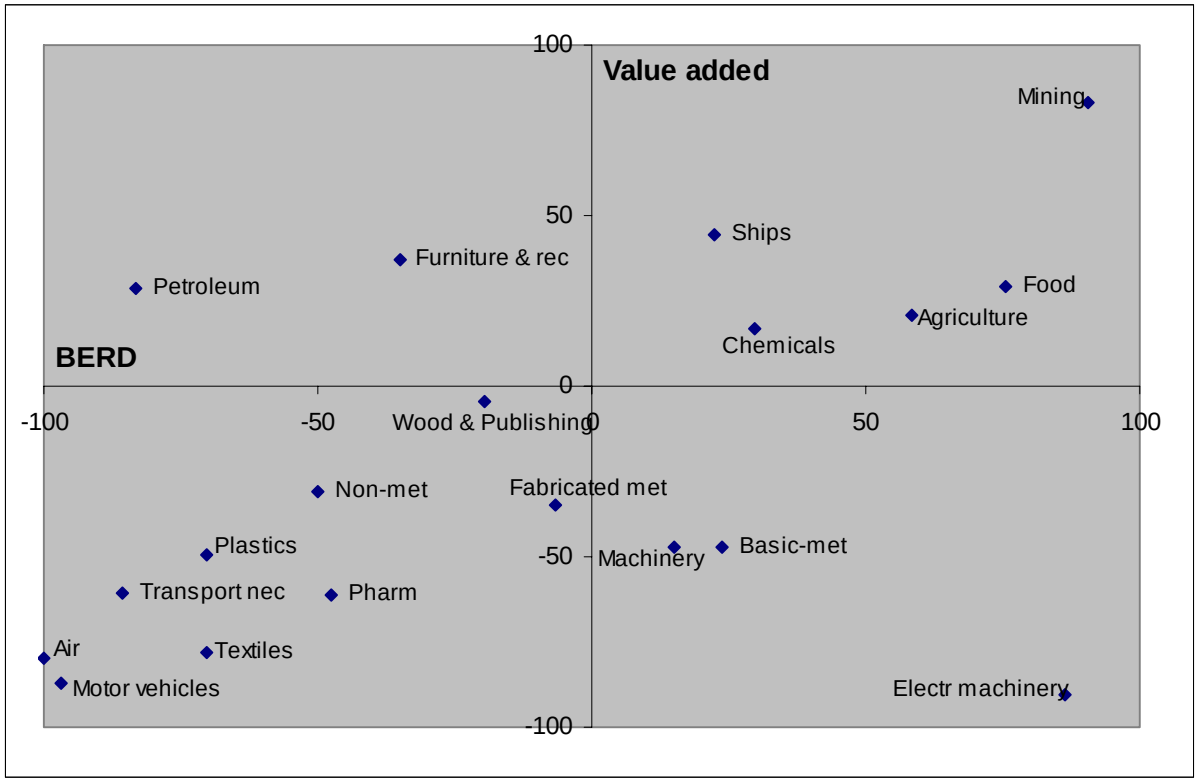
Correlations

		NL_BERD 9395	NL_BERD 0103	NL_PAT 9395	NL_PAT 0103	NL_VA 9395	NL_VA 0103	NL_EMP 9395	NL_EMP 0103	NL_EXP 9395	NL_EXP 0103
NL_BERD9395	Pearson Correlation	1									
	Sig. (2-tailed)	.									
NL_BERD0103	Pearson Correlation	.846**	1								
	Sig. (2-tailed)	.000	.								
NL_PAT9395	Pearson Correlation	.545*	.554*	1							
	Sig. (2-tailed)	.044	.040	.							
NL_PAT0103	Pearson Correlation	.628*	.635*	.954**	1						
	Sig. (2-tailed)	.016	.015	.000	.						
NL_VA9395	Pearson Correlation	.538**	.494**	.420	.350	1					
	Sig. (2-tailed)	.004	.009	.093	.169	.					
NL_VA0103	Pearson Correlation	.465*	.452*	.438	.341	.957**	1				
	Sig. (2-tailed)	.014	.018	.079	.180	.000	.				
NL_EMP9395	Pearson Correlation	-.064	-.076	.429	.389	.380*	.392*	1			
	Sig. (2-tailed)	.750	.705	.086	.123	.029	.024	.			
NL_EMP0103	Pearson Correlation	.099	.067	.432	.408	.537**	.548**	.834**	1		
	Sig. (2-tailed)	.624	.739	.084	.104	.001	.001	.000	.		
NL_EXP9395	Pearson Correlation	.465*	.385	.734**	.744**	.571**	.600**	.150	.159	1	
	Sig. (2-tailed)	.045	.103	.001	.001	.006	.003	.505	.479	.	
NL_EXP0103	Pearson Correlation	.319	.258	.597*	.609**	.216	.269	.294	.305	.687**	1
	Sig. (2-tailed)	.183	.287	.011	.010	.333	.226	.185	.168	.000	.

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

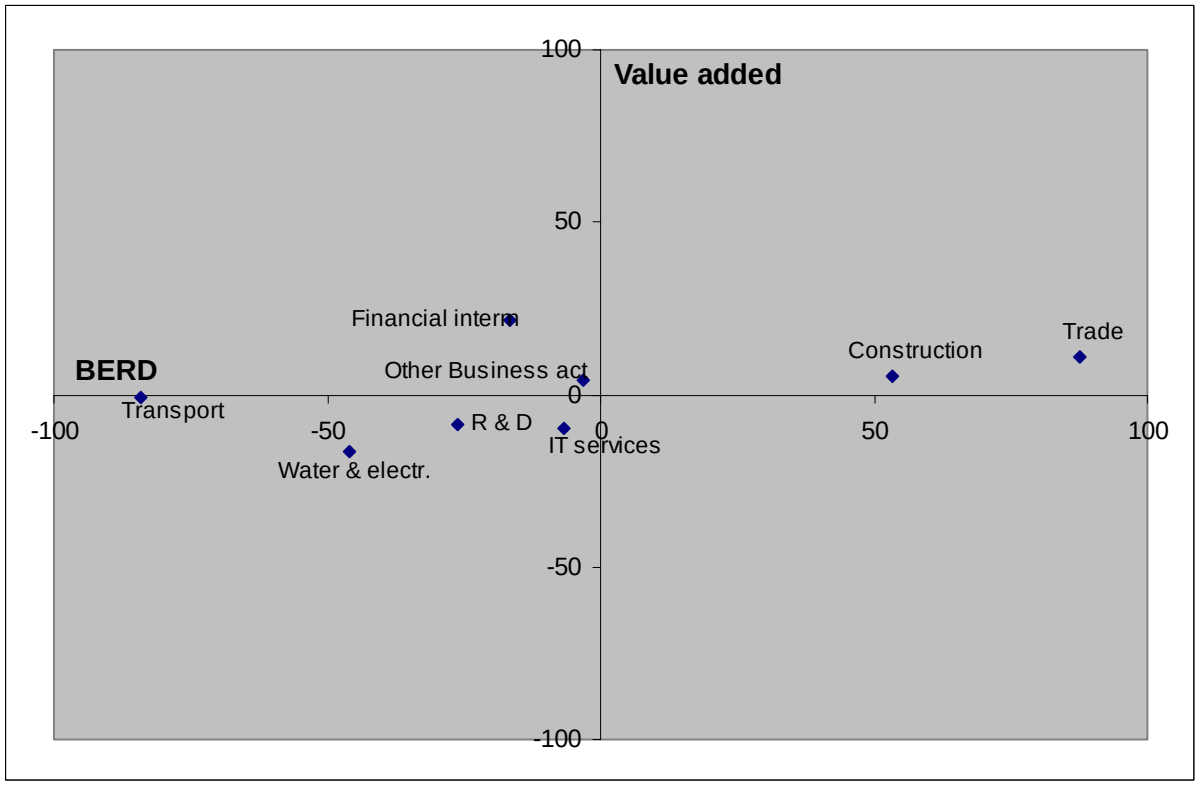
* Correlation is significant at the 0.05 level (2-tailed).

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



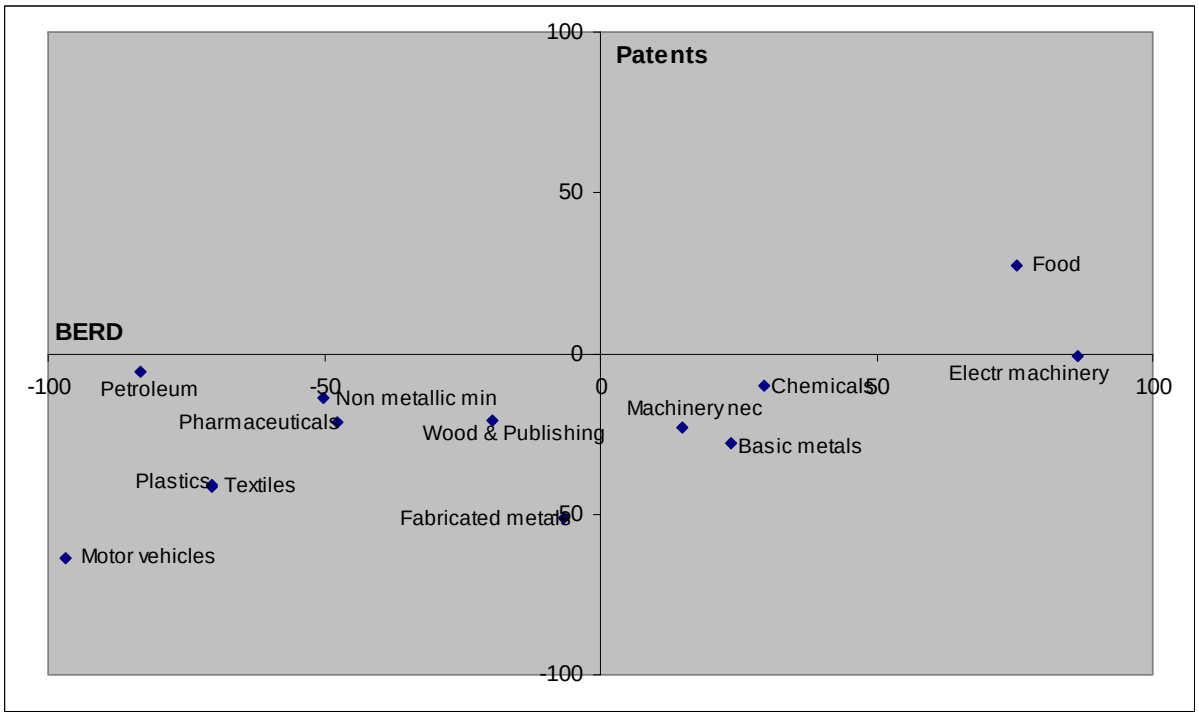
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: Own calculations

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



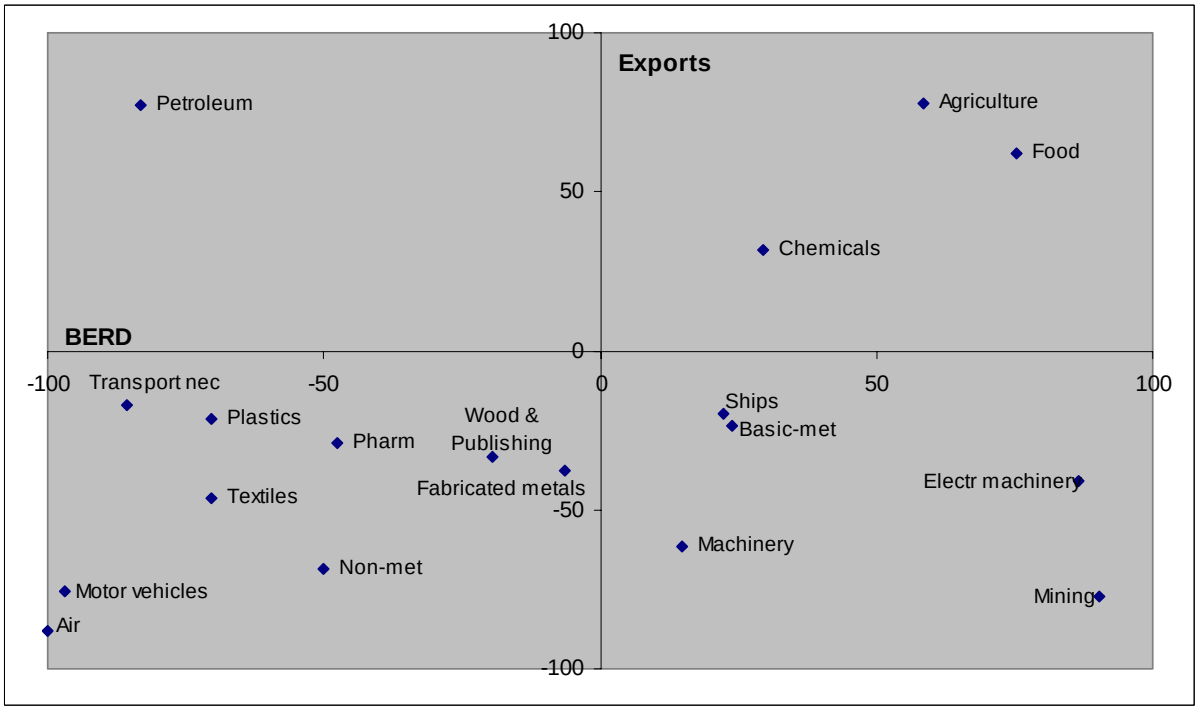
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.
Source: Own calculations

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



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

Figure 23. BERD versus exports. Specialisation indexes. Netherlands. Based on average values 2001- 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	45;		74; 60-63; 50-52; 10-14;	29; 27;	31; 01-05;	351; 24ex2423; 15-16;			
Specialisation Patents			23	32; 30		15-16			
Specialisation Value Added	74; 65-67; 45; 23; 10-14;	75-99;	50-52;	64; 15-16;		60-63; 36-37; 351; 32; 24ex2423; 20-22; 01-05			
Specialisation Employment	72; 65-67;		75-99; 74; 60-63; 50-52; 352+359;	64; 351;		36-37; 32; 24ex2423; 20-22			
Specialisation Exports			23; 10-14	33; 30; 24ex2423; 15-16; 01-05		32;			

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-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
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.

BERD and Value Added specialisation – an example