European Trend Chart on Innovation

European Sector Innovation Scoreboards

Hugo Hollanders and Anthony Arundel*

December 8, 2005

* MERIT – Maastricht University**.** The information contained in this report has not been validated in detail by either the Member States or the European Commission.

European Commission
Enterprise Directorate-General

A discussion paper from the Innovation/SMEs Programme

Table of Contents

Executive summary

The strong effect of a firm's sector of activity on its innovative performance has been well understood for decades. Innovation plays a vital role in the competitiveness of the pharmaceutical, instrument and aerospace sectors and a less important role in textiles, food products, and fabricated metals. These differences by sector in innovation performance create two main issues for policy. First, to what extent are aggregate innovation indicators, such as the ones used in EIS, influenced by the sector structure of the economy? The second question follows from the first: where are the European Union's most innovative firms in each sector and what factors encourage their innovative excellence?

The answers to these two questions are of value because they can help deflect an overemphasis on the activities of the 'high-tech' sectors, whose role in economic activity is often exaggerated. Modern economies are primarily dominated by the service sectors and secondarily by many low-technology and medium-technology manufacturing sectors. Overall productivity gains within an economy are strongly dependent on innovative capabilities of these sectors, particularly through the adoption or modification of innovations developed by other firms through a process of diffusion.

The underlying report differs substantially from the 2004 report on sector innovation scoreboards and direct comparison of sector innovation performance between both reports is not possible. Of the 15 indicators used in the 2004 report only 9 indicators are also included in the list of 12 indicators used in the 2005 report. The methodology for calculating the composite innovation index has changed as the 2005 report takes into account the skewness of the distribution of the data by first transforming the data before re-scaling.

Sector innovation indicators

This report provides a first step in the analysis of the innovation performance of European countries at the lowest level of sector aggregation possible. In addition to CIS-3 data from EUROSTAT it also uses sector level innovation data from the ANBERD and STAN datasets of the OECD. The report uses 12 indicators for which the construction of scoreboards showing national innovation performances by sector is possible without getting into conflict with EUROSTAT confidentiality rules: 1) Share of employees with higher education, 2) Share of firms using training for personnel directly aimed at the development and/or introduction of innovations 3) R&D expenditures as a percentage of value-added), 4) Share of firms that receive public subsidies to innovate, 5) Share of firms innovating in-house, 6) Share of SMEs co-operating with others, 7) Innovation expenditures as a percentage of total turnover, 8) Share of total sector sales from new-to-market products, 9) Share of total sector sales from new-to-firm but not new-to-market products, 10) Share of firms that patent, 11) Share of firms that use trademarks and 12) The share of firms that use registration of design patterns. All indicators are identical to or very similar to those used in the European Innovation Scoreboard.

Country and sector coverage

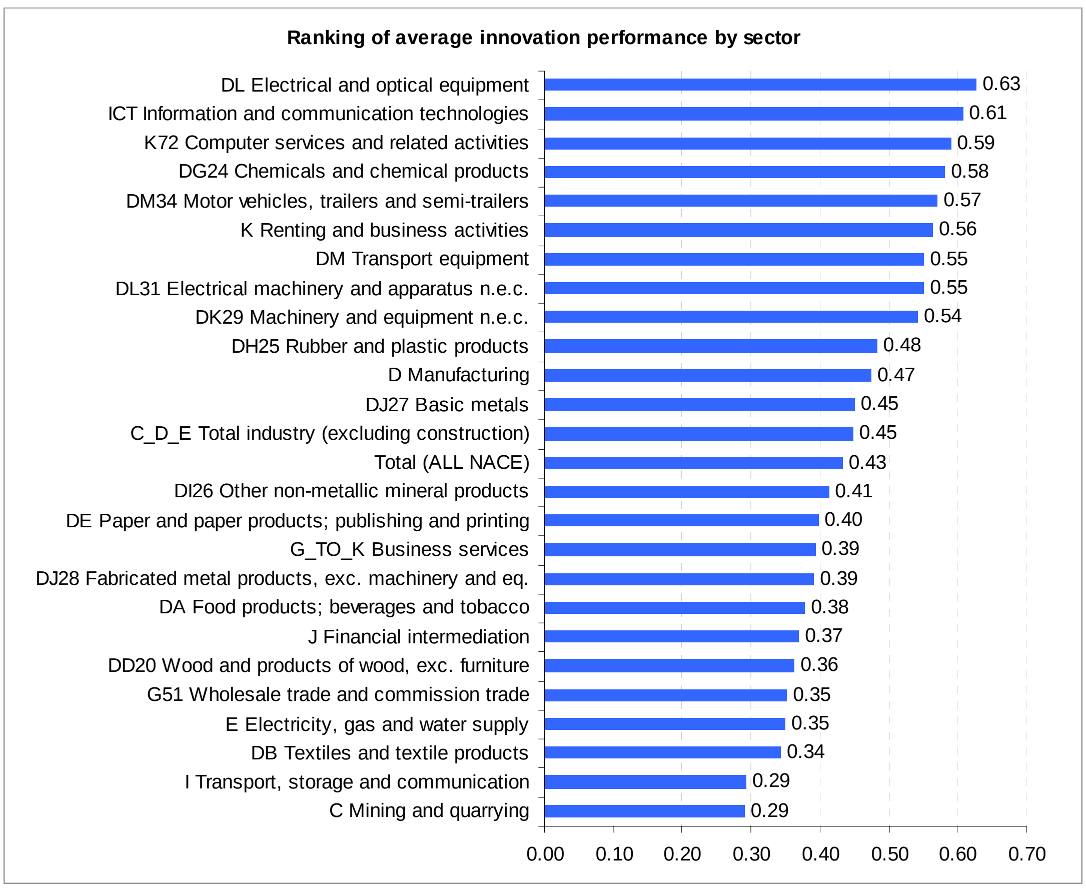
Sector data are available for the following 25 sectors: Total industry; Mining and quarrying; Manufacturing; Food products, beverages and tobacco; Textiles and textile products; Wood and wood products; Pulp, paper and paper products, publishing and printing; Chemicals and chemical products; Rubber and plastic products; Other non-metallic mineral products; Basic metals; Fabricated metal products, except machinery and equipment; Machinery and equipment n.e.c.; Electrical and optical equipment; Electrical machinery and apparatus n.e.c.; Transport equipment; Motor vehicles, trailers and semi-trailers; Electricity, gas and water supply; Services; Wholesale trade and commission trade; Transport, storage and communication; Financial intermediation; Renting and business activities; Computer services and relates activities and Information and communications technologies (ICT).

Sector data are available for 15 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain and Sweden. Data for Ireland, the United Kingdom and all new member states were not available for this report. The weighted average of these countries serves as an estimate for Europe.

Innovation Sector Index

The *Innovation Sector Index (ISI)* measures sector innovation performances. The ISI is a composite indicator that is calculated as an unweighted average of the re-scaled values of the 12 innovation indicators. Data are transformed into re-scaled data by first applying a square root transformation to reduce the skewness of the observed data and then by subtracting the transformed minimum value found among all countries and then dividing by the difference between the transformed maximum and minimum value found among all countries. The ISI is then calculated by taking the average value of these re-scaled data.

Figure I European sector innovation performance



Average European sector performance

Average European sector performance is shown in Figure 1. European averages have been estimated for all sectors by aggregating numerator and denominator data for all countries for CIS-3 indicators and by taking the unweighted average for the indicators on R&D expenditures. Most innovative sectors are Electrical and optical equipment (NACE DL), Information and communications technologies (ICT), Computer services and related activities (NACE K72), Chemicals and chemical products (NACE DG24) and Motor vehicles, trailers and semi-trailers (NACE DM34). Least innovative sectors are Transport, storage and communication (NACE I) and Mining and quarrying (NACE C).

Table I European sector innovation leaders

NACE	Sector			
C_D_E	Total industry	Finland	Germany	Belgium
C	Mining and quarrying	Finland	Norway	Netherlands
D	Manufacturing	Finland	Germany	Belgium
DA	Food products, beverages and tobacco	Belgium	Sweden	France
DB	Textiles and textile products	Finland	Germany	Belgium
DD20	Wood and wood products	Germany	Finland	Austria
DE	Pulp, paper and paper products, publishing and printing	Finland	Germany	Luxembourg
DG24	Chemicals and chemical products	Austria	Finland	Belgium
DH25	Rubber and plastic products	Sweden	Austria	France
DI26	Other non-metallic mineral products	Germany	Finland	Sweden
DJ27	Basic metals	Finland	Austria	Sweden
DJ28	Fabricated metal products, except machinery and equipment	Finland	Belgium	Germany
DK29	Machinery and equipment n.e.c.	Finland	Germany	Netherlands
DL	Electrical and optical equipment	Finland	Belgium	Sweden
DL31	Electrical machinery and apparatus n.e.c.	Germany	Finland	France
DM	Transport equipment	Germany	France	Austria
DM34	Motor vehicles, trailers and semi-trailers	Germany	France	Austria
E	Electricity, gas and water supply	Portugal	Netherlands	Germany
G_TO_K	Services	Sweden	Finland	Germany
G51	Wholesale trade and commission trade	Sweden	Finland	Germany
I	Transport, storage and communication	Finland	Luxembourg	Belgium
J	Financial intermediation	Portugal	Luxembourg	Germany
K	Renting and business activities (excluding real estate)	Belgium	Sweden	Greece
K72	Computer services and related activities	Greece	Germany	Belgium
DL30, DL32, DL33, I64, K72	Information & communication technologies (ICT)	Finland	Belgium	Germany

Sector innovation leaders

Table I gives the sector innovation leaders in Europe. Innovation leaders are here simply defined as the best 3 ranking countries. For several sectors differences with other countries are only marginal. Finland and Germany are leading in about 15 sectors each. Finland, Germany and Belgium are overall leaders in the manufacturing sector, with Finland leading in 9 manufacturing sectors. But also Sweden and Austria are leading in 5 manufacturing sectors. Although Sweden, Finland and Germany are the overall leaders in the services sectors, none of these countries is leading in more than 2 services sectors, as are Belgium and Luxembourg. Despite their above average EIS 2005 innovation performance, Denmark and the Netherlands show a below average representation in sector leadership, with the Netherlands only leading in 3 sectors and Denmark in no sector at all.

Most innovative sectors per country

Table II gives for each country the three most innovative sectors. Electrical and optical equipment is one of the leading sectors in all countries except Greece. Chemicals and chemical products and Computer and related activities are among the most innovative sectors in 10 of the 15 countries. Other leading sectors are Information and communication technologies (6 countries) and Transport equipment (& Motor vehicles, trailers and semi-trailers) in 4 countries.

Table II Main results per country

Austria	Chemicals and chemical products; Electrical and optical equipment; Basic metals
Belgium	Electrical and optical equipment; Information and communication technologies; Computer services and related activities
Denmark	Chemicals and chemical products; Electrical and optical equipment; Information and communication technologies
Finland	Electrical and optical equipment; Information and communication technologies; Chemicals and chemical products
France	Electrical and optical equipment; Chemicals and chemical products; Transport equipment (& Motor vehicles, trailers and semi-trailers)
Germany	Motor vehicles, trailers and semi-trailers (& Transport equipment); Electrical and optical equipment; Computer services and related activities
Greece	Computer services and related activities (& Renting and business activities); Information and communication technologies; Chemicals and chemical products
Iceland	Electrical and optical equipment; Renting and business activities (& Computer services and related activities); Chemicals and chemical products
Italy	Electrical and optical equipment; Chemicals and chemical products; Motor vehicles, trailers and semi-trailers (& Transport equipment)
Luxembourg	Chemicals and chemical products; Computer services and related activities (& Renting and business activities); Electrical and optical equipment
Netherlands	Machinery and equipment n.e.c.; Electrical and optical equipment & Electrical machinery and apparatus n.e.c.; Motor vehicles, trailers and semi-trailers
Norway	Electrical and optical equipment; Information and communication technologies; Computer services and related activities
Portugal	Computer services and related activities (& Renting and business activities); Chemicals and chemical products; Electrical and optical equipment
Spain	Computer services and related activities; Information and communication technologies; Electrical and optical equipment
Sweden	Electrical and optical equipment; Computer services and related activities; Chemicals and chemical products

1. Introduction

The re-launching of the Lisbon strategy by the new Commission will put particular emphasis on developing sector specific innovation policies. This will further increase the importance of the Community Innovation Survey as the main data source that could adequately guide such policies.

The strong effect of a firm's sector of activity on its innovative performance has been well understood for decades. Innovation plays a vital role in the competitiveness of the pharmaceutical, instrument and aerospace sectors and a less important role in textiles, food products, and fabricated metals. These differences by sector in innovation performance create two main issues for policy. First, to what extent are aggregate innovation indicators, such as the ones used in EIS, influenced by the sector structure of the economy? For example, a manufacturing economy dominated by textiles and food products, even if its firms in these two sectors are the most innovative textile and food product firms in the world, will never perform as well on innovation scoreboards as a manufacturing economy dominated by pharmaceuticals and aerospace. The second question follows from the first: where are the European Union's most innovative firms in each sector and what factors encourage their innovative excellence?

The answers to these two questions are of value because they can help deflect an overemphasis on the activities of the 'high-tech' sectors, whose role in economic activity is often exaggerated. Although high technology products such as pharmaceuticals, mobile telephones, computers and airplanes are glamorous and can be very profitable, the demand for these products is limited. Keith Smith (2002)[1] recently evaluated the direct economic impact of high technology manufacturing on GDP within the OECD and concluded that their contribution is 'surprisingly small' – accounting for less than 3% of GDP in the United States, which is the OECD country with the largest share of high technology manufacturing. Modern economies are primarily dominated by the service sectors and secondarily by many low and medium technology manufacturing sectors. Overall productivity gains within an economy are strongly dependent on innovative capabilities of these sectors, particularly through the adoption or modification of innovations developed by other firms through a process of diffusion.

This report provides a first step in the analysis of the innovation performance of European countries at the lowest level of sector aggregation possible. In addition to CIS data it also uses sector level innovation data from the ANBERD and STAN datasets of the OECD. The report uses 12 indicators for which the construction of scoreboards showing national innovation performances by sector is possible without getting into conflict with EUROSTAT confidentiality rules.

The report has been prepared by **Hugo Hollanders** and **Anthony Arundel** from MERIT under a Trend Chart service contract with the European Commission.

---

[1] See Smith, K. "What is the 'Knowledge Economy'? Knowledge Intensity and Distributed Knowledge Bases", UNU-INTECH Discussion Paper: DP 2002-6 (http://www.intech.unu.edu/publications/discussion-papers/2002-6.pdf).

2. Methodology

2.1 Sectors

The CIS-3 survey asks respondents for their main economic activity by identifying the corresponding NACE 2-digit sector. Using these responses, CIS-3 sector data can be calculated for at most 5 sectors in NACE C Mining and quarrying, 23 sectors in NACE D Manufacturing, 2 sectors in NACE E Electricity, gas and water supply and 12 sectors in NACE G_K Services. Sector data have been made available by EUROSTAT for the following 15 countries: Austria (AT), Belgium (BE), Germany (DE), Denmark (DK), Spain (ES), Greece (EL), France (FR), Finland (FI), Italy (IT), Iceland (IS), Luxembourg (LU), Netherlands (NL), Norway (NO), Portugal (PT) and Sweden (SE). Micro-data for Ireland, the UK and the new member states were not available to EUROSTAT at the time these sector data were made available for this report and the 2004 report on sector innovation scoreboards[2] and these countries are thus not included in this report.

Table 2.1 List of sectors for European Sector Innovation Scoreboards

NACE	Sectors included in Sector Innovation Scoreboards	
C_D_E	Total industry	
C	Mining and quarrying	
D	Manufacturing	
DA	Food products, beverages and tobacco	(1)
DB	Textiles and textile products	(1)
DD20	Wood and wood products	
DE	Pulp, paper and paper products, publishing and printing	
DG24	Chemicals and chemical products	(1)
DH25	Rubber and plastic products	(1)
DI26	Other non-metallic mineral products	(1)
DJ27	Basic metals	(1)
DJ28	Fabricated metal products, except machinery and equipment	(1)
DK29	Machinery and equipment n.e.c.	(1)
DL	Electrical and optical equipment	(1)
DL31	Electrical machinery and apparatus n.e.c.	
DM	Transport equipment	(1)
DM34	Motor vehicles, trailers and semi-trailers	
E	Electricity, gas and water supply	
G_TO_K	Services	
G51	Wholesale trade and commission trade	(1)
I	Transport, storage and communication	(1)
J	Financial intermediation	
K	Renting and business activities (excluding real estate)	(1)
K72	Computer services and related activities	(1)
DL30, DL32, DL33, I64, K72	ICT	

(1) Included in 2004 report on sector innovation scoreboards

[2] Hollanders, H. and A. Arundel, *Exploring Innovation Performances by Sectors*, European Commission: 2004 Trend Chart report (http://trendchart.cordis.lu/scoreboards/scoreboard2004/scoreboard_papers.cfm).

For many of the sectors CIS-3 data are not available as these are confidential. Either the number of responding innovative firms is too small or confidentiality cannot be maintained for other reasons[3]. In particular for the smaller countries for many sectors data are confidential. The criterion in selecting appropriate sectors has been to include only those sectors for which data are available for at least 8 indicators for most countries. The sectors shown in Table 2.1 meet this criterion and countries will be benchmarked on their relative innovation performance in each sector using mainly CIS-3 sector data.

2.2 Indicators

For the sector scoreboards 12 indicators were use, of which 11 indicators come from CIS-3 and 1 indicator from the OECD's STAN database. These indicators are listed in Table 2.2.

Table 2.2 List of indicators for Sector Innovation Scoreboards

#	Indicator	Source	Comparable to EIS 2005 indicator	Identical to 2004 report indicator[4]
1	Share of employees with higher education	CIS-3	#1.2	#6
2	Share of firms that use training	CIS-3	#1.4	
3	R&D expenditures (% of value-added)	OECD	#2.2	#11
4	Share of firms that receive public subsidies to innovate	CIS-3	#2.4	#8
5	Share of firms innovating in-house	CIS-3	#3.1	#1
6	Share of SMEs co-operating with other	CIS-3	#3.2	#2
7	Innovation expenditures as a percentage of total turnover	CIS-3	#3.3	#3
8	Share of total sector sales from new-to-market products	CIS-3	#4.3	#4
9	Share of total sector sales from new-to-firm but not new-to-market products	CIS-3	#4.4	#5
10	Share of firms that patent	CIS-3	#5.1	#7
11	Share of firms that use trademarks	CIS-3	#5.4	
12	Share of enterprises that use design registrations	CIS-3	#5.5	

1. Share of employees with higher education

The comparable EIS indicator *1.2* at the national level is the share of working age population with a tertiary education degree. CIS-3 does not distinguish between different age classes so for the sector scoreboards we use the share of all employees with a tertiary education degree. This is a general indicator of the use of advanced skills. It is not limited to science and technical fields because the adoption of innovations in many areas, particularly in the service sectors, depends on a wide range of skills. Source: CIS-3.

2. Share of firms that use internal or external training for personnel directly aimed at the development and/or introduction of innovations

Defined as the share of firms that used internal or external training for their personnel directly aimed at the development and/or introduction of innovations. The comparable

[3] See the unpublished *Options for Sector Scoreboards* working paper as delivered to DG Enterprise on June 16 2004.
[4] See footnote 2.

EIS indicator 1.4 at the national level is the share of working-age population involved in life-long learning. Source: CIS-3.

3. R&D expenditures (% of value-added)

Defined as the ratio of all R&D expenditures in a specific business sector and total value-added generated in that sector. The indicator captures the formal creation of new knowledge within firms. It is particularly important in science-based sectors (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories. Source: OECD.

4. Share of firms that receive public subsidies to innovate

Defined as the share of firms that have received any public financial support for innovation from at least one of three government levels: local, national and the European Union. Innovation outcomes are assumed to improve if firms receive a subsidy. This may only be true of small firms, with larger firms either using the subsidy to replace internal funding sources or using the subsidy for projects that are far from the market. Although the relevance off the indicator would probably increase if it was limited to SMEs only, CIS-3 data confidentiality for SMEs at the sector level force us to focus on all enterprises. Source: CIS-3.

5. Share of firms innovating in-house

Defined as the percentage of *all* firms that innovate in-house. The comparable EIS indicator *3.1* focuses on SMEs only. CIS-3 data confidentiality at the sector level prevents us from focusing on SMEs only. Source: CIS-3.

6. Share of SMEs co-operating with other

Defined as the percentage of all SMEs that had any co-operation agreements on innovation activities with other enterprises or institutions during the period 1998-2000. This indicator measures the degree to which SMEs are involved in innovation co-operation. Complex innovations, particularly in ICT, often depend on the ability to draw on diverse sources of information and knowledge, or to collaborate on the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms and between firms and other firms. The indicator is limited to SMEs because almost all large firms are involved in innovation co-operation. This indicator also captures technology-based small firms, since most are involved in co-operative projects. Source: CIS-3.

7. Innovation expenditures as a percentage of total turnover

Defined as the percentage of innovation expenditures in a specific sector and total turnover in that sector. Innovation expenditures includes the full range of innovation activities: in-house R&D, extramural R&D, machinery and equipment linked to product and process innovation, spending to acquire patents and licenses, industrial design, training, and the marketing of innovations. Several of the components of innovation expenditure, such as investment in equipment and machinery and the acquisition of patents and licenses, measure the diffusion of new production technology and ideas. Overall, the indicator measures total expenditures on many different activities of relevance to innovation. The indicator partly overlaps with the indicators on investments in machinery and equipment and R&D expenditures. A better version would exclude both, but concerns over data reliability have prevented this option. Source: CIS-3.

8. Share of total sector sales from new-to-market products

This indicator measures the turnover of new or significantly improved products, which are also new to the market, as a percentage of total turnover. The product must be new to the firm, which in many cases will also include innovations that are world-firsts. The main disadvantage is that there is some ambiguity in what constitutes a 'new-to-market' innovation. Smaller firms or firms from less developed countries could be more likely to include innovations that have already been introduced onto the market elsewhere. Source: CIS-3.

9. Share of total sector sales from new-to-firm but not new-to-market products

This indicator measures the turnover of new or significantly improved products, which are new to the firm but not new to the market, as a percentage of total turnover. CIS-2 results have shown that, in manufacturing, 31% of turnover is from products "new or improved for the firm", while only 7% is from products that were "new or improved to the market"[5]. The difference of 24% shows the importance of innovation as diffusion versus innovation as creation. Source: CIS-3.

10. Share of firms that patent to protect inventions or innovations

Defined as the percentage of all firms that have applied for at least one patent during the period 1998-2000. This indicator complements the indicator business R&D expenditures in that patenting captures new knowledge created anywhere within a firm and not just within a formal R&D laboratory. Source: CIS-3.

11. Share of firms that use trademarks to protect inventions or innovations

Defined as the percentage of all firms that have used trademarks to protect their inventions or innovations during the period 1998-2000. The comparable EIS indicator 5.4 at the national level is the number of new community trademarks per million population. Source: CIS-3.

12. Share of firms that use registration of design patterns to protect inventions or innovations

Defined as the percentage of all firms that have used registration of design patterns to protect their inventions or innovations during the period 1998-2000. The comparable EIS indicator 5.5 at the national level is the number of new community designs per million population. Source: CIS-3.

---

[5] EUROSTAT, Community Innovation Survey 1997/1998: Innovating Enterprises. Statistics in Focus, Theme 9 - 2/1999.

2.3 Innovation Sector Index (ISI)

All data will be normalised into re-scaled values using the MinMax-approach as outlined below. However, the underlying assumption is that all variables follow a normal distribution. Table 2.3 shows that almost all indicators, except the share of firms innovating in-house, do not follow the normal distribution. In a normal distribution the left tail and right tail of the distribution should be equally pronounced. The skewness of the distribution ideally should equal zero. If the right tail is more pronounced, we say that the distribution has a positive skewness. If the left tail is more pronounced, we say that the distribution has a negative skewness. As Table 2.3 shows, most indicators show a significant positive skewness. One way to transform skewed variables is by transforming the variables using a transformation function. Depending on the size of the skewness we have applied either a square root transformation or a power root transformation (cf. Esty et al., Appendix A[6]).

Table 2.3 Variable transformation and data outliers

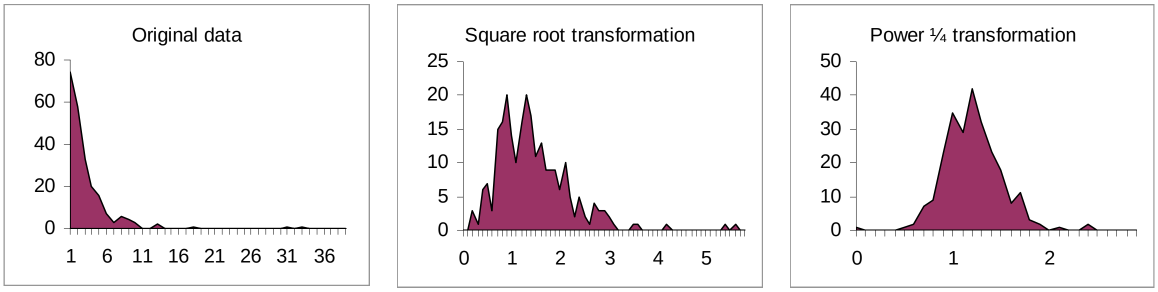
#	Indicator	Skewness	Trans-formation	Outliers removed *
1	Share of employees with higher education (HI_EDUC)	1.79	Power ¼	--
2	Share of firms that use training (TRAINING)	1.59	Square root	1
3	R&D expenditures as a percentage of value-added (R&D)	2.17	Power ¼	--
4	Share of firms that receive public subsidies to innovate (PUBSUB)	1.28	Square root	1
5	Share of firms innovating in-house (INHOUSE)	0.38	None	--
6	Share of SMEs co-operating with other (CO-OP)	1.67	Square root	1
7	Innovation expenditures as a percentage of total turnover (INNEXP)	4.76	Power ¼	2
8	Share of total sector sales from new-to-market products (NEWMAR)	3.09	Square root	--
9	Share of total sector sales from new-to-firm but not new-to-market products (NEWFIRM)	2.00	Square root	---
10	Share of firms that patent (PATENT)	1.61	Square root	--
11	Share of firms that use trademarks (TRMARK)	1.01	Square root	--
12	Share of firms that use design registrations (DESIGN)	2.43	Square root	--

* Outlier for TRAINING: Luxembourg DJ27 (Basic metals); Outlier for PUBSUB: Austria DJ27 (Basic metals); Outlier for CO-OP: Austria DJ27 (Basic metals); Outliers for INNEXP: Iceland + Luxembourg K (Renting and business activities).

Table 2.3 shows which transformation function has been used for each indicator. Figure 2.4 gives an example for the indicator on innovation expenditures of the results on the distribution of the data of applying a square root and a power ¼ transformation. For some variables we also had to remove so-called outliers, values that are far above the second-best value in the sample. Outliers were found for 4 indicators distributed over 3 countries. The re-scaled values of these outliers have been set to 1.

[6] Esty, Daniel C., Marc Levy, Tanja Srebotnjak and Alexander de Sherbinin (2005), *2005 Environmental Sustainability Index: Benchmarking National Environmental Stewardship*. New Haven: Yale Center for Environmental Law & Policy.

Figure 2.4 Example: Scale transformation of innovation expenditures as a percentage of total turnover



For all sectors and indicators the data are transformed into re-scaled values conform the MinMax-approach using the following formula:

$$x_{cij}^{r} = \frac{(x_{cij} - \min(\forall_c \forall_j x_{ij}))}{(\max(\forall_c \forall_j x_{ij}) - \min(\forall_c \forall_j x_{ij}))}$$

where x_{cij}^{r} is the re-scaled value for country *c* of indicator *i* and sector *j*: x_{cij}. The re-scaled value is obtained by first subtracting the minimum value for indicator *i* found among all EU countries among all sectors and then dividing by the difference between the maximum and minimum value for indicator *i* found among all countries among all sectors value. All values are thus transformed to a value between 0 and 1, with the maximum value transformed to 1 and the minimum value transformed to 0. Annex Table 1 shows all re-scaled data per sector for all countries. The *Innovation Sector Index (ISI)* is then calculated by taking the average value of the re-scaled data, where all indicators are weighted equally.

3. Average European results

3.1 Average European sector performance

The CIS-3 Sector Database (CIS3DB) as provided by EUROSTAT does not include EU averages. A European average has thus been estimated for all sectors by aggregating numerator and denominator data for all 15 countries covered by CIS3DB.

Figure 3.1 shows the ranking of sectors based on their average innovation performance as calculated by the Innovation Sector Index (ISI)[7]. Most innovative sectors are Electrical and optical equipment, ICT[8], Computer services and related activities, Chemicals and chemical products (including Pharmaceuticals) and Motor vehicles, trailers and semi-trailers.

Figure 3.1 European sector innovation performance

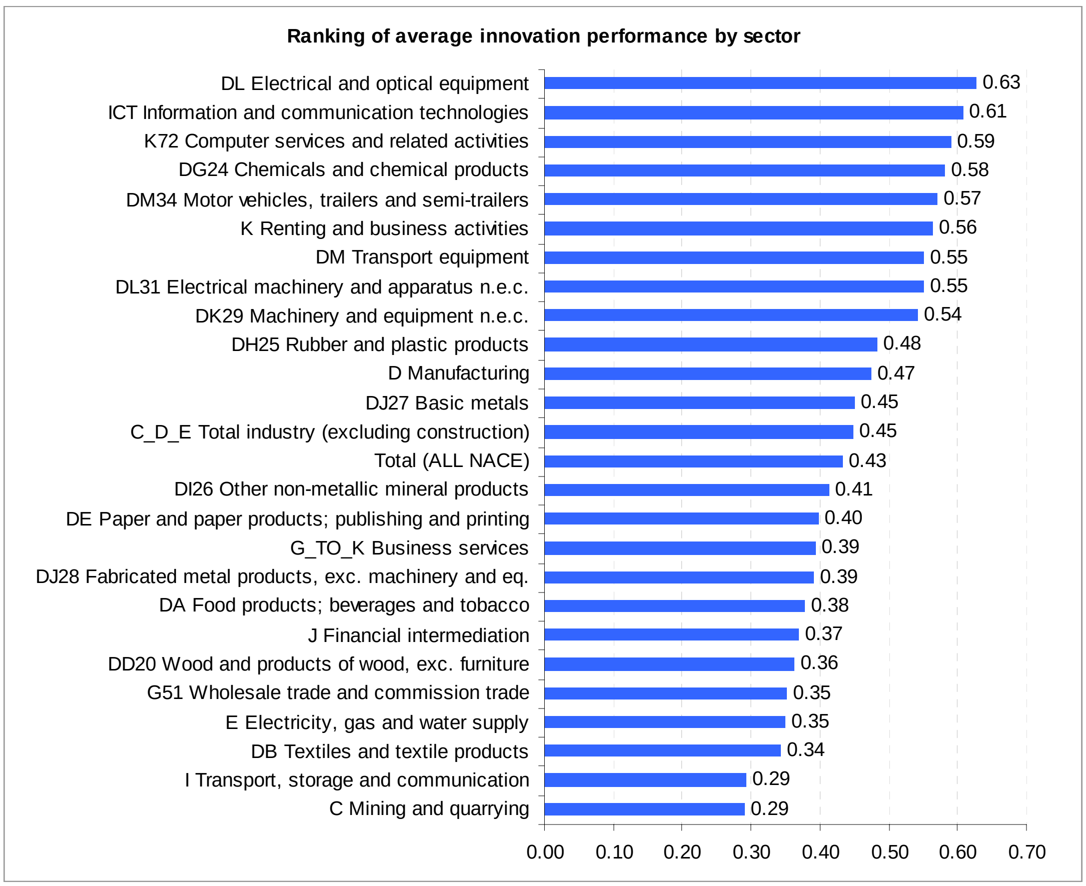


Table 3.3 shows average performance per indicator per sector for Europe. On average, the manufacturing sector shows higher percentages than the services sector for R&D

---

[7] The ranking of sectors is almost identical to the ranking of sectors without first applying a scale transformation. The correlation between these rankings is as high as 0.991. The highest difference in rank is for Financial intermediation, which is ranked 20 using transformed data and ranked 16 using non-transformed data.
[8] The ICT sector includes 3 of the 4 sub-sectors of Electrical and optical equipment.

expenditures, public funding, innovating in-house, innovation expenditures, sales due to new-to-market and new-to-firm products and the use of patents, trademarks and design registrations. The services sector shows higher percentages for highly educated employees, training and innovation co-operation.

3.2 Innovation performance and economic importance

Being among the best performers on innovation does not necessarily mean that a sector is also of relative great importance for the economy in a direct sense as measured by its relative weights in total GDP. Figure 3.2 plots the relative weight of each sector on the horizontal axis and its innovation performance on the vertical axis. There is apparently no clear connection between relative weight and economic performance. Of the 5 largest sectors (those with a value-added share above 4%) 3 sectors are among the least innovative sectors and only 2 sectors are among the most innovative sectors.

Figure 3.2 Economic importance

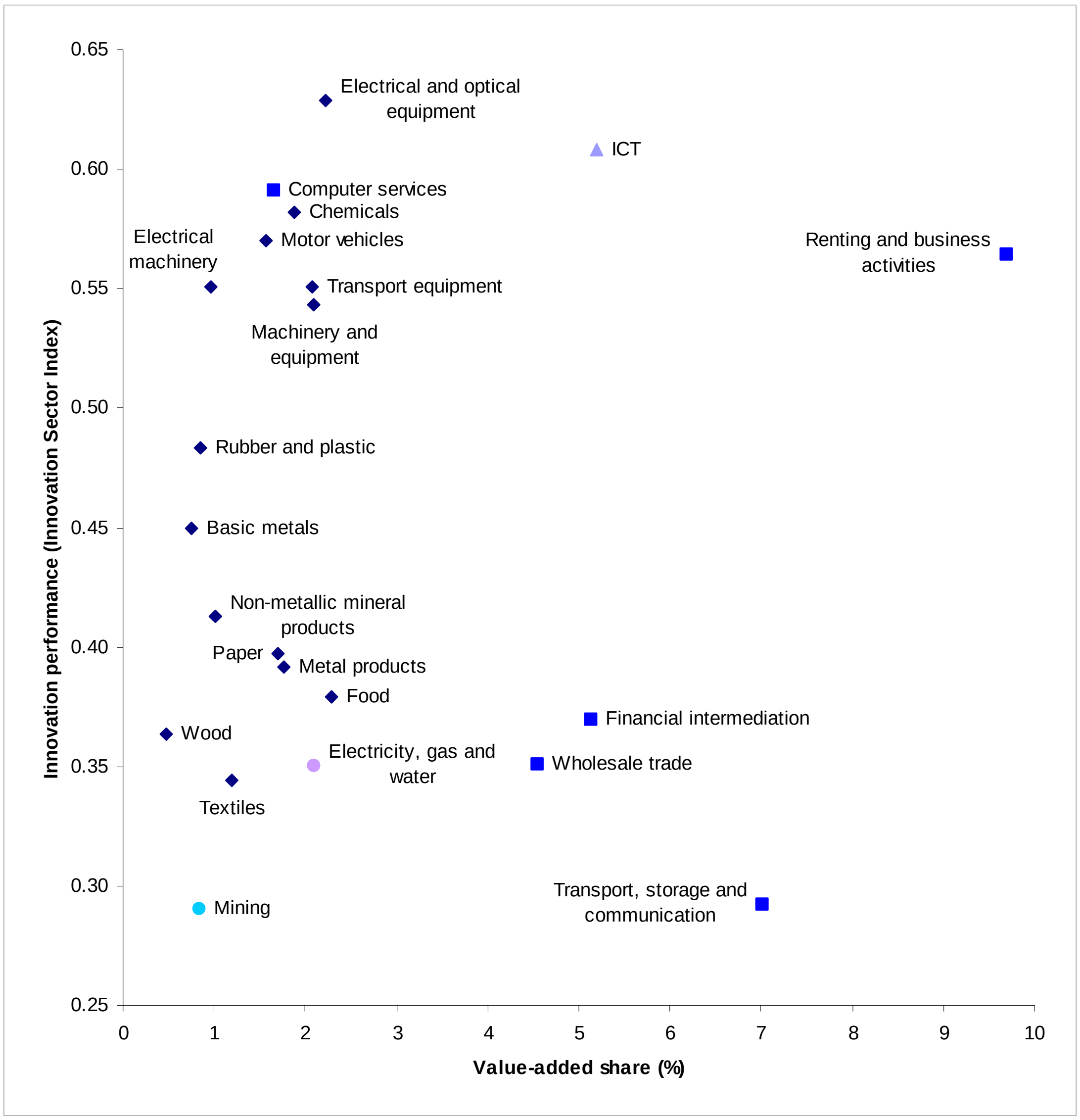


Table 3.3 Average European performance per sector per indicator

		RANK	HI_EDUC	TRAINING	R&D	PUBSUB	INHOUSE	CO_OP	INNEXP	NEWMAR	NEWFIRM	PATENT	TRMARK	DESIGN
	Comparable EIS indicator		1.2	1.4	2.2	2.4	3.1	3.2	3.3	4.3	4.4	5.1	5.4	5.5
TOTAL	All NACE branches		13.1	17.7	1.70	12.2	35.4	5.8	2.06	6.4	17.4	8.1	12.3	6.9
C_D_E	Total industry (excluding construction)	13	8.3	16.7		15.9	38.1	5.6	3.13	7.8	22.4	10.0	12.9	8.1
C	Mining and quarrying	25	8.5	6.7	1.21	9.2	23.8	2.3	0.89	1.0	3.1	3.0	4.0	2.2
D	Manufacturing	11	11.1	16.8	5.23	16.0	38.5	5.6	3.38	8.2	23.7	10.1	13.1	8.3
DA	Manufacture of food products; beverages and tobacco	18	6.6	12.8	1.15	14.2	35.6	3.9	1.10	2.9	9.1	4.7	18.0	4.8
DB	Manufacture of textiles and textile products	23	3.5	9.9	1.15	10.7	24.2	2.6	1.35	5.0	10.8	4.0	12.8	4.3
DD20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	20	11.4	9.9	0.46	13.5	32.3	3.6	1.41	4.1	8.6	5.9	7.6	4.8
DE	Manufacture of pulp, paper and paper products; publishing and printing	15	6.6	12.8	1.15	14.2	35.6	3.9	1.10	2.9	9.1	4.7	18.0	4.8
DG24	Manufacture of chemicals and chemical products	4	15.0	28.2	12.59	19.8	56.8	15.9	4.75	6.1	15.6	21.4	30.6	11.0
DH25	Manufacture of rubber and plastic products	10	7.7	19.9	3.08	17.4	49.7	9.6	2.11	6.1	16.5	15.1	12.5	12.9
DI26	Manufacture of other non-metallic mineral products	14	7.3	12.1	1.32	15.3	38.3	6.6	1.96	5.4	14.7	9.4	10.2	5.8
DJ27	Manufacture of basic metals	12	8.5	17.0	2.58	21.7	43.3	6.8	1.10	3.7	12.3	14.8	14.0	8.1
DJ28	Manufacture of fabricated metal products, except machinery and equipment	17	7.7	15.8	1.13	16.3	35.2	3.8	2.08	4.0	12.9	7.0	5.9	6.1
DK29	Manufacture of machinery and equipment n.e.c.	9	14.2	23.0	5.47	19.5	50.5	8.6	3.59	9.8	25.4	20.4	15.8	14.6
DL	Manufacture of electrical and optical equipment	1	21.2	29.8	15.39	22.8	53.1	13.2	7.64	16.7	44.3	21.1	18.2	13.8
DL31	Manufacture of electrical machinery and apparatus n.e.c.	8	20.9	21.8	5.89	17.6	43.5	8.0	6.25	8.4	39.2	18.2	13.9	13.5
DM	Manufacture of transport equipment	7	12.9	20.4	7.98	20.0	41.7	7.5	5.07	15.6	51.2	14.9	13.2	11.6
DM34	Manufacture of motor vehicles, trailers and semi-trailers	5	12.4	22.8	7.58	19.6	45.9	7.5	4.85	15.7	55.1	18.4	16.6	14.0
E	Electricity, gas and water supply	22	13.4	17.4	0.60	9.1	24.4	5.8	0.38	3.6	11.3	6.9	6.3	1.8
G_TO_K	Services (excluding public administration)	16	20.6	19.0	0.52	7.0	31.5	6.2	0.95	5.0	12.3	5.6	11.4	5.2
G51	Wholesale trade and commission trade, except of motor and motorcycles	21	11.2	13.5		5.4	27.0	3.8	0.44	3.3	7.4	6.3	14.9	6.9
I	Transport, storage and communication	24	8.0	12.8	0.59	3.9	19.6	2.7	1.19	5.8	13.4	0.7	2.3	0.9
J	Financial intermediation	19	30.1	26.0	0.27	1.6	42.7	7.1	0.60	5.6	14.9	1.0	8.4	1.8
K	Renting and business activities	6	51.4	35.0	2.13	15.6	50.8	15.2	5.42	10.6	25.6	11.4	15.5	8.1
K72	Computer services and related activities	3	50.9	38.1	6.12	13.8	58.4	14.6	4.18	12.7	33.6	9.2	22.8	6.8
ICT	ICT	2	29.4	35.5	7.93	17.8	56.7	15.0	5.80	17.7	37.4	14.1	21.3	9.0

HI_EDUC = Share of employees with higher education; TRAINING = Share of firms that use training; R&D = R&D expenditures as a percentage of value-added; PUBSUB = Share of firms that receive public subsidies to innovate; INHOUSE = Share of firms innovating in-house; CO_OP = Share of SMEs co-operating with others; INNEXP = Innovation expenditures as a percentage of total turnover; NEWMAR = Share of total sector sales from new-to-market products; NEWFIRM = Share of total sector sales from new-to-firm but not new-to-market products; PATENT = Share of firms that patent; TRMARK = Share of firms that use trademarks; DESIGN = Share of firms that use design registrations.

Electrical and optical equipment shows highest percentages for R&D and innovation expenditures, public funding and sales due to new-to-market products. Chemicals and chemical products show highest percentages for innovation co-operation and the use of patents and trademarks. Motor vehicles, trailers and semi-trailers show the highest percentages for sales due to new-to-firm products and the use of design registrations. Renting and business activities, including Computer and related activities, show highest percentages for highly educated employees, training and innovating in-house.

3.3 Input versus Output

Following the EIS 2005, the innovation indicators can be divided in input and output indicators. Input indicators are: Share of employees with higher education (HI_EDUC); Share of firms that use training (TRAINING); R&D expenditures as a percentage of value-added (R&D); Share of firms that receive public subsidies to innovate (PUBSUB); Share of firms innovating in-house (INHOUSE); Share of SMEs co-operating with other (CO-OP) and Innovation expenditures as a percentage of total turnover (INNEXP). Output indicators are: Share of total sector sales from new-to-market products (NEWMAR); Share of total sector sales from new-to-firm products (NEWFIRM); Share of firms that patent (PATENT); Share of firms that use trademarks (TRMARK) and Share of firms that use design registrations (DESIGN).

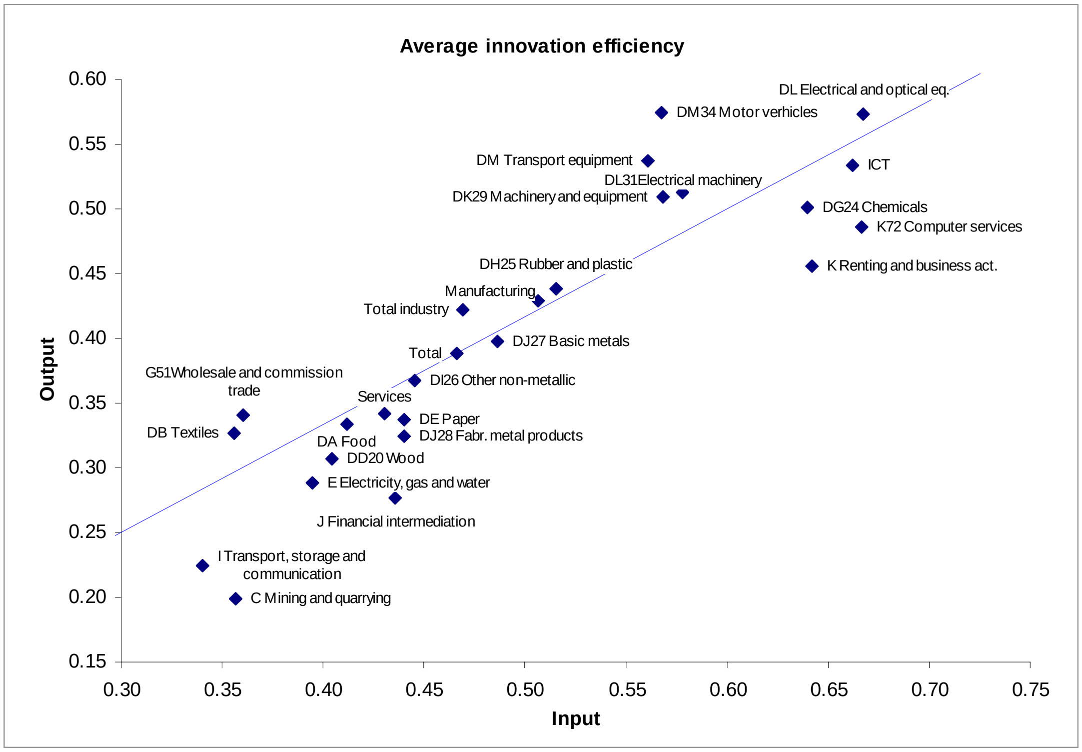
Figure 3.4 graphs the composite index scores for inputs against the scores for outputs. The results give an indication of the efficiency with which a sector transforms its innovation inputs into innovation outputs. Sectors above the blue solid line perform relatively better on outputs than on inputs compared to the average of all sectors, suggesting that they are more efficient at transforming inputs into outputs than sectors below the blue solid line.

Motor vehicles and Transport equipment, Electrical machinery and Electrical and optical equipment, Rubber and plastic, Wholesale and commission trade and Textiles appear to be more efficient than the average sector. Both Textiles and Wholesale and commission trade are among the least innovative sectors as shown in Figure 3.1, but both sectors appear to very efficient in transforming the ‘limited’ innovation inputs into innovation outputs as property rights or sales share of new products.

Of the more innovative sectors, Renting and business activities and Computer services, ICT and Chemicals and chemical products are all sectors were inputs are transformed into outputs below the transformation rate of the average sector. To be able to answer the question whether or not there is scope for these sectors to improve their efficiency one would need more detailed information about the particularities of the innovation process in each of these sectors. Such an analysis is outside the scope of this report, but e.g. ICT is one of the sectors to be analysed in detail in the Commission funded project on ‘Sectoral Innovation Systems in Europe Monitoring, Analysing Trends and Identifying Challenges’[9].

[9] http://www.cordis.lu/innovation/en/policy/europe-innova.htm

Figure 3.4 European sector innovation performance: input versus output



3.4 Economic performance

Innovation is assumed to be one of the drivers of economic growth. However, at the country level it is hard to find statistical evidence for this assumption. As shown in the EIS 2005 report, although there is a statistically significant *negative* correlation between the Summary Innovation Index and the growth rates of GDP per capita and labour productivity for a sample including all European countries, this correlation turns insignificant for a sample of higher-income countries only. One explanation for not finding a positive correlation between innovation and economic growth at the country level is the fact that at the country level there are other more important drivers of economic growth so that in the aggregated data the effect of innovation does not show up. An analysis at the sector should be better able to reveal any positive impact of innovation on a sector's economic performance.

Analysis of the sector data shows a significant positive correlation between innovative and economic performance at the sector level, after controlling for country-specific and sector-specific effects. Innovative performance at sector level and labour productivity growth as measured by the 1998-2000 growth rate of turnover per employee are positively correlated. More innovative sectors on average tend to have higher growth rates of labour productivity.

Table 3.5 summarizes the regression results for 4 simple linear regressions between innovation performance and the 1998-2000 growth rate of labour productivity. Labour productivity growth has been calculated using the 1998 and 2000 CIS-3 data for turnover per employee. A direct regression between labour productivity growth and ISI shows no significant results. An explanation for this result may be differences in business cycles between countries and between sectors. We therefore introduce sector and country dummies, which should capture country specific and sector specific effects. The single introduction of country dummies does not lead to a more significant correlation coefficient. Apparently differences in business cycles across countries are as such not able to explain differences between sectors in their economic performance. The single introduction of sector dummies has a stronger impact raising the level of significance but to a level still being insignificant. Differences in business cycles across sectors are thus also not able to explain differences between sectors in their economic performance.

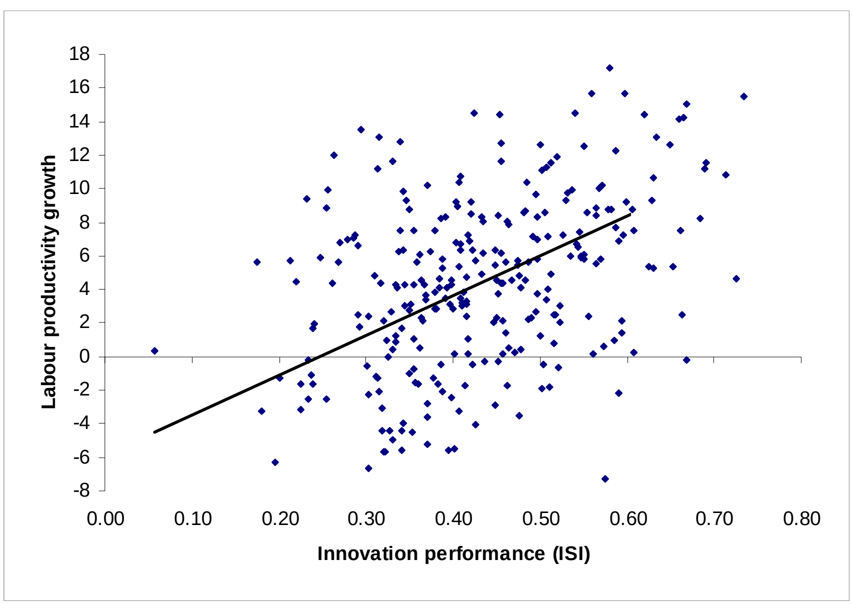
However, the introduction of both country and sector dummies shows a significant positive correlation between innovation and economic performance at the sector level. More innovative sectors thus tend to have higher growth rates of labour productivity, after controlling for both country-specific and sector-specific effects. Figure 3.6 shows a scatter plot between innovation performance on the horizontal axis and economic performance on the vertical axis, where the latter has been adjusted for country- and sector-effects by adding the regression coefficients for country and sector dummies.

Table 3.5 Regressions results for simple correlations between innovation indicators and economic performance

	1998-2000 Labour productivity per person (turnover per employee) growth rate	Adjusted R-square
ISI – 25 sectors, 15 countries (no dummies)	-1.256 (-0.201)	-0.003
ISI – 25 sectors, 15 countries (country dummies)	1.742 (0.291)	0.280
ISI – 25 sectors, 15 countries (sector dummies)	9.949 (0.950)	-0.016
ISI – 25 sectors, 15 countries (country and sector dummies)	23.488 * (1.814)	0.292

t-value in parentheses
***/**/* Correlation is significant at the 1%-level/5%-level/ 10%-level. ISI = Innovation Sector Index.

Figure 3.6 Innovation and economic performance



3.5 Most innovative sectors per country

Table 3.7 gives for each country the three most innovative sectors[10]. Electrical and optical equipment is one of the leading sectors in all countries except Greece. Chemicals and chemical products and Computer and related activities are among the most innovative sectors in 10 of the 15 countries. Other leading sectors are Information and communication technologies (6 countries) and Transport equipment (& Motor vehicles, trailers and semi-trailers) in 4 countries.

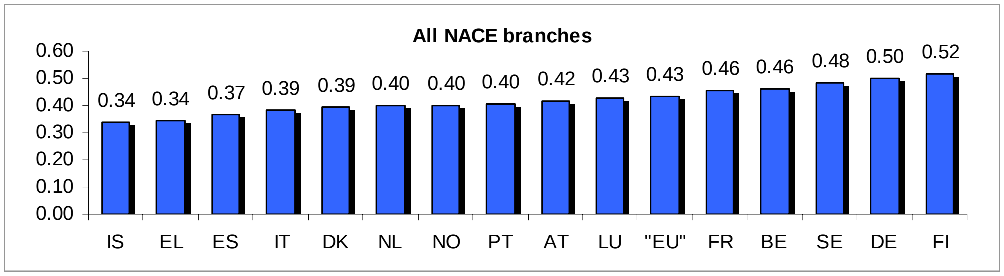
Table 3.7 Main results per country

Austria	Chemicals and chemical products; Electrical and optical equipment; Basic metals
Belgium	Electrical and optical equipment; Information and communication technologies; Computer services and related activities
Denmark	Chemicals and chemical products; Electrical and optical equipment; Information and communication technologies
Finland	Electrical and optical equipment; Information and communication technologies; Chemicals and chemical products
France	Electrical and optical equipment; Chemicals and chemical products; Transport equipment (& Motor vehicles, trailers and semi-trailers)
Germany	Motor vehicles, trailers and semi-trailers (& Transport equipment); Electrical and optical equipment; Computer services and related activities
Greece	Computer services and related activities (& Renting and business activities); Information and communication technologies; Chemicals and chemical products
Iceland	Electrical and optical equipment; Renting and business activities (& Computer services and related activities); Chemicals and chemical products
Italy	Electrical and optical equipment; Chemicals and chemical products; Motor vehicles, trailers and semi-trailers (& Transport equipment)
Luxembourg	Chemicals and chemical products; Computer services and related activities (& Renting and business activities); Electrical and optical equipment
Netherlands	Machinery and equipment n.e.c.; Electrical and optical equipment & Electrical machinery and apparatus n.e.c.; Motor vehicles, trailers and semi-trailers
Norway	Electrical and optical equipment; Information and communication technologies; Computer services and related activities
Portugal	Computer services and related activities (& Renting and business activities); Chemicals and chemical products; Electrical and optical equipment
Spain	Computer services and related activities; Information and communication technologies; Electrical and optical equipment
Sweden	Electrical and optical equipment; Computer services and related activities; Chemicals and chemical products

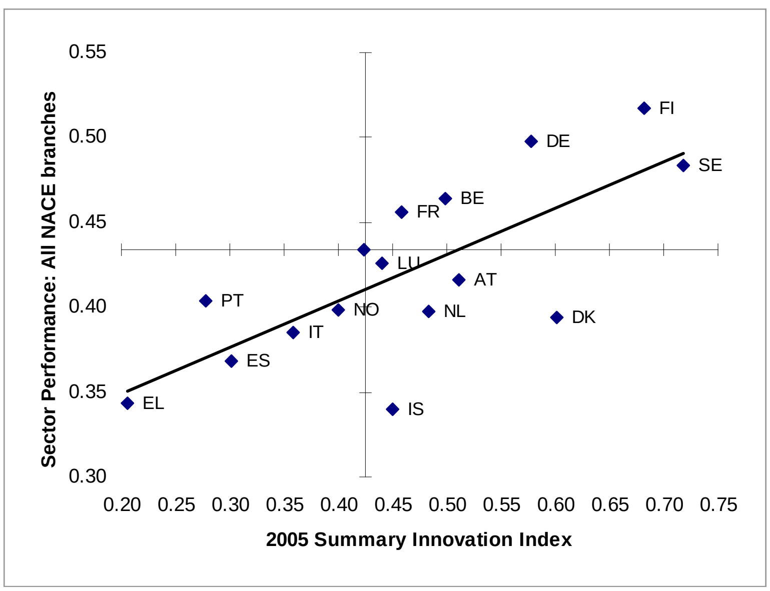
[10] Annex 2 provides sector results per country, showing innovation performance per sector in each country.

4. Sector Innovation Scoreboards

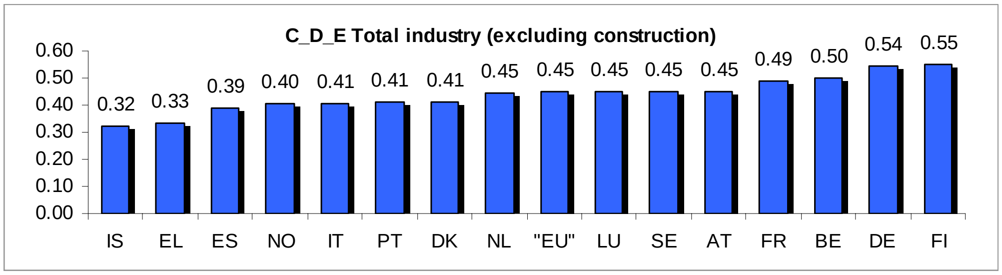
Total or All NACE branches



In the EIS 2005 Sweden, Finland and Germany are among the leading countries. Although the order of ranking is slightly different, we find a similar result for the whole business sector. Due to limited data availability, the results for Iceland as being the least innovative country should be interpreted with care. The figure below shows the performance for EIS 2005 and business sector for all 15 countries. The fact that the number of indicators for the analysis at the sector level is less than half that used in the EIS and that most of the indicators at the sector level are proxies for and thus not identical to those used in the EIS, is a straightforward explanation for the far from perfect correlation between both innovation performances.



Total industry



		Average	All NACE	% of average
1	Share of employees with higher education	8.3	13.1	63
2	Share of firms that use training	16.7	17.7	95
3	R&D expenditures (% of value-added)		1.7	
4	Share of firms that receive public subsidies to innovate	15.9	12.2	130
5	Percent of firms innovating in-house	38.1	35.4	108
6	Percent of firms co-operating with other	5.6	5.8	96
7	Innovation expenditures as a percentage of total turnover	3.1	2.1	152
8	Share of total sector sales from new-to-market products	7.8	6.4	121
9	Share of total sector sales from new-to-firm but not new-to-market products	22.4	17.4	128
10	Share of firms that patent	10.0	8.1	122
11	Share of firms that use trademarks	12.9	12.3	105
12	Share of enterprises that use design registrations	8.1	6.9	117

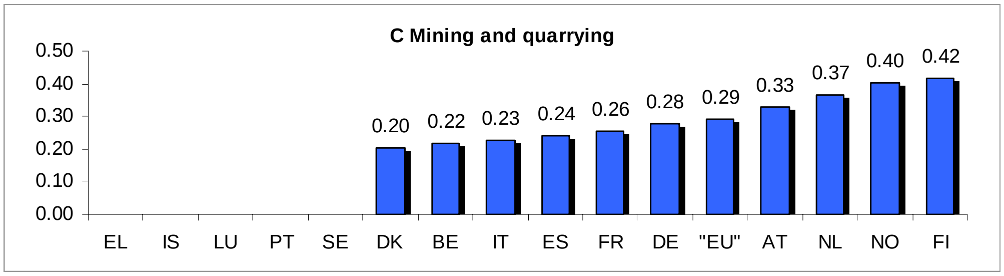
No sector average for R&D expenditures.

For Total industry, covering Mining and quarrying, Manufacturing and Electricity, gas and water supply, the most innovative countries are Finland, Germany and Belgium. A different set of indicators and the fact that services are not included explains the difference in country ranking as compared to the EIS ranking.

Total industry is showing below average[11] performance for the share of employees with higher education. The sector performs above average[12] on innovation expenditures, share of firms receiving public subsidies, sales share of both new-to-market and new-to-firm products and share of firms that patent.

[11] For all sectors we define a sector to be performing below average on a particular indicator if its relative score is below 80.
[12] For all sectors we define a sector to be performing above average on a particular indicator if its relative score is below 120.

Mining and quarrying



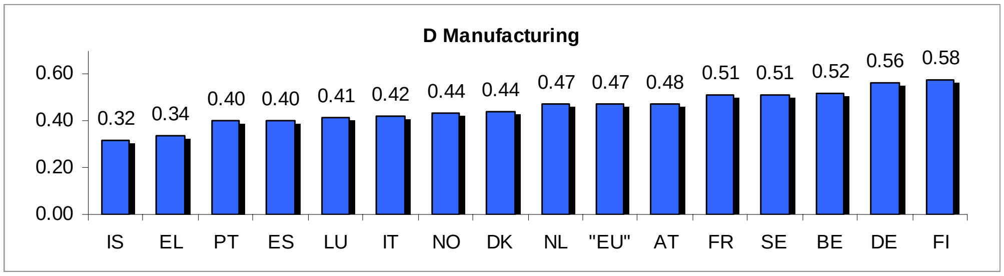
No ISI for EL, IS, LU, PT and SE.

		Average	All NACE	% of average
1	Share of employees with higher education	8.5	13.1	65
2	Share of firms that use training	6.7	17.7	38
3	R&D expenditures (% of value-added)	1.2	1.7	71
4	Share of firms that receive public subsidies to innovate	9.2	12.2	75
5	Percent of firms innovating in-house	23.8	35.4	67
6	Percent of firms co-operating with other	2.3	5.8	40
7	Innovation expenditures as a percentage of total turnover	0.9	2.1	43
8	Share of total sector sales from new-to-market products	1.0	6.4	15
9	Share of total sector sales from new-to-firm but not new-to-market products	3.1	17.4	18
10	Share of firms that patent	3.0	8.1	37
11	Share of firms that use trademarks	4.0	12.3	32
12	Share of enterprises that use design registrations	2.2	6.9	31

Due to limited data availability it was not possible to calculate a composite innovation index for Greece, Iceland, Luxembourg, Portugal and Sweden. The status of Finland, Norway and the Netherlands as innovation leaders in Mining and quarrying may thus partly be due by the fact that 5 countries are missing in the comparison.

Mining and quarrying shows below average performance for all indicators, in particular for the sales share of both new-to-market and new-to-firm products.

Manufacturing

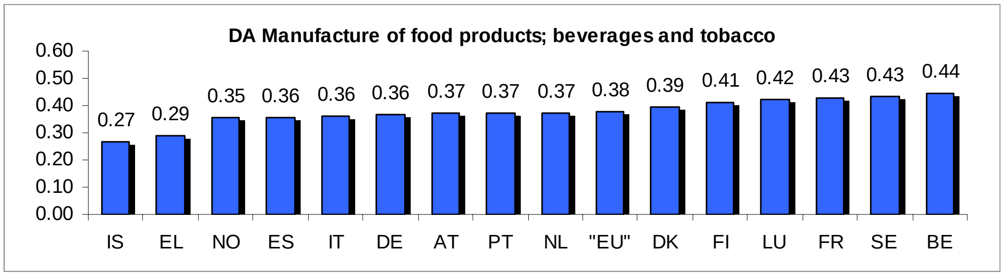


		Average	All NACE	% of average
1	Share of employees with higher education	11.1	13.1	84
2	Share of firms that use training	16.8	17.7	95
3	R&D expenditures (% of value-added)	5.2	1.7	308
4	Share of firms that receive public subsidies to innovate	16.0	12.2	131
5	Percent of firms innovating in-house	38.5	35.4	109
6	Percent of firms co-operating with other	5.6	5.8	97
7	Innovation expenditures as a percentage of total turnover	3.4	2.1	164
8	Share of total sector sales from new-to-market products	8.2	6.4	128
9	Share of total sector sales from new-to-firm but not new-to-market products	23.7	17.4	136
10	Share of firms that patent	10.1	8.1	124
11	Share of firms that use trademarks	13.1	12.3	107
12	Share of enterprises that use design registrations	8.3	6.9	119

Most innovative countries in Manufacturing are Finland, Germany and Belgium, closely followed by Sweden and France.

The sector's R&D intensity is more than triple the average. Manufacturing also performs above average on innovation expenditures, share of firms that receive public subsidies, sales share of new-to-market and new-to-firm products and the share of firms that patent.

Food products, beverages and tobacco

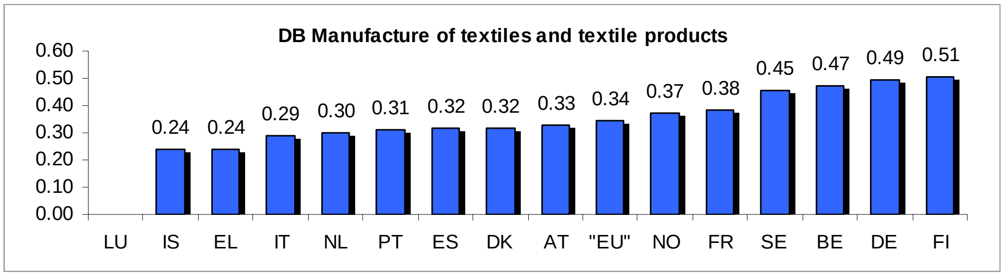


		Average	All NACE	% of average
1	Share of employees with higher education	6.6	13.1	51
2	Share of firms that use training	12.8	17.7	73
3	R&D expenditures (% of value-added)	1.1	1.7	68
4	Share of firms that receive public subsidies to innovate	14.2	12.2	116
5	Percent of firms innovating in-house	35.6	35.4	101
6	Percent of firms co-operating with other	3.9	5.8	67
7	Innovation expenditures as a percentage of total turnover	1.1	2.1	53
8	Share of total sector sales from new-to-market products	2.9	6.4	45
9	Share of total sector sales from new-to-firm but not new-to-market products	9.1	17.4	52
10	Share of firms that patent	4.7	8.1	57
11	Share of firms that use trademarks	18.0	12.3	147
12	Share of enterprises that use design registrations	4.8	6.9	70

Most innovative countries in Food products, beverages and tobacco are Belgium, Sweden and France.

The use of trademarks to protect inventions or innovations is strongly developed in the Food products, beverages and tobacco sector. The sector performs below average on sales shares due to new-to-market and new-to-firm products, the share of employees with higher education, innovation expenditures, the share of firms that patent, R&D expenditures, the share of firms that train their employees, the share of firms co-operating with others and the share of firms that use design registrations.

Textiles and textile products



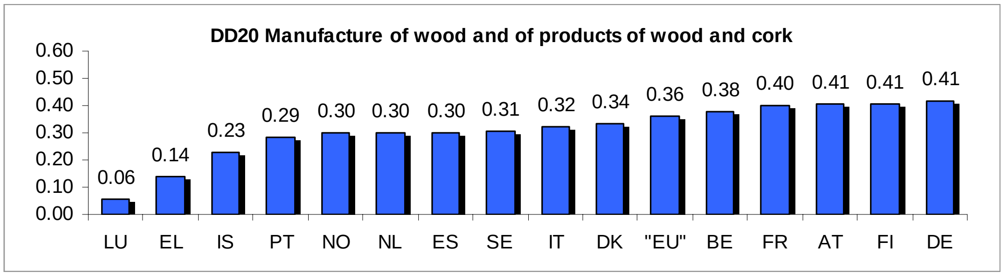
No ISI for LU.

		Average	All NACE	% of average
1	Share of employees with higher education	3.5	13.1	27
2	Share of firms that use training	9.9	17.7	56
3	R&D expenditures (% of value-added)	1.1	1.7	68
4	Share of firms that receive public subsidies to innovate	10.7	12.2	88
5	Percent of firms innovating in-house	24.2	35.4	68
6	Percent of firms co-operating with other	2.6	5.8	45
7	Innovation expenditures as a percentage of total turnover	1.3	2.1	65
8	Share of total sector sales from new-to-market products	5.0	6.4	78
9	Share of total sector sales from new-to-firm but not new-to-market products	10.8	17.4	62
10	Share of firms that patent	4.0	8.1	49
11	Share of firms that use trademarks	12.8	12.3	105
12	Share of enterprises that use design registrations	4.3	6.9	63

Most innovative countries in the Textiles sector are Finland, Germany, Belgium and Sweden.

The sector is performing below average in 10 indicators, in particular on the share of employees with higher education. Noteworthy is the use of trademarks in the Textiles sector: more than 3 times as many firms use trademarks as compared to firms using patents or designs.

Wood and wood products

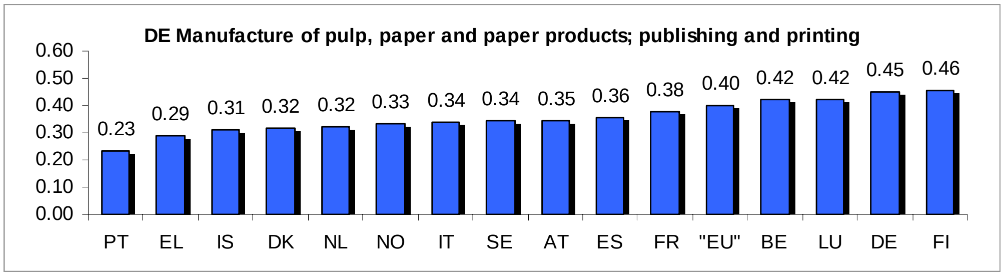


		Average	All NACE	% of average
1	Share of employees with higher education	11.4	13.1	87
2	Share of firms that use training	9.9	17.7	56
3	R&D expenditures (% of value-added)	0.5	1.7	27
4	Share of firms that receive public subsidies to innovate	13.5	12.2	110
5	Percent of firms innovating in-house	32.3	35.4	91
6	Percent of firms co-operating with other	3.6	5.8	61
7	Innovation expenditures as a percentage of total turnover	1.4	2.1	68
8	Share of total sector sales from new-to-market products	4.1	6.4	64
9	Share of total sector sales from new-to-firm but not new-to-market products	8.6	17.4	49
10	Share of firms that patent	5.9	8.1	72
11	Share of firms that use trademarks	7.6	12.3	62
12	Share of enterprises that use design registrations	4.8	6.9	70

Most innovative countries in Wood and wood products are Germany, Finland, Austria and France.

Wood and wood products performs below average on 9 indicators, its R&D intensity is almost 4 times as small as the average R&D intensity. The only indicator where the sector shows relatively good performance is the share of firms receiving public funding for innovation activities.

Pulp, paper and paper products, publishing and printing

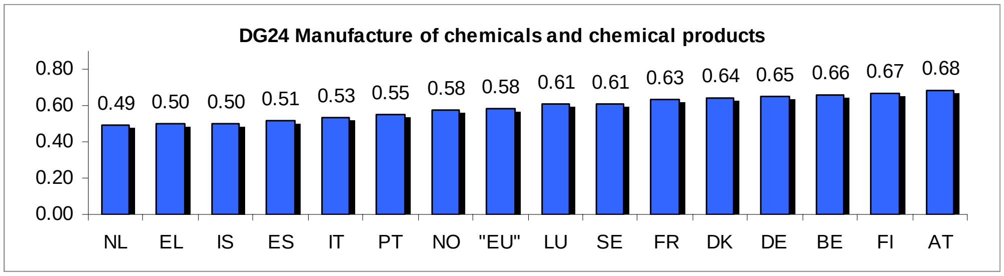


		Average	All NACE	% of average
1	Share of employees with higher education	6.6	13.1	51
2	Share of firms that use training	12.8	17.7	73
3	R&D expenditures (% of value-added)	1.1	1.7	68
4	Share of firms that receive public subsidies to innovate	14.2	12.2	116
5	Percent of firms innovating in-house	35.6	35.4	101
6	Percent of firms co-operating with other	3.9	5.8	67
7	Innovation expenditures as a percentage of total turnover	1.1	2.1	53
8	Share of total sector sales from new-to-market products	2.9	6.4	45
9	Share of total sector sales from new-to-firm but not new-to-market products	9.1	17.4	52
10	Share of firms that patent	4.7	8.1	57
11	Share of firms that use trademarks	18.0	12.3	147
12	Share of enterprises that use design registrations	4.8	6.9	70

In Pulp, paper and paper products, publishing and printing, the most innovative countries are Finland, Germany, Luxembourg and Belgium.

The sector scores above average on only one indicator: the share of firms that use trademarks. On 9 indicators the sector performs below average, in particular on sales shares due to new products are below average, the share of employees with higher education and the share of firms that patent.

Chemicals and chemical products



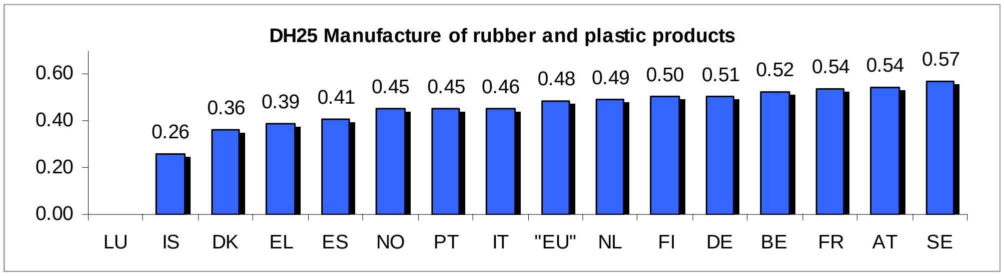
		Average	All NACE	% of average
1	Share of employees with higher education	15.0	13.1	114
2	Share of firms that use training	28.2	17.7	160
3	R&D expenditures (% of value-added)	12.6	1.7	741
4	Share of firms that receive public subsidies to innovate	19.8	12.2	162
5	Percent of firms innovating in-house	56.8	35.4	161
6	Percent of firms co-operating with other	15.9	5.8	272
7	Innovation expenditures as a percentage of total turnover	4.8	2.1	231
8	Share of total sector sales from new-to-market products	6.1	6.4	95
9	Share of total sector sales from new-to-firm but not new-to-market products	15.6	17.4	89
10	Share of firms that patent	21.4	8.1	262
11	Share of firms that use trademarks	30.6	12.3	249
12	Share of enterprises that use design registrations	11.0	6.9	160

Differences in innovation performance in Chemicals and chemical products between the top-8 countries are only small. Austria, Finland and Belgium are performing marginally better than the other countries. Quite surprisingly the Netherlands is ranking as the worst performing country, despite the fact that one of its chemical companies - DSM - was assessed being the most innovative company worldwide[13].

The sector is performing above average on 10 indicators, in particular on R&D (more than 7 times as high as the average intensity), share of firms co-operating with others, innovation expenditures, patents and trademarks. The presence of pharmaceuticals in this sector is one of the factors explaining the strong performance of the whole Chemicals sector.

[13] Jones, Tim, *Innovation Leaders*, Innovaro Limited, 2005.

Rubber and plastic products



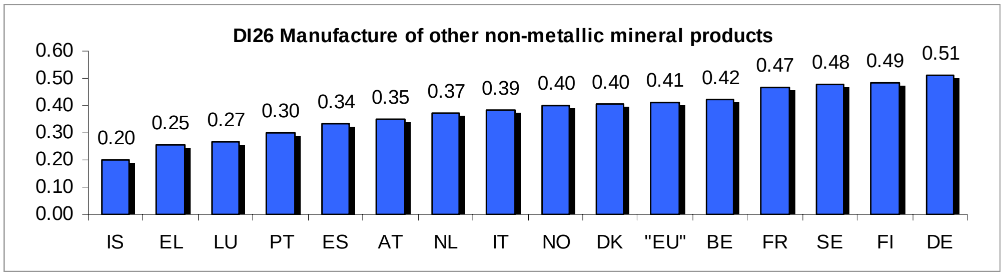
No ISI for LU.

		Average	All NACE	% of average
1	Share of employees with higher education	7.7	13.1	59
2	Share of firms that use training	19.9	17.7	113
3	R&D expenditures (% of value-added)	3.1	1.7	181
4	Share of firms that receive public subsidies to innovate	17.4	12.2	142
5	Percent of firms innovating in-house	49.7	35.4	141
6	Percent of firms co-operating with other	9.6	5.8	165
7	Innovation expenditures as a percentage of total turnover	2.1	2.1	102
8	Share of total sector sales from new-to-market products	6.1	6.4	94
9	Share of total sector sales from new-to-firm but not new-to-market products	16.5	17.4	95
10	Share of firms that patent	15.1	8.1	185
11	Share of firms that use trademarks	12.5	12.3	102
12	Share of enterprises that use design registrations	12.9	6.9	187

Most innovative countries in the Rubber and plastic sector are Sweden, Austria and France.

The sector scores above average on 7 indicators, with far above average performance on R&D, patents and designs. Rubber and plastics scores below average on the share of employees with higher education.

Other non-metallic mineral products

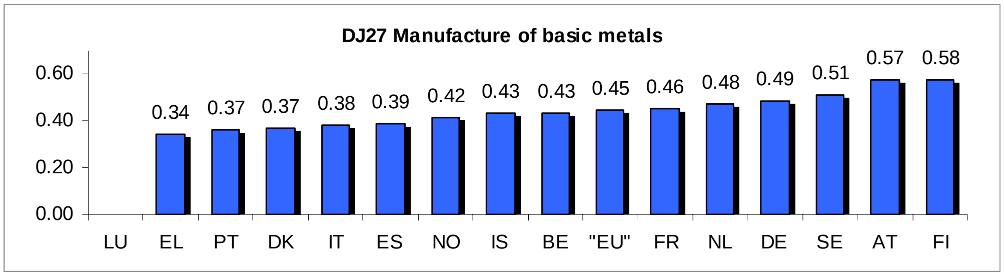


		Average	All NACE	% of average
1	Share of employees with higher education	7.3	13.1	55
2	Share of firms that use training	12.1	17.7	68
3	R&D expenditures (% of value-added)	1.3	1.7	78
4	Share of firms that receive public subsidies to innovate	15.3	12.2	125
5	Percent of firms innovating in-house	38.3	35.4	108
6	Percent of firms co-operating with other	6.6	5.8	112
7	Innovation expenditures as a percentage of total turnover	2.0	2.1	95
8	Share of total sector sales from new-to-market products	5.4	6.4	83
9	Share of total sector sales from new-to-firm but not new-to-market products	14.7	17.4	84
10	Share of firms that patent	9.4	8.1	116
11	Share of firms that use trademarks	10.2	12.3	83
12	Share of enterprises that use design registrations	5.8	6.9	84

Most innovative countries in Other non-metallic mineral products are Germany, Finland, Sweden and France.

The sector scores above average on only 1 indicator: the share of firms that receive public subsidies to innovate. The sector scores below average on the share of employees with higher education, the share of firms that use training and R&D expenditures.

Basic metals



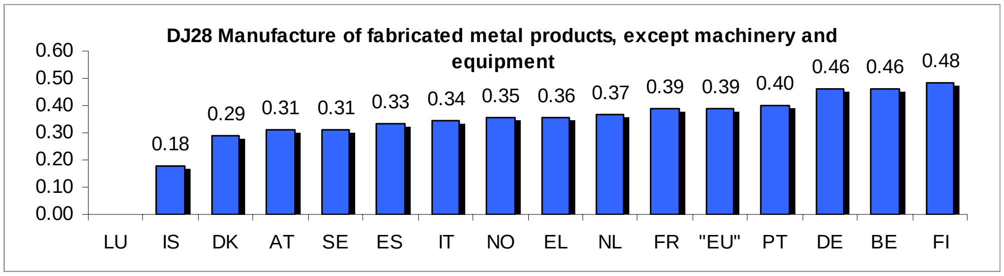
No ISI for LU.

		Average	All NACE	% of average
1	Share of employees with higher education	8.5	13.1	65
2	Share of firms that use training	17.0	17.7	96
3	R&D expenditures (% of value-added)	2.6	1.7	152
4	Share of firms that receive public subsidies to innovate	21.7	12.2	177
5	Percent of firms innovating in-house	43.3	35.4	122
6	Percent of firms co-operating with other	6.8	5.8	117
7	Innovation expenditures as a percentage of total turnover	1.1	2.1	53
8	Share of total sector sales from new-to-market products	3.7	6.4	57
9	Share of total sector sales from new-to-firm but not new-to-market products	12.3	17.4	71
10	Share of firms that patent	14.8	8.1	182
11	Share of firms that use trademarks	14.0	12.3	114
12	Share of enterprises that use design registrations	8.1	6.9	117

Most innovative countries in Basic metals are Finland and Austria.

Performance on patents, share of firms that receive public subsidies and firms innovating in-house is above average; performance on innovation expenditures, share of employees with higher education and sales share of new-to-market and new-to-firm products is below average.

Fabricated metal products, except machinery and equipment



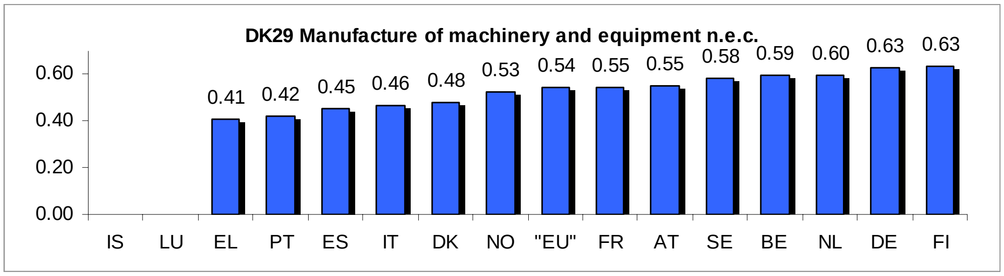
No ISI for LU.

		Average	All NACE	% of average
1	Share of employees with higher education	7.7	13.1	59
2	Share of firms that use training	15.8	17.7	89
3	R&D expenditures (% of value-added)	1.1	1.7	66
4	Share of firms that receive public subsidies to innovate	16.3	12.2	134
5	Percent of firms innovating in-house	35.2	35.4	99
6	Percent of firms co-operating with other	3.8	5.8	65
7	Innovation expenditures as a percentage of total turnover	2.1	2.1	101
8	Share of total sector sales from new-to-market products	4.0	6.4	62
9	Share of total sector sales from new-to-firm but not new-to-market products	12.9	17.4	74
10	Share of firms that patent	7.0	8.1	85
11	Share of firms that use trademarks	5.9	12.3	48
12	Share of enterprises that use design registrations	6.1	6.9	88

Most innovative countries in Fabricated metal products are Finland, Belgium and Germany.

Public subsidies are the only indicator where performance is above average. The sector performs below average on the share of employees with higher education, R&D expenditures, firms co-operating with others, sales shares of new-to-market and new-to-firm products and the use of trademarks.

Machinery and equipment n.e.c.



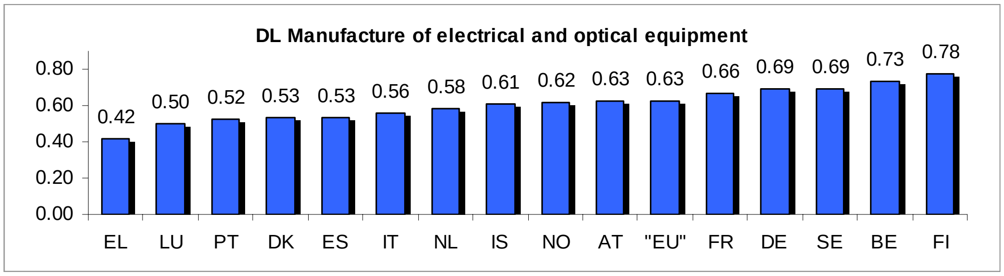
No ISI for IS and LU.

		Average	All NACE	% of average
1	Share of employees with higher education	14.2	13.1	109
2	Share of firms that use training	23.0	17.7	130
3	R&D expenditures (% of value-added)	5.5	1.7	322
4	Share of firms that receive public subsidies to innovate	19.5	12.2	159
5	Percent of firms innovating in-house	50.5	35.4	143
6	Percent of firms co-operating with other	8.6	5.8	147
7	Innovation expenditures as a percentage of total turnover	3.6	2.1	174
8	Share of total sector sales from new-to-market products	9.8	6.4	153
9	Share of total sector sales from new-to-firm but not new-to-market products	25.4	17.4	145
10	Share of firms that patent	20.4	8.1	250
11	Share of firms that use trademarks	15.8	12.3	129
12	Share of enterprises that use design registrations	14.6	6.9	211

Most innovative countries in Machinery and equipment are Finland, Germany and the Netherlands.

The sector scores above average on almost all indicators, in particular on R&D expenditures, patents and designs.

Electrical and optical equipment

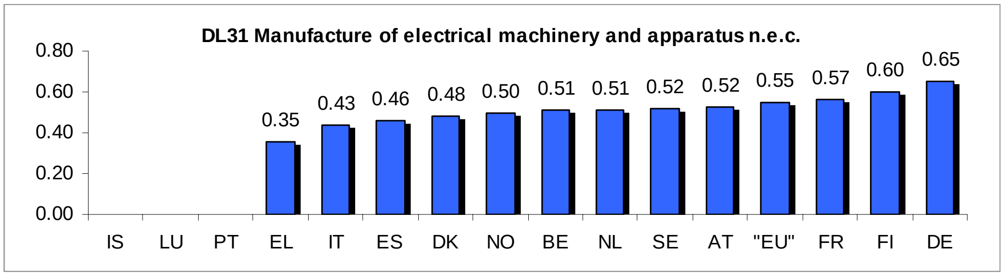


		Average	All NACE	% of average
1	Share of employees with higher education	21.2	13.1	162
2	Share of firms that use training	29.8	17.7	169
3	R&D expenditures (% of value-added)	15.4	1.7	906
4	Share of firms that receive public subsidies to innovate	22.8	12.2	187
5	Percent of firms innovating in-house	53.1	35.4	150
6	Percent of firms co-operating with other	13.2	5.8	226
7	Innovation expenditures as a percentage of total turnover	7.6	2.1	371
8	Share of total sector sales from new-to-market products	16.7	6.4	260
9	Share of total sector sales from new-to-firm but not new-to-market products	44.3	17.4	254
10	Share of firms that patent	21.1	8.1	259
11	Share of firms that use trademarks	18.2	12.3	149
12	Share of enterprises that use design registrations	13.8	6.9	200

Most innovative countries in Electrical and optical equipment are Finland, Belgium, Sweden and Germany.

The sector scores above average on all indicators, in particular on R&D and innovation expenditures.

Electrical machinery and apparatus n.e.c.



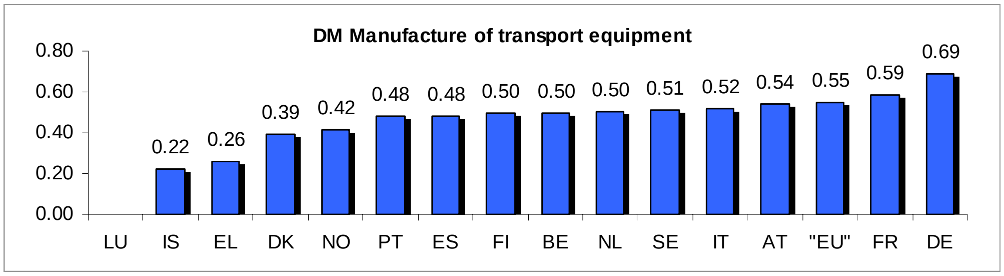
No ISI for IS, LU and PT.

		Average	All NACE	% of average
1	Share of employees with higher education	20.9	13.1	159
2	Share of firms that use training	21.8	17.7	123
3	R&D expenditures (% of value-added)	5.9	1.7	347
4	Share of firms that receive public subsidies to innovate	17.6	12.2	144
5	Percent of firms innovating in-house	43.5	35.4	123
6	Percent of firms co-operating with other	8.0	5.8	137
7	Innovation expenditures as a percentage of total turnover	6.2	2.1	303
8	Share of total sector sales from new-to-market products	8.4	6.4	131
9	Share of total sector sales from new-to-firm but not new-to-market products	39.2	17.4	225
10	Share of firms that patent	18.2	8.1	224
11	Share of firms that use trademarks	13.9	12.3	113
12	Share of enterprises that use design registrations	13.5	6.9	196

Most innovative countries in Electrical machinery and equipment are Germany, Finland and France.

The sector scores above average on almost all indicators, in particular on R&D and innovation expenditures.

Transport equipment



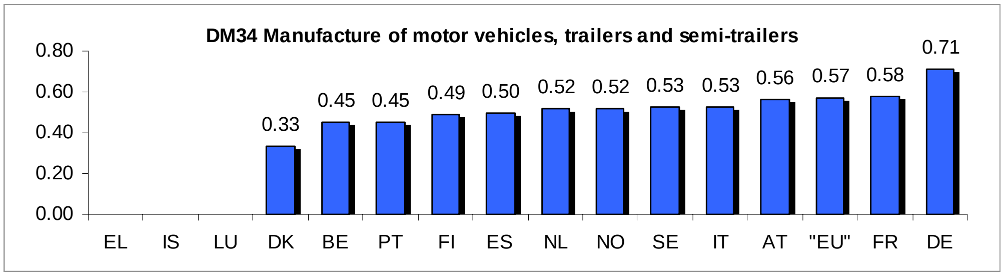
No ISI for LU.

		Average	All NACE	% of average
1	Share of employees with higher education	12.9	13.1	98
2	Share of firms that use training	20.4	17.7	116
3	R&D expenditures (% of value-added)	8.0	1.7	470
4	Share of firms that receive public subsidies to innovate	20.0	12.2	163
5	Percent of firms innovating in-house	41.7	35.4	118
6	Percent of firms co-operating with other	7.5	5.8	128
7	Innovation expenditures as a percentage of total turnover	5.1	2.1	246
8	Share of total sector sales from new-to-market products	15.6	6.4	243
9	Share of total sector sales from new-to-firm but not new-to-market products	51.2	17.4	293
10	Share of firms that patent	14.9	8.1	183
11	Share of firms that use trademarks	13.2	12.3	108
12	Share of enterprises that use design registrations	11.6	6.9	168

Most innovative countries in Transport equipment are Germany and France. The presence of several large car manufacturers (see next sector) is one of the explanations for the dominance of both countries.

The sector performs average on 8 indicators, in particular on R&D expenditures and the sales share of new-to-firm products.

Motor vehicles, trailers and semi-trailers



No ISI for EL, IS and LU.

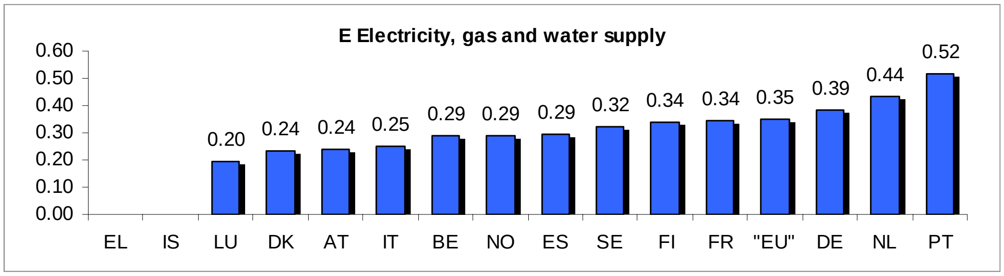
		Average	All NACE	% of average
1	Share of employees with higher education	12.4	13.1	95
2	Share of firms that use training	22.8	17.7	129
3	R&D expenditures (% of value-added)	7.6	1.7	446
4	Share of firms that receive public subsidies to innovate	19.6	12.2	160
5	Percent of firms innovating in-house	45.9	35.4	130
6	Percent of firms co-operating with other	7.5	5.8	129
7	Innovation expenditures as a percentage of total turnover	4.9	2.1	236
8	Share of total sector sales from new-to-market products	15.7	6.4	245
9	Share of total sector sales from new-to-firm but not new-to-market products	55.1	17.4	316
10	Share of firms that patent	18.4	8.1	225
11	Share of firms that use trademarks	16.6	12.3	135
12	Share of enterprises that use design registrations	14.0	6.9	202

Most innovative countries in the Automotive sector are Germany and France. In both countries we find large R&D intensive car manufacturers. Of the top 10 firms in terms of R&D spending, 5 are German firms and 4 are French firms[14].

The sector performs above average on almost all indicators. Only the share of employees with higher education is not higher than the European average. The R&D expenditures and the sales share of new-to-firm products are both more than 3 times above the European average.

[14] 2004 EU Industrial Research Investment Scoreboard.

Electricity, gas and water supply



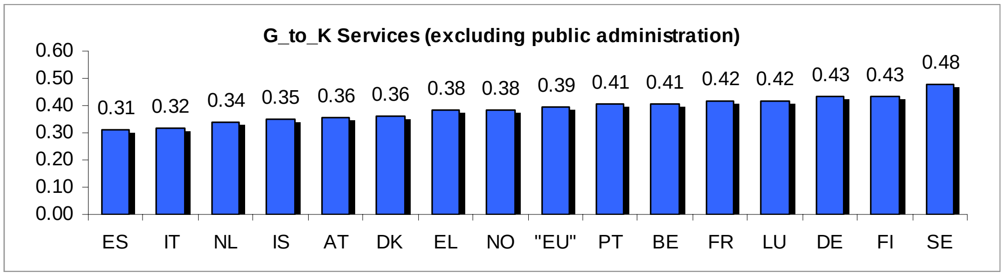
No ISI for EL and IS.

		Average	All NACE	% of average
1	Share of employees with higher education	13.4	13.1	103
2	Share of firms that use training	17.4	17.7	98
3	R&D expenditures (% of value-added)	0.6	1.7	35
4	Share of firms that receive public subsidies to innovate	9.1	12.2	74
5	Percent of firms innovating in-house	24.4	35.4	69
6	Percent of firms co-operating with other	5.8	5.8	100
7	Innovation expenditures as a percentage of total turnover	0.4	2.1	18
8	Share of total sector sales from new-to-market products	3.6	6.4	56
9	Share of total sector sales from new-to-firm but not new-to-market products	11.3	17.4	64
10	Share of firms that patent	6.9	8.1	84
11	Share of firms that use trademarks	6.3	12.3	51
12	Share of enterprises that use design registrations	1.8	6.9	25

Most innovative countries in Electricity, gas and water supply are Portugal, the Netherlands and Germany. The strong Portuguese performance is among others due to relatively high scores on the indicators on employees with higher education and public subsidies.

The sector performs below average on almost 8 indicators. Only for the share of employees with higher education the sector shows a relatively good performance.

Services

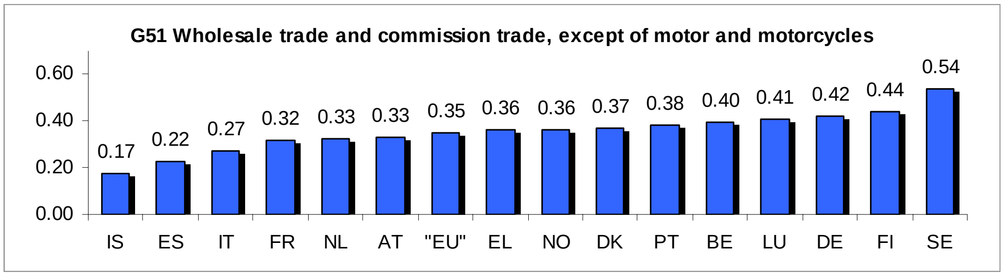


		Average	All NACE	% of average
1	Share of employees with higher education	20.6	13.1	157
2	Share of firms that use training	19.0	17.7	108
3	R&D expenditures (% of value-added)	0.5	1.7	31
4	Share of firms that receive public subsidies to innovate	7.0	12.2	57
5	Percent of firms innovating in-house	31.5	35.4	89
6	Percent of firms co-operating with other	6.2	5.8	106
7	Innovation expenditures as a percentage of total turnover	0.9	2.1	46
8	Share of total sector sales from new-to-market products	5.0	6.4	78
9	Share of total sector sales from new-to-firm but not new-to-market products	12.3	17.4	71
10	Share of firms that patent	5.6	8.1	68
11	Share of firms that use trademarks	11.4	12.3	93
12	Share of enterprises that use design registrations	5.2	6.9	76

Most innovative countries in Business services are Sweden, Finland and Germany.

The sector performs above average on the share of employees with higher education and below average on R&D expenditures, the share of firms receiving public subsidies to innovate, innovation expenditures, sales shares of new-to-market and new-to-firm products and the use of patents and design registrations.

Wholesale trade and commission trade



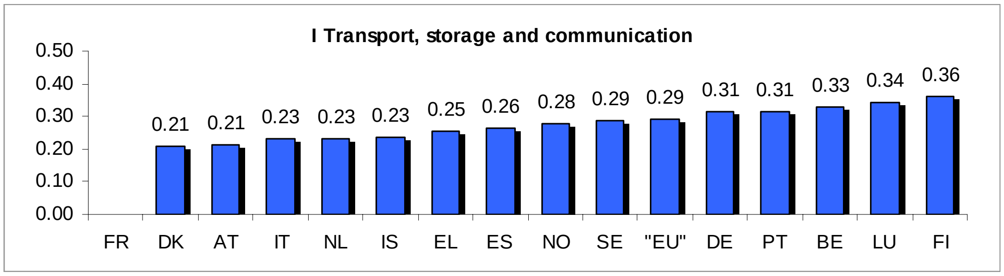
		Average	All NACE	% of average
1	Share of employees with higher education	11.2	13.1	85
2	Share of firms that use training	13.5	17.7	76
3	R&D expenditures (% of value-added)		1.7	
4	Share of firms that receive public subsidies to innovate	5.4	12.2	45
5	Percent of firms innovating in-house	27.0	35.4	76
6	Percent of firms co-operating with other	3.8	5.8	66
7	Innovation expenditures as a percentage of total turnover	0.4	2.1	21
8	Share of total sector sales from new-to-market products	3.3	6.4	51
9	Share of total sector sales from new-to-firm but not new-to-market products	7.4	17.4	43
10	Share of firms that patent	6.3	8.1	78
11	Share of firms that use trademarks	14.9	12.3	121
12	Share of enterprises that use design registrations	6.9	6.9	100

No sector average for R&D expenditures.

Most innovative countries in Wholesale and commission trade are Sweden, Finland and Germany.

The sector scores below average on 8 indicators and only just performs above average on trademarks.

Transport, storage and communication



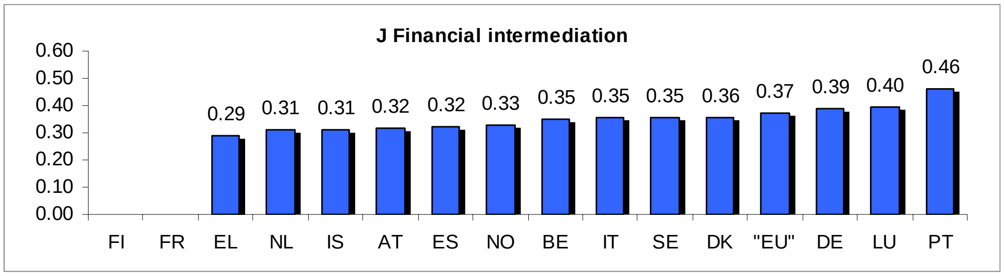
No ISI for FR.

		Average	All NACE	% of average
1	Share of employees with higher education	8.0	13.1	61
2	Share of firms that use training	12.8	17.7	73
3	R&D expenditures (% of value-added)	0.6	1.7	34
4	Share of firms that receive public subsidies to innovate	3.9	12.2	32
5	Percent of firms innovating in-house	19.6	35.4	55
6	Percent of firms co-operating with other	2.7	5.8	46
7	Innovation expenditures as a percentage of total turnover	1.2	2.1	58
8	Share of total sector sales from new-to-market products	5.8	6.4	90
9	Share of total sector sales from new-to-firm but not new-to-market products	13.4	17.4	77
10	Share of firms that patent	0.7	8.1	9
11	Share of firms that use trademarks	2.3	12.3	19
12	Share of enterprises that use design registrations	0.9	6.9	13

Most innovative countries in Transport, storage and communication are Finland, Luxembourg and Belgium.

The sector scores below average on almost all indicators, firms almost do not patent, but also the use of trademarks and designs is at a very low level. With a sales share of new-to-market products close to the average sales share, Transport, storage and communication seems to be innovating through other ways than technical innovation.

Financial intermediation



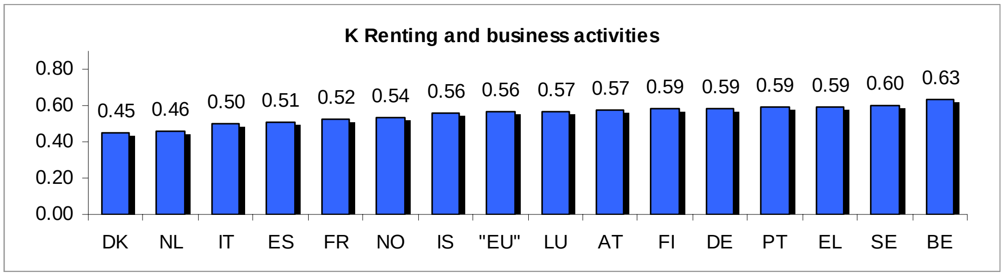
No ISI for FI and FR.

		Average	All NACE	% of average
1	Share of employees with higher education	30.1	13.1	230
2	Share of firms that use training	26.0	17.7	147
3	R&D expenditures (% of value-added)	0.3	1.7	16
4	Share of firms that receive public subsidies to innovate	1.6	12.2	13
5	Percent of firms innovating in-house	42.7	35.4	121
6	Percent of firms co-operating with other	7.1	5.8	122
7	Innovation expenditures as a percentage of total turnover	0.6	2.1	29
8	Share of total sector sales from new-to-market products	5.6	6.4	88
9	Share of total sector sales from new-to-firm but not new-to-market products	14.9	17.4	85
10	Share of firms that patent	1.0	8.1	12
11	Share of firms that use trademarks	8.4	12.3	68
12	Share of enterprises that use design registrations	1.8	6.9	25

Most innovative countries in Financial intermediation are Portugal, Luxembourg and Germany.

The sector scores above average on the share of employees with higher education, the share of firms that use training, the share of firms innovating in-house and the share of firms co-operating with others. The sector performs below average on the share of firms that use patents, trademarks or design registrations, R&D and innovation expenditures and the share of firms that receive public subsidies to innovate.

Renting and business activities

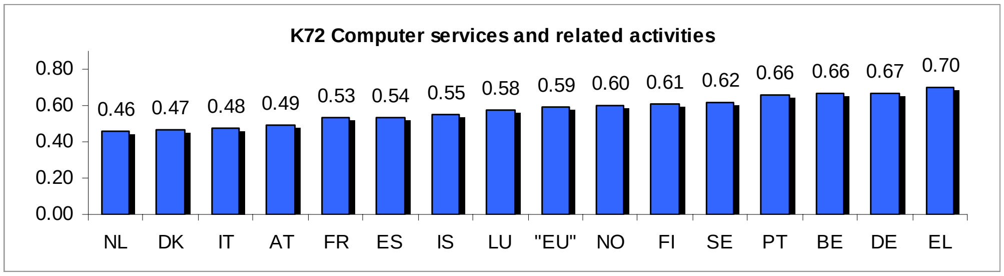


		Average	All NACE	% of average
1	Share of employees with higher education	51.4	13.1	393
2	Share of firms that use training	35.0	17.7	198
3	R&D expenditures (% of value-added)	2.1	1.7	126
4	Share of firms that receive public subsidies to innovate	15.6	12.2	128
5	Percent of firms innovating in-house	50.8	35.4	144
6	Percent of firms co-operating with other	15.2	5.8	261
7	Innovation expenditures as a percentage of total turnover	5.4	2.1	263
8	Share of total sector sales from new-to-market products	10.6	6.4	166
9	Share of total sector sales from new-to-firm but not new-to-market products	25.6	17.4	147
10	Share of firms that patent	11.4	8.1	140
11	Share of firms that use trademarks	15.5	12.3	127
12	Share of enterprises that use design registrations	8.1	6.9	118

Most innovative countries in Renting and business activities are Belgium and Sweden, closely followed by 4 other countries.

The sector scores above average on almost all indicators. The share of employees with higher education is almost 4 times the European average, with 1 out of 2 employees working in the sector having a higher education degree.

Computer services and related activities

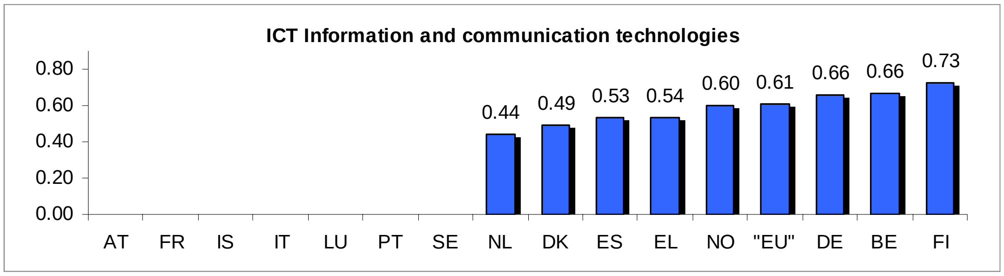


		Average	All NACE	% of average
1	Share of employees with higher education	50.9	13.1	389
2	Share of firms that use training	38.1	17.7	216
3	R&D expenditures (% of value-added)	6.1	1.7	360
4	Share of firms that receive public subsidies to innovate	13.8	12.2	113
5	Percent of firms innovating in-house	58.4	35.4	165
6	Percent of firms co-operating with other	14.6	5.8	250
7	Innovation expenditures as a percentage of total turnover	4.2	2.1	203
8	Share of total sector sales from new-to-market products	12.7	6.4	197
9	Share of total sector sales from new-to-firm but not new-to-market products	33.6	17.4	193
10	Share of firms that patent	9.2	8.1	113
11	Share of firms that use trademarks	22.8	12.3	186
12	Share of enterprises that use design registrations	6.8	6.9	98

Most innovative countries in computer services are Greece, Germany, Belgium and Portugal.

The sector performs above average on 9 indicators, in particular on the share employees with higher education, R&D expenditures and the share of firms co-operating with others.

Information and communication technologies



No ISI for AT, FR, IS, IT, LU, PT and SE.

		Average	All NACE	% of average
1	Share of employees with higher education	29.4	13.1	225
2	Share of firms that use training	35.5	17.7	201
3	R&D expenditures (% of value-added)	7.9	1.7	467
4	Share of firms that receive public subsidies to innovate	17.8	12.2	146
5	Percent of firms innovating in-house	56.7	35.4	160
6	Percent of firms co-operating with other	15.0	5.8	257
7	Innovation expenditures as a percentage of total turnover	5.8	2.1	282
8	Share of total sector sales from new-to-market products	17.7	6.4	275
9	Share of total sector sales from new-to-firm but not new-to-market products	37.4	17.4	215
10	Share of firms that patent	14.1	8.1	173
11	Share of firms that use trademarks	21.3	12.3	173
12	Share of enterprises that use design registrations	9.0	6.9	130

Limited data availability due to confidentiality reasons made it impossible to calculate a composite innovation index for ICT for 7 countries. Of the other 8 countries, Finland, Belgium and Germany are the most innovative countries.

ICT scores above average on all indicators, in particular on R&D, innovation expenditures, sales of new-to-market and new-to-firm products and the share of employees with higher education.

Annex Table 1: Normalised data per sector

C_D_E Total industry (excluding construction)

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.18	0.48	0.45		0.38	0.38		0.63	0.23	0.23	0.41	0.24	0.56	0.22	0.31
2	Share of firms that used training		0.65	0.73	0.46	0.41	0.45	0.54	0.48	0.41	0.39	0.69	0.54	0.48	0.45	
3	R&D expenditures (% of value-added)															
4	Share of firms that receive public subsidies to innovate	0.75	0.60	0.61	0.29	0.50	0.44	0.53	0.72	0.61	0.37	0.54	0.72	0.47	0.59	0.45
5	Percent of firms innovating in-house	0.41	0.50	0.57	0.20	0.31	0.18	0.39	0.45	0.37	0.49	0.47	0.47	0.36	0.39	0.39
6	Percent of firms co-operating with other	0.40	0.50	0.44	0.64	0.26	0.33	0.51	0.68	0.24	0.50					0.55
7	Innovation expenditures as a percentage of total turnover		0.71	0.71	0.46	0.56	0.59	0.64	0.66	0.62	0.45	0.57	0.63	0.52	0.61	
8	Share of total sector sales from new-to-market products	0.31	0.29	0.33	0.39	0.34	0.16	0.32	0.55	0.41	0.12	0.21	0.18	0.18	0.46	0.20
9	Share of total sector sales from new-to-firm not new-to-market products	0.47	0.39	0.64	0.45	0.44	0.29	0.37	0.52	0.47	0.22	0.36	0.45	0.30	0.45	0.54
10	Share of firms that patent	0.50	0.41	0.54	0.38	0.34	0.19	0.54	0.48	0.35	0.23	0.34	0.42	0.39	0.26	0.53
11	Share of firms that use trademarks	0.52	0.56	0.49	0.46	0.41	0.44	0.58	0.51	0.45	0.36	0.49	0.44	0.49	0.46	0.67
12	Share of enterprises that use design registrations	0.52	0.41	0.49	0.39	0.35	0.19	0.44	0.38	0.31	0.17	0.40	0.36	0.29	0.20	0.42

C Mining and quarrying

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.17	0.34	0.19		0.29	0.38		0.61	0.09			0.40	0.77	0.09	
2	Share of firms that used training		0.40	0.47	0.62	0.25		0.34	0.39	0.21			0.38	0.40	0.31	
3	R&D expenditures (% of value-added)		0.48	0.43		0.34	0.36		0.57	0.00			0.46	0.35		0.53
4	Share of firms that receive public subsidies to innovate		0.00	0.38	0.00	0.48		0.48	0.76	0.53			0.56	0.56	0.13	0.37
5	Percent of firms innovating in-house	0.00	0.14	0.17	0.30	0.19	0.02	0.19	0.45	0.35			0.35	0.34	0.39	0.07
6	Percent of firms co-operating with other	0.65	0.36	0.00	0.27	0.10	0.00	0.30	0.75	0.26	0.00					0.37
7	Innovation expenditures as a percentage of total turnover			0.59		0.47		0.38						0.44		
8	Share of total sector sales from new-to-market products	0.08		0.12	0.25	0.12		0.08	0.20	0.27				0.11		
9	Share of total sector sales from new-to-firm not new-to-market products	0.11		0.27	0.22	0.16		0.08	0.30	0.31				0.16		
10	Share of firms that patent	0.54	0.00	0.19	0.00	0.13	0.00	0.29	0.23	0.15			0.41	0.59	0.00	0.25
11	Share of firms that use trademarks	0.54	0.22	0.34	0.18	0.18	0.50	0.29	0.32	0.16			0.14	0.44	0.12	0.47
12	Share of enterprises that use design registrations	0.54	0.00	0.19	0.00	0.17	0.00	0.15	0.00	0.18			0.25	0.30	0.00	0.23

D Manufacturing

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.18	0.49	0.45		0.38	0.38		0.62	0.23		0.41	0.24	0.51	0.22	
2	Share of firms that used training		0.66	0.73	0.46	0.41	0.45	0.54	0.48	0.41	0.39		0.54	0.48	0.45	
3	R&D expenditures (% of value-added)	0.64	0.68	0.71	0.67	0.51	0.42	0.70	0.73	0.51			0.66	0.60	0.37	0.79
4	Share of firms that receive public subsidies to innovate	0.76	0.61	0.62	0.30	0.50	0.44	0.53	0.74	0.61	0.38		0.72	0.48	0.59	0.46
5	Percent of firms innovating in-house	0.42	0.51	0.58	0.19	0.32	0.18	0.39	0.46	0.37	0.49	0.48	0.47	0.36	0.39	0.39
6	Percent of firms co-operating with other	0.40	0.51	0.45	0.63	0.26	0.33	0.52	0.69	0.24	0.50					0.55
7	Innovation expenditures as a percentage of total turnover		0.72	0.72	0.48	0.56	0.59	0.64	0.68	0.63		0.58	0.64	0.58	0.63	
8	Share of total sector sales from new-to-market products	0.33	0.30	0.33	0.41	0.35	0.16	0.32	0.59	0.43	0.12	0.22	0.19	0.21	0.41	0.21
9	Share of total sector sales from new-to-firm not new-to-market products	0.48	0.40	0.65	0.47	0.45	0.29	0.38	0.56	0.48	0.23	0.38	0.47	0.38	0.42	0.56
10	Share of firms that patent	0.50	0.42	0.55	0.39	0.34	0.20	0.54	0.49	0.35	0.23	0.34	0.42	0.39	0.26	0.54
11	Share of firms that use trademarks	0.52	0.56	0.50	0.47	0.42	0.44	0.59	0.53	0.45	0.36	0.50	0.45	0.50	0.47	0.67
12	Share of enterprises that use design registrations	0.52	0.41	0.49	0.40	0.35	0.19	0.45	0.39	0.31	0.17	0.40	0.36	0.30	0.20	0.43

DA Manufacture of food products; beverages and tobacco

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.10	0.44	0.26		0.31	0.36		0.49	0.17	0.06	0.39	0.23	0.34	0.29	
2	Share of firms that used training		0.53	0.57	0.27	0.38	0.41	0.51	0.48	0.37	0.34	0.75	0.44	0.49	0.45	
3	R&D expenditures (% of value-added)		0.48	0.37	0.47	0.36	0.32	0.43	0.54	0.33			0.53	0.47	0.22	0.47
4	Share of firms that receive public subsidies to innovate	0.66	0.45	0.48	0.40	0.54	0.44	0.45	0.54	0.65	0.34	0.55	0.66	0.41	0.54	0.60
5	Percent of firms innovating in-house	0.48	0.39	0.46	0.21	0.32	0.17	0.33	0.34	0.37	0.54	0.61	0.41	0.33	0.48	0.38
6	Percent of firms co-operating with other	0.40	0.45	0.21	0.75	0.23	0.28	0.52	0.52	0.18	0.41					0.49
7	Innovation expenditures as a percentage of total turnover		0.59	0.47		0.49	0.43	0.52	0.50	0.54	0.37		0.50	0.45	0.59	
8	Share of total sector sales from new-to-market products	0.17	0.20	0.17	0.30	0.19	0.08	0.17	0.26	0.36	0.09	0.10	0.03	0.17	0.20	0.11
9	Share of total sector sales from new-to-firm not new-to-market products	0.32	0.25	0.35	0.36	0.31	0.13	0.24	0.30	0.40	0.20	0.17	0.40	0.29	0.27	0.32
10	Share of firms that patent	0.37	0.25	0.26	0.20	0.30	0.14	0.37	0.30	0.26	0.14	0.00	0.30	0.23	0.29	0.39
11	Share of firms that use trademarks	0.54	0.73	0.47	0.50	0.50	0.56	0.74	0.43	0.59	0.33	0.67	0.45	0.53	0.57	0.79
12	Share of enterprises that use design registrations	0.28	0.56	0.28	0.49	0.33	0.15	0.42	0.22	0.14	0.14	0.55	0.13	0.20	0.19	0.33

DB Manufacture of textiles and textile products

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.11	0.33	0.31		0.19	0.29		0.49	0.05	0.11		0.11	0.31	0.06	
2	Share of firms that used training		0.54	0.77	0.43	0.34	0.34	0.36	0.52	0.33	0.45			0.38	0.35	
3	R&D expenditures (% of value-added)		0.53	0.53		0.38	0.29	0.44	0.52	0.21			0.45	0.45	0.26	
4	Share of firms that receive public subsidies to innovate	0.48	0.64	0.55	0.23	0.45	0.30	0.37	0.59	0.49	0.00			0.43	0.54	0.53
5	Percent of firms innovating in-house	0.26	0.50	0.49	0.10	0.20	0.08	0.25	0.56	0.23	0.62		0.47	0.37	0.29	0.36
6	Percent of firms co-operating with other	0.00	0.51	0.50	0.30	0.21	0.16	0.38	0.83	0.16	0.54					0.47
7	Innovation expenditures as a percentage of total turnover		0.56	0.51		0.55	0.42	0.44	0.56	0.55	0.37			0.57	0.59	
8	Share of total sector sales from new-to-market products	0.29	0.36	0.28	0.44	0.26	0.13	0.20	0.22	0.30	0.09		0.00	0.16	0.26	0.18
9	Share of total sector sales from new-to-firm not new-to-market products	0.36	0.40	0.46	0.45	0.34	0.18	0.26	0.25	0.35	0.10		0.43	0.34	0.30	0.33
10	Share of firms that patent	0.41	0.33	0.41	0.00	0.23	0.09	0.44	0.43	0.21	0.00		0.37	0.19	0.24	0.41
11	Share of firms that use trademarks	0.59	0.59	0.59	0.78	0.39	0.44	0.59	0.70	0.44	0.34		0.43	0.60	0.46	0.87
12	Share of enterprises that use design registrations	0.43	0.40	0.55	0.13	0.24	0.15	0.51	0.41	0.18	0.00		0.15	0.30	0.09	0.48

DD20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.00	0.38	0.27		0.22	0.28		0.48	0.07		0.45	0.07	0.29	0.21	
2	Share of firms that used training		0.53	0.70	0.40	0.34		0.56	0.37	0.31	0.00		0.49			
3	R&D expenditures (% of value-added)	0.37	0.39	0.32	0.37	0.24	0.22	0.34	0.44	0.16			0.26	0.41	0.40	0.32
4	Share of firms that receive public subsidies to innovate	0.77	0.59	0.61	0.00	0.52		0.68	0.75	0.58	0.40		0.34			0.31
5	Percent of firms innovating in-house	0.31	0.44	0.54	0.31	0.29	0.16	0.32	0.35	0.39	0.24	0.00	0.29	0.25	0.15	0.27
6	Percent of firms co-operating with other	0.37	0.50	0.24	0.53	0.33	0.00	0.42	0.56	0.13	0.57					0.41
7	Innovation expenditures as a percentage of total turnover		0.66	0.56	0.28	0.58		0.43	0.39	0.63		0.00	0.47	0.47	0.55	
8	Share of total sector sales from new-to-market products	0.46	0.16	0.20	0.42	0.18	0.30	0.12	0.19	0.38	0.21	0.00	0.00	0.15	0.27	0.09
9	Share of total sector sales from new-to-firm not new-to-market products	0.44	0.18	0.30	0.43	0.24	0.27	0.18	0.24	0.45	0.26	0.00	0.36	0.24	0.26	0.31
10	Share of firms that patent	0.47	0.22	0.51	0.34	0.28	0.00	0.38	0.35	0.23	0.00	0.00	0.27	0.22	0.24	0.35
11	Share of firms that use trademarks	0.50	0.48	0.20	0.50	0.22	0.00	0.58	0.38	0.36	0.36	0.00	0.43	0.51	0.38	0.46
12	Share of enterprises that use design registrations	0.39	0.00	0.52	0.10	0.19	0.00	0.41	0.39	0.21	0.00	0.00	0.35	0.17	0.10	0.24

DE Manufacture of pulp, paper and paper products; publishing and printing

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.18	0.41	0.45		0.47	0.47		0.69	0.21	0.44	0.43	0.22	0.52	0.34	
2	Share of firms that used training		0.74	0.71	0.37	0.38	0.52	0.48	0.42	0.36	0.57	0.69	0.50	0.50		
3	R&D expenditures (% of value-added)	0.36	0.42	0.32	0.31	0.34	0.31	0.33	0.47	0.25			0.34	0.46	0.25	0.52
4	Share of firms that receive public subsidies to innovate	0.75	0.46	0.61	0.24	0.48	0.46	0.43	0.57	0.55	0.00	0.55	0.41	0.20		0.32
5	Percent of firms innovating in-house	0.35	0.44	0.47	0.22	0.26	0.15	0.28	0.40	0.32	0.45	0.48	0.29	0.24	0.44	0.33
6	Percent of firms co-operating with other	0.00	0.49	0.25	0.53	0.20	0.27	0.40	0.63	0.19	0.50					0.33
7	Innovation expenditures as a percentage of total turnover		0.62	0.71	0.27	0.60	0.72	0.46	0.66	0.61		0.63	0.51	0.45		
8	Share of total sector sales from new-to-market products	0.04	0.17	0.31	0.29	0.21	0.23	0.14	0.28	0.35		0.18	0.05	0.12	0.14	0.12
9	Share of total sector sales from new-to-firm not new-to-market products	0.50	0.31	0.61	0.28	0.29	0.27	0.20	0.33	0.39		0.18	0.32	0.26	0.25	0.30
10	Share of firms that patent	0.18	0.39	0.22	0.26	0.33	0.10	0.48	0.34	0.26	0.00	0.56	0.30	0.17	0.07	0.27
11	Share of firms that use trademarks	0.65	0.39	0.35	0.45	0.38	0.36	0.54	0.40	0.31	0.56	0.27	0.44	0.50	0.27	0.61
12	Share of enterprises that use design registrations	0.45	0.23	0.40	0.28	0.34	0.10	0.42	0.29	0.24	0.00	0.27	0.16	0.26	0.10	0.27

DG24 Manufacture of chemicals and chemical products

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.36	0.63	0.48		0.57	0.56		0.69	0.46	0.52	0.49	0.32	0.71	0.44	
2	Share of firms that used training		0.82	0.89		0.52	0.74	0.69	0.78	0.58				0.71	0.76	
3	R&D expenditures (% of value-added)	0.76	0.84	0.84	0.94	0.63	0.50	0.83	0.79	0.62			0.80			0.95
4	Share of firms that receive public subsidies to innovate		0.83	0.71		0.65	0.64	0.61	0.90	0.66				0.71	0.86	0.42
5	Percent of firms innovating in-house	0.99	0.70	0.66	0.28	0.53	0.42	0.67	0.67	0.53	0.93	0.66	0.74	0.65	0.69	0.59
6	Percent of firms co-operating with other	0.93	0.81	0.62	0.93	0.54	0.64	0.83	0.93	0.42	0.76					0.77
7	Innovation expenditures as a percentage of total turnover		0.84	0.77		0.59	0.69	0.68	0.70	0.64	0.65	0.69	0.67	0.57	0.57	
8	Share of total sector sales from new-to-market products	0.14	0.25	0.34	0.50	0.29	0.20	0.29	0.27	0.35	0.09	0.35	0.00	0.16	0.29	0.19
9	Share of total sector sales from new-to-firm not new-to-market products	0.32	0.36	0.51	0.56	0.38	0.51	0.32	0.31	0.41	0.47	0.58	0.45	0.33	0.32	0.36
10	Share of firms that patent	1.00	0.66	0.72	0.69	0.45	0.24	0.73	0.79	0.55	0.56	0.57	0.58	0.83	0.51	0.72
11	Share of firms that use trademarks	0.84	0.76	0.78	0.62	0.59	0.70	0.83	0.86	0.72	0.55	0.87	0.68	0.71	0.73	1.00
12	Share of enterprises that use design registrations	0.82	0.42	0.50	0.58	0.42	0.18	0.44	0.32	0.44	0.00	0.65	0.20	0.36	0.31	0.50

DH25 Manufacture of rubber and plastic products

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.11	0.48	0.34		0.36	0.38		0.52	0.15	0.21	0.36	0.17	0.38	0.27	
2	Share of firms that used training		0.57	0.65	0.40	0.49	0.42	0.63	0.35	0.52	0.33		0.60		0.54	
3	R&D expenditures (% of value-added)	0.57	0.60	0.56	0.62	0.47	0.40	0.64	0.64	0.43			0.52	0.59		0.58
4	Share of firms that receive public subsidies to innovate	0.98	0.67	0.43	0.33	0.49	0.55	0.66	0.76	0.71	0.67		0.82		0.50	0.61
5	Percent of firms innovating in-house	0.74	0.61	0.64	0.12	0.39	0.26	0.48	0.53	0.53	0.37	0.59	0.61	0.49	0.52	0.56
6	Percent of firms co-operating with other	0.81	0.56	0.46	0.64	0.24	0.54	0.63	0.64	0.42	0.55					0.72
7	Innovation expenditures as a percentage of total turnover		0.61	0.65	0.49	0.57	0.61	0.55	0.47	0.56	0.44		0.54	0.53	0.64	
8	Share of total sector sales from new-to-market products	0.37	0.34	0.30	0.20	0.23	0.29	0.25	0.27	0.37	0.14	0.09	0.02	0.20	0.42	0.25
9	Share of total sector sales from new-to-firm not new-to-market products	0.50	0.42	0.52	0.24	0.37	0.27	0.33	0.31	0.46	0.15	0.61	0.50	0.30	0.42	0.33
10	Share of firms that patent	0.40	0.52	0.57	0.32	0.44	0.24	0.70	0.52	0.44	0.00	0.51	0.59	0.53	0.38	0.72
11	Share of firms that use trademarks	0.40	0.49	0.42	0.31	0.38	0.44	0.53	0.61	0.48	0.00	0.36	0.52	0.54	0.49	0.80
12	Share of enterprises that use design registrations	0.54	0.39	0.56	0.33	0.49	0.25	0.51	0.42	0.39	0.00	0.00	0.50	0.51	0.35	0.59

DI26 Manufacture of other non-metallic mineral products

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.11	0.38	0.35		0.31	0.36		0.51	0.13	0.20	0.56	0.20	0.40	0.20	
2	Share of firms that used training		0.69	0.60	0.48	0.33	0.34	0.53	0.47	0.39	0.40	0.37	0.47	0.49	0.23	
3	R&D expenditures (% of value-added)	0.52	0.55	0.51	0.45	0.37	0.33	0.52	0.52	0.24			0.39	0.47	0.21	0.46
4	Share of firms that receive public subsidies to innovate	0.43	0.61	0.55	0.38	0.50	0.43	0.38	0.72	0.66	0.34	0.00	0.60	0.44	0.64	0.57
5	Percent of firms innovating in-house	0.32	0.48	0.51	0.19	0.31	0.12	0.46	0.37	0.45	0.50	0.19	0.41	0.45	0.37	0.47
6	Percent of firms co-operating with other	0.00	0.42	0.58	0.67	0.24	0.27	0.62	0.70	0.32	0.34					0.61
7	Innovation expenditures as a percentage of total turnover		0.63	0.64	0.33	0.56	0.47	0.49	0.59	0.57		0.53	0.54	0.54	0.57	
8	Share of total sector sales from new-to-market products	0.21	0.18	0.35	0.40	0.17	0.11	0.22	0.21	0.35	0.11	0.18	0.00	0.13	0.31	0.21
9	Share of total sector sales from new-to-firm not new-to-market products	0.32	0.28	0.54	0.41	0.33	0.24	0.26	0.31	0.45	0.13	0.30	0.36	0.30	0.34	0.28
10	Share of firms that patent	0.53	0.35	0.64	0.25	0.30	0.20	0.55	0.51	0.35	0.00	0.28	0.35	0.34	0.00	0.46
11	Share of firms that use trademarks	0.58	0.39	0.49	0.52	0.34	0.00	0.64	0.46	0.40	0.00	0.00	0.40	0.51	0.36	0.70
12	Share of enterprises that use design registrations	0.48	0.09	0.36	0.36	0.26	0.20	0.47	0.46	0.31	0.00	0.28	0.35	0.30	0.11	0.51

DJ27 Manufacture of basic metals

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.17	0.39	0.25		0.36	0.25		0.64	0.16	0.35		0.10	0.38	0.22	
2	Share of firms that used training		0.44	0.60	0.17	0.41	0.46	0.63	0.64	0.47		1.00	0.57	0.44	0.36	
3	R&D expenditures (% of value-added)	0.56	0.56	0.48	0.45	0.43	0.44	0.58	0.59	0.34			0.61	0.63	0.26	0.67
4	Share of firms that receive public subsidies to innovate	1.00	0.77	0.59	0.56	0.59	0.54	0.54	1.00	0.74		0.88	0.97	0.50	0.61	0.62
5	Percent of firms innovating in-house	0.91	0.36	0.52	0.04	0.33	0.27	0.42	0.54	0.44	0.67	1.00	0.55	0.51	0.51	0.50
6	Percent of firms co-operating with other	0.57	0.53	0.45	0.62	0.32	0.33	0.53	0.67	0.29	1.00					0.52
7	Innovation expenditures as a percentage of total turnover		0.48	0.51		0.55		0.45	0.44	0.51			0.57	0.54	0.56	
8	Share of total sector sales from new-to-market products	0.26	0.14	0.27	0.23	0.18	0.10	0.20	0.22	0.26	0.01		0.14	0.10	0.24	0.19
9	Share of total sector sales from new-to-firm not new-to-market products	0.44	0.28	0.46	0.24	0.38	0.38	0.22	0.22	0.32	0.23		0.38	0.38	0.23	0.26
10	Share of firms that patent	0.89	0.47	0.68	0.68	0.30	0.28	0.52	0.88	0.34	0.00	0.80	0.47	0.43	0.34	0.67
11	Share of firms that use trademarks	0.59	0.45	0.58	0.51	0.50	0.46	0.54	0.71	0.37	0.61	0.80	0.37	0.40	0.47	0.76
12	Share of enterprises that use design registrations	0.34	0.34	0.46	0.18	0.31	0.28	0.38	0.41	0.33	0.61	0.79	0.50	0.26	0.21	0.44

DJ28 Manufacture of fabricated metal products, except machinery and equipment

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.03	0.36	0.30		0.30	0.40		0.54	0.10	0.10		0.13	0.40	0.17	
2	Share of firms that used training		0.66	0.70	0.43	0.38	0.59	0.49	0.42	0.42		0.50	0.50	0.42	0.52	
3	R&D expenditures (% of value-added)	0.47	0.55	0.46	0.43	0.38	0.34	0.41	0.55	0.27			0.44	0.42	0.38	0.37
4	Share of firms that receive public subsidies to innovate	0.45	0.56	0.62	0.18	0.42	0.51	0.50	0.72	0.67		0.28	0.66	0.40	0.75	0.22
5	Percent of firms innovating in-house	0.32	0.53	0.53	0.09	0.27	0.29	0.29	0.42	0.37	0.33	0.31	0.37	0.31	0.45	0.25
6	Percent of firms co-operating with other	0.31	0.48	0.36	0.46	0.21	0.39	0.42	0.64	0.18	0.38					0.40
7	Innovation expenditures as a percentage of total turnover		0.71	0.64		0.55	0.63	0.52	0.59	0.60			0.48	0.53	0.57	
8	Share of total sector sales from new-to-market products	0.21	0.23	0.25	0.24	0.21	0.28	0.23	0.28	0.30	0.10		0.00	0.13	0.31	0.10
9	Share of total sector sales from new-to-firm not new-to-market products	0.27	0.32	0.51	0.38	0.29	0.33	0.26	0.47	0.37	0.15		0.43	0.28	0.40	0.21
10	Share of firms that patent	0.39	0.39	0.43	0.23	0.34	0.24	0.44	0.37	0.28	0.00	0.00	0.33	0.34	0.23	0.46
11	Share of firms that use trademarks	0.22	0.41	0.33	0.20	0.31	0.29	0.38	0.40	0.29	0.20	0.33	0.33	0.37	0.39	0.43
12	Share of enterprises that use design registrations	0.42	0.36	0.42	0.25	0.33	0.00	0.33	0.40	0.26	0.20	0.18	0.35	0.30	0.26	0.37

DK29 Manufacture of machinery and equipment n.e.c.

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.18	0.55	0.49		0.42	0.47		0.68	0.29	0.51		0.26	0.59	0.23	
2	Share of firms that used training		0.76	0.79	0.60	0.53	0.43	0.59	0.51	0.47			0.62	0.49	0.64	
3	R&D expenditures (% of value-added)	0.63	0.67	0.66	0.71	0.56	0.58	0.63	0.74	0.49			0.71	0.64	0.52	0.75
4	Share of firms that receive public subsidies to innovate	0.91	0.76	0.66	0.24	0.48	0.60	0.56	0.85	0.63			0.95	0.54	0.78	0.53
5	Percent of firms innovating in-house	0.35	0.61	0.77	0.22	0.43	0.28	0.52	0.53	0.45	0.78		0.61	0.46	0.46	0.52
6	Percent of firms co-operating with other	0.31	0.67	0.58	0.75	0.32	0.28	0.53	0.78	0.27	0.68					0.69
7	Innovation expenditures as a percentage of total turnover		0.69	0.75	0.53	0.58	0.52	0.61	0.66	0.59			0.68	0.68	0.70	
8	Share of total sector sales from new-to-market products	0.44	0.41	0.31	0.29	0.30	0.32	0.37	0.52	0.46			0.51	0.34	0.44	0.29
9	Share of total sector sales from new-to-firm not new-to-market products	0.61	0.49	0.57	0.40	0.45	0.36	0.42	0.51	0.55			0.66	0.55	0.47	0.52
10	Share of firms that patent	0.74	0.59	0.76	0.55	0.41	0.37	0.72	0.70	0.48	0.69		0.61	0.63	0.09	0.71
11	Share of firms that use trademarks	0.62	0.48	0.61	0.57	0.50	0.38	0.59	0.65	0.44	0.49		0.43	0.47	0.30	0.76
12	Share of enterprises that use design registrations	0.76	0.44	0.60	0.39	0.48	0.33	0.49	0.49	0.44	0.00		0.52	0.40	0.00	0.49

DL Manufacture of electrical and optical equipment

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.32	0.70	0.65		0.51	0.38		0.75	0.38	0.56	0.42	0.37	0.70	0.46	
2	Share of firms that used training		0.87	0.89	0.47	0.62		0.71	0.62	0.56	0.65	0.71		0.56	0.68	
3	R&D expenditures (% of value-added)	0.86	0.89	0.80	0.80	0.69	0.81	0.87	0.94	0.71			0.95	0.84	0.56	1.00
4	Share of firms that receive public subsidies to innovate	0.97	0.84	0.74	0.36	0.63		0.72	0.95	0.72	0.78	0.29		0.74	0.61	0.54
5	Percent of firms innovating in-house	0.55	0.62	0.69	0.16	0.47	0.36	0.59	0.65	0.51	0.40	0.62	0.59	0.55	0.48	0.55
6	Percent of firms co-operating with other	0.78	0.64	0.63	0.61	0.42	0.52	0.71	0.89	0.38	0.91					0.79
7	Innovation expenditures as a percentage of total turnover		0.92	0.83	0.51	0.64		0.82	0.83	0.87		0.72	1.00	0.85	0.64	
8	Share of total sector sales from new-to-market products	0.41	0.69	0.37	0.60	0.44	0.16	0.54	1.00	0.49	0.40	0.60	0.34	0.43	0.56	0.31
9	Share of total sector sales from new-to-firm not new-to-market products	0.55	0.68	0.78	0.67	0.57	0.29	0.56	0.90	0.62	0.67	0.56	0.66	0.67	0.58	0.86
10	Share of firms that patent	0.56	0.60	0.74	0.66	0.50	0.47	0.68	0.66	0.49	0.71	0.26	0.52	0.59	0.27	0.79
11	Share of firms that use trademarks	0.47	0.79	0.61	0.58	0.49	0.36	0.62	0.67	0.49	0.58	0.53	0.56	0.57	0.58	0.83
12	Share of enterprises that use design registrations	0.79	0.55	0.55	0.41	0.45	0.42	0.48	0.50	0.45	0.40	0.26	0.27	0.33	0.34	0.57

DL31 Manufacture of electrical machinery and apparatus n.e.c.

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.21	0.50	0.66		0.39	0.34		0.60	0.25			0.19	0.58		
2	Share of firms that used training		0.72	0.78	0.26	0.59	0.48	0.64	0.46	0.48			0.67	0.45		
3	R&D expenditures (% of value-added)	0.66	0.63	0.58	0.72	0.57	0.60	0.69	0.84	0.47			0.71	0.72	0.47	0.70
4	Share of firms that receive public subsidies to innovate	0.67	0.59	0.66	0.42	0.49	0.44	0.60	0.93	0.61			0.91	0.71		0.57
5	Percent of firms innovating in-house	0.78	0.42	0.66	0.16	0.45	0.35	0.51	0.66	0.36	0.37		0.54	0.42		0.41
6	Percent of firms co-operating with other	0.00	0.27	0.55	0.63	0.34	0.32	0.60	0.82	0.29	0.87					0.63
7	Innovation expenditures as a percentage of total turnover		0.75	0.85		0.58	0.47	0.67	0.57	0.58				0.68	0.66	
8	Share of total sector sales from new-to-market products	0.32	0.33	0.35	0.56	0.31	0.12	0.31	0.34	0.42	0.35		0.08	0.22	0.54	0.12
9	Share of total sector sales from new-to-firm not new-to-market products	0.60	0.36	0.80	0.53	0.46	0.29	0.38	0.38	0.50	0.30		0.58	0.47	0.57	0.35
10	Share of firms that patent	0.58	0.44	0.77	0.65	0.45	0.34	0.69	0.58	0.43	0.00		0.61	0.40		0.63
11	Share of firms that use trademarks	0.42	0.65	0.56	0.52	0.43	0.19	0.59	0.51	0.44	0.00		0.59	0.50		0.74
12	Share of enterprises that use design registrations	1.00	0.47	0.61	0.40	0.40	0.34	0.54	0.48	0.40	0.00		0.25	0.35		0.51

DM Manufacture of transport equipment

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.19	0.32	0.39		0.34	0.31		0.52	0.28	0.19	0.36	0.19	0.56	0.25	
2	Share of firms that used training		0.80	0.81		0.47	0.43	0.57	0.35	0.47	0.30		0.56	0.49	0.62	
3	R&D expenditures (% of value-added)	0.78	0.63	0.90	0.56	0.63	0.33	0.87	0.56	0.77			0.64	0.53	0.35	0.91
4	Share of firms that receive public subsidies to innovate	0.81	0.49	0.87		0.56	0.41	0.62	0.75	0.61	0.00		0.77	0.45	0.59	0.57
5	Percent of firms innovating in-house	0.73	0.68	0.59	0.44	0.37	0.17	0.47	0.30	0.38	0.26	0.00	0.53	0.29	0.50	0.34
6	Percent of firms co-operating with other	0.00	0.40	0.61	0.77	0.31	0.21	0.47	0.62	0.33	0.52					0.58
7	Innovation expenditures as a percentage of total turnover		0.51	0.80		0.61	0.58	0.73	0.51	0.70			0.56	0.59	0.60	
8	Share of total sector sales from new-to-market products	0.51	0.15	0.42	0.30	0.65	0.12	0.43	0.69	0.75	0.21	0.00	0.19	0.26	0.81	0.15
9	Share of total sector sales from new-to-firm not new-to-market products	0.57	0.53	0.92	0.38	0.74	0.33	0.55	0.62	0.70	0.26	0.00	0.58	0.44	0.73	0.54
10	Share of firms that patent	0.89	0.49	0.68	0.36	0.36	0.00	0.72	0.34	0.39	0.00	0.00	0.52	0.38	0.26	0.53
11	Share of firms that use trademarks	0.15	0.52	0.63	0.34	0.38	0.26	0.53	0.43	0.50	0.47	0.00	0.47	0.33	0.32	0.54
12	Share of enterprises that use design registrations	0.79	0.44	0.64	0.00	0.35	0.00	0.50	0.26	0.36	0.00	0.00	0.51	0.27	0.23	0.46

DM34 Manufacture of motor vehicles, trailers and semi-trailers

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education		0.31	0.38		0.29			0.52	0.21			0.10	0.45	0.28	
2	Share of firms that used training		0.76	0.86		0.53		0.56	0.39	0.53			0.51	0.61	0.62	
3	R&D expenditures (% of value-added)	0.77	0.60	0.88	0.56	0.54	0.28	0.81	0.58	0.73			0.70	0.69	0.36	0.91
4	Share of firms that receive public subsidies to innovate		0.42	0.86		0.63		0.50	0.82	0.63			0.89	0.45	0.50	0.60
5	Percent of firms innovating in-house	0.84	0.62	0.60	0.42	0.44	0.08	0.48	0.24	0.42			0.61	0.53	0.48	0.34
6	Percent of firms co-operating with other	0.00	0.39	0.56	0.85	0.29	0.39	0.45	0.55	0.37	0.00					0.58
7	Innovation expenditures as a percentage of total turnover			0.80		0.56		0.68	0.63	0.67			0.59	0.92		
8	Share of total sector sales from new-to-market products	0.51	0.14	0.42	0.28	0.68		0.46	0.69	0.72			0.19	0.35	0.83	0.15
9	Share of total sector sales from new-to-firm not new-to-market products	0.56	0.54	0.93	0.38	0.76		0.60	0.61	0.68			0.52	0.40	0.74	0.56
10	Share of firms that patent	0.95	0.38	0.79	0.16	0.43	0.00	0.74	0.24	0.44			0.42	0.52	0.21	0.58
11	Share of firms that use trademarks	0.00	0.39	0.74	0.00	0.42	0.00	0.57	0.32	0.58			0.57	0.37	0.35	0.54
12	Share of enterprises that use design registrations	0.85	0.40	0.72	0.00	0.41	0.00	0.50	0.32	0.36			0.56	0.40	0.15	0.49

E Electricity, gas and water supply

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.15	0.41	0.51		0.57	0.51		0.71	0.30		0.50	0.26	0.63	0.62	
2	Share of firms that used training		0.69	0.65	0.17	0.37		0.48	0.48	0.36			0.50	0.53	0.59	
3	R&D expenditures (% of value-added)	0.28	0.38	0.31	0.25	0.32	0.25	0.49	0.47	0.36			0.33	0.44	0.25	0.39
4	Share of firms that receive public subsidies to innovate		0.83	0.41	0.15	0.52		0.38	0.48	0.45			0.97	0.21	0.90	0.35
5	Percent of firms innovating in-house	0.27	0.27	0.29	0.23	0.20	0.11	0.19	0.21	0.18		0.26	0.45	0.27	0.55	0.24
6	Percent of firms co-operating with other	0.22	0.00	0.26	1.00	0.25	0.00	0.44	0.41	0.28	0.74					0.59
7	Innovation expenditures as a percentage of total turnover			0.37		0.39		0.50				0.44		0.39		
8	Share of total sector sales from new-to-market products	0.17		0.34	0.11	0.12		0.21	0.13	0.06		0.00		0.16		0.08
9	Share of total sector sales from new-to-firm not new-to-market products	0.38		0.50	0.19	0.12		0.19	0.23	0.33		0.00		0.20		0.10
10	Share of firms that patent	0.44	0.00	0.44	0.00	0.22	0.00	0.39	0.21	0.13		0.00	0.50	0.12	0.41	0.33
11	Share of firms that use trademarks	0.00	0.00	0.38	0.13	0.27	0.00	0.37	0.24	0.13		0.00	0.31	0.21	0.41	0.61
12	Share of enterprises that use design registrations	0.23	0.00	0.17	0.13	0.19	0.00	0.13	0.17	0.16		0.37	0.16	0.00	0.40	0.19

G_TO_K Services (excluding public administration)

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.31	0.64	0.51		0.55	0.63	0.81	0.71	0.37	0.43	0.66	0.40	0.67	0.47	0.62
2	Share of firms that used training		0.56	0.72	0.39	0.33	0.57	0.43	0.52	0.41	0.53	0.72	0.47	0.46	0.62	
3	R&D expenditures (% of value-added)	0.38	0.35	0.32	0.46	0.28	0.26	0.31	0.39	0.29			0.35	0.42	0.28	0.41
4	Share of firms that receive public subsidies to innovate	0.50	0.37	0.41	0.23	0.31	0.41	0.36	0.48	0.37	0.24	0.34	0.39	0.36	0.41	0.43
5	Percent of firms innovating in-house	0.39	0.34	0.46	0.17	0.18	0.23	0.27	0.37	0.22	0.53	0.43	0.31	0.28	0.41	0.38
6	Percent of firms co-operating with other	0.47	0.41	0.45	0.52	0.20	0.52	0.34	0.63	0.28	0.55					0.53
7	Innovation expenditures as a percentage of total turnover		0.47	0.49		0.43	0.54	0.54	0.48	0.46	0.59	0.50	0.45	0.49	0.62	
8	Share of total sector sales from new-to-market products	0.20	0.26	0.28	0.26	0.36	0.31	0.23	0.26	0.32	0.11	0.17	0.10	0.16	0.33	0.31
9	Share of total sector sales from new-to-firm not new-to-market products	0.30	0.40	0.39	0.35	0.44	0.39	0.35	0.28	0.37	0.16	0.28	0.32	0.26	0.37	0.44
10	Share of firms that patent	0.25	0.33	0.34	0.29	0.20	0.13	0.43	0.33	0.22	0.22	0.25	0.25	0.31	0.28	0.53
11	Share of firms that use trademarks	0.47	0.42	0.45	0.57	0.28	0.42	0.58	0.48	0.33	0.37	0.51	0.43	0.54	0.46	0.72
12	Share of enterprises that use design registrations	0.28	0.33	0.37	0.37	0.18	0.17	0.34	0.30	0.18	0.10	0.32	0.25	0.28	0.21	0.40

G51 Wholesale trade and commission trade, except of motor and motorcycles

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.23	0.63	0.44		0.37	0.61		0.79	0.26	0.33	0.54	0.23	0.57	0.36	0.69
2	Share of firms that used training		0.53	0.66	0.37	0.22	0.53	0.28	0.53	0.34		0.65	0.45	0.42	0.62	
3	R&D expenditures (% of value-added)															
4	Share of firms that receive public subsidies to innovate	0.45	0.33	0.39	0.13	0.26	0.31	0.26	0.37	0.32		0.27	0.41	0.31	0.36	0.42
5	Percent of firms innovating in-house	0.32	0.36	0.46	0.21	0.14	0.19	0.18	0.40	0.18	0.31	0.40	0.30	0.26	0.35	0.44
6	Percent of firms co-operating with other	0.37	0.36	0.40	0.49	0.09	0.42	0.21	0.66	0.18	0.44					0.48
7	Innovation expenditures as a percentage of total turnover		0.48	0.43		0.32	0.47	0.43	0.37	0.34	0.26	0.43	0.33	0.33	0.47	
8	Share of total sector sales from new-to-market products	0.12	0.14	0.25	0.26	0.14	0.30	0.16	0.16	0.24	0.04	0.17	0.14	0.11	0.34	0.36
9	Share of total sector sales from new-to-firm not new-to-market products	0.27	0.28	0.29	0.35	0.21	0.48	0.27	0.18	0.28	0.07	0.30	0.26	0.23	0.34	0.51
10	Share of firms that patent	0.29	0.39	0.34	0.29	0.19	0.13	0.44	0.38	0.26	0.00	0.42	0.31	0.35	0.30	0.64
11	Share of firms that use trademarks	0.59	0.47	0.53	0.73	0.32	0.37	0.60	0.58	0.39	0.12	0.52	0.54	0.67	0.47	0.82
12	Share of enterprises that use design registrations	0.36	0.38	0.45	0.49	0.20	0.15	0.38	0.42	0.19	0.00	0.37	0.31	0.36	0.21	0.49

I Transport, storage and communication

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.08	0.49	0.35		0.39	0.41		0.51	0.18	0.16	0.35	0.27	0.53	0.30	0.34
2	Share of firms that used training		0.42	0.61	0.30	0.28	0.37		0.42	0.26	0.47	0.56	0.34	0.29	0.39	
3	R&D expenditures (% of value-added)		0.31			0.36	0.27		0.48	0.15			0.34	0.40		0.42
4	Share of firms that receive public subsidies to innovate	0.39	0.28	0.26	0.20	0.26	0.26		0.29	0.33	0.00	0.43	0.24	0.25	0.51	0.30
5	Percent of firms innovating in-house	0.17	0.17	0.30	0.07	0.13	0.09		0.24	0.12	0.49	0.34	0.17	0.13	0.43	0.17
6	Percent of firms co-operating with other	0.38	0.36	0.24	0.46	0.17	0.42	0.30	0.43	0.18	0.35					0.35
7	Innovation expenditures as a percentage of total turnover		0.39	0.61		0.47	0.68		0.50	0.49	0.53	0.46	0.49	0.48		
8	Share of total sector sales from new-to-market products	0.17	0.42	0.26	0.22	0.33	0.09	0.44	0.41	0.39	0.10	0.18	0.00	0.16	0.24	0.17
9	Share of total sector sales from new-to-firm not new-to-market products	0.20	0.40	0.43	0.27	0.43	0.21	0.53	0.42	0.39	0.13	0.20	0.37	0.21	0.35	0.35
10	Share of firms that patent	0.05	0.16	0.10	0.09	0.12	0.00		0.20	0.05	0.00	0.00	0.12	0.18	0.18	0.21
11	Share of firms that use trademarks	0.29	0.30	0.17	0.17	0.13	0.24		0.25	0.17	0.35	0.56	0.13	0.27	0.29	0.39
12	Share of enterprises that use design registrations	0.19	0.24	0.12	0.10	0.10	0.00		0.17	0.07	0.00	0.34	0.10	0.16	0.13	0.20

J Financial intermediation

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.36	0.65	0.52		0.71	0.63			0.53	0.27	0.78	0.42	0.71	0.60	0.61
2	Share of firms that used training		0.61	0.84	0.53	0.56	0.45			0.63	0.50	0.79	0.57	0.67	0.81	
3	R&D expenditures (% of value-added)	0.31	0.27	0.15	0.39	0.00	0.25			0.24			0.35	0.35	0.34	
4	Share of firms that receive public subsidies to innovate	0.12	0.29	0.14	0.00	0.09	0.00			0.25	0.00	0.28	0.34	0.21	0.13	0.18
5	Percent of firms innovating in-house	0.64	0.40	0.70	0.30	0.48	0.15			0.35	0.73	0.47	0.43	0.35	0.68	0.39
6	Percent of firms co-operating with other	0.43	0.40	0.44	0.56	0.24	0.50	0.43		0.44	0.66					0.54
7	Innovation expenditures as a percentage of total turnover		0.42	0.44		0.33	0.45			0.43	0.36	0.43	0.49	0.48	0.61	
8	Share of total sector sales from new-to-market products	0.28	0.16	0.29	0.21	0.47	0.35	0.21		0.30	0.15	0.16	0.00	0.08	0.29	0.31
9	Share of total sector sales from new-to-firm not new-to-market products	0.36	0.25	0.43	0.35	0.55	0.34	0.38		0.40	0.18	0.27	0.36	0.24	0.37	0.36
10	Share of firms that patent	0.17	0.26	0.05	0.23	0.07	0.00			0.19	0.19	0.09	0.06	0.07	0.32	0.00
11	Share of firms that use trademarks	0.40	0.31	0.43	0.54	0.28	0.32			0.37	0.38	0.47	0.37	0.38	0.58	0.57
12	Share of enterprises that use design registrations	0.12	0.21	0.22	0.44	0.11	0.00			0.11	0.00	0.23	0.00	0.10	0.34	0.22

K Renting and business activities (real estate not included)

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.67	0.88	0.84		0.83	0.83	0.96	0.90	0.56	0.82	0.85	0.69	0.93	0.66	0.89
2	Share of firms that used training		0.92	0.85	0.48	0.66	0.86	0.57	0.64	0.62		0.89	0.66	0.60	0.85	
3	R&D expenditures (% of value-added)	0.59	0.48	0.43	0.64	0.40	0.47						0.42	0.59	0.41	
4	Share of firms that receive public subsidies to innovate	0.86	0.66	0.56	0.45	0.58	0.75	0.54	0.77	0.58		0.35	0.56	0.52	0.56	0.57
5	Percent of firms innovating in-house	0.88	0.68	0.60	0.15	0.45	0.53	0.40	0.53	0.45	0.76	0.60	0.52	0.48	0.64	0.53
6	Percent of firms co-operating with other	0.80	0.66	0.63	0.69	0.49	0.74	0.51	0.80	0.48	0.71					0.73
7	Innovation expenditures as a percentage of total turnover		0.64	0.76		0.81	0.71	0.82	0.77	0.77	1.00	1.00	0.66	0.74		
8	Share of total sector sales from new-to-market products	0.28	0.52	0.38	0.43	0.38	0.48	0.32	0.43	0.55	0.18	0.30	0.12	0.34	0.82	0.36
9	Share of total sector sales from new-to-firm not new-to-market products	0.57	0.95	0.48	0.53	0.49	0.53	0.39	0.49	0.61	0.45	0.57	0.37	0.51	0.74	0.45
10	Share of firms that patent	0.36	0.42	0.50	0.49	0.36	0.23	0.47	0.38	0.29	0.39	0.31	0.29	0.39	0.33	0.60
11	Share of firms that use trademarks	0.42	0.52	0.55	0.46	0.37	0.67	0.52	0.54	0.34	0.55	0.48	0.44	0.56	0.61	0.82
12	Share of enterprises that use design registrations	0.28	0.29	0.46	0.15	0.28	0.33	0.27	0.20	0.27	0.19	0.33	0.27	0.24	0.28	0.42

K72 Computer services and related activities

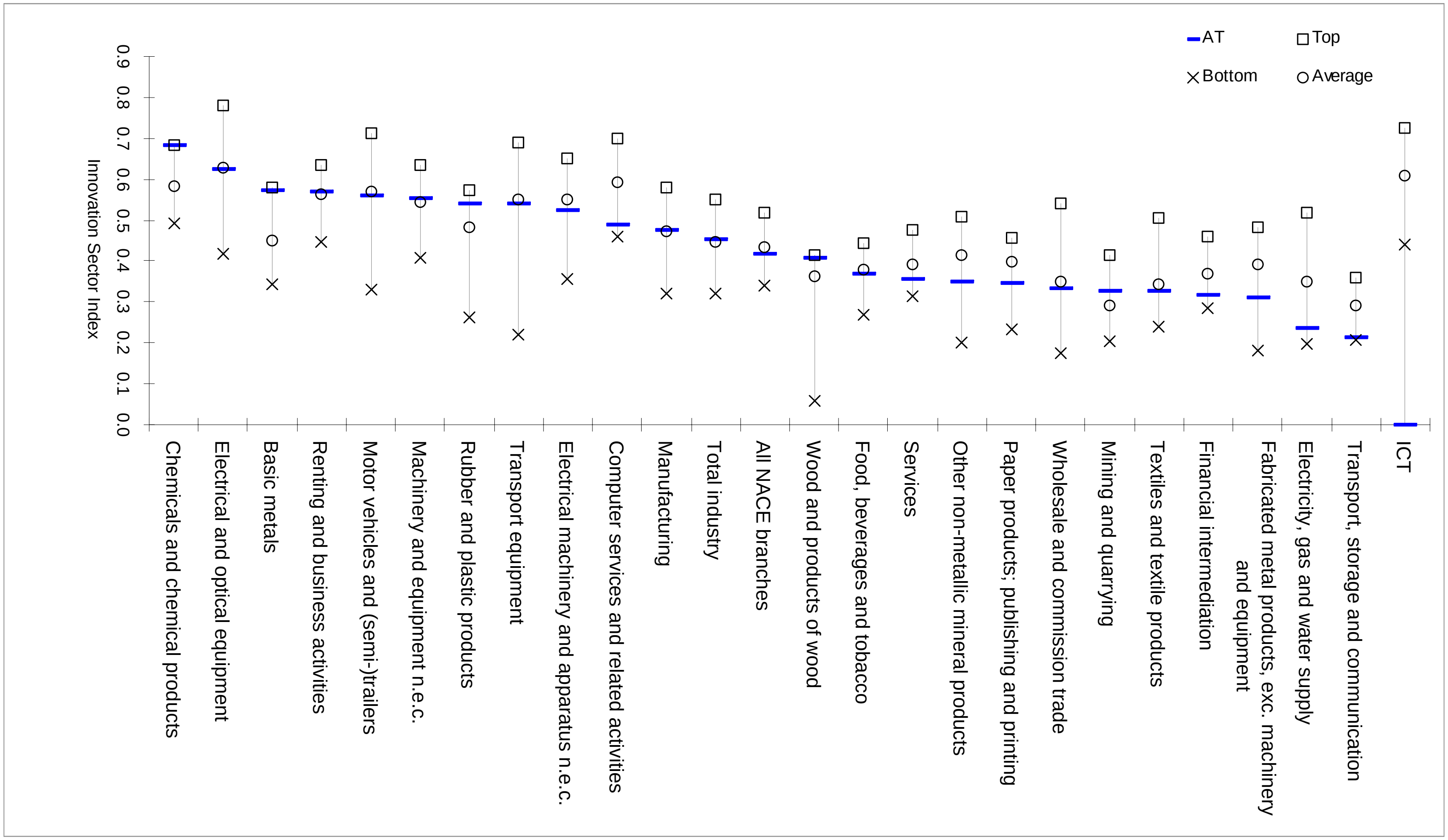
		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education	0.69	0.91	0.83		0.82	0.86	1.00	0.88	0.53	0.75	1.00	0.73	0.94	0.65	0.91
2	Share of firms that used training		0.98	1.00	0.60	0.73	0.95	0.61		0.62		0.94	0.68	0.68	0.99	
3	R&D expenditures (% of value-added)	0.50	0.72	0.56	0.78	0.50	0.95	0.51	0.63	0.42			0.49	0.75	0.53	0.69
4	Share of firms that receive public subsidies to innovate		0.64	0.61	0.15	0.59	0.83	0.45		0.56		0.45	0.48	0.49	0.76	0.44
5	Percent of firms innovating in-house	0.85	0.79	0.84	0.20	0.55	0.67	0.43	0.74	0.44	1.00	0.76	0.59	0.64	0.74	0.56
6	Percent of firms co-operating with other	0.21	0.67	0.71	0.72	0.47	0.80	0.45	0.92	0.46	0.77					0.68
7	Innovation expenditures as a percentage of total turnover		0.53	0.81		0.74	0.72	0.73	0.69	0.74			0.61	0.76		
8	Share of total sector sales from new-to-market products	0.30	0.54	0.43	0.42	0.39	0.53	0.40	0.48	0.56	0.20	0.31	0.12	0.34		0.40
9	Share of total sector sales from new-to-firm not new-to-market products	0.59	1.00	0.56	0.54	0.52	0.58	0.44	0.53	0.63	0.41	0.54	0.40	0.57		0.49
10	Share of firms that patent	0.15	0.30	0.45	0.52	0.39	0.25	0.44	0.29	0.25	0.41	0.26	0.28	0.39	0.37	0.67
11	Share of firms that use trademarks	0.68	0.57	0.75	0.63	0.44	0.83	0.65	0.75	0.33	0.66	0.64	0.54	0.72	0.90	0.90
12	Share of enterprises that use design registrations	0.44	0.31	0.47	0.15	0.29	0.42	0.26	0.15	0.22	0.18	0.31	0.16	0.28	0.31	0.44

ICT Information and communication technologies

		AT	BE	DE	DK	ES	EL	FR	FI	IT	IS	LU	NL	NO	PT	SE
1	Share of employees with higher education		0.86	0.60		0.66			0.75				0.54	0.90		
2	Share of firms that used training			0.97	0.61	0.62										
3	R&D expenditures (% of value-added)		0.72		0.74	0.56	0.51	0.71	0.85	0.56			0.71	0.71		0.85
4	Share of firms that receive public subsidies to innovate			0.67	0.25	0.58										
5	Percent of firms innovating in-house	0.59	0.74	0.77	0.18	0.43	0.54		0.66		0.97		0.58	0.64		
6	Percent of firms co-operating with other	0.64	0.70	0.68	0.69	0.43	0.76	0.59	0.89	0.47	0.78					0.74
7	Innovation expenditures as a percentage of total turnover			0.78		0.68			0.80	0.83				0.77		
8	Share of total sector sales from new-to-market products	0.45	0.58	0.40	0.45	0.58	0.45	0.54	0.93	0.56	0.20		0.19	0.35		
9	Share of total sector sales from new-to-firm not new-to-market products	0.52	0.89	0.63	0.54	0.71	0.50	0.57	0.84	0.62	0.36		0.48	0.53		
10	Share of firms that patent	0.32	0.42	0.57	0.56	0.41	0.37		0.48		0.47		0.33	0.47		
11	Share of firms that use trademarks	0.62	0.65	0.70	0.60	0.42	0.74		0.74		0.69		0.51	0.70		
12	Share of enterprises that use design registrations	0.42	0.41	0.48	0.28	0.33	0.42		0.32		0.23		0.19	0.30		

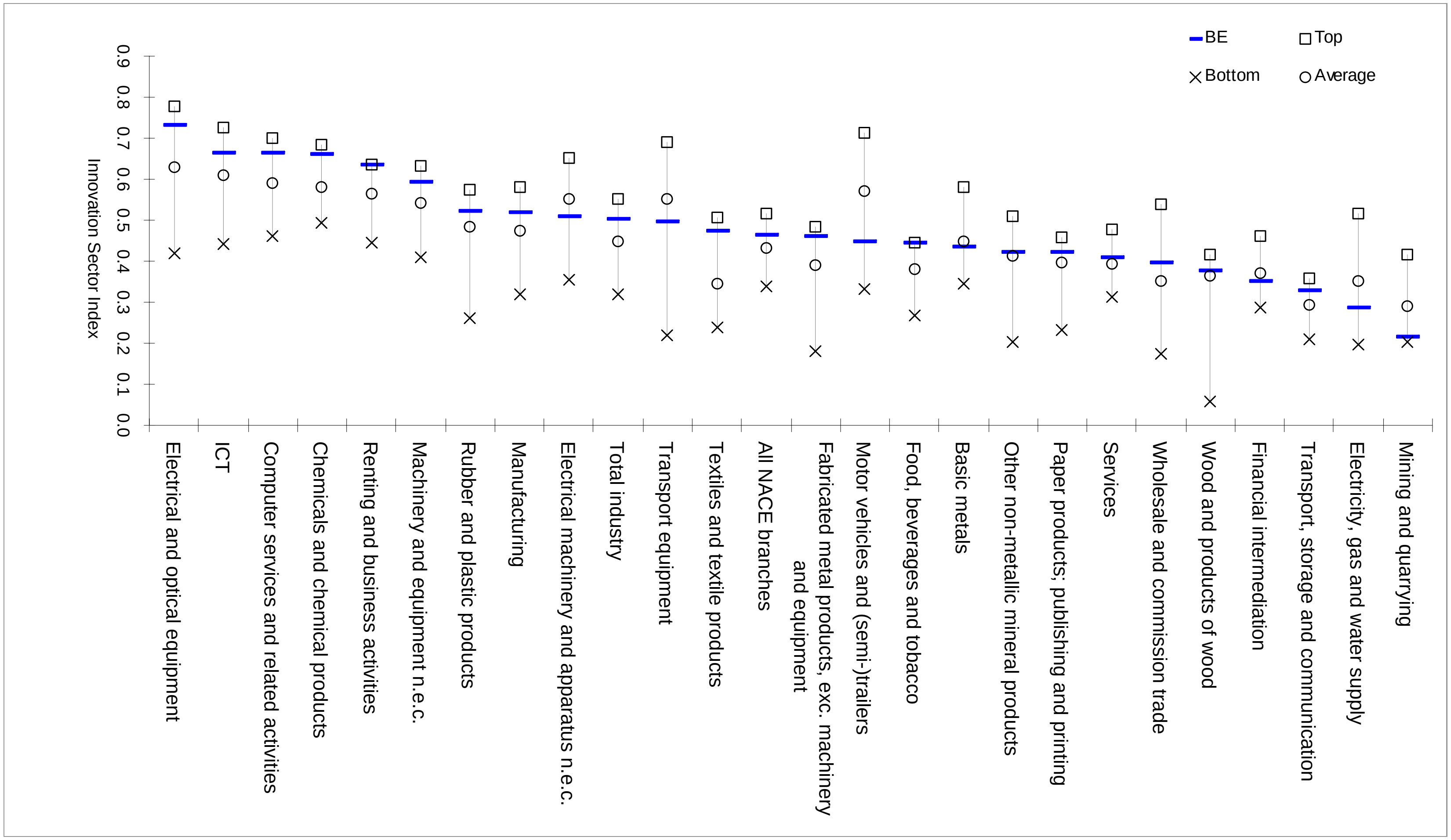
Annex Table 2: Country sector scoreboards

AUSTRIA

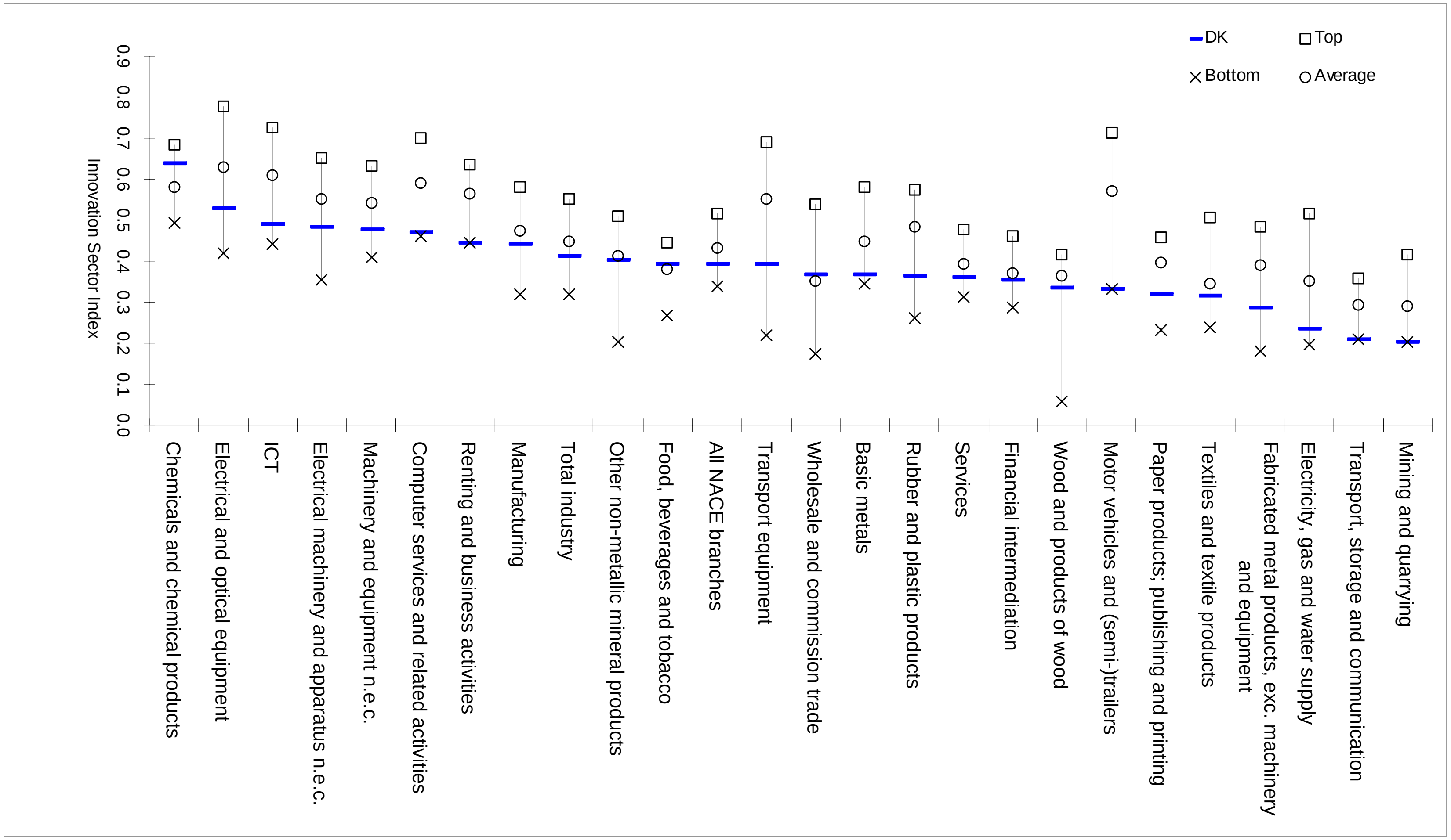


No ISI for ICT.

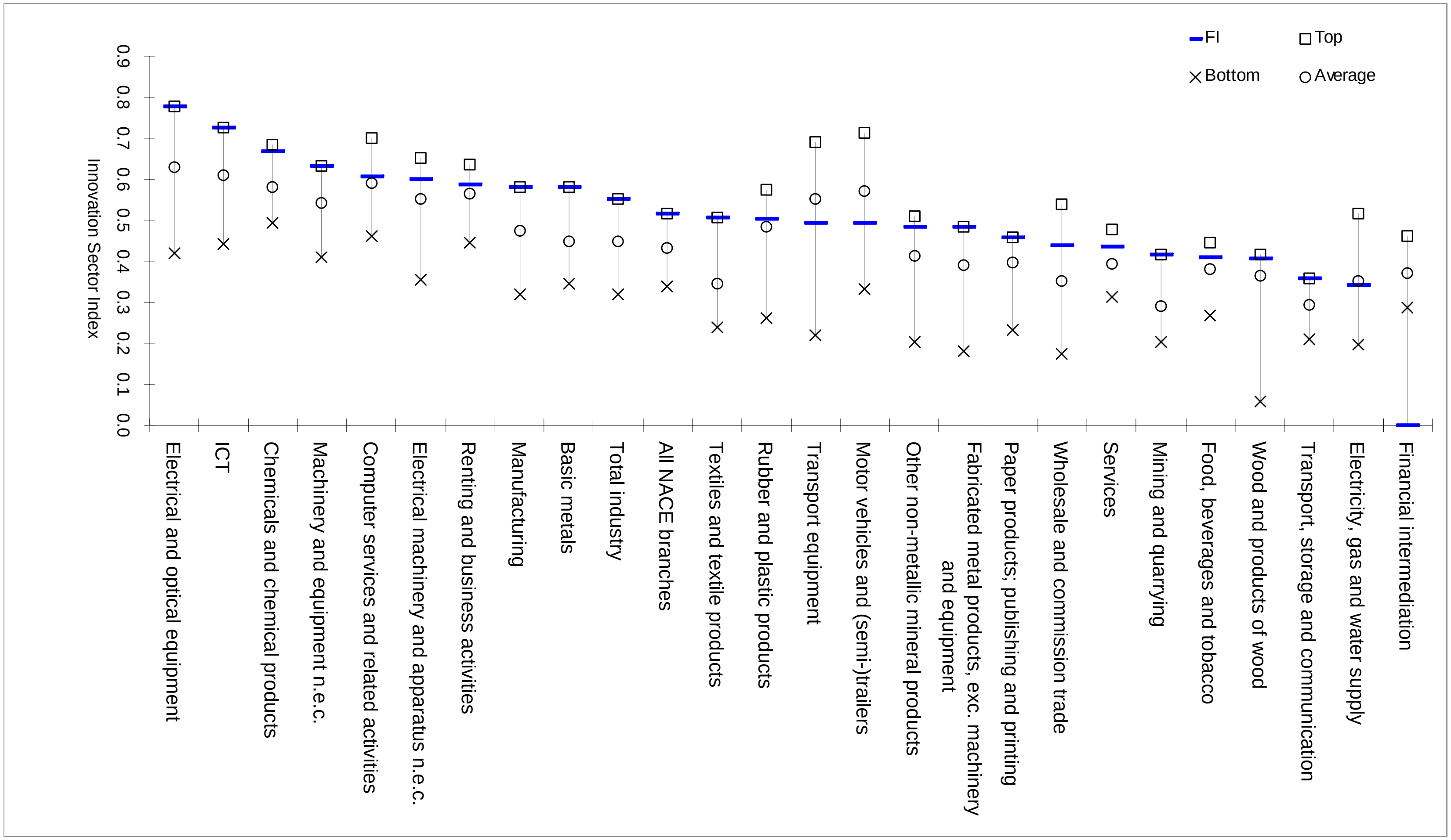
BELGIUM


BE
Top
Bottom
Average
Innovation Sector Index
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Electrical and optical equipment
ICT
Computer services and related activities
Chemicals and chemical products
Renting and business activities
Machinery and equipment n.e.c.
Rubber and plastic products
Manufacturing
Electrical machinery and apparatus n.e.c.
Total industry
Transport equipment
Textiles and textile products
All NACE branches
Fabricated metal products, exc. machinery and equipment
Motor vehicles and (semi-)trailers
Food, beverages and tobacco
Basic metals
Other non-metallic mineral products
Paper products; publishing and printing
Services
Wholesale and commission trade
Wood and products of wood
Financial intermediation
Transport, storage and communication
Electricity, gas and water supply
Mining and quarrying

DENMARK

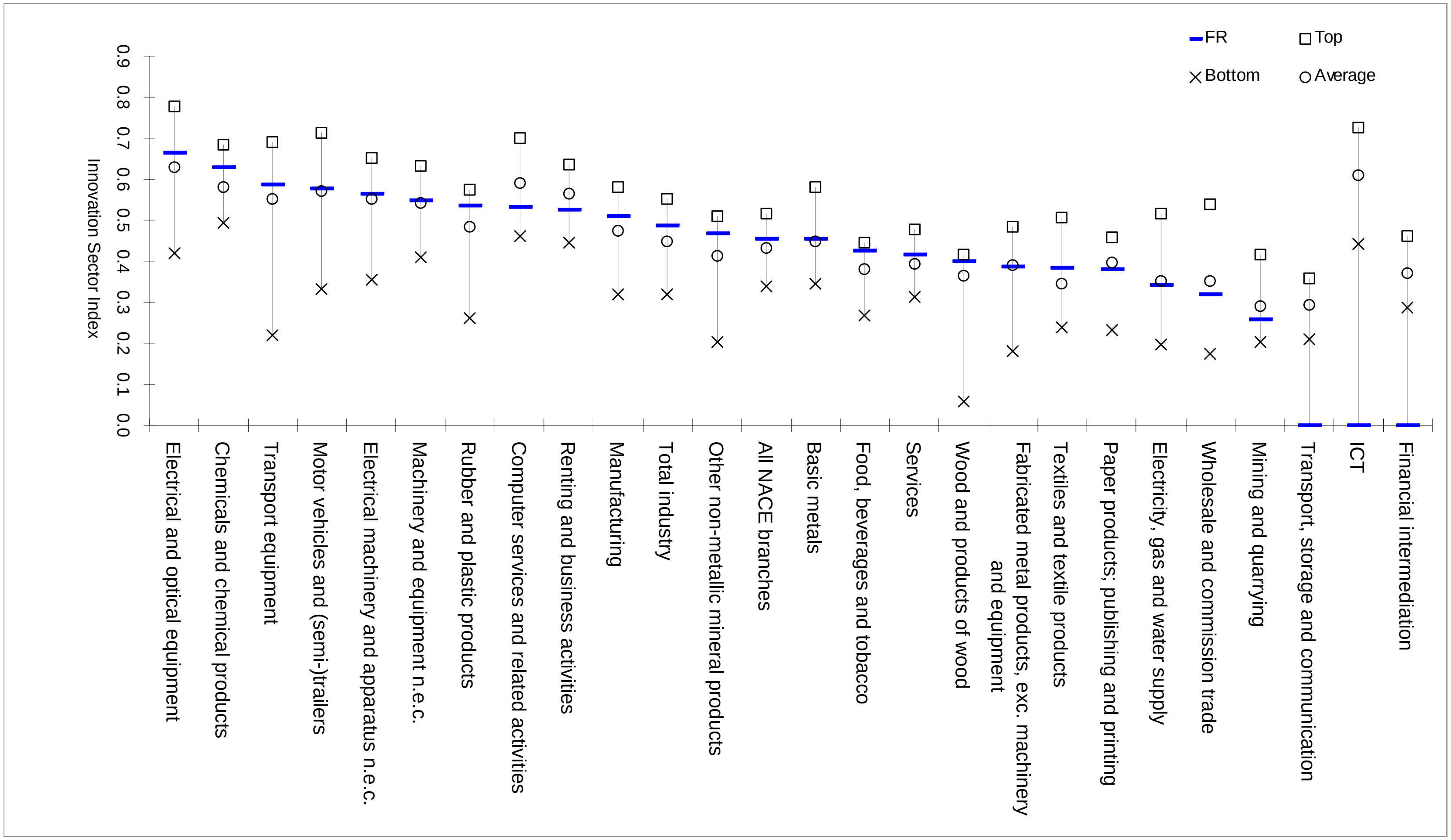

DK
Top
Bottom
Average
Innovation Sector Index
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Chemicals and chemical products
Electrical and optical equipment
ICT
Electrical machinery and apparatus n.e.c.
Machinery and equipment n.e.c.
Computer services and related activities
Renting and business activities
Manufacturing
Total industry
Other non-metallic mineral products
Food, beverages and tobacco
All NACE branches
Transport equipment
Wholesale and commission trade
Basic metals
Rubber and plastic products
Services
Financial intermediation
Wood and products of wood
Motor vehicles and (semi-)trailers
Paper products; publishing and printing
Textiles and textile products
Fabricated metal products, exc. machinery and equipment
Electricity, gas and water supply
Transport, storage and communication
Mining and quarrying

FINLAND



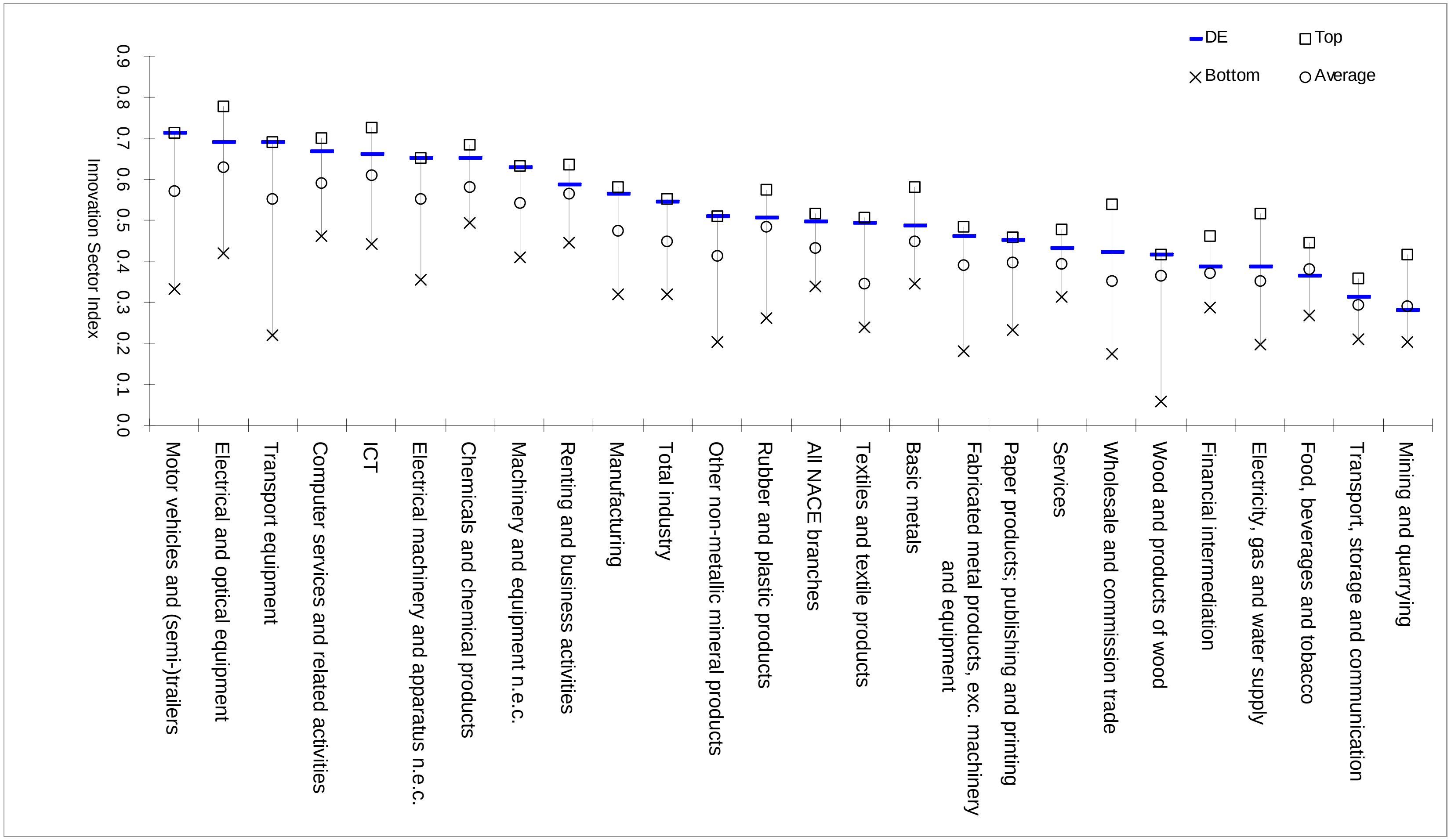
No ISI for Financial intermediation.

FRANCE



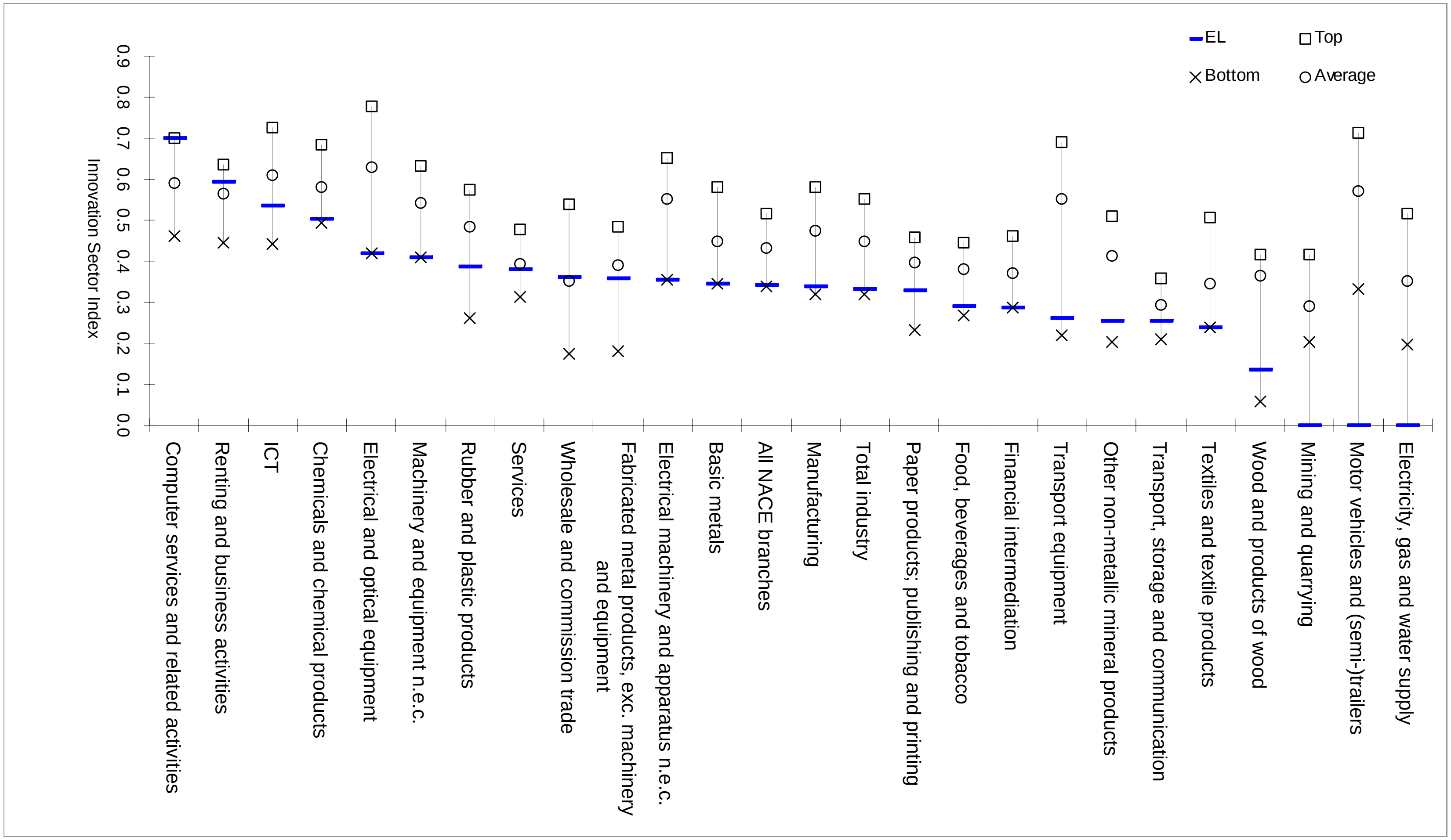
No ISI for Transport, storage and communication, ICT and Financial intermediation.

GERMANY



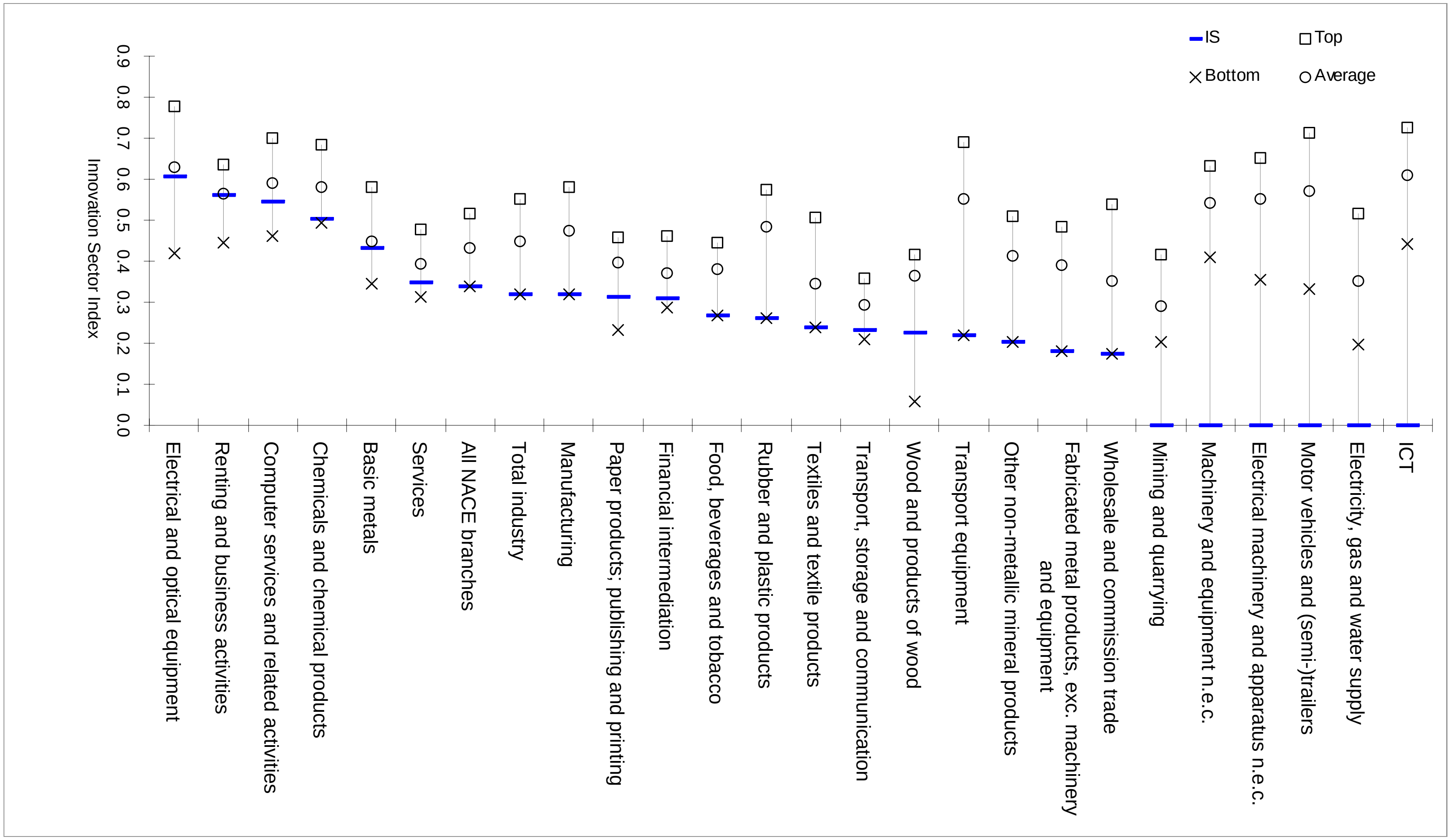
DE
Top
Bottom
Average
Innovation Sector Index
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Motor vehicles and (semi-)trailers
Electrical and optical equipment
Transport equipment
Computer services and related activities
ICT
Electrical machinery and apparatus n.e.c.
Chemicals and chemical products
Machinery and equipment n.e.c.
Renting and business activities
Manufacturing
Total industry
Other non-metallic mineral products
Rubber and plastic products
All NACE branches
Textiles and textile products
Basic metals
Fabricated metal products, exc. machinery and equipment
Paper products; publishing and printing
Services
Wholesale and commission trade
Wood and products of wood
Financial intermediation
Electricity, gas and water supply
Food, beverages and tobacco
Transport, storage and communication
Mining and quarrying

GREECE



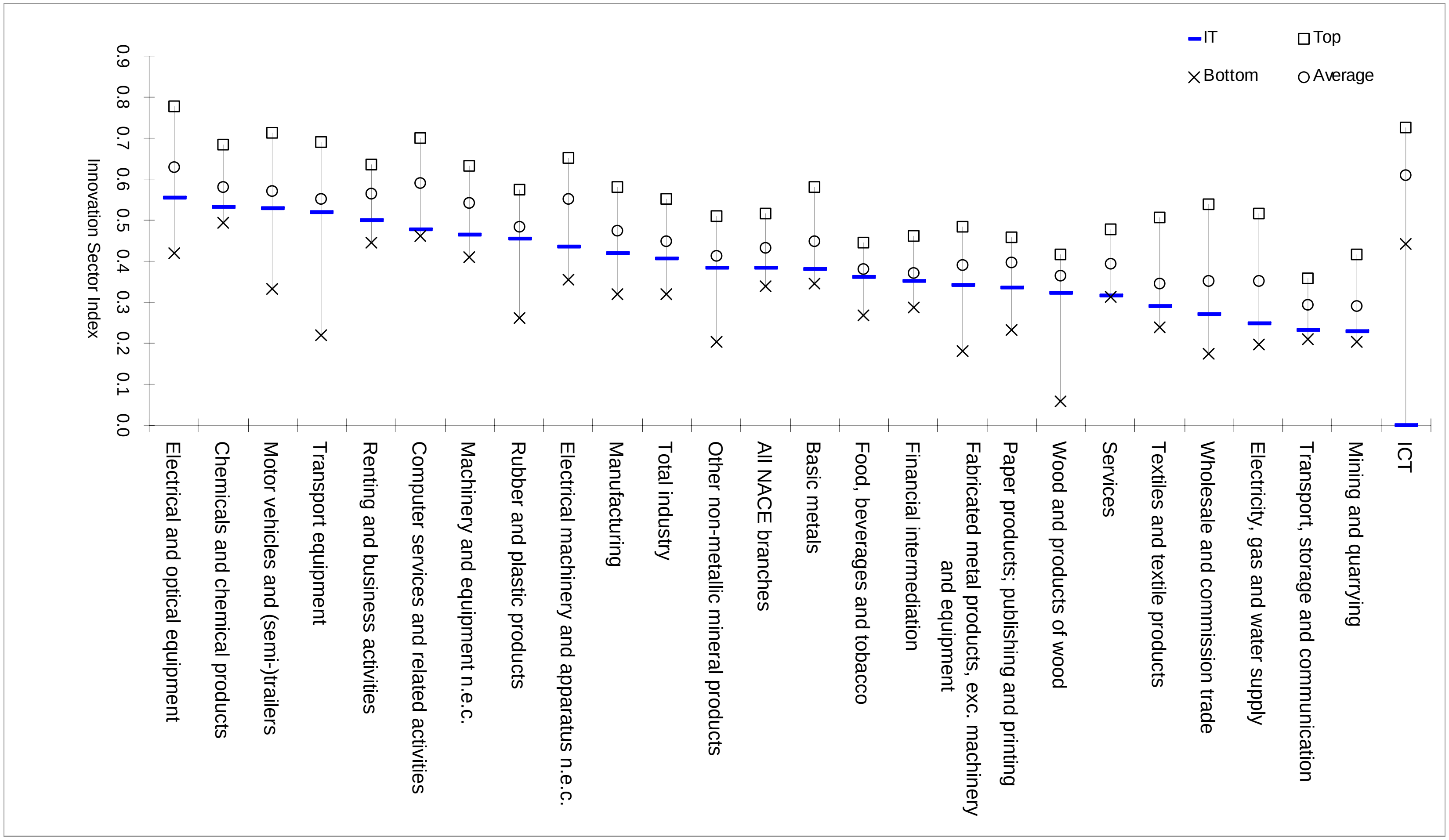
No ISI for Mining and quarrying, Motor vehicles and Electricity, gas and water supply.

ICELAND



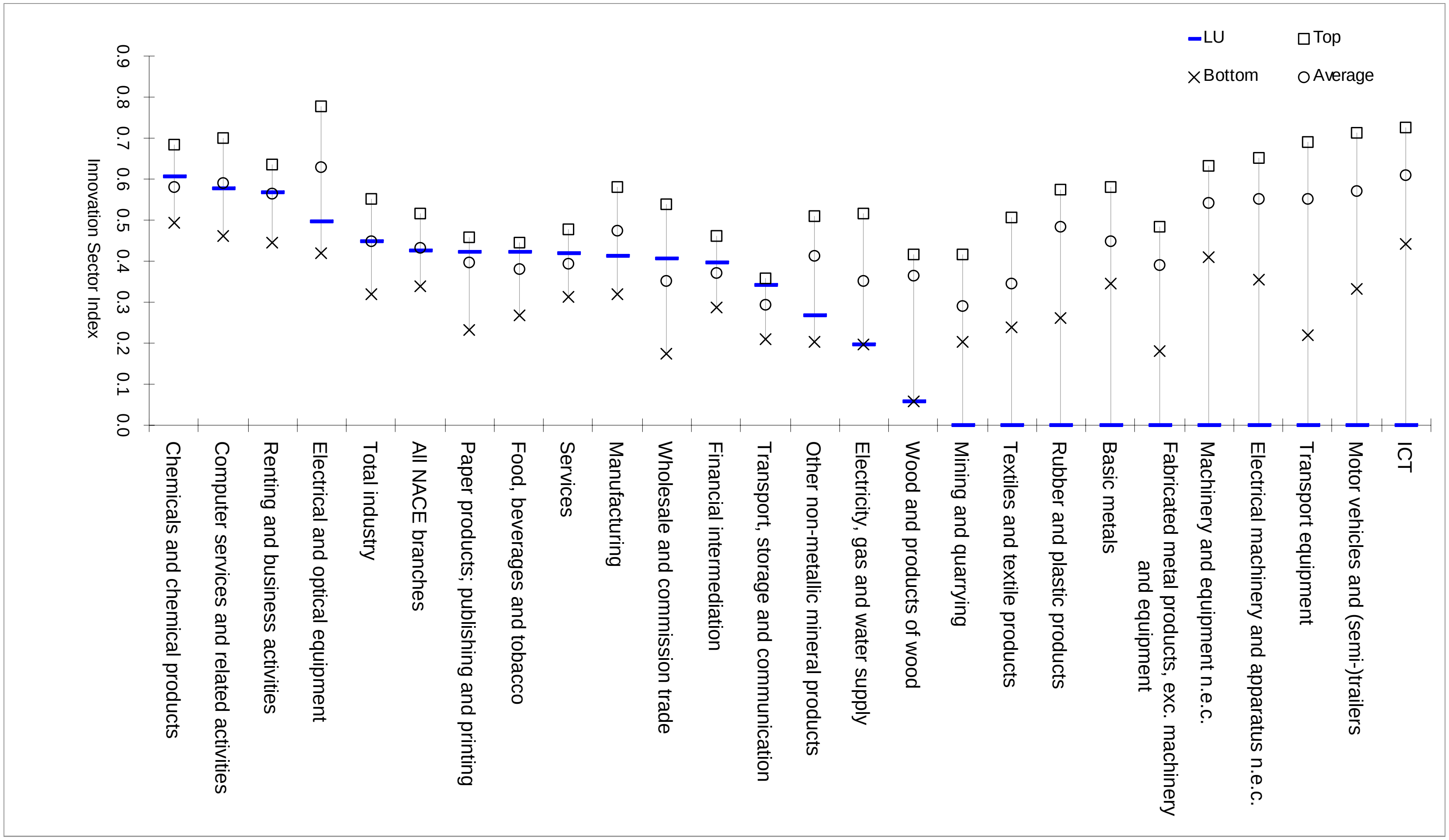
No ISI for Mining and quarrying, Machinery and equipment, Electrical machinery and equipment, Transport equipment, Motor vehicles, Electricity, gas and water supply and ICT.

ITALY



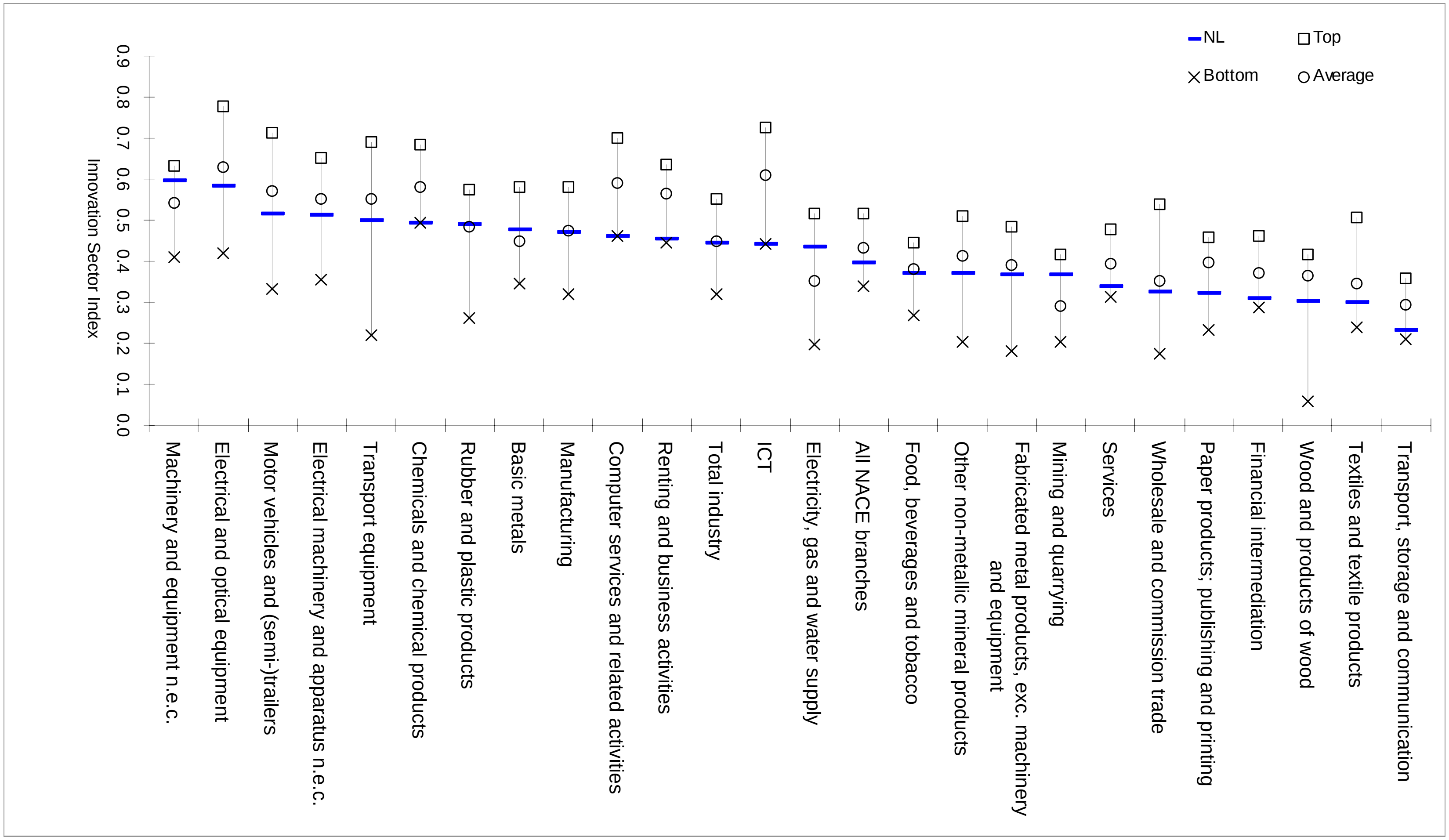
No ISI for ICT.

LUXEMBOURG

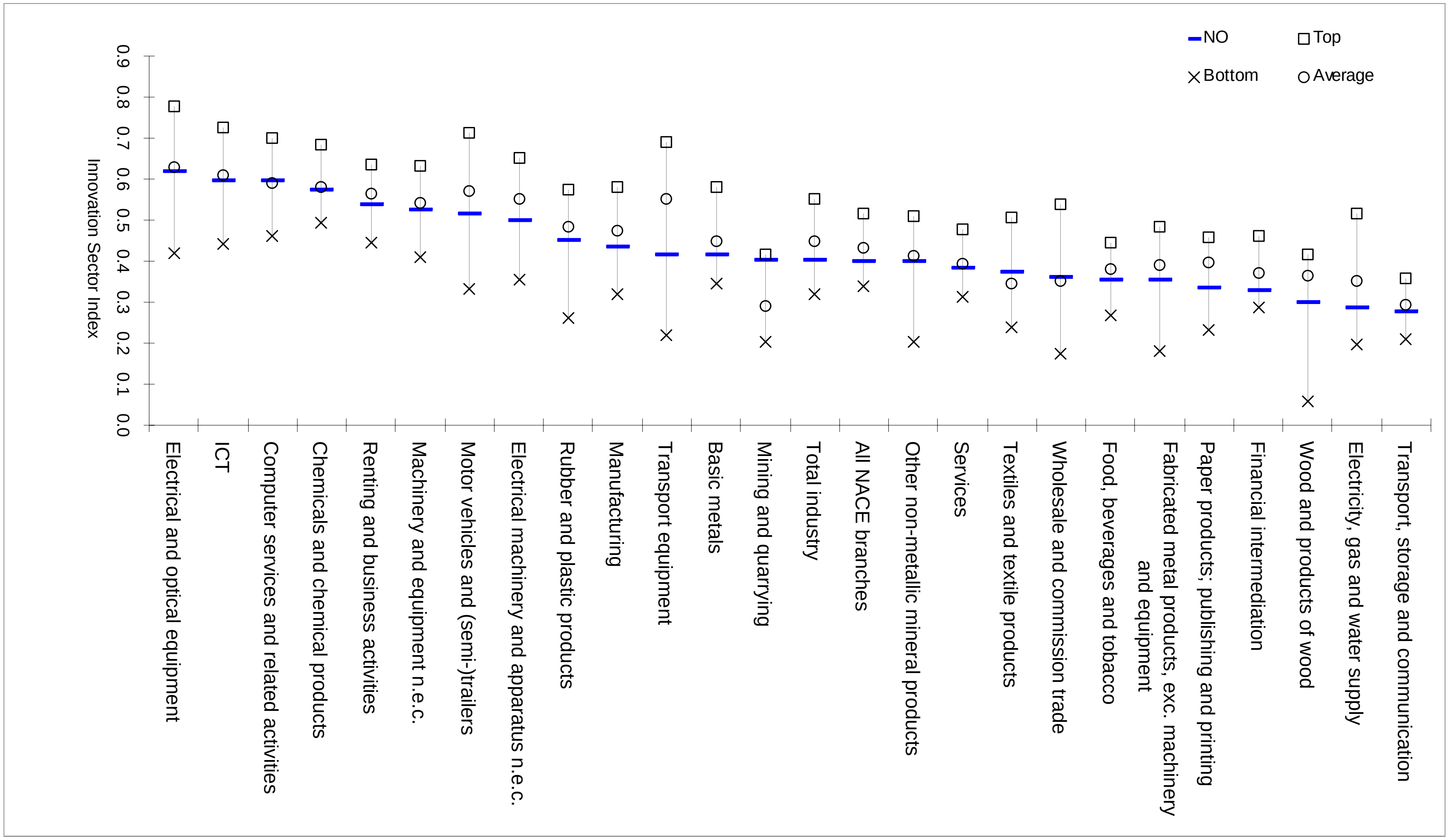


No ISI for Mining and quarrying, Textiles and textile products, Rubber and plastic products, Basic metals, Fabricated metal products, Machinery and equipment, Electrical machinery and equipment, Transport equipment, Motor vehicles and ICT.

NETHERLANDS

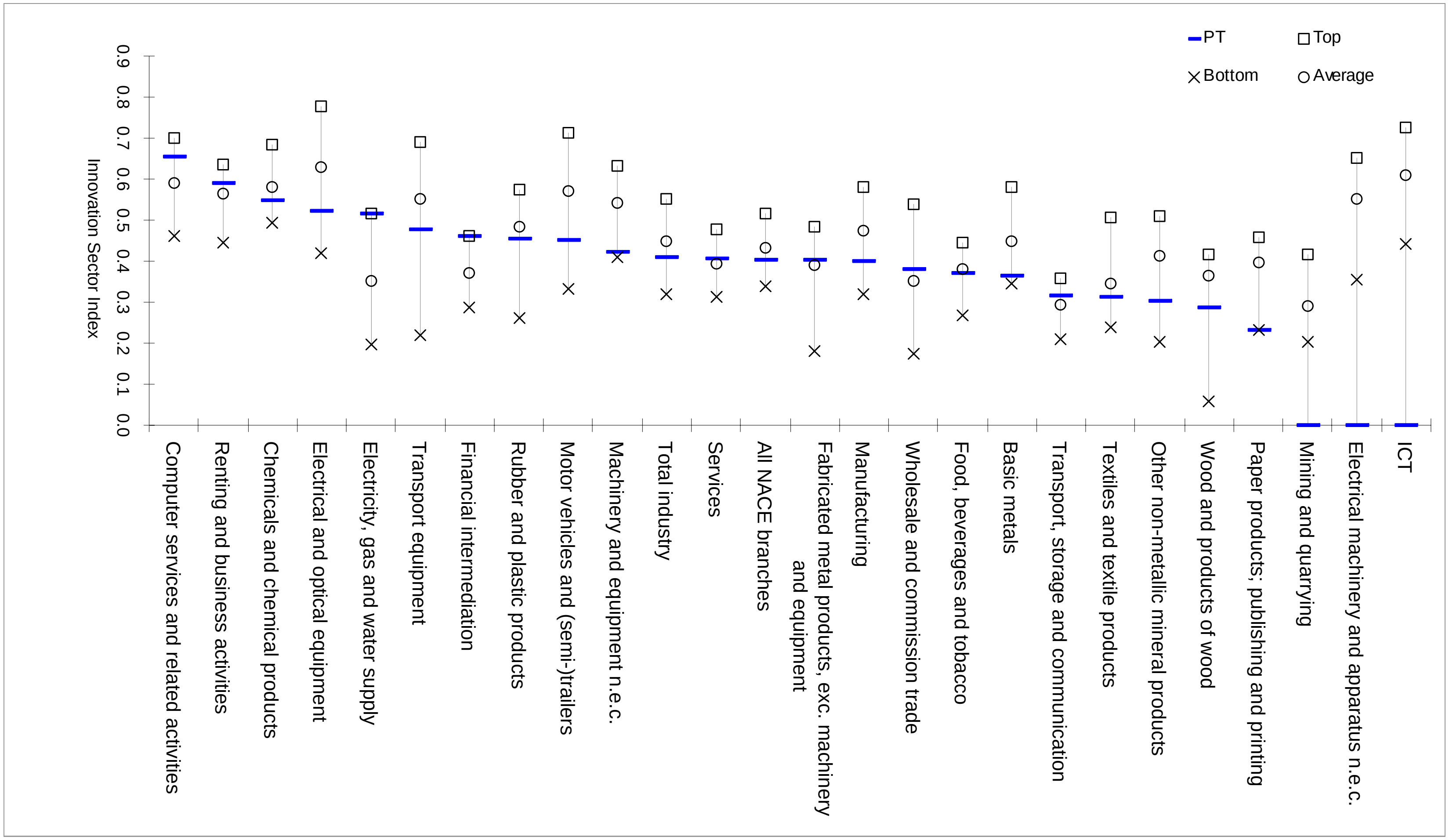


NORWAY



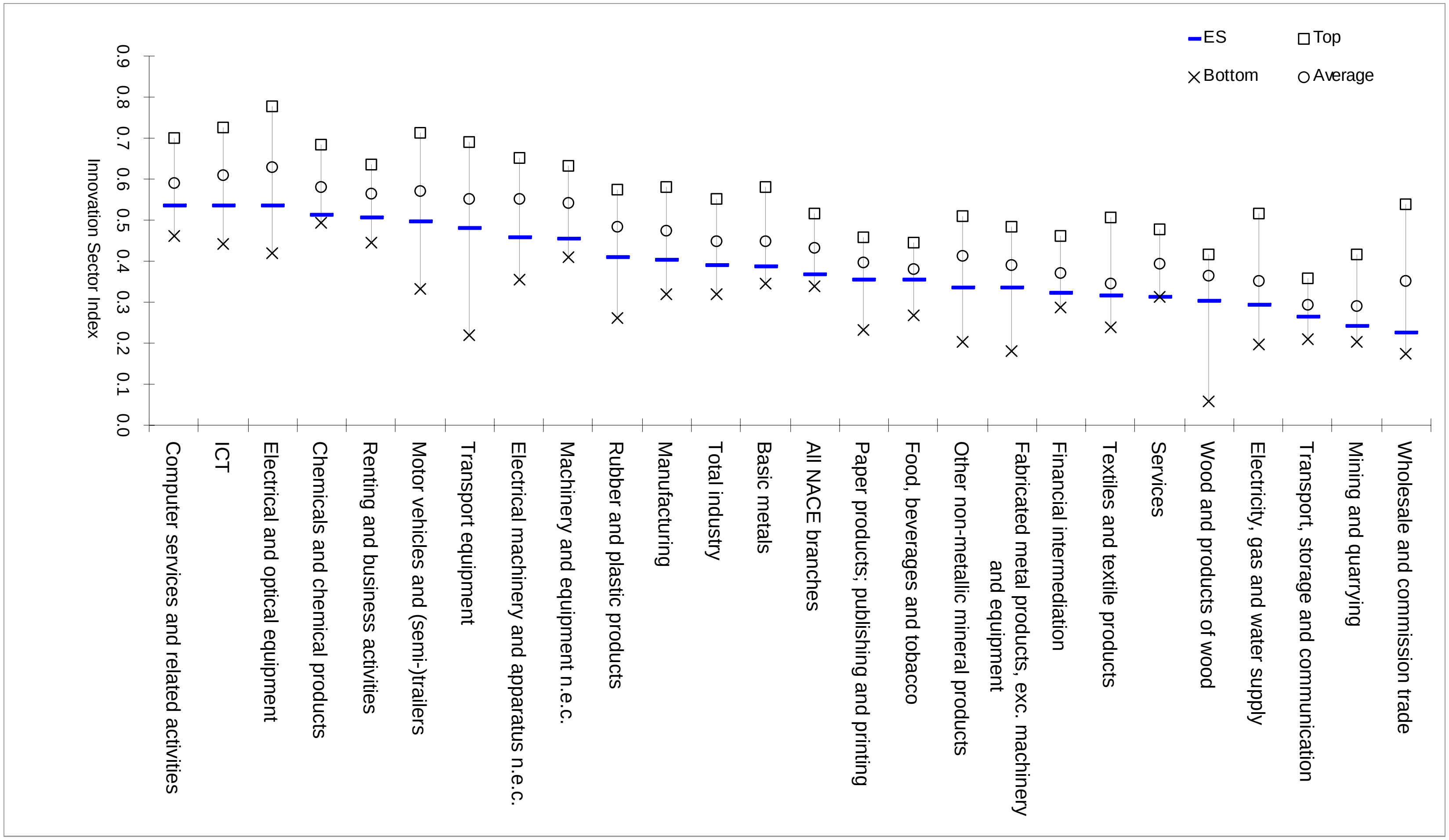
NO
Top
Bottom
Average
Innovation Sector Index
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Electrical and optical equipment
ICT
Computer services and related activities
Chemicals and chemical products
Renting and business activities
Machinery and equipment n.e.c.
Motor vehicles and (semi-)trailers
Electrical machinery and apparatus n.e.c.
Rubber and plastic products
Manufacturing
Transport equipment
Basic metals
Mining and quarrying
Total industry
All NACE branches
Other non-metallic mineral products
Services
Textiles and textile products
Wholesale and commission trade
Food, beverages and tobacco
Fabricated metal products, exc. machinery and equipment
Paper products; publishing and printing
Financial intermediation
Wood and products of wood
Electricity, gas and water supply
Transport, storage and communication

PORTUGAL



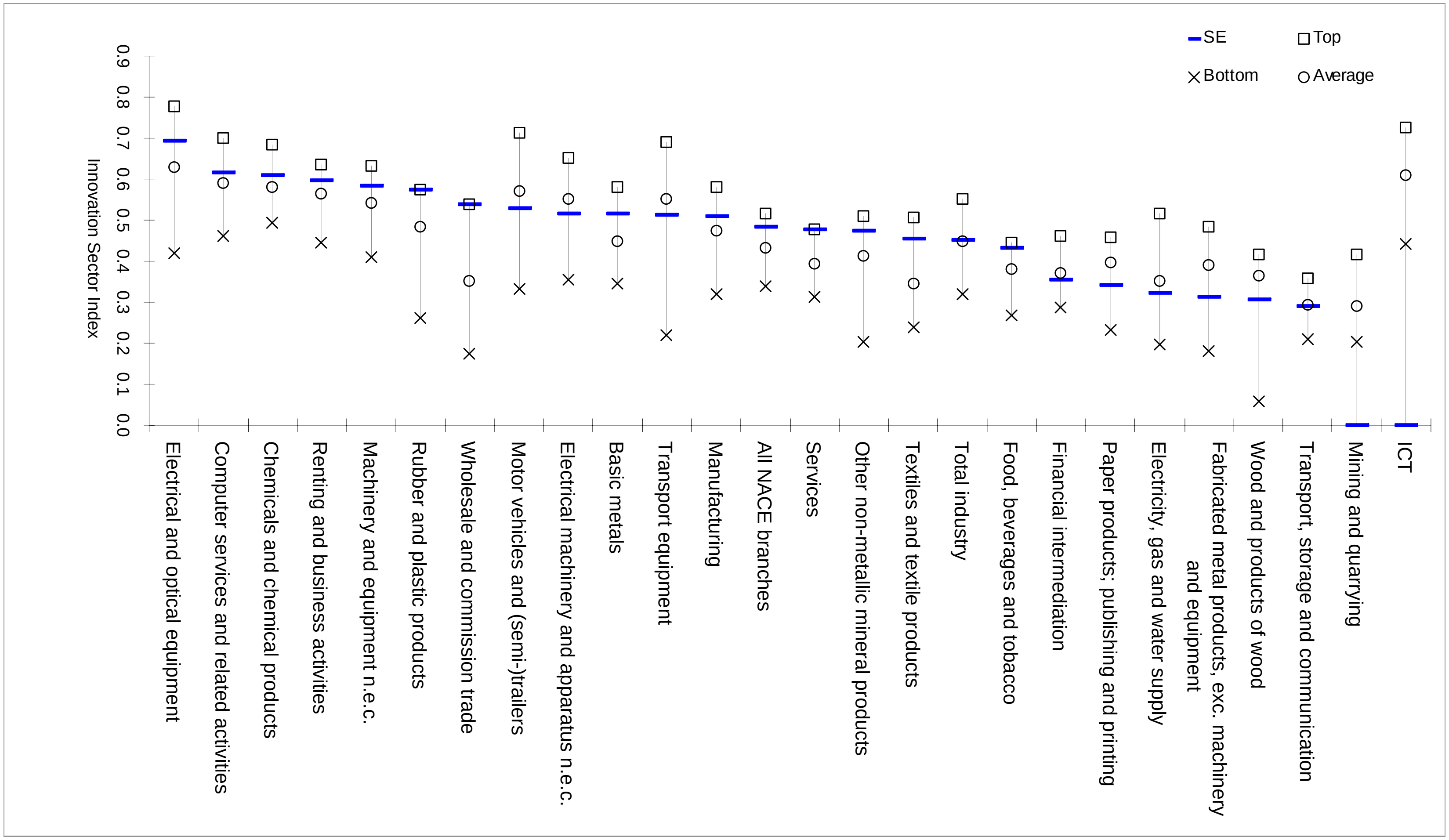
No ISI for Mining and quarrying, Electrical machinery and equipment and ICT.

SPAIN



ES
Top
Bottom
Average
Innovation Sector Index
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Computer services and related activities
ICT
Electrical and optical equipment
Chemicals and chemical products
Renting and business activities
Motor vehicles and (semi-)trailers
Transport equipment
Electrical machinery and apparatus n.e.c.
Machinery and equipment n.e.c.
Rubber and plastic products
Manufacturing
Total industry
Basic metals
All NACE branches
Paper products; publishing and printing
Food, beverages and tobacco
Other non-metallic mineral products
Fabricated metal products, exc. machinery and equipment
Financial intermediation
Textiles and textile products
Services
Wood and products of wood
Electricity, gas and water supply
Transport, storage and communication
Mining and quarrying
Wholesale and commission trade

SWEDEN



No ISI for Mining and quarrying and ICT.