Innovation and R&D in the European Union

Wood and Furniture Industry

EU and National Analysis of the Present State of Affairs

Short Version

Partners

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The following analysis provides a general overview of the innovation and R&D performance in EU industry focusing on wood sectors. It also presents information about wood industry in the countries involved in the project: Slovenia, Slovakia, Sweden and Greece.

1. EU Innovation performance

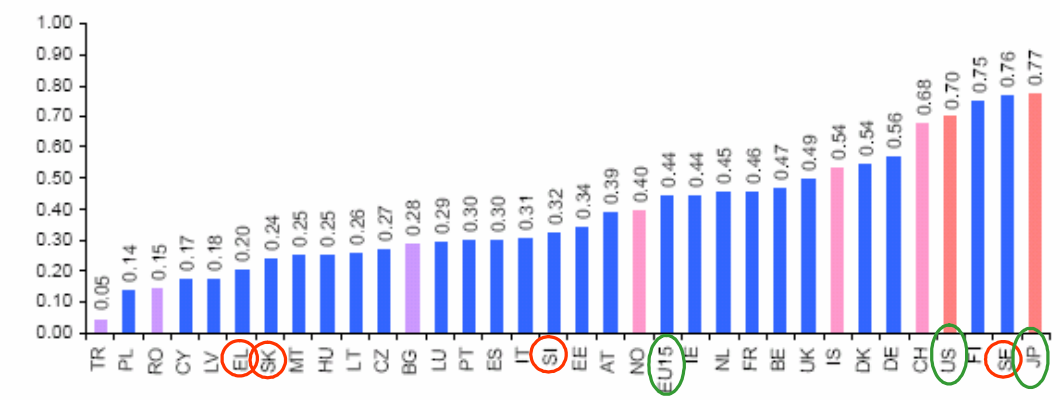
1.1. EU innovation performance in general

In the current economic framework the competition to attract research and innovation investment is growing world-wide. In addition to attractive locations such as the US and Japan, new competitors such as China, India and Brazil have emerged. To achieve sustainable global competitiveness, the EU has to become a vibrant knowledge economy. That is why, in launching the new Lisbon partnership for growth and jobs, the European Council outlines knowledge and innovation for growth as one of three main areas for action. The 2010 target set at the Lisbon Summit in 2000 for the Research & Development intensity (i.e. R&D expenditure as a % of GDP) was 3 %. Nearly all Member States have set targets, which – if met – would bring research investment in the EU to 3 % of GDP by 2010. However, according to the data provided, instead of rising, EU research intensity is more or less stagnant.

According to the data provided in the European Innovation Scoreboard for 2004, the EU still lags behind the US and Japan in terms of innovation performance (Summary Innovation Index (SII) for 2004). Statistical indicators show that in the period after 1996 the innovation performance in EU is relevantly constant while in US and Japan it has further improved.1 Main factors which influence the index and cause as well increase innovation gap each year are: patents (50%), active working population with high level education, expenditure for R&D, proportion of high value added Hi-Teck companies, seed venture capital.

[1] Source: European Innovation Scoreboard 2004, Comparative Analysis of Innovation Performance, Author: European Commission

Figure 1: Summary Innovation Index for 2004:

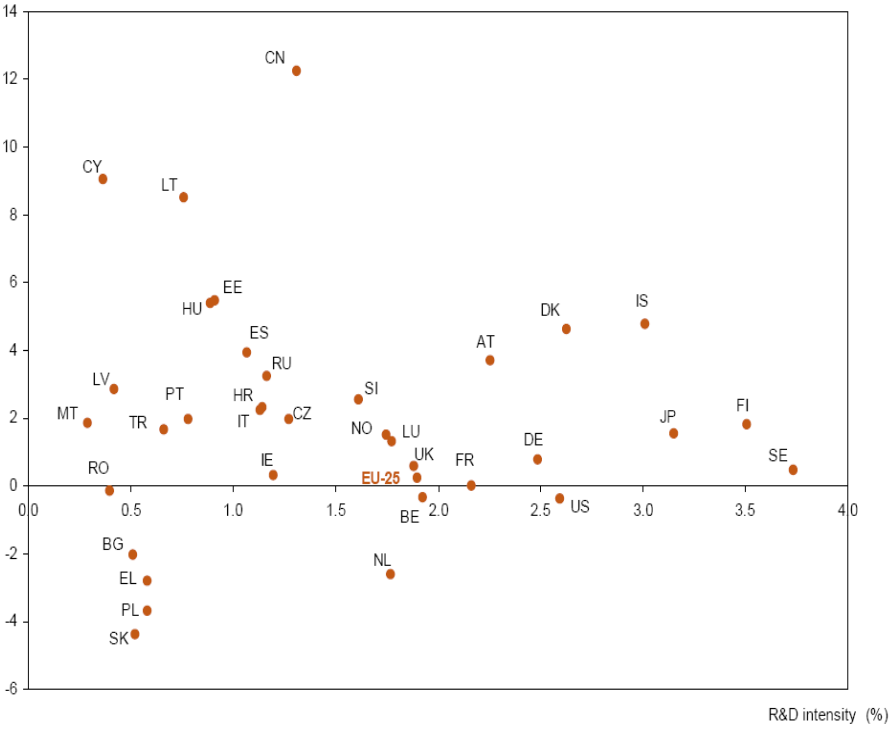


Despite the relatively low innovation performance in the EU in general (SII – 0.44), it must be noted that individual results of Sweden (SII – 0.76) and Finland (SII – 0.75) related to innovation performance for 2004 exceeded the results of US (SII- 0.70) and are very close to the world leader Japan (SII - 0.77).

In 2004, only 1.90 % of GDP was spent on R&D in the EU-25. The highest R&D intensities, above the Lisbon target of 3 %, were observed in Sweden (3.74 %), Finland (3.51 %) and Iceland (3.01 %). Similar trend, however, can be observed in other major economies (Japan, US). In nominal terms, EU-25 R&D expenditure grew by 2.7 % per year between 2001 and 2004 (almost EUR 200 billion in 2004).

Considering the R&D intensity level in 2004 and its annual average growth rate (AAGR) (1999 – 2004), higher R&D intensity can be observed in Japan and US compared to EU. In addition although China remains behind the EU by its R&D intensity, its yearly increase of more than 12 % is the highest of all the countries in consideration. In EU, only three countries combine high R&D intensity level (over 2.2 %) and high annual average growth rate (AAGR) (above 4 %), i.e. Iceland, Denmark and Austria.

Figure 2: R&D intensity in 2004 and Annual average growth rate (AAGR) of the R&D intensity (1999-2004): y-axis is indicating AAGR and x-axis is indicating R&D intensity



Source: Eurostat, OECD

R&D intensity: R&D expenditure as a percentage of GDP

Exceptions to the reference year 2004: IT, LU, PT, UK, NO, CN, JP and US.

Exceptions to the reference period 1999-2004: IT, PT, UK, NO, CN, JP, and US: 1999-2003; LU: 2000-2003; MT: 2002-2004; HR: 2002-2003

Eurostat estimation: EU-25. National estimation: DE, AT, SI. Provisional data: DK, FR, NL, EE, EL, CY. Forecast: BE

In 2004 the major source of financing of R&D was the Business sector, providing 54 % of funding, ahead of the Government sector with 35 %. Within the Business sector, Manufacturing is the biggest R&D spending sector, just ahead of the Service sector.

In the EU-25, the proportion of R&D allocated to applied research is high compared to the United States, Japan and China in which R&D expenditure is more focused on experimental development. In the EU, too strong basic research and weak transfer of knowledge into business results can be seen. USA and Japan have better balance and therefore more efficient transfer of knowledge in economy and consequently better business results.

1.2. EU innovation performance –analysis by economic sectors

The strong effect of a company's sector of activity on its innovative performance has been well understood for decades. Currently, however, there is 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[2] 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. The common orientation of modern economies in services could represent a future direction; market nische for wood related companies as well.

1.2.1. Methodology

The report[3] that has been prepared by Hugo Hollanders and Anthony Arundel under a Trend Chart service contract with the European Commission provides a first step in the analysis of the innovation performance of European countries at the lowest level of sector aggregation possible. The report uses 12 indicators that are divided in input and output indicators. Countries under consideration are EU15 including Norway and Iceland and excluding UK and Ireland. An Innovation Sector Index (ISI) is calculated by rescaling the indicators values due to their skewness and then calculating the average value of the re-scaled data, where all indicators are weighted equally.

[2] Smith, K. What is the Knowledge Economy? 2002. www.intech.unu.edu/publications/discussion-papers/2002-6.pdf

[3] Source: Hollanders, H., Arundel, A. European Sector Innovation Scoreboards, 2005. http://trendchart.cordis.lu/scoreboards/scoreboard2005/pdf/EIS%202005%20European%20Sector%20Innovation%20Scoreboards.pdf

Table 1: List of indicators for Sector Innovation Scoreboards

#	Indicator	Source
1	Share of employees with higher education	CIS-3
2	Share of firms that use training	CIS-3
3	R&D expenditures (% of value-added)	OECD
4	Share of firms that receive public subsidies to innovate	CIS-3
5	Share of firms innovating in-house	CIS-3
6	Share of SMEs co-operating with other	CIS-3
7	Innovation expenditures as a percentage of total turnover	CIS-3
8	Share of total sector sales from new-to-market products	CIS-3
9	Share of total sector sales from new-to-firm but not new-to-market products	CIS-3
10	Share of firms that patent	CIS-3
11	Share of firms that use trademarks	CIS-3
12	Share of enterprises that use design registrations	CIS-3

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 (PLTBSUB);
- 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).

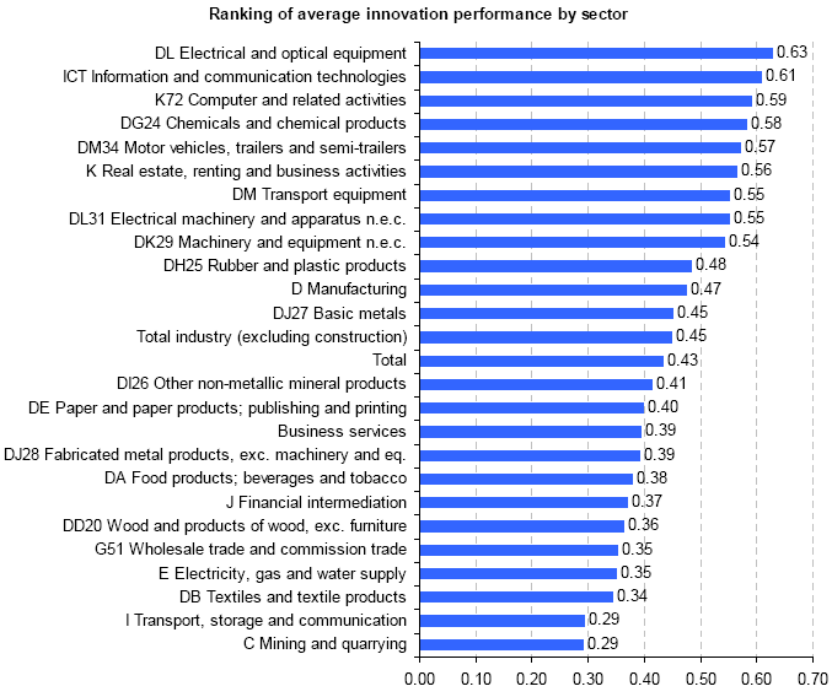
Output indicators are:

- 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).

1.2.2. Results

According to the results of the study the most innovative sectors are Electrical and optical equipment, ICT, Computer services and related activities, Chemicals and chemical products (including Pharmaceuticals) and Motor vehicles, trailers and semi-trailers. Wood sector (DD20) is one of the least innovative (ranked 20 out of 25). Wood sector represents not only low innovation performance, but also a small economic importance (small contribution to the country's GDP).

Figure 3: European sector innovation performance expressed by ISI



The composite index scores for inputs against the scores for outputs provide an indication of the efficiency with which a sector transforms its innovation inputs into innovation outputs. Textiles and Wholesale and commission trade are among the least innovative sectors as shown in, 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. On the other hand, wood sector does not appear so.

1.3. National Innovation Policies: Greece, Slovakia, Slovenia and Sweden

Looking into Member State challenges to innovation and best practice policies, we identify similarities in the innovation challenges, while the best practice policies tend to focus in different directions according to national needs. We will outline some issues of the four national policies of the states participating in the I-model project.

1.3.1. Greece

In spite of a slight catching up trend in innovation performance, the Greek innovation system remains one of the weakest in the EU and economic growth is not strongly based on innovation. The relation between innovation performance and per capita GDP clearly demonstrates that economic growth is based on other sources that innovative production and this may imply a considerable danger for future competitiveness. According to the data of the European Innovation Scoreboard 2004, Greece has a very low implementation rate of advanced management methods (15%). Furthermore, Greece has a very low percentage in SMEs innovating in-house, this includes implementing "advanced management techniques", "new or significantly changed organisational structures", or "significant changes in the aesthetic appearance or design in at least one product". Especially in the “wood and products of wood sector”, the percentage is much lower, only 13-14%.

1.3.2. Slovakia

Industrial restructuring and economic growth in Slovakia in recent years has not been mirrored or supported by a step-change in the innovation potential of the country. EIS2004 results indicate that Slovakia is falling further behind in a number of key indicators. Specific challenges include raising public and private rates of expenditure on R&D and boosting the rates of new product development and raising the technology content in the service sector. Innovation policy is still not well formulated in Slovakia and the response to the challenges is fragmented. One organisation active across the country in supporting enterprises is the National Agency for Development of Small and Medium Enterprises, which supports is business development, technology transfer and innovation through a network of centres. It also runs a number of funding programmes and initiatives such as the INTEG programme which supports innovation and technology transfer through technology incubators and cross border economic co-operations.

1.3.3. Slovenia

Slovenia's position in terms of innovation is in many respects enviable with respect to other new Member States, to the extent that it performs above EU25 average for six indicators. The weaknesses of the Slovenian innovation system relate notably to insufficient commercialization both in terms of patents and in terms of new-to-market products. Limited access to specialized finance is one factor, which explains the low intensity of innovation activity amongst SMEs. The country has been a front-runner in developing support for innovation and industrial development through cluster initiatives. A recent evaluation of the programme launched in 2000 suggested this initiative has had some notably success in boosting competitiveness.

1.3.4. Sweden

Structural changes during the 1990's enabled the Swedish economy to grow at rates close to the EU average during the past few years. Yet, evidence suggests that this growth has not been 'employment-rich' nor based on the creation of new smaller innovative firms. The overall performance of the Swedish innovation system is extremely good compared to the EU25. Yet, a number of trends give cause for concern including problems with recruiting students to S&E disciplines, SMEs innovating in-house and rates of non-technological innovation. Business R&D remains dominated by a number of large industrial groups and there is a financial bottleneck to creating new innovative firms. In response, VINNOVA, the national innovation agency, has launched the VINNKUBATOR programme and is studying a Swedish version of the US SBIR scheme (which provides for a percentage of all research funding to be allocated to new small business initiatives).

2. Wood industry in Greece, Slovakia, Slovenia and Sweden

2.1. Greece

A factor that affects the wood processing industries in Greece is that the wood production has been reduced (16%) since year 2000. Furthermore, the exportation rate of wood products has fallen off significantly since 1996, whereas the import rates grew 58% the years 1993-2000. Another point that represents the bad situation of the wood industry is that this sector constitutes only the 1.05% of the Greek industries. The Greek furniture producers face many problems due to the cheaper products that are being supplied by the big industries and are searching for cheaper raw materials outside Greece. This lead to the closure of many, small sized industries during the last years.

2.2. Slovakia

Wood processing industry has a relatively small share in Slovakia despite the large potential of natural resources for wood product manufacturing. The share of wood processing of the gross domestic product achieved in 2001 was only 0.65%. Compared to other production sectors, this figure illustrates its ranking in value added generation, but the intermediate consumption of total gross production represents as much as 70%. The GDP per capita exceeds the average value of industrial production, illustrating that this sector is stronger than the earlier figure indicates. In 2001, 10,460 employees worked in this sector, which represents 2.7% of all employees in the industry (the survey is based on the data of companies with 20 and more employees).

Slovakia is lagging behind the EU in terms of production structure. The largest share of the total Slovak forestry-wood processing production is pulp wood production with 43.5%, while the EU participates only by slightly more than 23%. The most sophisticated wood processing products are panels and boards, and sells for approximately 5 times more than round logs. Their share in Slovakia represents only 2.2%, while in the EU 10.6%.

2.3. Slovenia

According to the statement made be the company LIP Bled, one of the largest and most successful wood processing companies in Slovenia, Slovenian wood industry has been unduly disregarded, partly due to the wood processors themselves. The slow adaptation of the Slovenian wood industry to the new market situations resulted in fall in demand and surplus in production capacities. However, the Slovenian wood industry still has its prospects.

According to statistical data4 there are only 21% innovative companies among Slovenian companies. The percentage of innovation active companies there is only 19.2% in statistical class DD 20, 8,6% in DE 21 and 24,2% in DN (the average in Slovenian processing industry and selected service activities is 21.1%) Among the innovators of products/process there is only 6,1% in statistical class DD 20, 0% in DE 21 and 4,5 % in DN (the average in Slovenian processing industry and selected service activities is 5,6%).

[4] European innovation scoreboard (EIS), 2003.
http://trendchart.cordis.lu/scoreboards/scoreboard2005/pdf/EIS%202003.pdf

2.4. Sweden

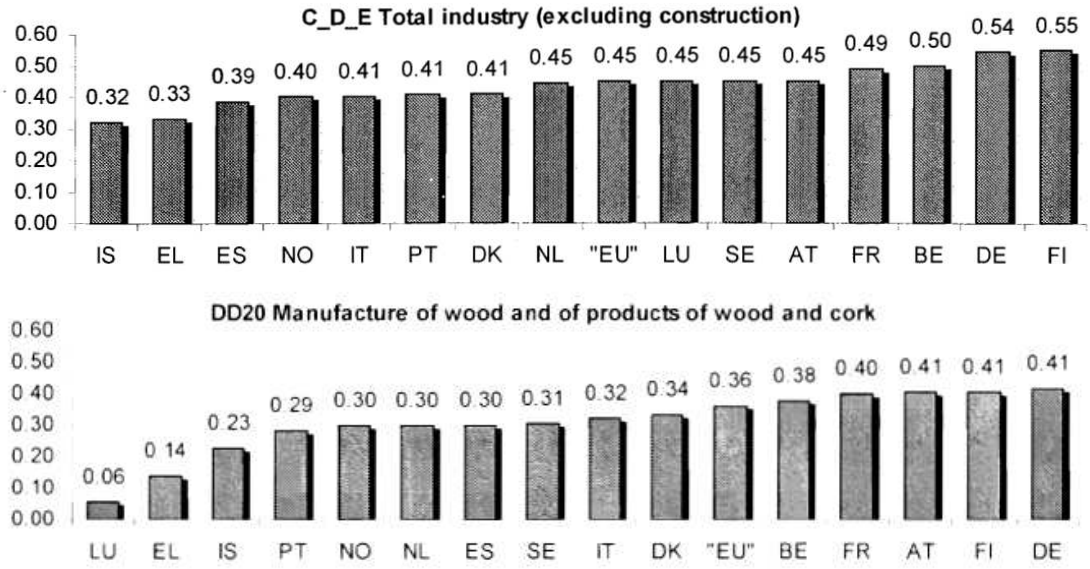
Sweden is a world leader in wood product development and applications. Wood processing, based on abundant forests, is historically one of Sweden's most important industries and one of its largest export industries. The comparatively small domestic market very early prompted the Swedish wood processing industry to seek foreign markets. The strength is based on close proximity to raw material, efficient production, high quality, good design, speedy deliveries and efficient transportation. Sweden is highly competitive in products, materials and design know-how. In areas such as flat packaged furniture, glue technology, combined materials, wood structure fire behaviour and machine stress grading of sawn timber, Sweden has developed leading edge knowledge. Further, Sweden is outstanding in environment friendly wood products and technologies, and the Swedish standards of forest management and working environment are unique.

Most producers are relatively small, creating opportunities for ventures with well-established foreign companies. Sweden's wood processing, which covers a wide range of products from furniture and prefabricated houses to heavy engineering structures, offers a variety of specialized investment opportunities. The country is world leader in IT infrastructure, innovation and production technology, and is in the forefront with regard to research and development in the industry. Even though many of the wood processing firms are relatively small, they have considerable experience in exporting. For example, some 60 % of Swedish furniture is exported, supported by highly efficient transport and other infrastructure.

3. Innovation in the wood sector

For the purposes of the project I-Model it is important to concentrate on the trends in Innovation performance in wood sector in EU. Figure 4 shows the Innovation Sector Index in total industry (i.e. service sector excluded) and in the wood sector, by country. Germany, Finland, France and Belgium are the most innovative both in absolute terms and in the wood sector. Austria as well is among the most innovative countries in wood sector.

Figure 4: Innovation Sector Index (ISI) in total industry and in the wood sector, by country



3.1. Methodology

In order to identify the largest players in the wood and furniture industries, statistical data from Eurostat5 and the national statistical offices were analysed. The countries in consideration were the project members' countries (Slovenia, Slovakia, Greece and Sweden) and the 3 highest ranking countries according to the Innovation Sector Index for the wood industry (Germany, Finland and Austria).

In the first phase, the data were analysed for the calendar years 2000 to 2005. In the second phase, the year taken into consideration was 2002, since it provides the largest number of national data (12 EU countries out of 25 for DD20 and 8 EU countries for DN361). In addition, the 2003 Eurostat data were used instead of the missing 2002 for Greece and Germany and the 2003 Swedish statistical office data for Sweden. So, altogether 13 countries are included for DD20 and 10 for DD361. The average EU data were calculated out of the country data available.

[5] Source: Eurostat. http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136250,0_45572555&_dad=portal&_schema=PORTAL&screen=ExpandTree&open=/science/research/rd&product=EU_science_technology_innovation&nodeid=64660&vindex=2&level=3&portletid=39994100_QUEENPORTLET_92281242&scrollto=0

3.2. Results

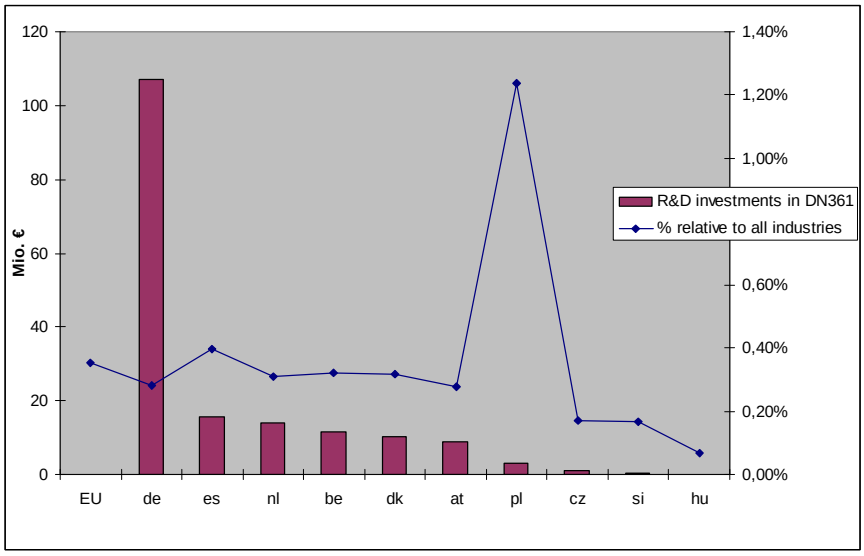
3.2.1. Manufacture of wood - NACE DD20

Sweden is, according to 2002 Eurostat and 2003 Swedish statistical office data, the largest R&D investor in the wood sector in EU (€ 22.13 MIO in 2003), followed by Germany, Austria and Finland. Greece (€ 1.03 MIO) and Slovenia (€ 0.51 MIO) are in the second half of the 15 countries in consideration. Data for the Slovak republic are not available. In relative terms, Portugal invests the largest proportion of all R&D funds into wood sector (1.01 %), followed by Ireland and Austria. Greece (0.36 %), Sweden (0.28 %) and Slovenia (0.24 %) also rank in the first half. Data for the Slovak republic are not available.

3.2.2. Manufacture of furniture - NACE DN361

On the aggregated EU level, R&D investments in furniture are much higher than in wood. In absolute terms, Germany invests an amount higher than the sum of the amounts of the remaining 9 EU countries for which data are available. Slovenia's investments are insignificant; data for Greece, Sweden and Slovakia are not available.In relative terms, Poland invests by far the largest proportion of all its R&D funds into furniture sector (1.24 %); the EU average (for available countries only) reaches 0.35 %. Slovenia is below average with 0.17 %, data for Greece, Sweden and Slovakia are not available.

Figure 5: R&D investments in the furniture sector, by country



4. Conclusions

Analyzing specifically wood sector apart from Sweden, in the other countries of the project partnership – Slovenia, Slovakia and Greece wood-related industries face difficulties: low capacity of adaptability to the new market environment (Slovenia and Slovakia), low potential to compete with other companies from the sector (Greece). Compared to the other economic branches wood-related industries show a very low level of innovativeness. Lack of innovativeness puts these sectors in a disadvantaged position, as innovativeness is a factor closely related to the competitiveness in the economy. In order the introduction of innovation to bring a real economic benefit to the sector, there is a need of a comprehensive approach based on the qualitative and quantitative evaluation of the advantages of innovation. Innovation has to be considered in all its different aspects: from technological innovation, through introduction of innovative market and human resources strategies, to establishment of a stable network between enterprises in the sector as a basis for innovation transfer and sharing of good practices.

The training model "I-Model" will directly address the identified needs of the wood related sectors for transfer of innovation providing methodology and materials that will support and stimulate innovation management in the companies. Thus it will favour the competitiveness of these sectors in the new knowledge based economy and will promote the cultural change in the EU companies in terms of valuing knowledge, education, innovations, creativity and sharing of knowledge.

Full version of this short edition is available at the following link:

http://www.innovation.si/documents/1_EU%20and%20National%20Analysis%20of%20the%20Present%20State%20of%20Affairs.pdf