

nind Policy Relevant Nordic Innovation Indicators

Intellectual Property Rights as indicators for innovation **PART ONE: International patent databases**

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Summary and recommendations

The focus in this part of *Intellectual property rights as indicators for innovation* is the application and development of indicators based on international patent databases. All indicators presented are based on the *applicants* of patent applications to the European Patent Office (EPO), making European comparisons fairly reliable (but giving USA and Japan a handicap) and focusing on the business sector (90% of applicants being enterprises). The nationalities of the *inventors* are also considered, when developing indicators for multinational patent applications. The Nordic countries have been defined as a new group – and so have also the non-Nordic EU-members as EU22 and the OECD-countries not among the Nordic or EU-countries as OECDrest. When using patents as indicators for innovation one should keep the advantages and disadvantages in mind, see the introductory chapter.

As the over-all indicator of applicants of patents the fractional counted² number of patent applications per country is **recommended**, measured per inhabitant and also per industry-financed R&D. Figure 3 illustrates that Finland, Sweden and partly Denmark is positioned among the best on these two indicators, while Norway is below the OECD-levels. Also, it is **recommended** to bring in the time series aspect, in Figure 4 as an index over the last 10 years. Here, Iceland, Finland and Denmark have increased more than the OECD-level, while Norway and Sweden are below.

Patent applications can be classified according to their main technical class, and it is **recommended** to use special aggregates of these classes for ICT, biotech and medicine to illustrate the position and development over time for the Nordic countries. In Figure 5a-c the strong position of Finland in ICT and of Iceland and Denmark in biotech and medicine are illustrated. Also Sweden has a strong position in medicine, but is lacking behind.

The technical structure of the patents of a country can be illustrated by calculating the relative specialization index (*RS*) for each technical class using OECD as a benchmark. The outcomes of *RS* vary from -1 to +1 and a positive *RS* reflects a higher share of that class than the OECD-level. This index may be used in more ways.

First, it is **recommended** to compare the *RS*-value of a given technical class for relevant countries. For ICT it is revealed that Finland along with The Netherlands are the most specialized, while Denmark is among the least specialized, see Figure 6. For biotech Iceland and Denmark are the most specialized, while Finland is among the least specialized.

Next, it is **recommended** to use the *RS*-values to compare the technical patent structure of different countries. The first radar in Figure 7 compares Denmark and Finland using a 7-class technical classification. These countries vary a lot in their patent structure, both internally and when compared. The second radar shows that Norway and Sweden have less variation and the structure is more alike.

Further comparisons of the technical structure are **recommended** for detailed analyses of patent data. By squaring the *RS*-values one gets an indicator of the difference between the technical structure of the OECD-total and each country. Figure 8 shows that Iceland, Finland, Luxembourg and Denmark have the largest differences from the OECD-total. Finally, a total picture of the differences between the technical structures of the countries can be estimated by calculating the squared differences between each combination of countries and use these differences as the distances in a Multi-Dimension Scaling Technique. Figure 9 reveals that the Nordic countries have very different technical patent structure, as Iceland, Finland and Denmark are situated in different outskirts of the 2-dimensional delineation.

In 2003, 31% of the patent applications of EPO included two or more countries among the applicants and inventors. It is **recommended** to analyse this source of international flow of know how by measuring the inflow (domestic applicants with foreign (co)inventors) and outflow (domestic (co)inventors to foreign applicants) for each country and the international cooperation between inventors.

The inflow is described in Figure 10-11. Iceland has a high level and Sweden and Finland have progressed well during the last 10 years, while Norway is lacking behind. The main region of inflow is the other EU-countries, but it varies among the Nordic countries.

The outflow is described in Figure 12-13. Iceland has a high level, while Finland is rather low. The other Nordic countries are all a bit higher than the OECD-level, but Sweden has increased the most. The main region of outflow varies much, but other Nordic countries have higher shares than with the inflows.

The net inflow is calculated as the inflow minus the outflow. Figure 17 reveals that Finland and Sweden has a high net inflow while Norway has a negative net inflow. In all, the Nordic countries are doing well compared to USA, Japan and EU22.

The international cooperation between inventors is described in Figure 14-15. Iceland has a high level, while the other Nordic countries are just a bit over the OECD-average – and Norway and Denmark are even lacking behind. The main region of the co-inventors is the EU22-countries, but also USA and other Nordic countries, especially Sweden, have a fair share.

A new worldwide patent database, called PATSTAT, has been developed by EPO in cooperation with OECD and Eurostat and it is now accessible for statistical producers and researchers. The database consists of raw data on some 60 mill. patents with rich information on each patent application including names, addresses, citations and claims.

The database has been investigated as part of the NIND-project and the **conclusion** of this is that many resources would be needed to develop National or Nordic indicators from PATSTAT for the moment. At the same time the indicators would be vitiated by a high degree of unreliability due to missing, misspelled or illegal values. In a few years OECD and Eurostat are expected to have improved the database and to have set up rules for editing and then indicators aimed at describing the National and Nordic patenting could be developed.

1. Introduction

Indicators on Intellectual Property Rights (IPR) may reflect the inventive performance of enterprises and of regions, sectors and countries. Such indicators may also reflect other dynamics of the innovation process, such as co-operation, globalisation and technical paths. IPR-based indicators can thus supplement other indicators on innovation and contribute to the understanding of the innovation system and the factors that support economic growth.

There are more types of IPRs:

- 1) **Patents** are exclusive rights issued by authorised bodies to inventors to allow them to make use of and exploit their inventions for a limited period of time, if the invention is novel, non-obvious and industrially applicable.
- 2) **Utility models** or “petty patents” are IPRs for simpler inventive steps than that in traditional patents.
- 3) **Trademarks** are words, phrases, symbols or designs, or combinations of words, phrases, symbols or designs, that identify and distinguish the source of the goods of one party from those of others.
- 4) **Designs** are compositions of lines, shapes, configurations or compositions of patterns or colors, or combinations of patterns and colors in three dimensional forms containing aesthetic value, provided that such compositions or forms give a special appearance to a product of industry or handicraft or can serve as a pattern for (such) a product.
- 5) **Copyrights** are exclusive legal rights granted to a writer, editor, composer, publisher or distributor to publish, produce, sell or distribute an artistic work.

Role as indicators for innovation:

IPR-statistics provide measures of innovation output, measuring many aspects of the inventive performance, including R&D. Conversely, IPRs may also be viewed as measures of innovation input, as they are bought or licensed and used as a source of information by subsequent inventors.

Measurement points:

The first measurement point is when an application of an invention (or another IPR) is handed in for the first time to a patent office, called the priority date, as this is closest to the invention itself.

The IPRs may be traded (sold or licensed) and this would be a relevant measurement point to describe the knowledge flows, see the Part on IPR trade.

Finally, the measurement itself is at the micro level, so the statistics may also be on micro level merging the information on IPR with other STI-statistics like innovation or R&D surveys, see the Part on the merging of IPR-data to innovation surveys. Indicators directly from the registrations of IPRs would most often be at National, sectoral or technical level.

This Part will **focus on patents** that are applied for at international patent offices. Although this involves a number of advantages, there are also certain **disadvantages**:

- The time lag from the first date of filing to the publication may be from minimum 18 months and up to 5 years. This means that the newest indicators presented here are based on 2003. OECD provides, however, nowcasts for the main indicators.
- The distribution of the value of patents is much skewed: a few has a substantial value, while many never generate any revenue.

- There are different traditions for patenting in different countries and industries and the patent laws and costs differ over time and from country to country.
- Many inventions are not patented, either because they are not patentable or there is no tradition for patenting or because other methods are used (secrecy, lead time).
- The indicators are to be based on registrations from one or more patent offices and this may give a “home advantage” to the locals.

Some of these drawbacks are addressed by the way the indicators are constructed, while others remain.

The main source for the patent indicators presented in this part will be the OECD database on international patents, see Chapter 2. Also the new patent database PATSTAT that was released last year by EPO will be considered, as this database includes micro-based information from around 80 patent offices with identification of applicants and inventors by name and address and with rich details on the application, see Chapter 3.

2. Patent indicators based on the OECD database

OECD and the international patent offices have been putting much effort into the creation of a patent database to be used for developing indicators in the Science- and Technology-domain. This database includes patent applications and grants from the European, the US and the Japanese patent offices, making it possible to construct statistics on 3 kinds of international patents: European patents (EPO=European Patent Office), US-patents (USPTO=US Patent Office) and Triadic (patent families applied for at EPO and JPO (Japanese Patent Office) and granted by USPTO)¹.

The patents are identified by the countries of the applicant and inventor(s), and by the classifications used by EPO (called the IPC-classification); USPTO has another classification. The principle of fractional counts² is used except for multinational counts³.

The indicators presented will all refer to the OECD patent database. However, it has not been possible just to compile the indicators from the OECD patent database. First of all, the Nordic countries are not defined as a geographical area (like EU25 and OECD are) and also EU22 and OECD-rest had to be defined to prevent overlapping area. Finally, some recalculations have been done to improve the usability of the indicators.

It has been decided to present indicators, based on applications to the European Patent Office (EPO), putting focus on Nordic vs. other European countries. One graph does include patent applications from the US Patent Office to illustrate the difference. Mostly, the number of *applicants* for each country is used – and not *inventors* – as the indicators relate to innovation in the business sector⁴. In this way the patents counted will in most cases be the result of intramural innovation activities in the enterprise or acquisitions of enterprises of know how through patents from some other source, including from abroad. Special indicators will inform on the level of cross-border patents – that is patents with more than one nationality among the applicant and inventor(s). A fairly fixed set of countries and geographical areas have been chosen when comparing countries. Focus is on European countries supplemented with USA, Japan and in some cases China.

¹ See: www.oecd.org/document/10/0,2340,en_2649_34451_1901066_1_1_1_1,00.html

² If a patent for instance has one Swedish and three Finnish inventors, then the patent is counted as 0.25 for Sweden and 0.75 for Finland.

³ Here, a patent counts as many times as there are countries involved, that is 2 in the example of the footnote above.

⁴ Nearly 90% of all EPO patent applications in 2003 were applied by the business sector.

2.1 Total number of patents

The total number of applicants for patents can give an overview of the level of ownership of patent application in each country and area. The levels depend however on at which patent office the applications are registered. To illustrate this – and further arguing for using the EPO-applications – Figure 1 shows both the EPO- and USPTO-applications.

Also, as countries and areas differ in size, one need to normalize the number of patent applications by some measure of the size – or effort – of the country. Most often used is the population, so in **Figure 1** the patent applications of each country and area are divided by millions of inhabitants for that country/area.

Figure 1: Applicants of EPO+USPTO-patents per mill inhabitants, 2003

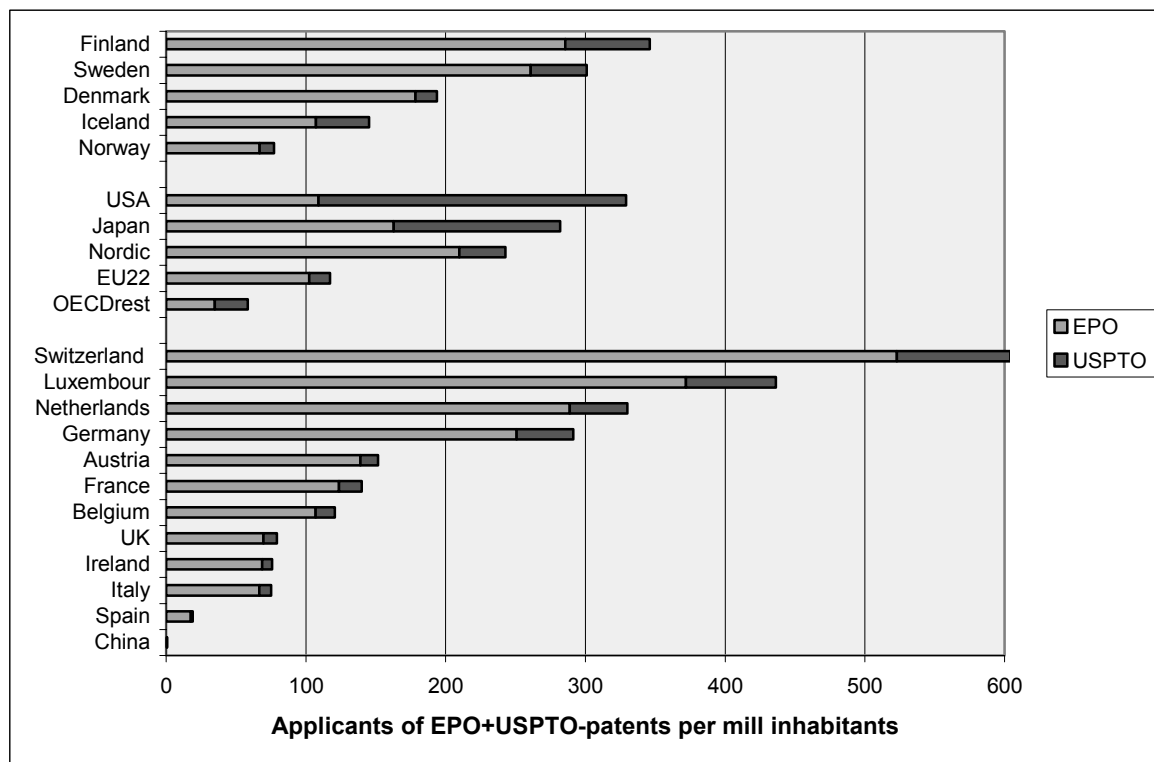


Figure 1 shows the patent applications per million inhabitants in 2003 to EPO and USPTO, sorted by country/area according to the applicants. First, the results of the 5 Nordic countries are presented, then the results of selected geographical areas and finally for selected European countries⁵. Only USA has more USPTO-applications than EPO-applications with US-applicants, and apart from Japan the share of USPTO-applications is fairly stable for the rest of the countries. The EPO-patenting is thus giving a fair picture of the level of patenting among European countries.

By choosing the nationality of the applicants instead of the inventors when counting patent applications the focus is on the innovation of enterprises. This level is compared with the nationality of the inventors of the patent applications in **Figure 2** by showing the ratio between the number of national applicants and national inventors for each country. The calculation is for EPO-patent applications in 2003 and for the same countries

⁵ The figures for Iceland and Luxembourg are very small and thus very volatile.

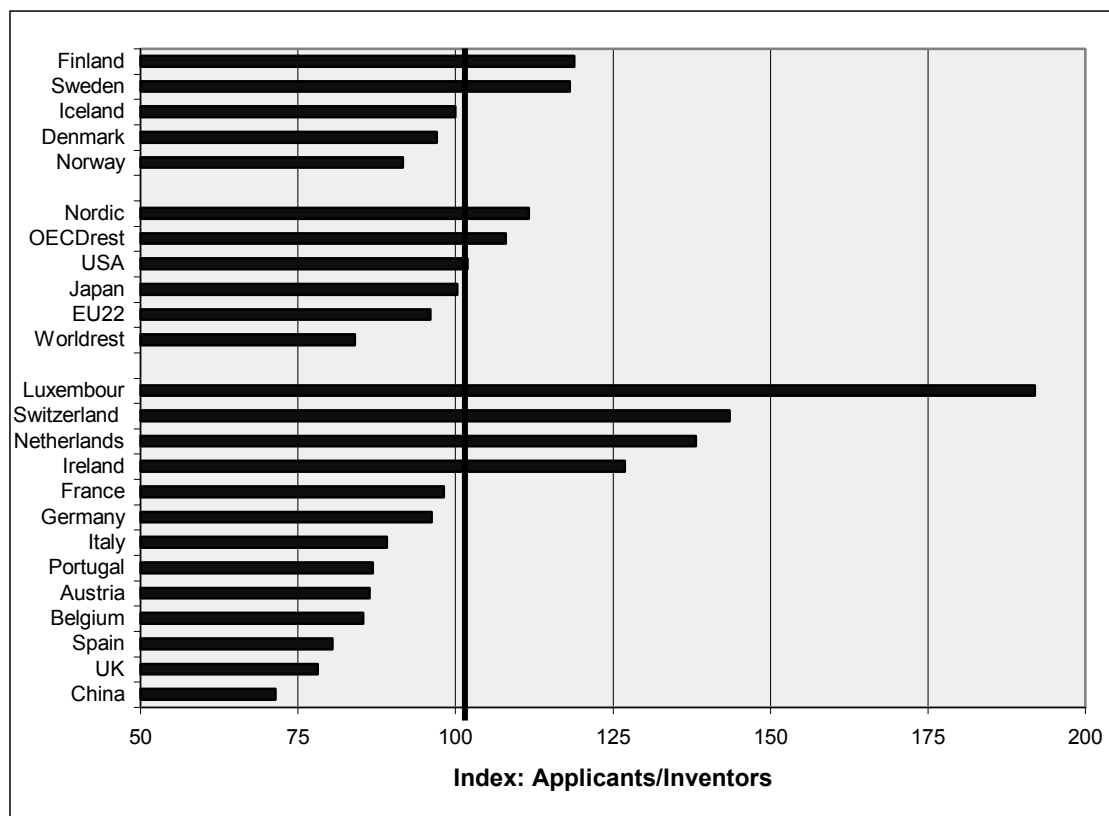
OECDrest is a heterogeneous group of countries: Canada, Australia, New Zealand, Switzerland, Korea, Mexico, Turkey.

EU22 is the countries in EU25 excluding the 3 Nordic member states.

Worldrest (see Figure 2) is all countries that are not a member of OECD or EU25.

and areas as in Figure 1. Countries/areas with more national applicants than inventors (index>100) like Finland and Sweden seem to be net importer of know how through patents. However, for countries like Netherlands and Ireland part of the explanation is that many multinational companies have decided to apply for EPO-patents through their European headquarters in these countries. Also, quite a share of the patent applications is multinational, see Section 2.3.

Figure 2: Index of Applicants to Inventors of EPO-patents, 2003



Measuring the patent applications against the population size – as in Figure 1 – does not take into account the resources of each country for being innovative. One such measure is the Gross Domestic Product (GDP), also being used when comparing R&D expenditure. The number of applicants of EPO-patents divided by GDP for each country can be compared with the applicants of EPO-patents per mill inhabitants. However, the coefficient of determination (R^2) between the two indicators is 98.0 %⁶. This means that not much extra information about the position of the countries is provided by adding the GDP-ratio.

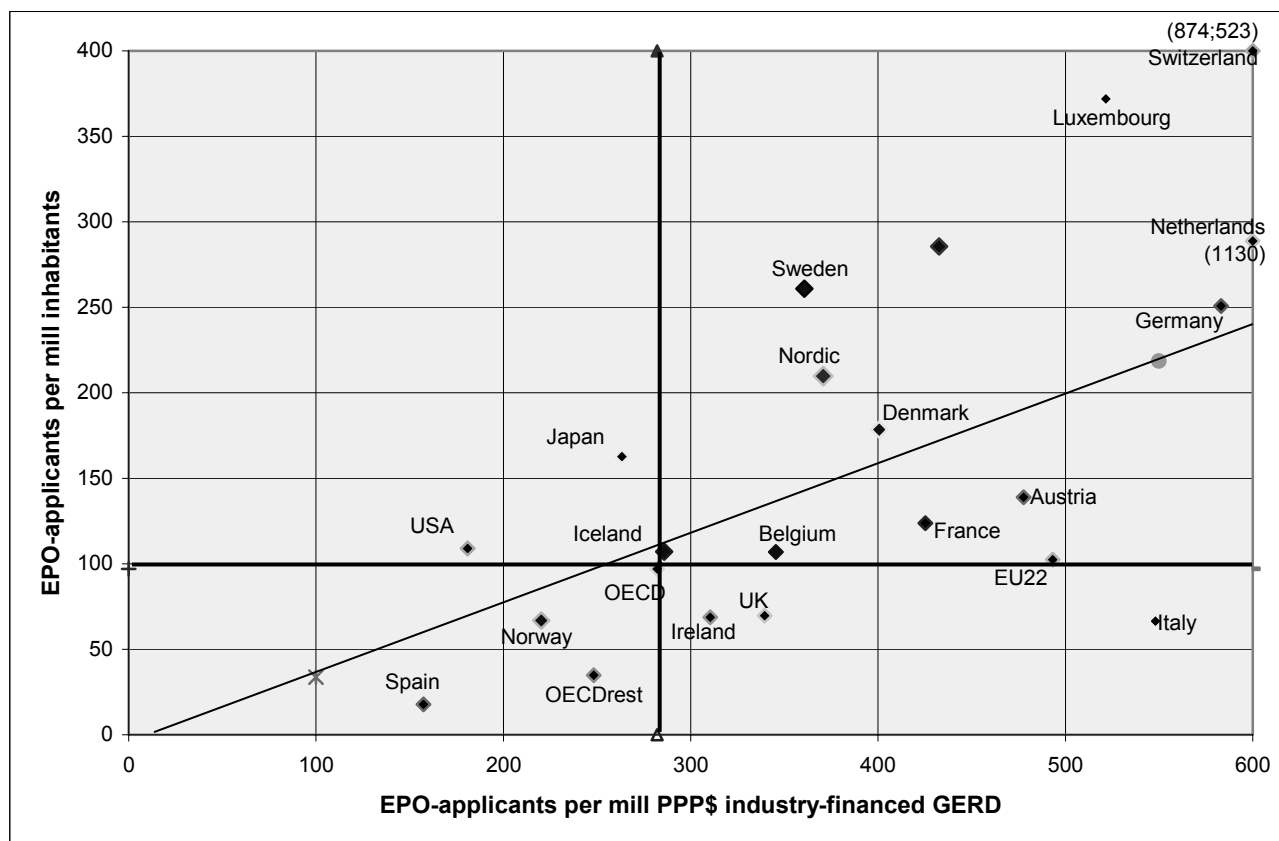
Instead, some measure of the innovation activity may be used. The innovation expenditure cannot be a candidate due to the measurement problems reported, so the total R&D expenditure (Gross Domestic Expenditure on R&D = GERD) may be used as a proxy. Further, when measuring the *applicants* of patents, a more relevant yardstick would be the part of the total R&D expenditure that the business sector is funding⁷. This measure is used in the scatter plot of **Figure 3** with the applicants of EPO-patents per mill inhabitants.

⁶ Excluding Switzerland and Luxembourg.

⁷ Used by OECD, see *Compendium of Patent Statistics 2006*, Table 1.5.

Here, the countries are much more scattered than when using GDP, as the R^2 is only 29.5 %⁸. More information is thus obtained by studying Figure 3 than using GDP as yardstick or studying Figure 1.

Figure 3: Applicants of EPO-patents per mill inhabitants and PPP\$ industry-financed GERD, 2003

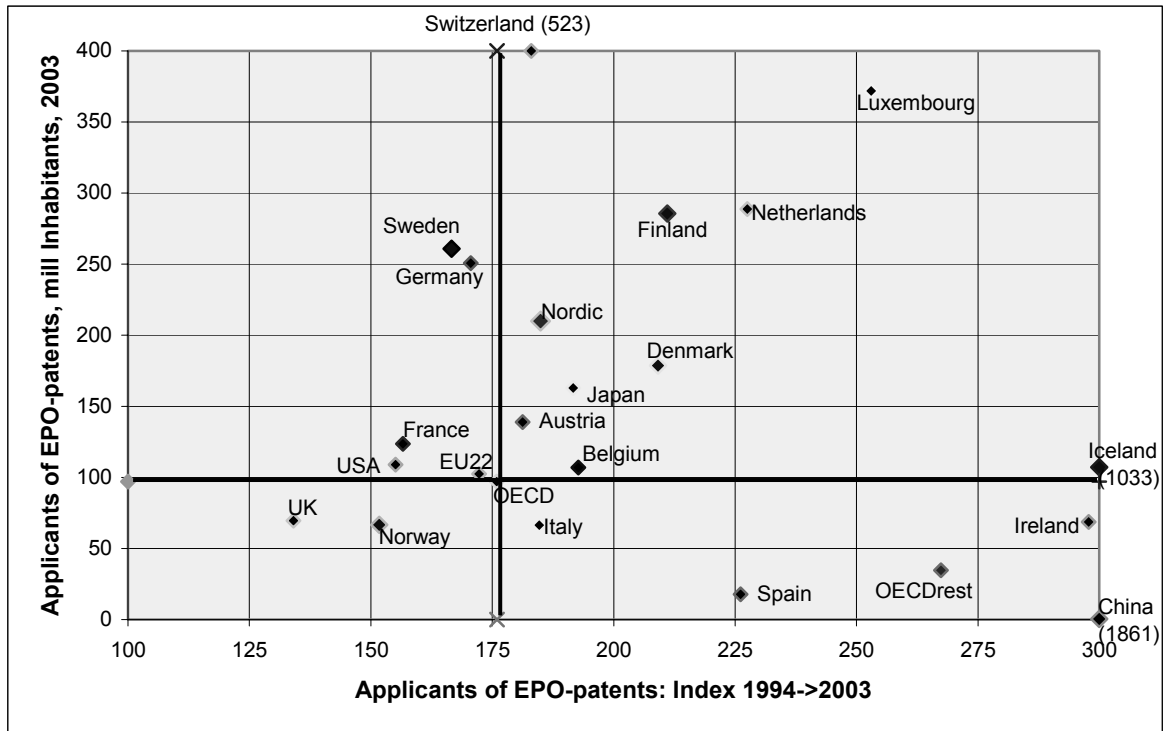


The interpretation of the scatter plot is that being above both OECD-levels like Finland, Sweden and Denmark tells that more applications of EPO-patents than expected for the given level of population and industry-financed GERD have been applied for. A position like the Italian tells that Italy is getting more than average applications for their industry-financed GERD, but population-wise Italy is below the OECD-level. Norway is below both OECD-levels.

Finally, the time series aspect needs to be brought into the patent indicators for innovation to illustrate the development in patent applications over the years for each country. The traditional way to illustrate time series is a graph with curves for each country over the years. Here, a scatter plot is proposed with the changes in the number of applicants of EPO-patents in the form of an index from 1994 to 2003 as X-values while the Y-values are the 2003-figures per mill inhabitants, see **Figure 4**. Again, the OECD-level can be used as benchmark, both for level and growth of the number of applicants of EPO-patents. A position to the upper right of the OECD-levels reports a higher number of applicants per mill inhabitants and a higher increase from 1994 to 2003 than the OECD-level, see for instance Finland and to a lesser degree Denmark. Some countries are only higher on one of the dimensions, like Iceland (high progress since 1994) or Sweden (high level of applicants of EPO-patents), and some countries are below the OECD-level of both dimensions, like Norway and UK.

⁸ Excluding Switzerland and Netherlands.

Figure 4: Applicants of EPO-patents per mill inhabitants and indexed, 1994, 2003



2.2 Technical groups of patents

All patents are classified in one or more classes according to the “International Patent Classification”, IPC, by EPO, one of the classes being the primary one in the patent application. The classification involves 8 main classes, but they are not well suited as indicators for relevant technical groups. Instead, new groups have been defined on basis of the detailed EPO-classification by OECD and EUROSTAT. The most used ones are technical groups for ICT, Biotech and Medicine. Also, groups for nanotechnology, environmental technologies etc. have been defined in various statistics.

For each of the technical groups the same indicators as for the total number of patent applications can be calculated. Here, the most used groups will be illustrated with the graph used in Figure 4, see **Figure 5**.

Figure 5a: Applicants of ICT-patents per mill inhabitants and indexed, EPO, 1994, 2003

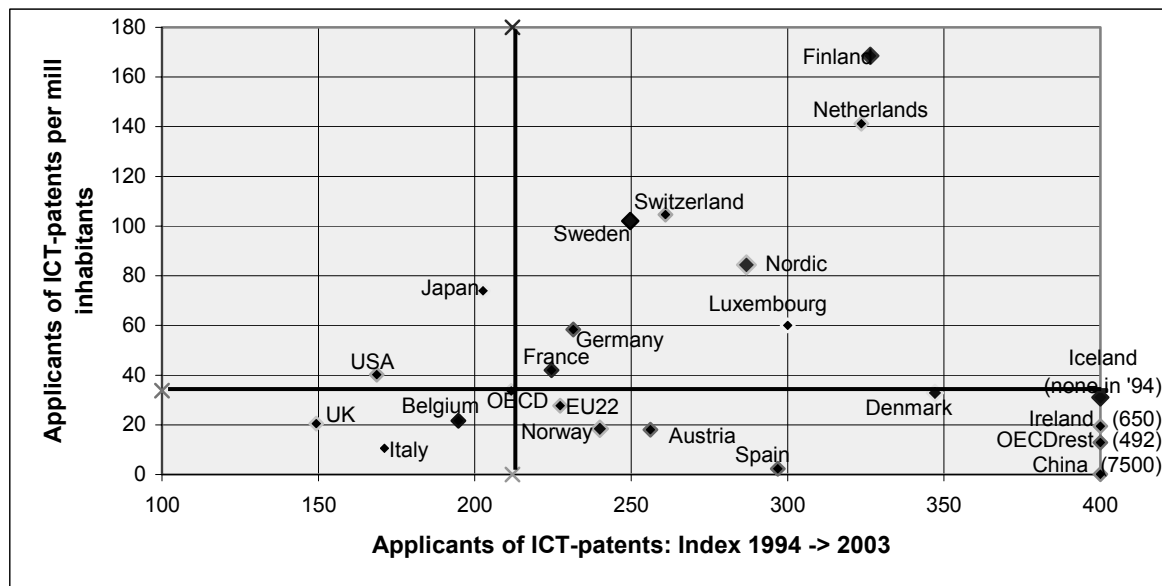


Figure 5b: Applicants of Biotech-patents per mill inhabitants and indexed, EPO, 1994, 2003

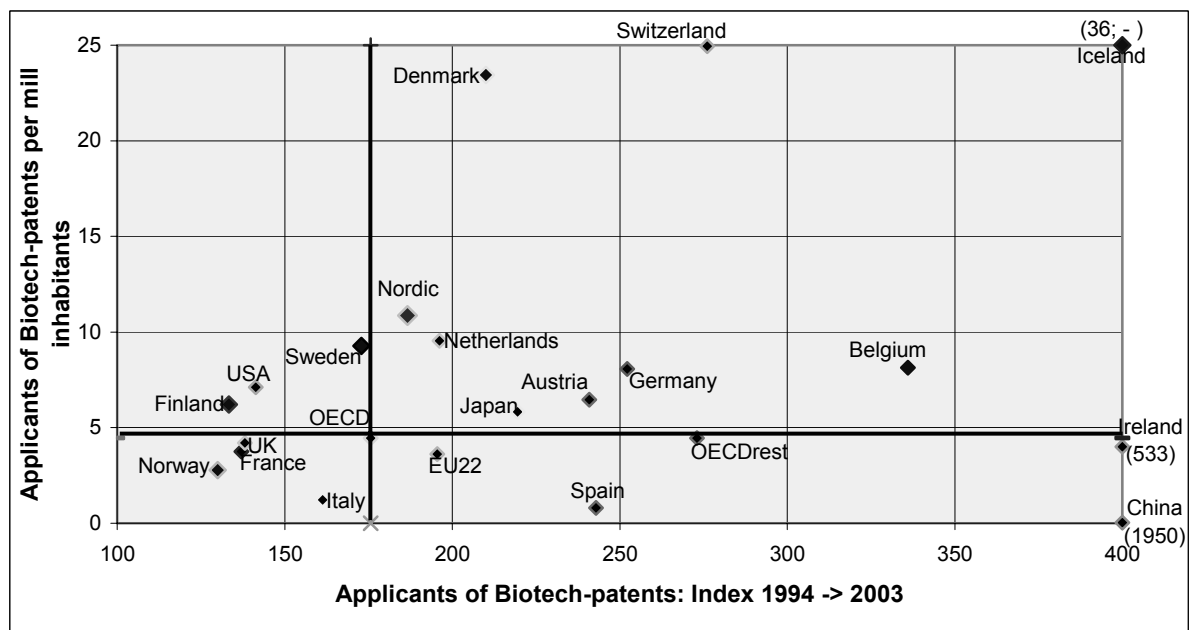
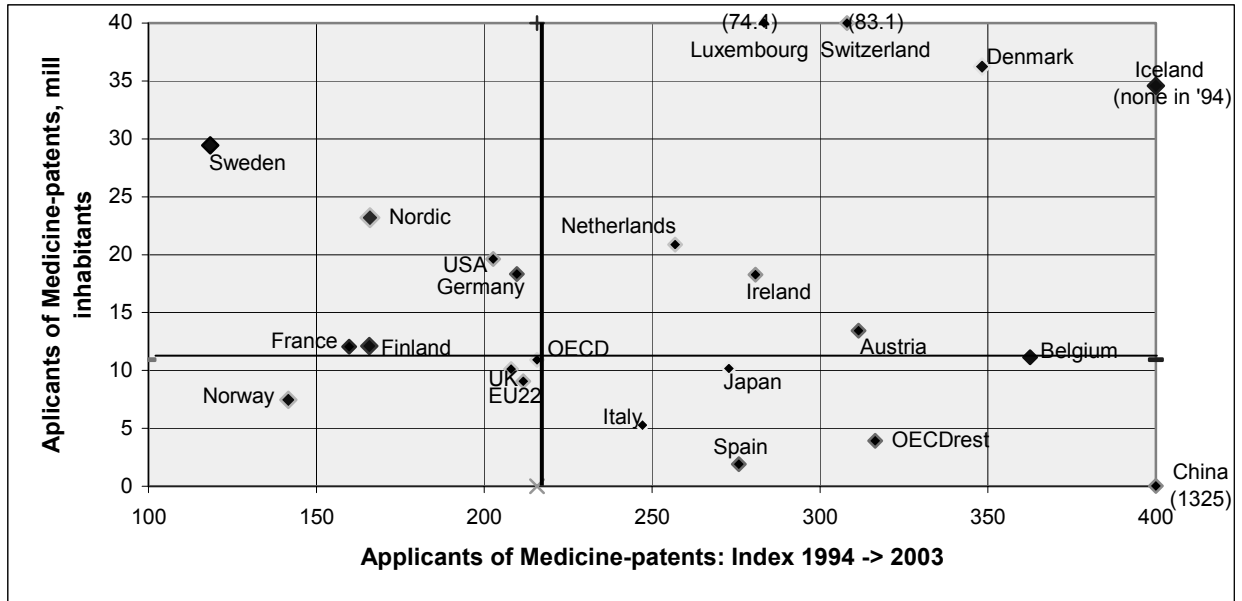


Figure 5c: Applicants of Medicine-patents per mill inhabitants and indexed, EPO, 1994, 2003



For the applicants of ICT-patents, Finland is high above the OECD-levels, and also Sweden is above. Iceland and to a lesser degree Denmark and Norway have had progress above the OECD-level from 1994 to 2003. For the applicants of Biotech-patents, Iceland and Denmark is above both OECD-levels, while Finland and Norway have had a lower increase than the OECD-level. For the applicants of Medicine-patents, Iceland and Denmark are high above the OECD-levels, while the other Nordic countries are lacking behind with less progress than the OECD-level. Sweden has, however, a level of national applicants close to the levels of Iceland and Denmark.

These indicators for specific technical groups describe the situation for each country regarding the group, but it does not give a full indication of the significance of these groups for all patent applications of a country and neither compared to other countries. This can be illustrated in two ways.

First, the relative specialization of a technical group can be compared between countries, using the relative specialization index⁹. This index gives a value for the specialization on a scale from -1 to +1. A benchmark has to be defined, often set to the OECD-level. A value of 0 for a country will then equals the share of OECD for that technical group and a positive value tells that the country is more specialized for that technical group. The calculation goes like this:

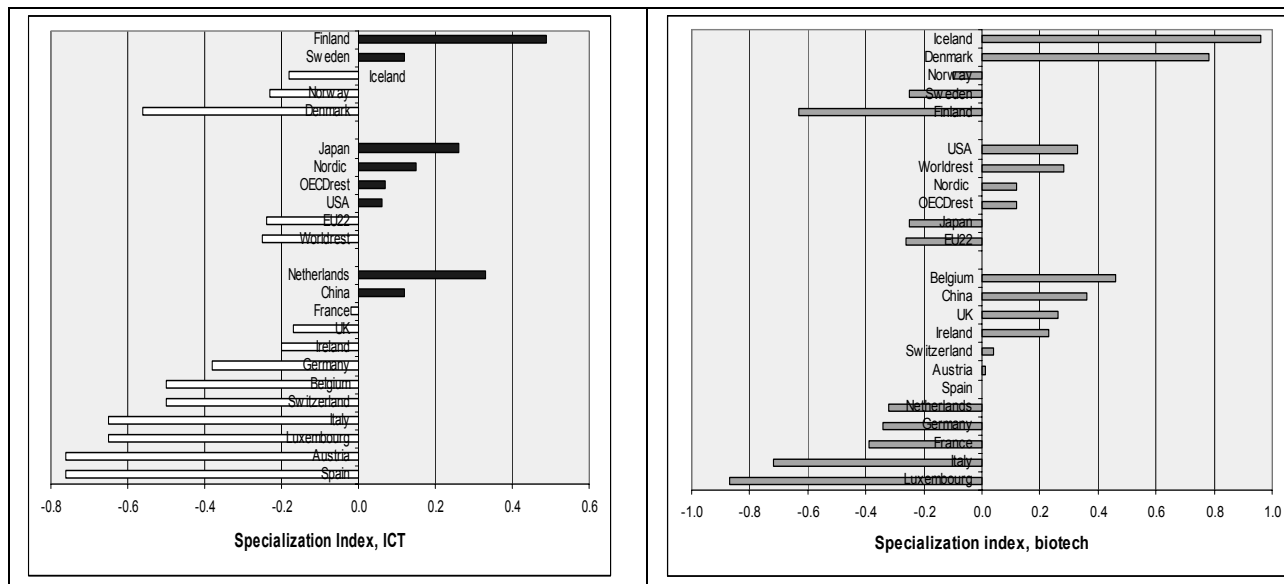
$$\text{Relative specialization index} = RS_{it} = \frac{\left(\frac{P_{it}}{P_{i.}}\right)^2 - 1}{\left(\frac{P_{it}}{P_{i.}}\right)^2 + 1}$$

where $P_{i.}$ is country i 's share of all patent applications of the benchmark area (=OECD), no matter which group and P_{it} is the same share within (technical) group t .

⁹ See Compendium of Patent Statistics, Annex B, OECD, 2005

In **Figure 6** the specialization index is calculated for the ICT and Biotech groups. For ICT, only a few countries have specialized more than the OECD-average, while the Biotech group is more spread out. In both groups 1-2 Nordic countries are among the most specialized in the group.

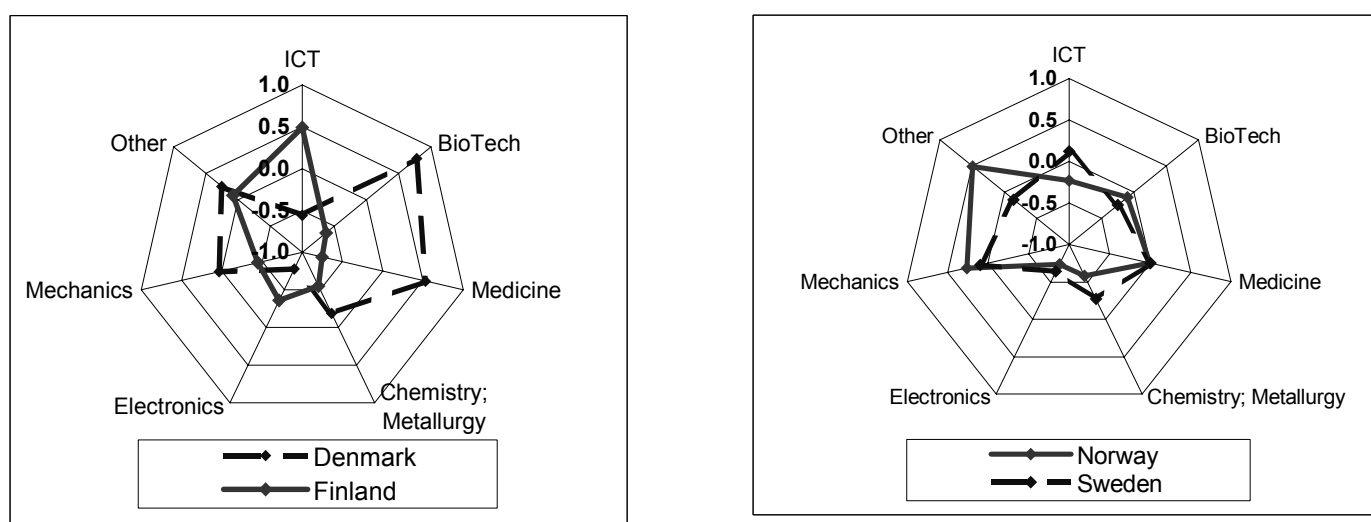
Figure 6: Specialization index for ICT and biotech, applicants of EPO-patents, 2003



To give a picture of the full technical structure of the patent applications of a country one needs to assign each patent to a technical group. In Annex 1 a concordance between the IPC-codes and 7 technical groups is established, the 7 groups including ICT, Biotech and Medicine, part of three of the IPC-groups and an “Other”-group. Other groupings may of course be possible and relevant.

The specialization index for each technical group of a country or area can be calculated and illustrated by a radar graph. In **Figure 7**, Denmark and Finland are compared in one graph and Norway and Sweden in another. While Denmark and Finland are highly specialized and there are large differences in the Danish and Finnish specialization indices, the Norwegian and Swedish specialization indices are rather close and not very specialized – but still the Finnish and Swedish levels of patenting are higher, see Figure 4.

Figure 7: Specialization index for technical groups, applicants of EPO-patents, 2003



The radar graphs tell that some countries vary more from the OECD-distribution of patents in the 7 technical groups than others – and are thus specializing in one or more technical groups compared to the OECD. An indicator of the degree of specialization of each country compared to OECD can be calculated by squaring and summing the specialization indices of each country and area. The calculation goes like this:

$$s^2(RS_i) = \sum_t (RS_{it})^2$$

where i is the country and t is the technical groups

and the relative specialization indices (RS) are still calculated with OECD as the benchmark.

This indicator is illustrated in **Figure 8**. One can see that the degree of specialization varies much from country to country and from area to area. One reason seems to be the size of the country. Three of the Nordic countries, Iceland, Denmark and Finland, are among the 7 most specialized.

Figure 8: Deviation from the OECD-distribution of technical groups, squared Specialization Index, applicants of EPO-patents, 2003

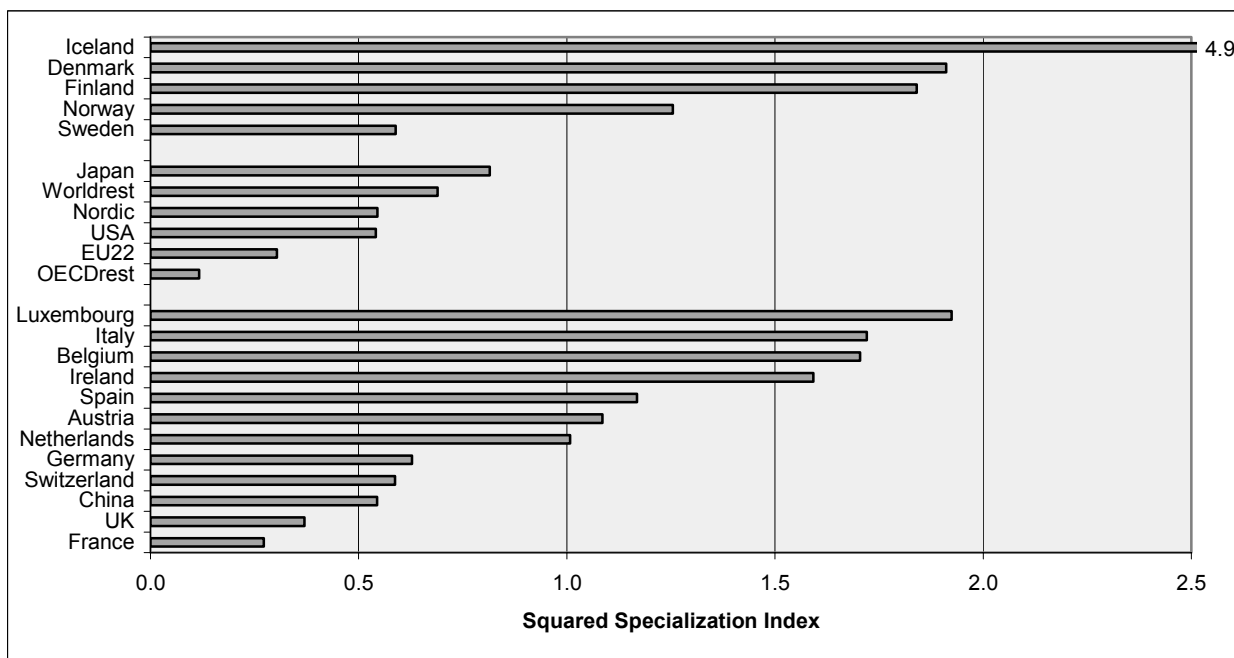


Figure 8 only describes the deviation between OECD and each of the countries/areas. It would give further insight in the different distribution of the technical groups to describe the deviation between a country and each of the other selected countries and areas. However, such an indicator would result in many numbers – with 19 countries/ areas one would need 18 figures for each country. Instead the MDS-technique¹⁰ may be used to position each country in a two-dimensional scatter plot in such a way that the distances between any two countries reflect the deviation between them, measured as the squared differences in their specialization indices, in the best possible way.

¹⁰ A Multi-Dimensional Scaling technique compresses the dimensions of a set of observations to a lower number of dimensions, often only two, minimizing some measure of deviation between the real distance between the observations and the distance according to the MDS-calculations. Sometimes, it is possible to baptise the two dimensions, eventually after a rotation.

The calculation goes like this:

$$s^2(RS_{ij}) = \sum_t (RS_{it} - RS_{jt})^2$$

where i and j are the two countries/areas and t is the technical groups.

Figure 9: MDS-analysis of structure of technical groups, applicants of EPO-patents, 2003

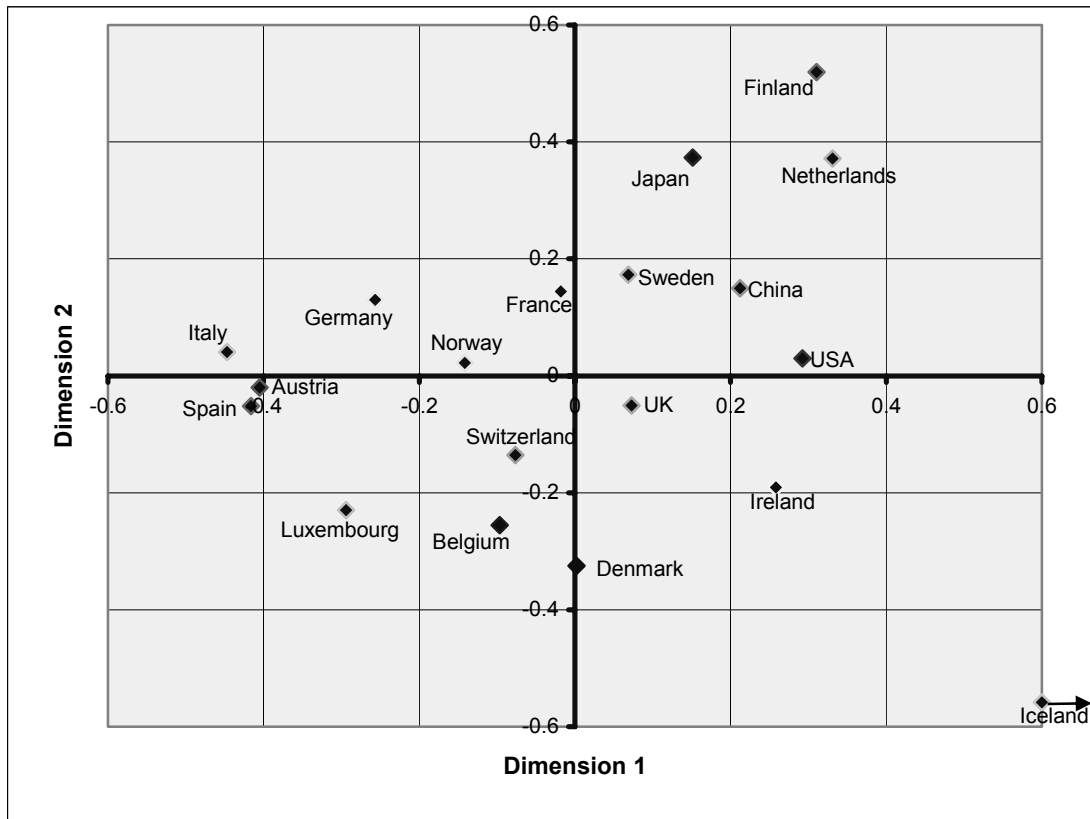


Figure 9 shows the result of a MDS-analysis of the 19 countries used in most of the graphs. Three of the Nordic countries are in the outskirts of the graph, Iceland, Finland and Denmark and this is a sign of high specialization. However the three countries are in different parts of the graph illustrating that the differences between the technical structures of the patent applicants of the Nordic countries are large, and even larger than between other countries.

The closest neighbours can be identified for each country, for instance are China and France the closest neighbours for Sweden, so the distribution of Swedish patent applicants over the 7 technical groups is close to the French and Chinese.

2.3 Multinational patent applications

At least one applicant and one inventor are included in all patent applications. These two legal entities need not be the same and they need not come from the same country. Also, there may be more inventors mentioned in a patent application, eventually from different countries. The OECD patent database makes use of this information, so counts of patent applications¹¹ with more than one country involved can be produced. This facility will be used here to develop some indicators on multinational patenting from the point of view of the Nordic countries.

It is worth stressing that the indicators need to be interpreted with caution. Generally, knowledge flow across the borders through multinational patents is regarded positively. However, a patent is giving the applicant the sole right to use (or sell or license) an invention, so seen from a National point of view one would prefer patent applications with domestic applicants and foreign (co)inventors for patent applications with domestic inventors and foreign applicants. Another aspect is that the National applicant may be a multinational company with headquarters in another country. This can only be analyzed with access to micro data, see Section 3.

The OECD patent database makes it possible to classify any patent application from a country into one of five classes, depending on the multinational elements of the patent:

Applicant	Inventor(s)
Domestic	Domestic
Domestic	Domestic & foreign
Domestic	Foreign
Foreign	Domestic
Foreign	Domestic & foreign

First, a set of indicators for different ownership and invention will be presented and then the same set of indicators will be used for illustrating the amount of cooperation between domestic and foreign inventors. The full classification will be illustrated in one single graph for all countries and finally the net share of ingoing and outgoing inventions will be presented.

Indicators for patent applications from **domestic applicants with foreign (co)inventors** tell to which degree know how is brought into the country from abroad through patents. The same graph as in Figure 4 and 5 will be used for illustrating the share of patent applications with foreign (co)inventors for 2003 and the growth in this share since 1994, see **Figure 10**.

The shares and the growth rates vary much between the 19 countries, with high shares for some smaller European countries, but the shares being a bit lower for the Nordic countries. Regarding growth Sweden and Finland have experienced two of the highest, while Norway has experienced a decline.

The OECD database also gives information on which country the (co)inventor(s) come from. This makes it possible to count the number of (co)inventors from different areas for each country, see **Figure 11a**. The (co)inventors are sorted in 5 geographical areas.

The EU22 has a dominant role as supplier of inventors to patent applications of other countries, but also USA is supplying well. This observation is also valid for the Nordic countries, but also inventions from other Nordic countries play a role.

¹¹ The principle of fractional counting is not used here, as the number of patent applications with more countries involved is the object of the indicators.

Figure 10: EPO-applications of domestic owned patents with foreign (co)inventors, 1994, 2003

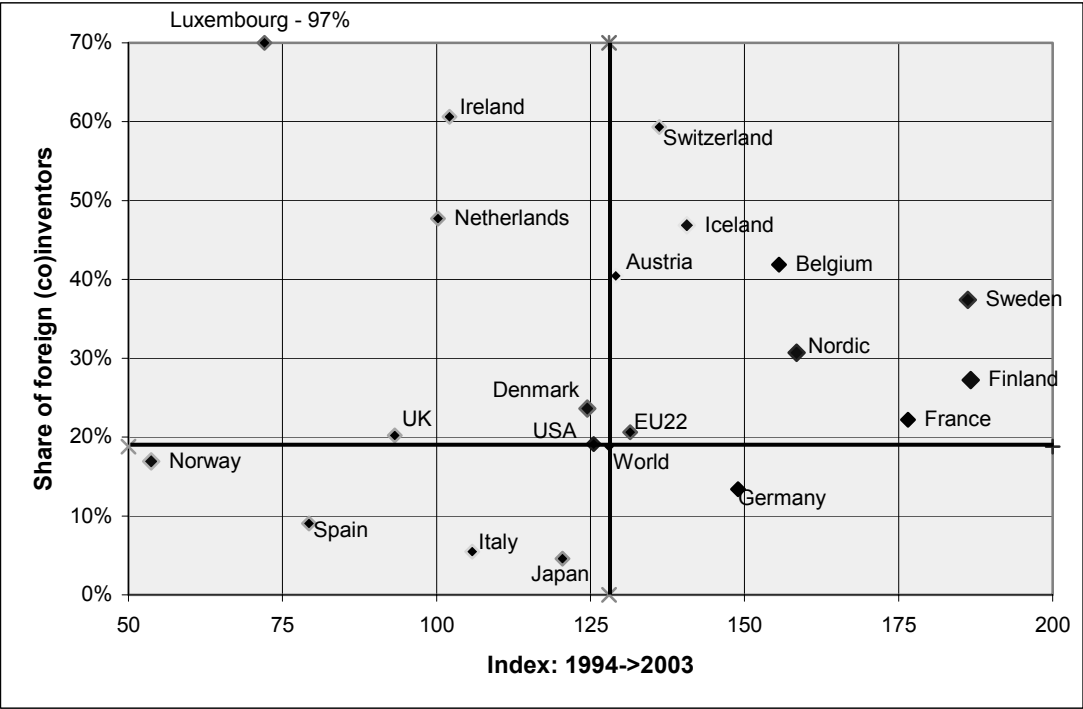
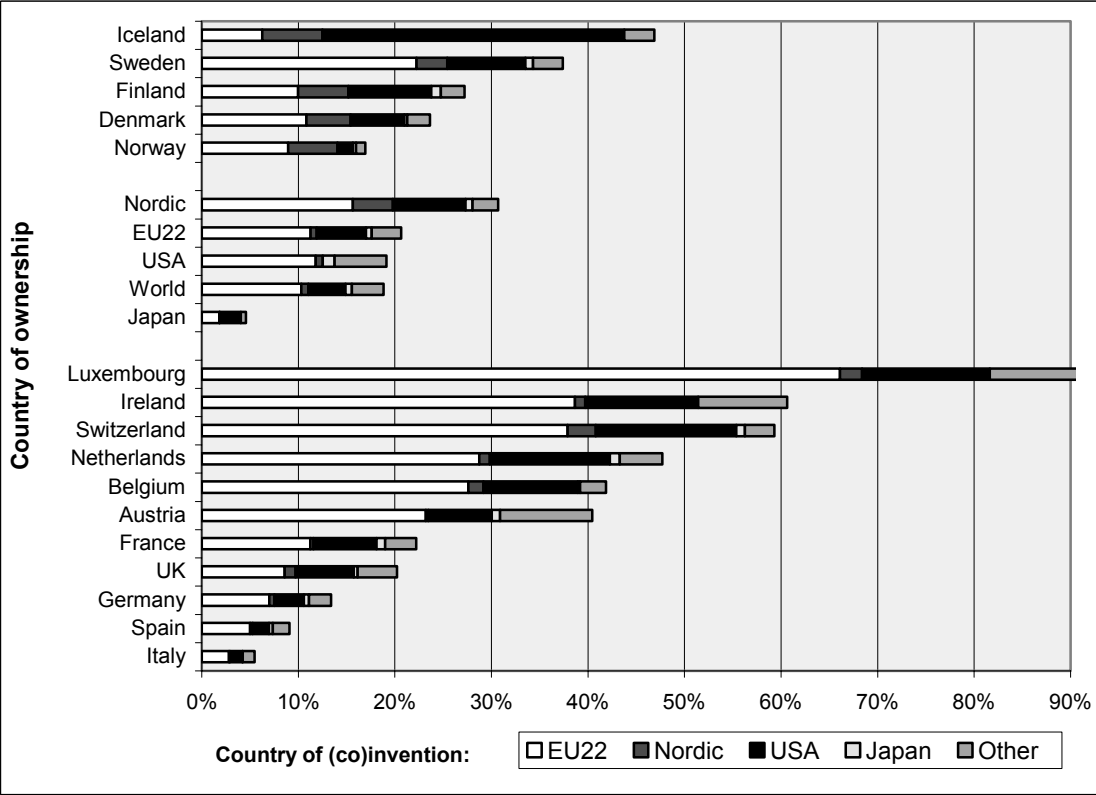
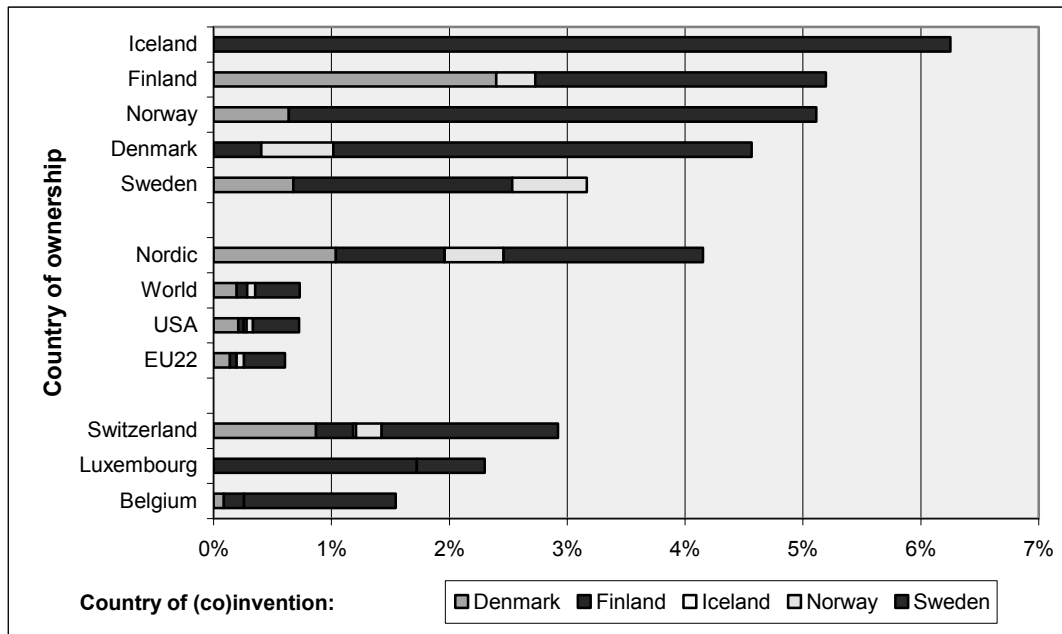


Figure 11a: Applications of domestic owned patents with foreign (co)inventors, EPO, 2003



In **Figure 11b** a special focus is on the Nordic countries as (co)inventors. The shares are rather small, and most are intra-Nordic relations. Sweden is the main country of the Nordic (co)inventors. Only three none-Nordic countries have Nordic (co)inventors in more than 1% of their patent applications.

Figure 11b: Applications of domestic owned patents with Nordic (co)inventors, EPO, 2003



The total supply of know how to other countries via EPO-patents is measured as the share of all patents with **domestic (co)inventors, but foreign applicants**. This indicator is calculated and presented in **Figure 12**, which is structured like Figure 10.

None of the Nordic countries are supplying much more than the world-average, and Finland is supplying much less. The shares have even declined since 1994 for the Nordic countries except Sweden.

A mixed pattern evolves when the country of ownership is analysed for each country's inventions, see **Figure 13**.

For the Nordic countries all 4 geographical areas (EU22, USA, (other) Nordic countries, Other) plays a role as owners, see part a. Also, Nordic countries play a minor role as owners in most other countries except UK and The Netherlands, Sweden being the main country of foreign ownership, see part b.

Figure 12: EPO-patent applications of domestic inventions with foreign ownership, 1994, 2003

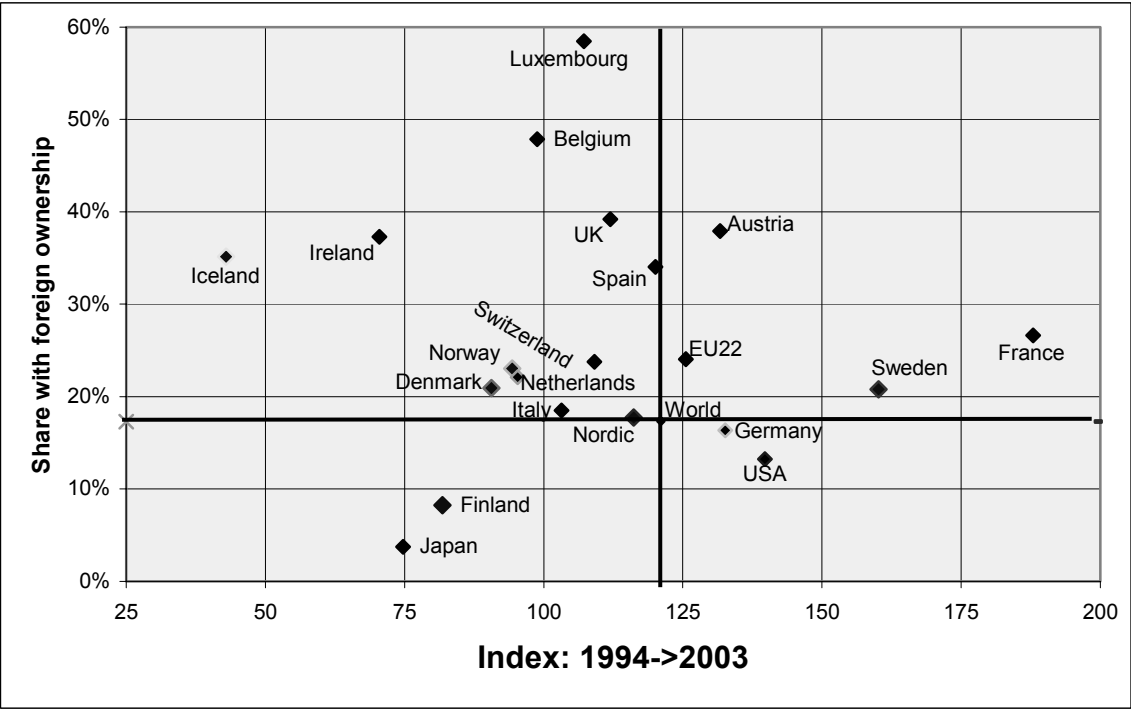


Figure 13a: Patent applications of domestic inventions with foreign ownership, EPO, 2003

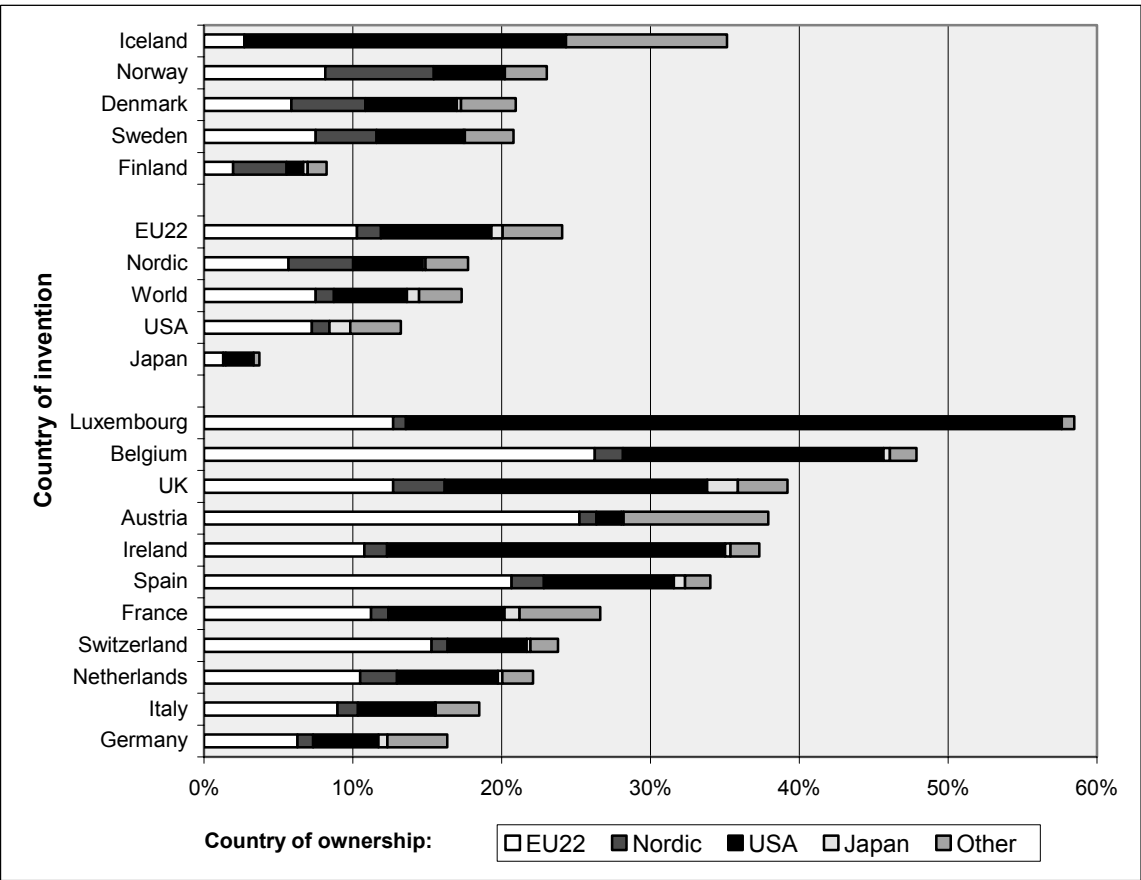
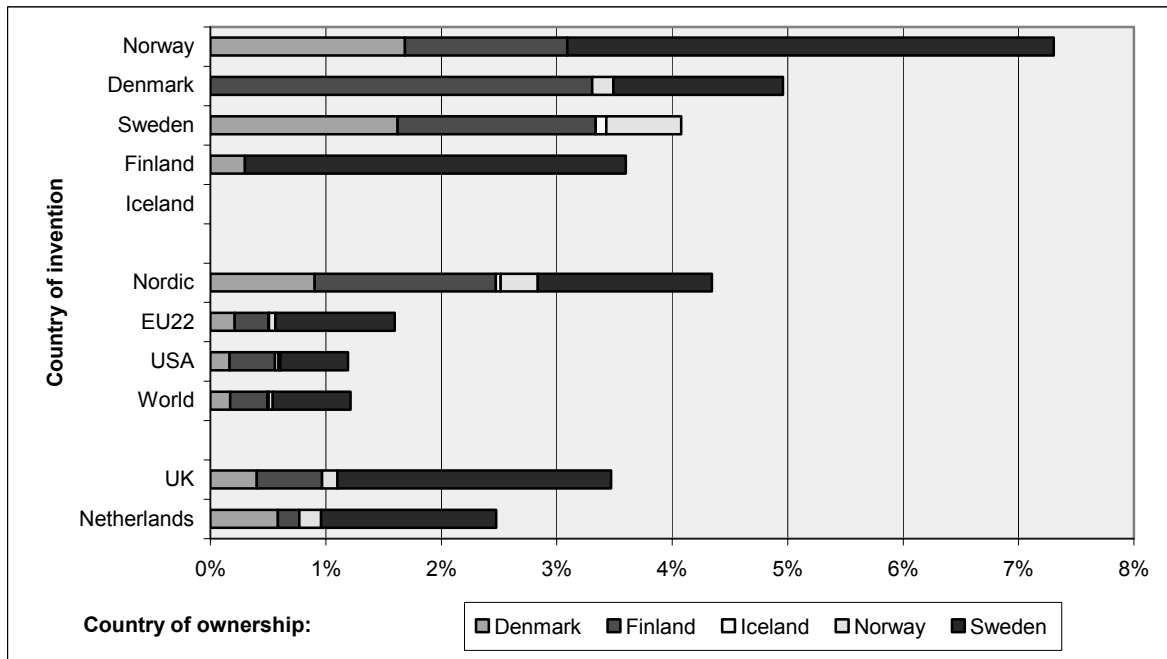


Figure 13b: Patent applications of domestic inventions with Nordic ownership, EPO, 2003



A third aspect of international cooperation on patent applications is the **share of applications with inventors from more countries**. Here, the focus is solely on the inventors, but still it is a relevant indicator also for innovation, illustrating the level of international cooperation of the inventors of a country. Micro data analysis could tell from which sectors the innovators come: Business, University, Other governmental or Private Non-profit.

Figure 14: Patent applications with domestic and foreign co-inventors, EPO, 1994, 2003

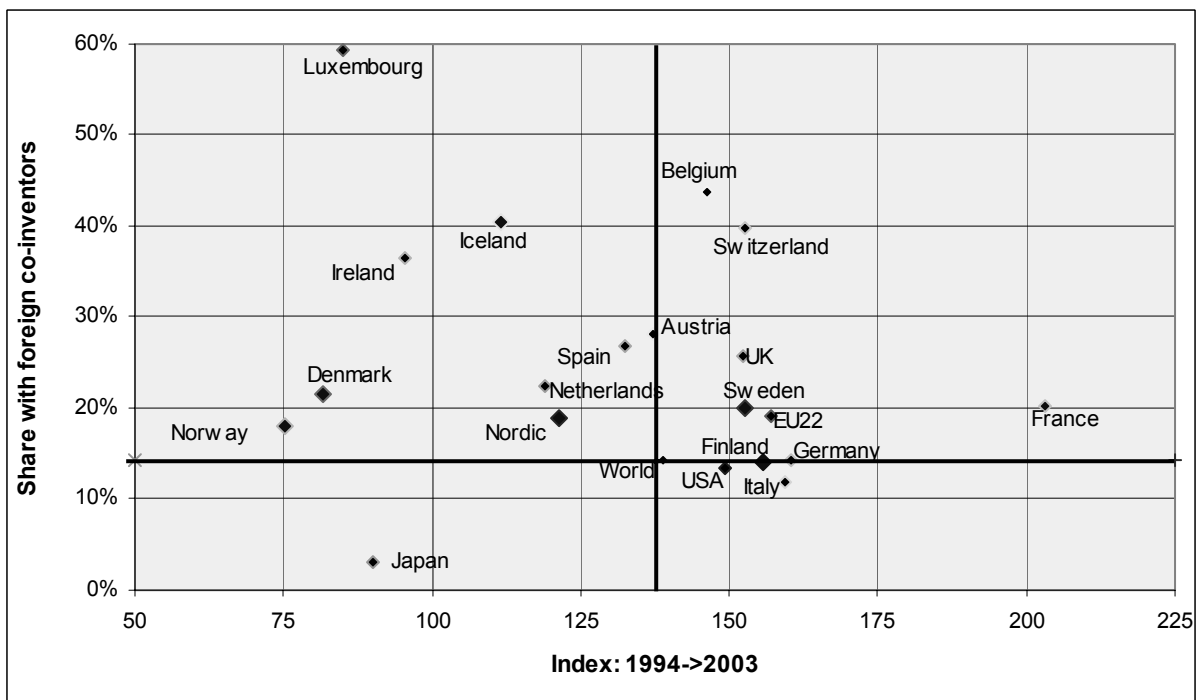


Figure 14 presents the cooperation shares in the same way as Figure 10/12. Generally, the Nordic countries are not in front of this indicator, but just a bit over the World-average. Denmark and Norway have even experienced a decline since 1994.

Figure 15a: Patent applications of domestic inventions with foreign co-inventors, EPO, 2003

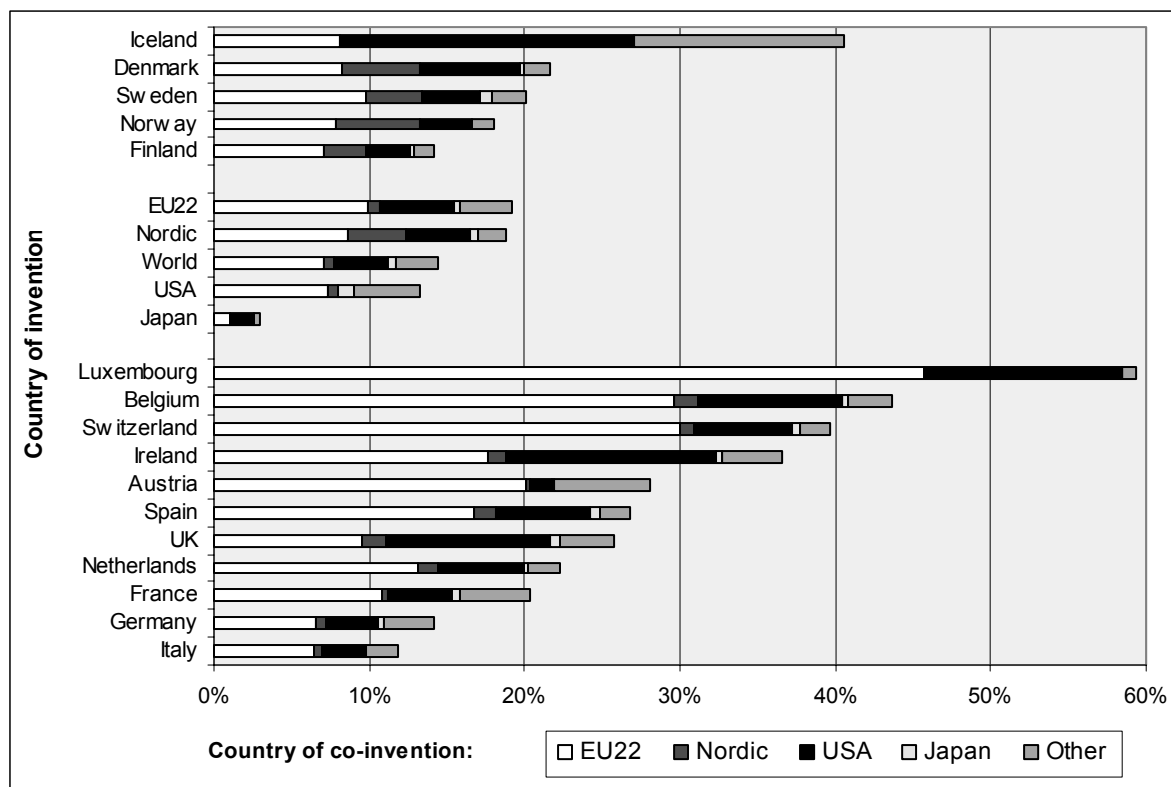
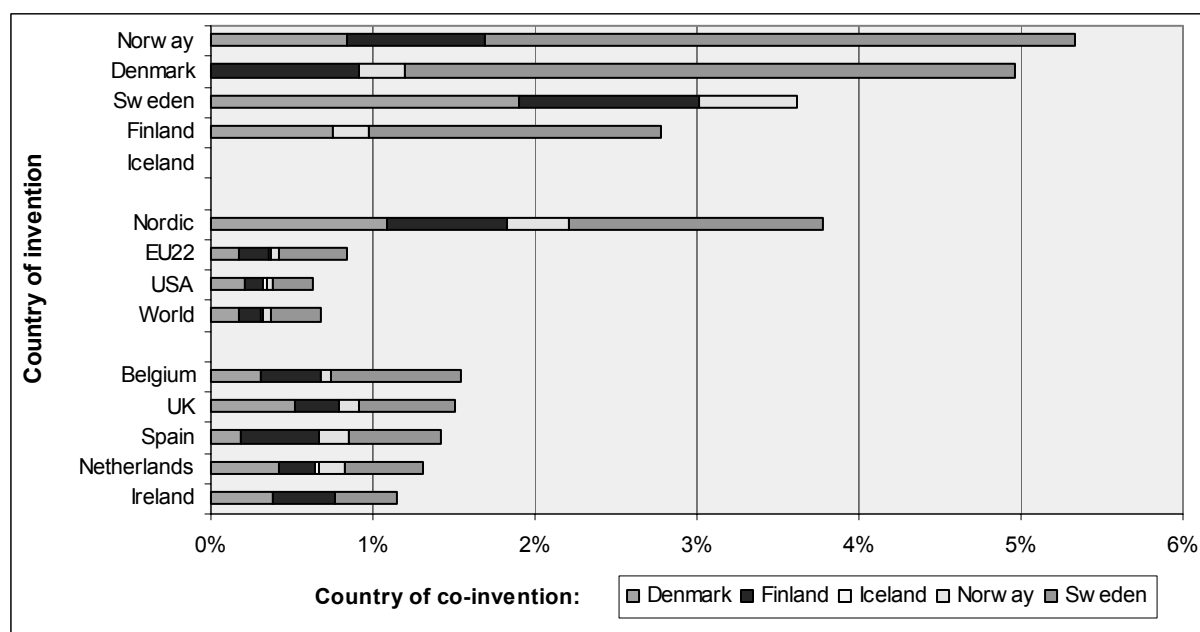


Figure 15b: Patent applications of domestic inventions with Nordic co-inventors, EPO, 2003

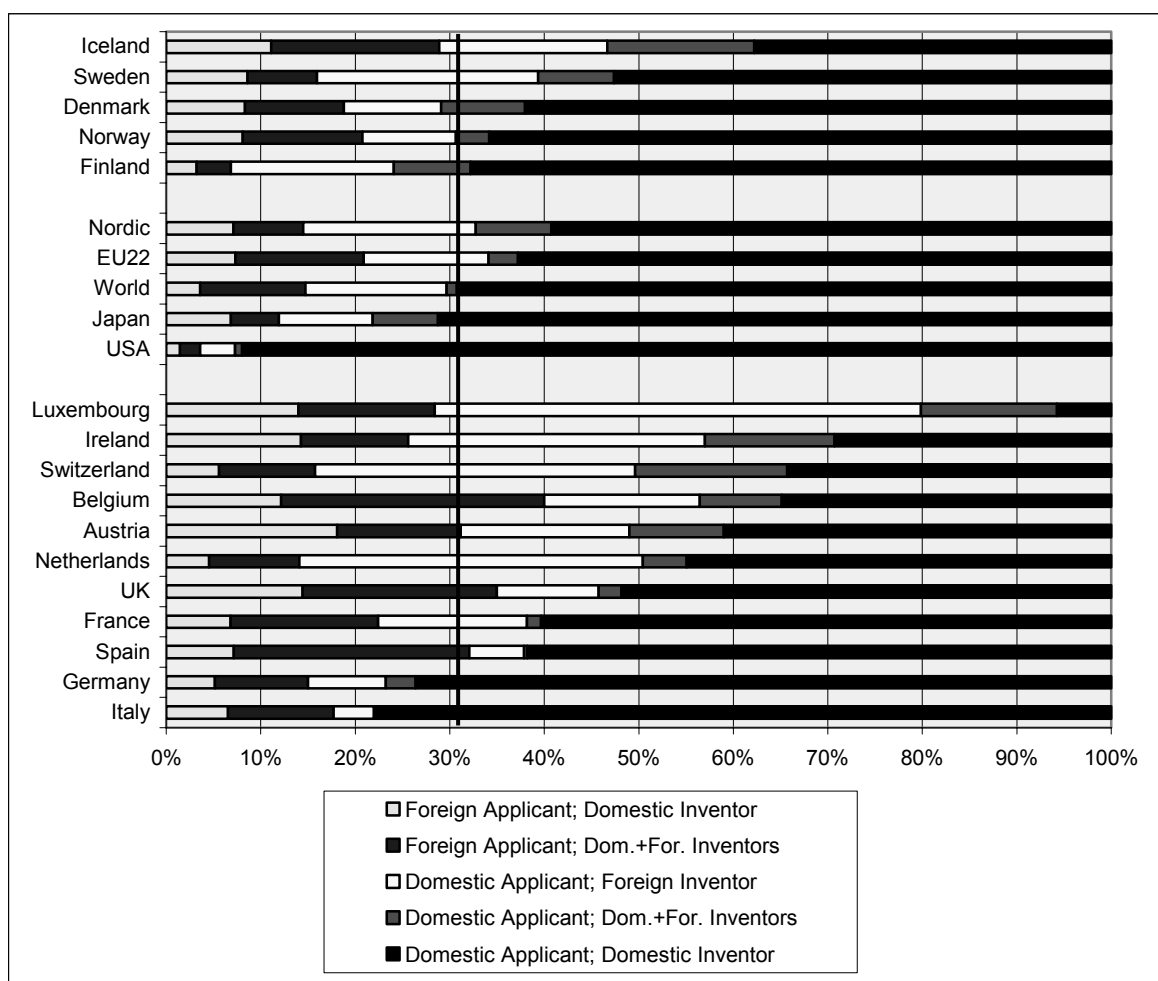


In line with the two other indicators for international patents it is possible to count the co-invented patents by country of co-inventor. This is illustrated in **Figure 15.a-b**. Again, EU22 is the main area of the co-inventing countries for most countries. At Nordic level, five countries have Nordic co-inventors in more than 1% of their patent applications. Sweden is the main country of the co-inventor, followed by Denmark.

As mentioned earlier, it is possible to combine the information of nationality of applicant and inventor(s) to **classify all patents from a country** – either as applicant, inventor or both – into 5 classes. One class is the purely national patents, while the others are foreign or domestic applicants with or without multinational inventors, see **Figure 16**.

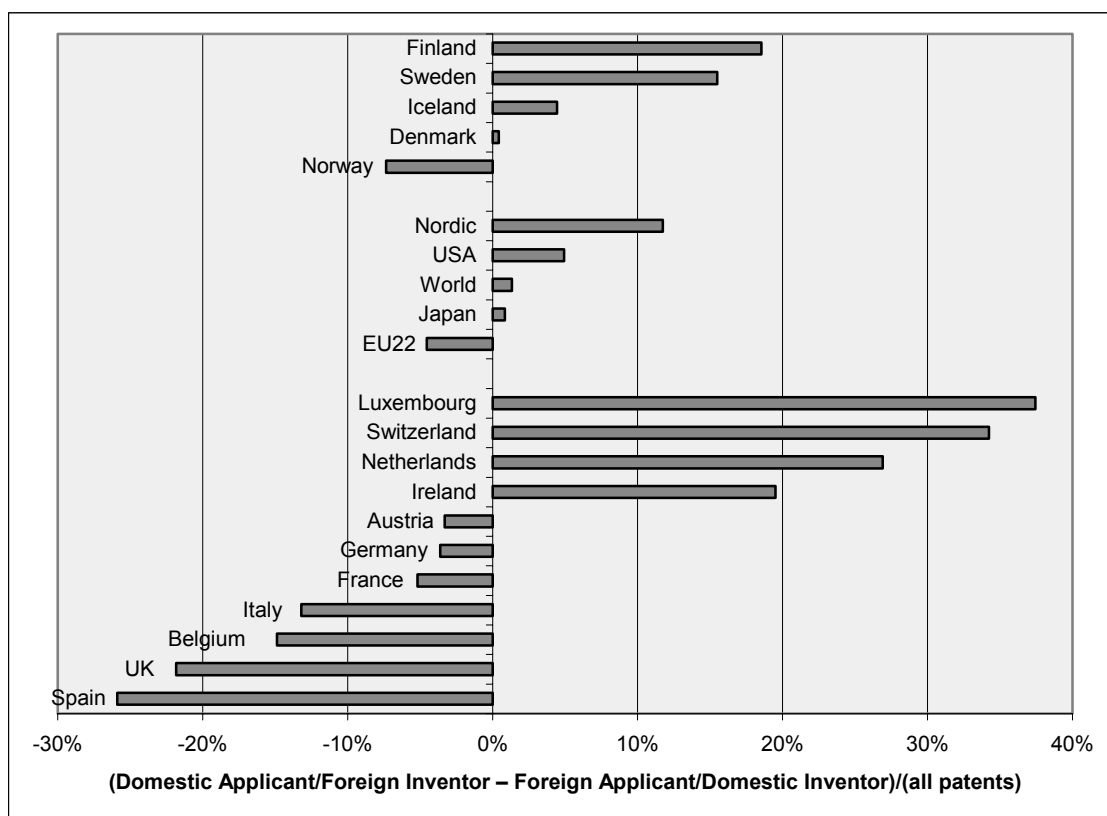
The three groups (the Nordic countries; areas; other European countries) have been sorted according to their level of globalisation defined as the sum of the 4 classes involving a foreign partner. Large differences, which were partly seen in the former graphs, appear. Generally, smaller countries are more international oriented, but with variations, see for instance Sweden and Finland. Compared to the worldwide level, all Nordic countries have more multinational patent applications, though Finland only very little.

Figure 16: All patent applications by applicant and inventor(s), EPO, 2003



Another aspect of the 5 categories is the net flow from inventors to applicants. This can be measured as a share of all patents of the country/area. The results of that calculation for 2003 are presented in **Figure 17**. Apart from Norway the Nordic countries are net receivers, that is having more patent applications with domestic applicants and foreign (co)inventors than patent applications with foreign applicants and domestic (co)inventors. The EU22 has a negative balance, but this comes from summing up large deviations among the member countries, as can be seen in the last part of the graph.

Figure 17: The net share of (Domestic Applicant/Foreign Inventor – Foreign Applicant/Domestic Inventor), EPO, 2003



3. Patent indicators based on the new PATSTAT database

A new worldwide statistical patent database has been developed by The European Patent Office (EPO) in cooperation with OECD, Eurostat and other patents offices. The database – PATSTAT – includes a number of details on all patents filed in around 80 patent offices, a total of close to 60 mill patent applications. The information includes the same information as in the OECD patent database, but at micro level. Also, information on title and abstract of the application, patent and non-patent literature citations of the applicant, examiner and names and addresses of applicants and inventors are included. The database is planned to be updated twice a year. Statistical agencies and researchers may request a copy at “marginal cost”, if not used for commercial purposes. *The Danish Centre for Studies in research and Research Policy* has acquired the Spring 2007-update of PATSTAT for the NIND-project.

This new database should make it possible to construct new and more informative patent indicators which also may be used as indicators of innovation. Some of the possibilities are:

- Weighting of patent applications by a measure of their value. In this way the much skewed distribution of the value of patents may be corrected to some degree. In PATSTAT more elements of a patent application could be used:
 - o Number of citations of former patents
 - o Number of citations of non-patent literature (NPL-citations)
 - o Number of patent offices of an application. However, patents may be divided in different ways, when applied for – see the OECD-glossary on triadic patent families.

Also, the number of citations by new patent applications may be used for weighting, but the time lag would be a problem, as these citations may appear years after the priority date of a patent application. Finally, the number of claims in the application could be used, but there hasn't been time to make sure, if these are part of PATSTAT.

- Closeness to scientific R&D, measured as the number of citations of non-patent literature (see OECD,2006).
- Knowledge spill over, geographical or across fields of (technical) science, based on patent citations.
- Improvement of the IPC-classification by including more – and more detailed – IPC-codes (see the demand for details in Annex 1).
- Indicators based on the institutional sectors of the applicants (business sector, universities, governmental institutions, PNP's, other: private/unknown).
- Regional indicators, based on the addresses of the applicants/inventors.
- Micro data: the patenting patterns of large – and multinational – companies.
- Micro data: merging data on the patenting enterprises into innovation surveys or R&D surveys. However, the database does not include National ID's of enterprises.

As can be seen the PATSTAT database makes it possible to construct a number of indicators that will give further insights in the knowledge production that is centred on patents. However, the development of such indicators has just started, see the OECD-compendium of patent statistics, so some time will go before new indicators are developed and are universally accepted. Further, after an investigation of the PATSTAT database, one has to conclude that much work need to be done to make PATSTAT produce valid indicators like the above mentioned.

PATSTAT is a huge database comprised of 15 tables. The number of records makes it very time consuming to work with. There are around 60 mill records in the patent applications and around 30 mill records in the names table. Also, PATSTAT is really raw data with a number of missing value, illegal dates and misspellings. An example is given in the table below from the names table of Nordic names starting with the letter *B*.

person_id	person_country_code	person_name	person_address
1505	FI		BASTVAEGEN 83 68410 NEDERVETIL
1533	SE	BENGT AXEL ESKIL AHLGREN	
1538	SE	BERG, Jan	Spolegatan 8 B,S-222 20 Lund
1539	FI	BERG, KARI	
1540	FI	BERG, Kari	MÅkitorpantie 32 B 18,FIN-00640 Helsinki
1541	FI	BERG, Kari	Muskettitie 2,FIN-02680 Espoo
1542	SE	BERG, Kenneth	Enbacken 2,S-183 46 TÅby
1543	SE	BERG, Leif	Broholms väg 21,S-193 31 Sigtuna
1600	SE		bogatan 4A, S-272 96 Simrishamn, SWEDEN
1710	SE		by, S-34 014 Lagan, SWEDEN
1711	SE		by, S-34 014 Lagen, SWEDEN
1712	DK	BYBRO MASKINFABRIK A/S	

The conclusion of the investigation is that far too many resources would be needed to develop National or Nordic indicators from PATSTAT for the moment and at the same time the indicators would be vitiated by a high degree of unreliability. In a few years OECD and Eurostat are expected to have improved the database and to have set up rules for editing. Then indicators aimed at describing the National and Nordic patenting could be developed.

Annex 1: Concordance table for Technical groups

Technical groups	IPC main classes							
	A-Human Necc.	B-Operations Transport	C-Chemistry Metallurgy	D-Paper Textile	E-Construction	F-Mechanics Engineering	G-Physics	H-Electricity
Biotech	(Part of A01h - all included)		C(biotech)=Biotech-A01h				(Part of G01n, double counted)	
Chemistry Metallurgy			C(CM)=C-C(biotech)-C(Mech)					
Electronics							G(Elec)=G-G(ICT)-G(other)	H(Elec)=Elec-G(Elec)
ICT		B(ICT)=B07c+B41j+B41k					G(ICT)=G01+G02b ^f +G03g+G05bf+G06+G07+G08cg+G09bcg+G10l+G11	H(ICT)=ICT-B(ICT)-G(ICT)
Mechanics		B(Mech)=B-B(ICT)-B(other)	C(Mech)=C21+C22+C23+C25+C30		E	F(Mech)=F-F(other)		
Medicine	A01n, A61							
Other	A(other)=A(Med)-A01h	B(other)=B01-B09 excl B07c		D		F(other)=F41+F42	G(other)=G21	

Biotech patents:

[A01H1/00,A01H4/00,A61K38/00,A61K39/00,A61K48/00,C02F3/34, C07G(11/00,13/00,15/00), C07K(4/00,14/00,16/00,17/00,19/00), C12M,C12N,C12P,C12Q,C12S,G01N27/327, G01N33/(53*,54*,55*,57*,68,74,76,78,88,92)]

ICT-related patents:

Telecommunications [G01S,G08C,G09C,H01P,H01Q, H01S3/(025,043,063,067,085,0933,0941,103,133,18,19,25), H1S5,H03B,H03C,H03D,H03H,H03M,H04B, H04J,H04K,H04L,H04M,H04Q];
Consumer electronics [G11B,H03F,H03G,H03J,H04H, H04N,H04R,H04S];
Computers, office machinery [B07C,B41J,B41K,G02F,G03G,G05F, G06,G07,G09G,G10L,G11C,H03K,H03L];
Other ICT [G01B,G01C,G01D,G01F,G01G,G01H, G01J,G01K,G01L,G01M,G01N,G01P, G01R,G01V,G01W,G02B6,G05B,G08G,G09B,H01B11, H01J(11/,13/,15/,17/,19/,21/,23/, 25/,27/,29/,31/,33/,40/,41/,43/,45/),H01L]

Source: Compendium of Patent Statistics, OECD, 2006

Annex 2: List of tables

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Table 2. Applicants to USPTO-patents by country (applicants per mill inhabitants), 1994-2003

Table 3. Total applicants and inventors of EPO-patents by country/area, indexed, 2003

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Table 5. Applicants to ICT-, Biotech- and Medicine-patents at EPO by country, 1994-2003

Table 6. Applicants to ICT-, Biotech- and Medicine-patents at EPO by country (applicants per mill inhabitants), 1994-2003

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Table 8. Mean absolute deviations in the shares of technical groups among countries/areas, applicants of EPO-patents, 2003

Table 9. Share of EPO-patent applications with Domestic ownership and inventor(s) abroad, EPO-patents, worldwide, 1994, 2003

Table 10. Share of EPO-patent applications with Domestic ownership and inventor(s) abroad, Nordic countries. 1994, 2003

Table 11. Share of patent applications with Domestic inventor(s) and Foreign ownership, EPO-patents, worldwide, 1994, 2003

Table 12. Share of EPO-patent applications with Foreign ownership and Domestic inventor(s), Nordic countries. 1994, 2003

Table 13. Share of patent applications with Foreign co-inventor(s), EPO-patents, worldwide. 1994, 2003

Table 14. Share of patent applications with Foreign co-inventor(s), EPO-patents, Nordic countries. 1994, 2003

Table 15. All patent applications by domestic/foreign applicant/inventors, EPO. 1994, 2003

Table 16. Net share of (Domestic Applicant/Foreign Inventor – Foreign Applicant/Domestic Inventor), EPO-patents. 1994, 2003

Table 1. Applicants to EPO-patents by country (applicants per mill inhabitants). 1994-2003

Country	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Finland	138,4	142,8	178,5	216,0	246,0	308,8	307,4	313,9	287,0	285,5
Sweden	159,8	179,0	213,9	247,4	257,2	275,8	289,0	268,8	246,8	260,9
Denmark	88,3	92,9	111,9	113,8	136,7	146,9	161,4	154,4	162,4	178,5
Iceland	11,3	20,6	35,3	29,5	36,5	79,4	92,5	80,7	144,3	107,2
Norway	46,4	57,2	64,5	70,0	76,1	81,4	83,3	76,9	74,6	66,8
Nordic	117,0	128,2	154,4	176,1	192,2	216,1	224,2	215,2	203,4	209,8
Japan	86,7	98,9	111,9	119,7	125,8	145,3	166,6	152,0	154,3	162,8
USA	77,7	84,6	89,3	97,8	105,6	110,8	112,1	107,2	107,5	109,0
EU22	61,0	63,8	73,0	82,1	89,5	97,2	101,9	101,3	101,4	102,4
OECDrest	14,9	15,7	17,2	21,0	23,6	26,5	28,1	29,1	30,9	34,8
Switzerland	300,5	300,0	340,7	390,4	431,8	462,8	505,7	523,6	505,0	522,8
Luxembourg	162,6	163,9	249,5	299,5	358,7	346,8	342,8	313,3	328,7	371,9
Netherlands	133,9	143,6	160,0	174,2	190,2	219,1	249,8	271,8	298,1	288,7
Germany	149,0	155,4	185,6	209,0	231,3	248,4	261,2	255,4	250,0	250,7
Austria	78,5	75,1	81,6	101,2	102,7	109,9	127,2	127,6	128,5	139,0
France	82,6	85,0	91,3	102,6	109,4	117,4	116,5	115,3	115,4	123,7
Belgium	56,9	65,4	70,4	90,2	93,5	97,6	95,3	100,0	108,2	107,0
UK	53,4	54,7	60,3	64,2	71,6	77,0	80,9	75,3	71,0	69,6
Ireland	25,6	34,2	39,7	43,9	56,6	65,1	62,1	79,1	70,4	68,7
Italy	36,5	39,1	44,5	49,3	51,8	58,0	61,7	62,3	66,2	66,5
Spain	8,4	8,6	9,1	12,3	12,2	15,0	15,4	16,8	18,3	17,7
China	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,3	0,3	0,5
OECD	59,1	63,5	70,6	78,4	84,7	92,3	97,1	93,9	94,3	97,0

Source: OECD patent database, June 2007

Table 2. Applicants to USPTO-patents by country (applicants per mill inhabitants), 1994-2003

Country	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Finland	130,0	133,0	165,7	186,4	210,6	227,9	180,9	170,8	108,5	60,6
Sweden	138,7	150,7	184,9	213,8	211,0	212,8	180,1	138,4	72,4	40,1
Iceland	11,3	22,4	42,8	29,5	47,5	68,6	55,1	50,9	40,0	38,0
Denmark	71,9	69,6	84,2	82,1	81,0	80,8	73,2	51,3	38,2	15,3
Norway	42,9	49,4	57,6	58,7	63,6	56,2	49,4	34,2	22,0	10,4
USA	292,7	300,5	301,3	336,9	345,3	345,8	334,7	308,8	272,3	220,1
Japan	210,8	237,3	260,0	278,4	280,6	298,1	305,9	260,3	202,5	119,2
Nordic	103,0	108,8	133,1	147,9	152,6	155,4	130,2	105,1	62,3	33,0
OECDrest	27,9	33,4	36,0	41,7	42,4	41,9	39,8	37,7	32,7	23,6
EU22	39,9	42,8	47,3	51,0	53,7	53,7	50,7	42,6	27,4	14,8
Switzerland	188,7	202,7	206,9	244,1	238,5	262,9	255,5	211,2	142,9	81,3
Luxembourg	122,2	133,0	130,4	177,0	185,2	196,5	159,8	131,4	94,1	64,4
Netherlands	57,5	61,9	59,6	76,8	93,1	123,4	144,9	137,6	72,9	41,2
Germany	99,3	108,2	123,3	133,8	142,6	140,7	133,3	114,0	75,7	40,5
France	54,7	58,3	63,4	67,5	68,5	67,6	56,6	45,0	28,3	16,3
Belgium	43,6	46,2	46,2	55,4	54,2	47,2	42,3	31,8	22,2	13,6
Austria	43,9	40,4	41,9	48,0	47,3	47,4	47,3	44,5	24,7	12,7
UK	43,9	44,6	47,0	45,5	48,2	43,9	38,5	30,0	17,9	9,7
Italy	19,8	22,8	25,6	27,3	26,8	27,2	27,8	22,2	16,5	8,6
Ireland	20,4	21,5	30,9	32,3	32,7	40,0	36,5	24,5	20,6	7,1
Spain	4,3	4,6	5,6	5,2	5,6	5,7	5,4	4,1	3,7	1,4
China	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2
OECD	120,2	127,7	133,4	147,6	151,4	153,6	149,5	133,8	110,4	80,5

Source: OECD patent database, June 2007

Table 3. Total applicants and inventors of EPO-patents by country/area, indexed, 2003

Country	Applicants	Inventors	Index: Applicants/Inventors
Finland	1488	1252	118,8
Sweden	2338	1979	118,1
Iceland	31	31	100,0
Denmark	962	992	97,0
Norway	305	333	91,6
Nordic	5124	4588	111,7
OECDrest	9524	8820	108,0
USA	31730	31147	101,9
Japan	20789	20738	100,2
EU22	44913	46786	96,0
Worldrest	3815	4542	84,0
Luxembourg	167	87	192,0
Switzerland	3871	2696	143,6
Netherlands	4684	3390	138,2
Ireland	274	216	126,9
France	7662	7811	98,1
Germany	20687	21508	96,2
Italy	3832	4301	89,1
Austria	1129	1307	86,4
Belgium	1110	1301	85,3
Spain	744	925	80,4
UK	4144	5304	78,1
China	577	808	71,4

Source: OECD patent database, June 2007

Table 4. Applicants per mio. PPP\$ GERD and Industry-financed R&D to EPO-patents by country, fixed prices, 1994-2003

Country	Year										Industry-financed R&D ¹
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2003
Finland	300,3	301,1	327,1	349,6	357,6	392,5	352,5	355,9	315,9	302,7	432,5
Denmark	202,8	199,9	233,2	220,5	244,8	241,7	249,3	223,8	223,8	239,9	400,6
Sweden	219,4	231,7	264,6	292,1	287,7	292,4	275,6	230,9	216,7	234,3	360,6
Ireland	116,2	141,3	148,1	152,1	187,9	206,8	191,6	239,3	203,4	184,8	310,4
Norway	103,4	123,7	133,9	139,4	148,1	154,8	150,8	132,3	126,1	108,4	220,2
EU22	190,0	197,0	222,8	244,6	258,6	266,0	266,8	258,2	255,2	257,1	493,3
Nordic	212,5	221,2	250,9	267,9	274,0	286,3	271,2	242,6	227,7	233,3	370,8
Japan	128,3	137,8	158,0	163,0	167,4	192,9	213,8	190,2	190,3	196,5	263,2
OECDrest	121,7	106,3	95,4	111,8	128,6	137,1	135,0	128,5	133,2	146,2	248,3
USA	108,9	112,8	114,3	119,7	123,4	123,4	118,2	112,8	116,9	115,5	181,0
Netherlands	293,6	304,6	326,9	342,2	379,7	406,9	482,6	525,1	606,1	576,9	1130,0
Switzerland	407,4	404,4	455,4	515,1	563,3	598,2	648,4	651,0	607,3	608,3	874,3
Germany	297,6	305,0	360,7	392,0	418,6	418,4	416,5	402,0	389,4	386,3	583,1
Italy	155,6	170,4	190,3	198,0	201,6	227,0	227,8	217,8	223,1	230,2	548,1
Luxembourg	.	.	.	.	.	.	408,5	365,9	377,5	419,2	521,5
Austria	211,3	194,9	200,5	229,7	215,3	209,9	231,4	217,5	209,4	216,1	477,7
France	157,5	161,3	173,2	198,1	209,7	216,7	209,4	200,2	196,7	215,9	425,2
Belgium	149,4	166,0	167,0	200,1	200,8	195,9	181,4	179,6	205,3	208,4	345,5
UK	123,0	126,5	141,6	152,1	165,5	166,8	170,2	157,6	146,5	143,7	339,4
Iceland	33,9	55,6	83,8	61,5	66,2	121,8	118,7	91,3	164,5	125,5	285,9
Spain	61,3	61,1	61,8	82,2	72,1	86,3	80,6	85,1	84,6	76,1	157,4
China	1,6	2,0	2,2	2,8	4,0	4,6	5,6	6,7	6,8	7,9	13,1
OECD	140,9	144,5	154,9	165,6	173,2	180,7	180,8	171,0	172,8	174,5	282,0

Source: OECD patent database, June 2007

Note 1: Only calculated for 2003 due to many missing values in 1994-2000

Table 5A. Applicants to ICT-patents at EPO by country, 1994-2003

Country	Year										Index 1994->2003
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Denmark	51	54	85	79	125	138	178	172	175	177	347
Finland	269	337	475	580	678	995	951	994	912	878	326
Sweden	366	477	559	808	888	1001	1062	964	770	914	250
Norway	35	39	51	61	88	81	88	98	86	84	240
Iceland					4	7	5	10	6	9	
Nordic	719	908	1170	1528	1783	2223	2284	2237	1949	2062	287
EU22	5355	5751	6906	8291	9385	10696	12197	12468	12513	12173	227
Japan	4659	5312	6166	6836	7166	8172	9538	8629	8930	9438	203
OECD-rest	12291	13702	15416	17279	19251	22058	24241	22877	23223	24610	200
USA	6946	7560	8255	9105	10490	11908	12540	11930	11403	11717	169
China	3	4	5	10	28	43	84	120	164	227	7567
Ireland	12	20	27	38	43	86	83	112	95	78	650
Netherlands	708	803	871	995	1179	1487	1793	2307	2538	2291	324
Luxembourg	9	13	18	17	29	9	18	29	23	27	300
Spain	32	39	45	58	56	72	92	87	113	95	297
Switzerland	297	320	382	406	484	604	752	796	812	775	261
Austria	57	77	57	84	101	100	160	152	135	146	256
Germany	2081	2326	3030	3754	4179	4669	5300	5087	4968	4818	232
France	1157	1123	1270	1666	1840	2190	2272	2393	2509	2598	225
Belgium	115	153	150	206	226	241	209	213	249	224	195
Italy	357	385	419	398	471	466	609	531	579	611	171
UK	815	800	1007	1055	1238	1338	1612	1495	1251	1217	149
OECD	18400	20401	23544	27161	30508	35062	38814	37687	37774	38936	212
World	18610	20619	23835	27594	31092	35728	39600	38487	38679	39958	215

Table 5B. Applicants to Biotech-patents at EPO by country, 1994-2003

Country	Year										Index 1994->2003
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Denmark	60	72	91	92	106	107	107	92	115	126	210
Sweden	48	40	44	60	80	83	99	83	96	83	173
Finland	24	23	17	19	25	33	33	29	26	32	133
Norway	10	12	7	17	18	24	19	14	32	13	130
Iceland						5	4	5	10	11	
OECD-rest	182	237	291	327	358	444	454	516	476	497	273
Japan	339	353	431	422	478	598	713	739	792	744	219
Nordic	142	146	158	188	228	251	261	222	278	265	187
EU22	810	879	1051	1301	1577	1839	1974	1868	1818	1584	196
USA	1464	1766	1958	2481	2795	2862	2881	2645	2430	2069	141
China	2		5	3	13	9	16	28	33	39	1950
Ireland	3	12	10	9	14	11	11	22	10	16	533
Belgium	25	34	33	60	120	137	98	94	76	84	336
Switzerland	67	80	89	104	91	131	156	182	180	185	276
Germany	264	302	379	425	523	689	899	816	811	666	252
Spain	14	14	20	14	12	25	17	27	39	34	243
Austria	22	27	22	22	23	32	44	50	39	53	241
Netherlands	79	86	106	168	156	169	212	150	195	155	196
Italy	44	38	32	47	49	54	54	51	66	71	161
UK	181	204	290	338	403	401	354	342	311	250	138
France	170	156	157	210	264	299	273	288	247	233	137
Luxembourg	0	1		1	4	1			5	2	
OECD	2937	3381	3889	4719	5436	5994	6283	5990	5794	5159	176
World	2984	3435	3951	4817	5553	6123	6462	6188	6009	5393	181

Table 5C. Applicants to Medicine-patents at EPO by country, 1994-2003

Country	Year										Index 1994->2003
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Denmark	56	56	94	87	87	105	110	140	148	195	348
Finland	38	39	43	55	58	47	58	56	50	63	166
Norway	24	18	33	43	40	41	46	35	39	34	142
Sweden	223	189	218	261	263	267	296	313	310	264	118
Iceland		2	3	3	4	6	7	7	16	10	
OECD-rest	340	385	462	535	675	828	932	991	991	1076	316
Japan	476	530	598	666	736	849	1039	1056	1161	1299	273
EU22	1880	1984	2344	2676	2960	3431	3421	3803	3860	3978	212
USA	2820	3383	3689	3970	4451	4490	4494	4861	5427	5714	203
Nordic	341	303	390	448	452	466	516	550	564	566	166
China	4	4	6	12	16	12	31	40	47	53	1325
Belgium	32	40	46	72	51	73	82	78	112	116	363
Austria	35	44	43	52	55	83	76	91	103	109	311
Switzerland	200	203	254	295	324	409	493	561	545	616	308
Luxembourg	12	11	12	27	19	19	28	23	29	34	283
Ireland	26	34	29	41	64	52	50	73	79	73	281
Spain	29	40	28	39	47	60	64	75	53	80	276
Netherlands	132	138	169	180	224	240	228	294	318	339	257
Italy	123	146	158	181	182	254	238	292	310	304	247
Germany	721	732	926	1081	1173	1366	1378	1566	1535	1512	210
UK	290	307	387	417	436	527	566	572	572	603	208
France	467	472	513	557	668	710	659	685	692	746	160
OECD	5857	6585	7483	8295	9274	10064	10402	11261	12003	12633	216
World	6026	6790	7749	8657	9670	10530	10980	11937	12801	13470	224

Source: OECD patent database, June 2007

Table 6A. Applicants to ICT-patents at EPO by country (applicants per mill inhabitants), 1994-2003

Country	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Finland	52,8	66,0	92,6	112,9	131,6	192,7	183,7	191,5	175,3	168,5
Sweden	41,6	54,1	63,2	91,3	100,4	113,0	119,6	108,4	86,3	102,0
Denmark	9,7	10,3	16,2	15,0	23,6	25,9	33,4	32,1	32,5	32,8
Iceland					14,6	25,3	17,8	33,3	20,9	31,1
Norway	8,0	9,0	11,6	13,9	19,9	18,2	19,6	21,7	19,0	18,4
Nordic	30,4	38,2	49,0	63,8	74,3	92,3	94,5	92,3	80,1	84,5
Japan	37,2	42,3	49,0	54,2	56,7	64,5	75,2	67,9	70,1	73,9
USA	26,4	28,4	30,6	33,4	38,0	42,6	44,4	41,8	39,6	40,3
EU22	12,5	13,4	16,1	19,3	21,8	24,8	28,2	28,7	28,7	27,8
OECDrest	3,0	3,6	4,2	5,6	6,6	8,0	8,5	9,1	11,0	12,9
Netherlands	46,0	51,9	56,1	63,7	75,1	94,0	112,6	143,8	157,2	141,2
Switzerland	42,2	45,2	53,8	57,0	67,9	84,2	104,4	109,2	110,5	104,6
Luxembourg	21,1	30,5	43,3	40,4	68,8	20,8	41,1	65,7	50,8	60,0
Germany	25,6	28,5	37,0	45,8	51,0	56,9	64,5	61,8	60,2	58,4
France	19,5	18,9	21,3	27,9	30,6	36,3	37,4	39,2	40,8	42,0
Belgium	11,4	15,1	14,8	20,3	22,2	23,6	20,4	20,7	24,1	21,6
UK	14,1	13,8	17,3	18,1	21,2	22,8	27,4	25,3	21,1	20,4
Ireland	3,4	5,6	7,5	10,3	11,5	23,0	21,7	29,1	24,3	19,5
Austria	7,2	9,7	7,2	10,5	12,7	12,5	20,0	18,9	16,8	18,0
Italy	6,3	6,8	7,4	7,0	8,3	8,2	10,7	9,3	10,1	10,6
Spain	0,8	1,0	1,1	1,5	1,4	1,8	2,3	2,1	2,7	2,3
China				0,01	0,02	0,03	0,07	0,09	0,13	0,18
OECD	17,1	18,7	21,5	24,6	27,4	31,3	34,3	33,1	32,9	33,7

Table 6B. Applicants to Biotech-patents at EPO by country (applicants per mill inhabitants), 1994-2003

Country	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Iceland						18,0	14,2	15,8	34,8	36,3
Denmark	11,6	13,7	17,2	17,5	19,9	20,1	20,1	17,1	21,4	23,4
Sweden	5,5	4,5	5,0	6,8	9,0	9,4	11,1	9,3	10,8	9,3
Finland	4,7	4,6	3,2	3,7	4,9	6,3	6,3	5,6	4,9	6,2
Norway	2,2	2,6	1,6	3,9	4,0	5,3	4,2	3,1	6,9	2,8
Nordic	6,0	6,1	6,6	7,9	9,5	10,4	10,8	9,2	11,5	10,9
USA	5,6	6,6	7,3	9,1	10,1	10,3	10,2	9,3	8,4	7,1
Japan	2,7	2,8	3,4	3,4	3,8	4,7	5,6	5,8	6,2	5,8
OECDrest	2,7	3,1	3,5	4,3	4,9	5,4	5,6	5,3	5,1	4,5
EU22	1,9	2,1	2,5	3,0	3,7	4,3	4,6	4,3	4,2	3,6
Switzerland	9,5	11,3	12,5	14,6	12,7	18,2	21,7	25,0	24,6	25,0
Netherlands	5,1	5,5	6,8	10,8	9,9	10,7	13,3	9,3	12,1	9,5
Belgium	2,5	3,3	3,2	5,9	11,7	13,4	9,6	9,1	7,4	8,1
Germany	3,2	3,7	4,6	5,2	6,4	8,4	10,9	9,9	9,8	8,1
Austria	2,8	3,3	2,7	2,8	2,9	4,1	5,5	6,3	4,8	6,5
Luxembourg		2,4		2,4	9,4	2,3			10,1	4,4
UK	3,1	3,5	5,0	5,8	6,9	6,8	6,0	5,8	5,2	4,2
Ireland	0,7	3,3	2,8	2,6	3,7	2,8	3,0	5,7	2,4	4,0
France	2,9	2,6	2,6	3,5	4,4	5,0	4,5	4,7	4,0	3,8
Italy	0,8	0,7	0,6	0,8	0,9	1,0	1,0	0,9	1,2	1,2
Spain	0,4	0,3	0,5	0,4	0,3	0,6	0,4	0,7	0,9	0,8
China					0,01	0,01	0,01	0,02	0,03	0,03
OECD	2,7	3,1	3,5	4,3	4,9	5,4	5,6	5,3	5,1	4,5

Table 6C. Applicants to Medicine-patents at EPO by country (applicants per mill inhabitants), 1994-2003

Country	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Denmark	10,8	10,6	17,8	16,4	16,5	19,7	20,6	26,1	27,6	36,2
Iceland		5,6	9,3	9,2	14,6	21,7	24,9	24,6	55,6	34,6
Sweden	25,4	21,5	24,7	29,5	29,7	30,2	33,3	35,1	34,8	29,4
Finland	7,4	7,6	8,3	10,7	11,3	9,1	11,3	10,8	9,7	12,1
Norway	5,6	4,0	7,5	9,8	8,9	9,1	10,1	7,7	8,6	7,5
Nordic	14,4	12,7	16,3	18,7	18,8	19,3	21,4	22,7	23,2	23,2
USA	10,7	12,7	13,7	14,5	16,1	16,1	15,9	17,0	18,8	19,6
Japan	3,8	4,2	4,8	5,3	5,8	6,7	8,2	8,3	9,1	10,2
EU22	4,4	4,6	5,5	6,2	6,9	8,0	7,9	8,8	8,9	9,1
OECDrest	1,4	1,6	1,9	2,1	2,6	3,2	3,5	3,7	3,7	3,9
Austria	4,4	5,6	5,4	6,5	6,9	10,3	9,5	11,4	12,8	13,4
Belgium	3,1	3,9	4,5	7,1	5,0	7,2	8,0	7,6	10,8	11,2
China				0,01	0,01	0,01	0,02	0,03	0,04	0,04
France	7,9	8,0	8,6	9,3	11,1	11,8	10,9	11,2	11,3	12,0
Germany	8,9	9,0	11,3	13,2	14,3	16,6	16,8	19,0	18,6	18,3
Ireland	7,1	9,4	8,0	11,1	17,3	13,8	13,1	19,0	20,2	18,3
Italy	2,2	2,6	2,8	3,2	3,2	4,5	4,2	5,1	5,4	5,3
Luxembourg	29,7	26,9	28,9	64,1	44,6	43,9	62,7	52,1	63,9	74,4
Netherlands	8,6	8,9	10,9	11,5	14,3	15,2	14,3	18,4	19,7	20,9
Spain	0,7	1,0	0,7	1,0	1,2	1,5	1,6	1,8	1,3	1,9
Switzerland	28,4	28,6	35,8	41,5	45,5	57,1	68,4	77,0	74,2	83,1
UK	5,0	5,3	6,7	7,2	7,5	9,0	9,6	9,7	9,6	10,1
OECD	5,4	6,1	6,8	7,5	8,3	9,0	9,2	9,9	10,5	10,9

Source: OECD patent database, June 2007

Table 7. Specialization-index for countries/areas, EPO-Applicants, 2003

Country/area	Technical groups							Squared spec. index
	ICT	BioTech	Medicine	Chemistry; Metallurgy	Electronics	Mechanics	Other	
Iceland	-0,18	0,96	0,78	-1,00	-1,00	-1,00	-0,58	4,91
Denmark	-0,56	0,78	0,53	-0,19	-0,78	0,03	0,25	1,91
Finland	0,49	-0,63	-0,75	-0,55	-0,36	-0,45	0,08	1,84
Norway	-0,23	-0,10	-0,01	-0,58	-0,74	0,26	0,49	1,25
Sweden	0,12	-0,25	0,00	-0,27	-0,64	0,10	-0,14	0,59
Japan	0,26	-0,25	-0,53	0,09	0,30	-0,12	-0,54	0,81
Worldrest	-0,25	0,28	0,58	0,18	-0,21	-0,31	0,20	0,69
Nordic	0,15	0,12	-0,02	-0,36	-0,61	-0,05	0,06	0,54
USA	0,06	0,33	0,44	0,01	-0,28	-0,37	-0,14	0,54
EU22	-0,24	-0,26	-0,24	0,01	0,06	0,27	0,21	0,31
OECDrest	0,07	0,12	0,00	-0,14	0,04	-0,18	0,21	0,12
Luxembourg	-0,65	-0,87	0,52	-0,18	-0,46	0,39	0,28	1,92
Italy	-0,65	-0,72	-0,34	-0,18	-0,26	0,50	0,56	1,72
Belgium	-0,50	0,46	-0,08	0,62	-0,80	0,00	0,46	1,71
Ireland	-0,20	0,23	0,70	-0,15	-0,92	-0,31	0,21	1,59
Spain	-0,76	0,00	-0,05	-0,04	-0,38	0,49	0,45	1,17
Austria	-0,76	0,01	-0,15	-0,01	0,01	0,44	0,54	1,07
Netherlands	0,33	-0,32	-0,42	0,04	0,52	-0,59	-0,02	1,01
Germany	-0,38	-0,34	-0,41	0,05	0,08	0,42	0,12	0,63
Switzerland	-0,50	0,04	0,33	0,24	0,16	0,08	0,37	0,59
China	0,12	0,36	-0,20	-0,17	0,14	-0,39	0,40	0,54
UK	-0,17	0,26	0,25	0,05	-0,38	-0,04	0,25	0,37
France	-0,02	-0,39	-0,15	-0,23	0,09	0,14	0,13	0,27
OECD	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Note: The specialization-index measures - for a given country/area - the share of a technical group like Biotech compared to the share of all patents, using OECD as the base.

The measure is normalized to a scale from {-1;+1}, where 0 is equal to the OECD-share, while positive values tells that the share is higher than that of OECD.

The technical groups are defined by correcting the IPC-groups, so ICT, Biotech and Medicine can be isolated as separate groups.

Source: OECD patent database, June 2007

**Table 8. Mean absolute deviations in the shares of technical groups among countries/areas,
Applicants of EPO-patents, 2003**

Country/area	Country/area												
	Denmark	Finland	Iceland	Norway	Sweden	Nordic	EU22	USA	Japan	OECDrest	Worldrest	Austria	Belgium
Denmark	0,00	0,85	0,87	0,42	0,46	0,45	0,43	0,44	0,69	0,45	0,31	0,49	0,33
Finland	0,85	0,00	1,19	0,66	0,46	0,40	0,64	0,48	0,37	0,44	0,64	0,92	0,81
Iceland	0,87	1,19	0,00	1,04	1,03	1,00	1,11	0,83	1,13	0,99	0,81	1,36	1,14
Norway	0,42	0,66	1,04	0,00	0,28	0,31	0,16	0,49	0,55	0,34	0,42	0,32	0,34
Sweden	0,46	0,46	1,03	0,28	0,00	0,09	0,29	0,27	0,27	0,18	0,44	0,56	0,46
Nordic	0,45	0,40	1,00	0,31	0,09	0,00	0,34	0,25	0,26	0,12	0,39	0,58	0,43
EU22	0,43	0,64	1,11	0,16	0,29	0,34	0,00	0,44	0,41	0,29	0,35	0,29	0,38
USA	0,44	0,48	0,83	0,49	0,27	0,25	0,44	0,00	0,35	0,19	0,21	0,69	0,53
Japan	0,69	0,37	1,13	0,55	0,27	0,26	0,41	0,35	0,00	0,26	0,51	0,70	0,60
OECDrest	0,45	0,44	0,99	0,34	0,18	0,12	0,29	0,19	0,26	0,00	0,29	0,53	0,43
Worldrest	0,31	0,64	0,81	0,42	0,44	0,39	0,35	0,21	0,51	0,29	0,00	0,59	0,41
Austria	0,49	0,92	1,36	0,32	0,56	0,58	0,29	0,69	0,70	0,53	0,59	0,00	0,41
Belgium	0,33	0,81	1,14	0,34	0,46	0,43	0,38	0,53	0,60	0,43	0,41	0,41	0,00
China	0,54	0,39	1,00	0,42	0,27	0,21	0,38	0,21	0,31	0,14	0,35	0,58	0,46
France	0,45	0,50	1,07	0,24	0,15	0,20	0,16	0,33	0,32	0,17	0,39	0,43	0,43
Germany	0,49	0,71	1,23	0,29	0,40	0,45	0,13	0,55	0,48	0,42	0,46	0,23	0,43
Ireland	0,33	0,66	0,69	0,42	0,44	0,39	0,43	0,27	0,58	0,32	0,13	0,67	0,49
Italy	0,52	0,87	1,39	0,34	0,56	0,61	0,34	0,75	0,73	0,59	0,65	0,14	0,47
Luxembourg	0,29	0,88	1,16	0,36	0,51	0,56	0,34	0,57	0,75	0,55	0,43	0,27	0,49
Netherlands	0,79	0,28	1,11	0,66	0,40	0,36	0,51	0,37	0,21	0,34	0,54	0,80	0,72
Portugal	0,36	0,91	1,22	0,32	0,55	0,57	0,34	0,68	0,75	0,55	0,59	0,14	0,38
Spain	0,47	0,93	1,34	0,32	0,54	0,57	0,33	0,68	0,74	0,55	0,59	0,08	0,41
Switzerland	0,26	0,78	1,09	0,32	0,39	0,41	0,27	0,42	0,53	0,35	0,28	0,34	0,24
UK	0,29	0,59	0,91	0,26	0,27	0,22	0,23	0,24	0,40	0,19	0,19	0,47	0,30
OECD	0,42	0,50	1,01	0,30	0,14	0,13	0,22	0,22	0,27	0,11	0,32	0,47	0,37
World	0,42	0,51	1,00	0,30	0,15	0,14	0,23	0,21	0,27	0,11	0,31	0,47	0,37

**Table 8 (cont.) Mean absolute deviations in the shares of technical groups among countries/areas,
Applicants of EPO-patents, 2003**

Country/area	Country/area												
	China	France	Germany	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Switzerland	UK	OECD	World
Denmark	0,54	0,45	0,49	0,33	0,52	0,29	0,79	0,36	0,47	0,26	0,29	0,42	0,42
Finland	0,39	0,50	0,71	0,66	0,87	0,88	0,28	0,91	0,93	0,78	0,59	0,50	0,51
Iceland	1,00	1,07	1,23	0,69	1,39	1,16	1,11	1,22	1,34	1,09	0,91	1,01	1,00
Norway	0,42	0,24	0,29	0,42	0,34	0,36	0,66	0,32	0,32	0,32	0,26	0,30	0,30
Sweden	0,27	0,15	0,40	0,44	0,56	0,51	0,40	0,55	0,54	0,39	0,27	0,14	0,15
Nordic	0,21	0,20	0,45	0,39	0,61	0,56	0,36	0,57	0,57	0,41	0,22	0,13	0,14
EU22	0,38	0,16	0,13	0,43	0,34	0,34	0,51	0,34	0,33	0,27	0,23	0,22	0,23
USA	0,21	0,33	0,55	0,27	0,75	0,57	0,37	0,68	0,68	0,42	0,24	0,22	0,21
Japan	0,31	0,32	0,48	0,58	0,73	0,75	0,21	0,75	0,74	0,53	0,40	0,27	0,27
OECDrest	0,14	0,17	0,42	0,32	0,59	0,55	0,34	0,55	0,55	0,35	0,19	0,11	0,11
Worldrest	0,35	0,39	0,46	0,13	0,65	0,43	0,54	0,59	0,59	0,28	0,19	0,32	0,31
Austria	0,58	0,43	0,23	0,67	0,14	0,27	0,80	0,14	0,08	0,34	0,47	0,47	0,47
Belgium	0,46	0,43	0,43	0,49	0,47	0,49	0,72	0,38	0,41	0,24	0,30	0,37	0,37
China	0,00	0,27	0,51	0,38	0,63	0,67	0,29	0,56	0,62	0,43	0,30	0,25	0,25
France	0,27	0,00	0,26	0,42	0,45	0,44	0,42	0,45	0,46	0,32	0,23	0,12	0,12
Germany	0,51	0,26	0,00	0,56	0,24	0,29	0,58	0,33	0,27	0,32	0,35	0,34	0,34
Ireland	0,38	0,42	0,56	0,00	0,71	0,47	0,60	0,65	0,65	0,40	0,24	0,38	0,37
Italy	0,63	0,45	0,24	0,71	0,00	0,25	0,82	0,22	0,13	0,42	0,52	0,55	0,55
Luxembourg	0,67	0,44	0,29	0,47	0,25	0,00	0,85	0,31	0,25	0,31	0,41	0,51	0,50
Netherlands	0,29	0,42	0,58	0,60	0,82	0,85	0,00	0,86	0,84	0,64	0,50	0,37	0,37
Portugal	0,56	0,45	0,33	0,65	0,22	0,31	0,86	0,00	0,19	0,39	0,47	0,52	0,52
Spain	0,62	0,46	0,27	0,65	0,13	0,25	0,84	0,19	0,00	0,36	0,45	0,49	0,49
Switzerland	0,43	0,32	0,32	0,40	0,42	0,31	0,64	0,39	0,36	0,00	0,21	0,29	0,29
UK	0,30	0,23	0,35	0,24	0,52	0,41	0,50	0,47	0,45	0,21	0,00	0,16	0,15
OECD	0,25	0,12	0,34	0,38	0,55	0,51	0,37	0,52	0,49	0,29	0,16	0,00	0,01
World	0,25	0,12	0,34	0,37	0,55	0,50	0,37	0,52	0,49	0,29	0,15	0,01	0,00

Source: OECD patent database, June 2007

Table 9A. Share of EPO-patent applications with Domestic ownership and inventor(s) abroad, EPO-patents, Worldwide, 1994

Country of ownership	Country/area of (co)invention						Total applications
	World	Nordic	EU22	USA	Japan	Other	
Iceland	33,3%	0,0%	0,0%	0,0%	0,0%	33,3%	3
Norway	31,6%	9,2%	13,1%	8,3%	0,5%	0,5%	206
Sweden	20,1%	3,5%	11,2%	3,6%	0,2%	1,5%	1439
Denmark	19,0%	5,1%	6,3%	4,2%	0,6%	2,7%	474
Finland	14,6%	2,9%	6,3%	3,4%	0,1%	1,8%	713
Nordic	19,4%	4,1%	9,3%	4,0%	0,3%	1,8%	2835
EU22	15,7%	0,4%	8,4%	4,5%	0,5%	2,0%	27117
USA	15,2%	0,7%	9,7%	0,0%	1,8%	3,1%	20690
World	14,7%	0,7%	8,2%	2,8%	0,9%	2,2%	64700
Japan	3,8%	0,1%	1,3%	1,9%	0,0%	0,5%	10916
Luxembourg	97,1%	0,0%	65,7%	20,0%	0,0%	11,4%	70
Ireland	59,4%	0,0%	45,5%	7,9%	0,0%	5,9%	101
Netherlands	47,6%	0,7%	29,3%	12,4%	0,9%	4,3%	2309
Switzerland	43,6%	2,6%	28,3%	9,8%	1,6%	1,4%	2190
Austria	31,3%	0,0%	16,5%	3,2%	0,0%	11,6%	680
Belgium	26,9%	0,5%	20,5%	3,6%	0,5%	1,8%	606
UK	21,7%	0,7%	8,4%	9,8%	0,4%	2,4%	3341
France	12,6%	0,2%	6,7%	3,7%	0,3%	1,7%	5044
Spain	11,4%	0,6%	8,8%	1,2%	0,3%	0,6%	341
Germany	9,0%	0,4%	4,3%	2,4%	0,5%	1,3%	12378
Italy	5,2%	0,3%	2,6%	1,5%	0,1%	0,6%	2106

Table 9B. Share of EPO-patent applications with Domestic ownership and inventor(s) abroad, EPO-patents, Worldwide, 2003

Country of ownership	Country/area of (co)invention						Total applications
	World	Nordic	EU22	USA	Japan	Other	
Iceland	46,9%	6,3%	6,3%	31,3%	0,0%	3,1%	32
Sweden	37,4%	3,2%	22,2%	8,1%	0,8%	3,1%	2369
Finland	27,2%	5,2%	10,0%	8,6%	1,0%	2,5%	1502
Denmark	23,6%	4,6%	10,9%	5,6%	0,3%	2,3%	986
Norway	16,9%	5,1%	8,9%	1,6%	0,3%	1,0%	313
Nordic	30,7%	4,2%	15,6%	7,5%	0,7%	2,6%	5202
EU22	20,6%	0,6%	11,3%	5,1%	0,6%	3,1%	46476
USA	19,1%	0,7%	11,8%	0,0%	1,2%	5,4%	32123
World	18,8%	0,7%	10,3%	3,8%	0,7%	3,3%	115893
Japan	4,6%	0,0%	1,8%	2,2%	0,0%	0,5%	20941
Luxembourg	92,0%	2,3%	66,1%	13,2%	0,0%	10,3%	174
Ireland	60,6%	1,1%	38,7%	11,7%	0,0%	9,2%	282
Switzerland	59,3%	2,9%	37,9%	14,5%	0,9%	3,1%	4141
Netherlands	47,7%	1,1%	28,7%	12,4%	1,0%	4,4%	5071
Belgium	41,9%	1,5%	27,6%	9,8%	0,3%	2,7%	1166
Austria	40,4%	0,2%	23,2%	6,6%	0,9%	9,5%	1249
France	22,2%	0,3%	11,2%	6,5%	0,9%	3,2%	7898
UK	20,2%	1,1%	8,6%	6,0%	0,4%	4,1%	4365
Germany	13,4%	0,5%	7,0%	3,0%	0,5%	2,3%	21124
Spain	9,1%	0,3%	5,0%	1,7%	0,4%	1,7%	761
Italy	5,5%	0,1%	2,8%	1,3%	0,0%	1,2%	3891

Source: OECD patent database, June 2007

Table 10A. Share of EPO-patent applications with Domestic ownership and inventor(s) abroad, 1994
(Nordic countries)

Country of ownership	Country of (co)invention							Total applications
	Nordic	Denmark	Finland	Iceland	Norway	Sweden	World	
Norway	9,2%	1,9%	0,5%	0,5%		6,3%	31,6%	206
Denmark	5,1%		0,8%		1,5%	2,7%	19,0%	474
Sweden	3,5%	1,5%	1,1%		1,0%		20,1%	1439
Finland	2,9%	0,4%			0,3%	2,2%	14,6%	713
Iceland							33,3%	3
Nordic	4,1%	1,0%	0,7%		0,8%	1,5%	19,4%	2835
USA	0,7%	0,3%	0,03%	0,02%	0,06%	0,3%	15,2%	20690
World	0,7%	0,2%	0,1%		0,1%	0,3%	14,7%	64700
EU22	0,4%	0,1%	0,1%	0,00%	0,04%	0,2%	15,7%	27117
Switzerland	2,6%	0,4%	0,4%	0,00%	0,2%	1,6%	43,6%	2190

Table 10B. Share of EPO-patent applications with Domestic ownership and inventor(s) abroad, 2003
(Nordic countries)

Country of ownership	Country of (co)invention							Total applications
	Nordic	Denmark	Finland	Iceland	Norway	Sweden	World	
Iceland	6,3%					6,3%	46,9%	32
Finland	5,2%	2,4%			0,3%	2,5%	27,2%	1502
Norway	5,1%	0,6%				4,5%	16,9%	313
Denmark	4,6%		0,4%		0,6%	3,5%	23,6%	986
Sweden	3,2%	0,7%	1,9%		0,6%		37,4%	2369
Nordic	4,2%	1,0%	0,9%		0,5%	1,7%	30,7%	5202
World	0,7%	0,2%	0,1%		0,1%	0,4%	18,8%	115893
USA	0,7%	0,2%	0,05%	0,02%	0,05%	0,4%	19,1%	32123
EU22	0,6%	0,1%	0,06%	0,002%	0,06%	0,3%	20,6%	46476
Switzerland	2,9%	0,9%	0,3%	0,02%	0,2%	1,5%	59,3%	4141
Luxembourg	2,3%		1,7%			0,6%	92,0%	174
Belgium	1,5%	0,1%	0,2%			1,3%	41,9%	1166

Source: OECD patent database, June 2007

Table 11A. Share of patent applications with Domestic inventor(s) and Foreign ownership
EPO-patents, Worldwide, 1994

Country of (co)invention	Country/area of ownership						Total applications
	World	Nordic	EU22	USA	Japan	Other	
Iceland	81,8%	9,1%		45,5%		27,3%	11
Norway	24,4%	10,8%	4,7%	5,6%	0,5%	2,8%	213
Denmark	23,1%	5,2%	4,8%	11,3%	0,4%	1,5%	541
Sweden	13,0%	2,9%	2,9%	4,1%	0,1%	2,9%	1424
Finland	10,1%	2,9%	4,3%	1,0%	0,6%	1,3%	714
EU22	19,2%	0,9%	7,9%	7,0%	0,5%	2,9%	28724
Nordic	15,3%	4,0%	3,8%	5,0%	0,3%	2,3%	2903
World	14,3%	0,8%	6,2%	4,6%	0,6%	2,1%	64580
USA	9,5%	0,6%	5,9%		1,0%	1,9%	20290
Japan	5,0%	0,1%	1,1%	3,3%		0,5%	11146
Luxembourg	54,5%	0,0%	21,2%	27,3%	0,0%	6,1%	33
Ireland	52,9%	1,0%	16,7%	33,3%	0,0%	2,0%	102
Belgium	48,4%	1,3%	24,2%	20,9%	0,4%	1,6%	898
UK	35,0%	1,7%	11,0%	17,9%	1,6%	2,8%	3976
Austria	28,8%	1,5%	17,7%	1,2%	0,0%	8,5%	757
Spain	28,3%	0,7%	19,8%	5,3%	0,9%	1,6%	434
Netherlands	23,2%	3,2%	10,1%	8,1%	0,2%	1,6%	1677
Switzerland	21,8%	0,8%	13,8%	5,3%	0,3%	1,7%	1949
Italy	17,9%	0,2%	9,1%	5,3%	0,3%	3,0%	2421
France	14,2%	0,4%	5,7%	5,1%	0,3%	2,6%	5232
Germany	12,3%	0,6%	4,8%	3,6%	0,3%	3,0%	12977

Table 11B. Share of patent applications with Domestic inventor(s) and Foreign ownership
EPO-patents, Worldwide, 2003

Country of (co)invention	Country/area of ownership						Total applications
	World	Nordic	EU22	USA	Japan	Other	
Iceland	35,1%		2,7%	21,6%		10,8%	37
Norway	23,0%	7,3%	8,1%	4,8%		2,8%	356
Denmark	20,9%	5,0%	5,9%	6,2%	0,3%	3,7%	1089
Sweden	20,8%	4,1%	7,5%	5,8%	0,1%	3,3%	2158
Finland	8,2%	3,6%	1,9%	1,1%	0,3%	1,3%	1334
EU22	24,1%	1,6%	10,3%	7,4%	0,7%	4,0%	50982
Nordic	17,7%	4,3%	5,7%	4,7%	0,2%	2,9%	4974
World	17,3%	1,2%	7,5%	4,9%	0,8%	2,9%	115558
USA	13,2%	1,2%	7,2%		1,4%	3,4%	32840
Japan	3,7%	0,2%	1,3%	1,9%		0,4%	20918
Luxembourg	58,5%	0,8%	12,7%	44,1%	0,0%	0,8%	118
Belgium	47,9%	1,9%	26,2%	17,5%	0,4%	1,8%	1623
UK	39,2%	3,5%	12,7%	17,6%	2,1%	3,3%	5991
Austria	37,9%	1,1%	25,2%	1,7%	0,1%	9,7%	1490
Ireland	37,3%	1,5%	10,8%	22,7%	0,4%	1,9%	260
Spain	34,0%	2,2%	20,7%	8,7%	0,8%	1,7%	1055
France	26,6%	1,2%	11,2%	7,8%	1,0%	5,4%	8577
Switzerland	23,8%	1,1%	15,3%	5,3%	0,3%	1,8%	3249
Netherlands	22,1%	2,5%	10,5%	6,8%	0,3%	2,1%	3758
Italy	18,5%	1,4%	9,0%	5,2%	0,1%	2,9%	4526
Germany	16,4%	1,0%	6,3%	4,4%	0,6%	4,0%	22813

Source: OECD patent database, June 2007

Table 12A. Share of EPO-patent applications with Foreign ownership and Domestic inventor(s),1994
(Nordic countries)

Country of (co)invention	Country of ownership							Total applications
	Nordic	Denmark	Finland	Iceland	Norway	Sweden	World	
Norway	10,8%	3,3%	0,9%			6,6%	24,4%	213
Iceland	9,1%				9,1%		81,8%	11
Denmark	5,2%		0,6%		0,7%	3,9%	23,1%	541
Sweden	2,9%	0,9%	1,1%		0,9%		13,0%	1424
Finland	2,9%	0,6%			0,1%	2,2%	10,1%	714
Nordic	4,0%	0,8%	0,7%		0,7%	1,8%	15,3%	2903
EU22	0,9%	0,1%	0,2%	0,0%	0,1%	0,6%	19,2%	28724
World	0,8%	0,1%	0,2%	0,0%	0,1%	0,4%	14,3%	64580
USA	0,6%	0,1%	0,1%	0,0%	0,1%	0,3%	9,5%	20290
Netherlands	3,2%	0,2%	0,1%	0,0%	0,1%	2,9%	23,2%	1677
UK	1,7%	0,2%	0,5%	0,0%	0,2%	0,9%	35,0%	3976

Table 12B. Share of EPO-patent applications with Foreign ownership and Domestic inventor(s), 2003
(Nordic countries)

Country of (co)invention	Country of ownership							Total applications
	Nordic	Denmark	Finland	Iceland	Norway	Sweden	World	
Norway	7,3%	1,7%	1,4%			4,2%	23,0%	356
Denmark	5,0%		3,3%		0,2%	1,5%	20,9%	1089
Sweden	4,1%	1,6%	1,7%	0,1%	0,6%		20,8%	2158
Finland	3,6%	0,3%				3,3%	8,2%	1334
Iceland							35,1%	37
Nordic	4,3%	0,9%	1,6%	0,04%	0,3%	1,5%	17,7%	4974
EU22	1,6%	0,2%	0,3%	0,004%	0,1%	1,0%	24,1%	50982
World	1,2%	0,2%	0,3%	0,01%	0,04%	0,7%	17,3%	115558
USA	1,2%	0,2%	0,4%	0,03%	0,02%	0,6%	13,2%	32840
UK	3,5%	0,4%	0,6%		0,1%	2,4%	39,2%	5991
Netherlands	2,5%	0,6%	0,2%		0,2%	1,5%	22,1%	3758

Source: OECD patent database, June 2007

Table 13A. Share of patent applications with Foreign co-inventor(s), EPO-patents, 1994 (Worldwide)

Country of invention	Country/area of co-inventor						Total applications
	World	Nordic	EU22	USA	Japan	Other	
Iceland	36,4%	9,1%	9,1%	18,2%			11
Denmark	26,4%	6,1%	9,4%	9,2%	0,6%	1,1%	541
Norway	23,9%	8,5%	5,2%	7,0%	0,5%	2,8%	213
Sweden	13,1%	3,5%	4,6%	3,9%	0,1%	1,1%	1424
Finland	9,1%	3,1%	2,8%	1,7%	0,1%	1,4%	714
Nordic	15,5%	4,3%	5,1%	4,7%	0,2%	1,3%	2903
EU22	12,2%	0,5%	5,7%	3,6%	0,4%	2,2%	28724
World	10,4%	0,6%	4,9%	2,6%	0,5%	1,7%	64580
USA	8,9%	0,7%	5,0%		1,0%	2,2%	20290
Japan	3,3%	0,1%	0,9%	1,9%		0,5%	11146
Luxembourg	69,7%		51,5%	18,2%			33
Ireland	38,2%	2,0%	15,7%	19,6%		1,0%	102
Belgium	29,8%	0,8%	21,0%	6,8%	0,8%	0,4%	898
Switzerland	26,0%	0,7%	20,1%	3,6%	0,5%	1,1%	1949
Austria	20,5%	0,1%	13,5%	2,0%		4,9%	757
Spain	20,3%	0,7%	12,9%	4,4%	0,9%	1,4%	434
Netherlands	18,8%	1,3%	10,4%	5,0%	0,2%	1,8%	1677
UK	16,9%	1,0%	5,9%	7,1%	0,8%	2,2%	3976
France	10,0%	0,2%	4,3%	2,8%	0,2%	2,5%	5232
Germany	8,9%	0,4%	3,5%	2,4%	0,3%	2,3%	12977
Italy	7,5%	0,2%	4,2%	2,0%	0,2%	0,9%	2421

Table 13B. Share of patent applications with Foreign co-inventor(s), EPO-patents, 2003 (Worldwide)

Country of invention	Country/area of co-inventor						Total applications
	World	Nordic	EU22	USA	Japan	Other	
Iceland	40,5%		8,1%	18,9%		13,5%	37
Denmark	21,6%	5,0%	8,3%	6,4%	0,4%	1,6%	1089
Sweden	20,1%	3,6%	9,8%	3,7%	0,7%	2,2%	2158
Norway	18,0%	5,3%	7,9%	3,4%		1,4%	356
Finland	14,2%	2,8%	7,0%	2,8%	0,3%	1,3%	1334
EU22	19,2%	0,8%	9,9%	4,8%	0,4%	3,4%	50982
Nordic	18,8%	3,8%	8,6%	4,1%	0,5%	1,8%	4974
World	14,4%	0,7%	7,1%	3,4%	0,5%	2,7%	115558
USA	13,3%	0,6%	7,4%		1,0%	4,3%	32840
Japan	3,0%	0,1%	1,0%	1,5%		0,4%	20918
Luxembourg	59,3%		45,8%	12,7%		0,8%	118
Belgium	43,7%	1,5%	29,6%	9,3%	0,4%	2,8%	1623
Switzerland	39,7%	1,0%	30,0%	6,2%	0,5%	2,0%	3249
Ireland	36,5%	1,2%	17,7%	13,5%	0,4%	3,8%	260
Austria	28,1%	0,3%	20,1%	1,4%	0,1%	6,1%	1490
Spain	26,8%	1,4%	16,7%	6,2%	0,6%	2,0%	1055
UK	25,7%	1,5%	9,6%	10,5%	0,7%	3,5%	5991
Netherlands	22,3%	1,3%	13,1%	5,5%	0,3%	2,2%	3758
France	20,3%	0,4%	10,8%	4,1%	0,5%	4,5%	8577
Germany	14,2%	0,6%	6,5%	3,3%	0,4%	3,3%	22813
Italy	11,9%	0,5%	6,5%	2,8%		2,1%	4526

Source: OECD patent database, June 2007

Table 14A. Share of patent applications with Foreign co-inventor(s), EPO-patents, 1994
(Nordic countries)

Country of invention	Country of (co)inventor							Total applications
	Nordic	Denmark	Finland	Iceland	Norway	Sweden	World	
Iceland	9,1%				9,1%		36,4%	11
Norway	8,5%	2,8%	0,9%	0,5%		4,2%	23,9%	213
Denmark	6,1%		0,6%		1,1%	4,4%	26,4%	541
Sweden	3,5%	1,7%	1,2%		0,6%		13,1%	1424
Finland	3,1%	0,4%			0,3%	2,4%	9,1%	714
Nordic	4,3%	1,1%	0,8%	0,03%	0,6%	1,7%	15,5%	2903
USA	0,7%	0,2%	0,06%	0,01%	0,07%	0,3%	8,9%	20290
World	0,6%	0,2%	0,1%	0,005%	0,1%	0,3%	10,4%	64580
EU22	0,5%	0,2%	0,07%	0,003%	0,04%	0,2%	12,2%	28724
UK	1,0%	0,4%	0,2%	0,03%	0,05%	0,4%	16,9%	3976
Belgium	0,8%	0,2%	0,3%		0,1%	0,1%	29,8%	898

Table 14B. Share of patent applications with Foreign co-inventor(s), EPO-patents, 2003
(Nordic countries)

Country of invention	Country of (co)inventor							Total applications
	Nordic	Denmark	Finland	Iceland	Norway	Sweden	World	
Norway	5,3%	0,8%	0,8%			3,7%	18,0%	356
Denmark	5,0%		0,9%		0,3%	3,8%	21,6%	1089
Sweden	3,6%	1,9%	1,1%		0,6%		20,1%	2158
Finland	2,8%	0,7%			0,2%	1,8%	14,2%	1334
Iceland							40,5%	37
Nordic	3,8%	1,1%	0,7%		0,4%	1,6%	18,8%	4974
EU22	0,8%	0,2%	0,2%	0,01%	0,05%	0,4%	19,2%	50982
World	0,7%	0,2%	0,1%	0,01%	0,05%	0,3%	14,4%	115558
USA	0,6%	0,2%	0,1%	0,02%	0,04%	0,2%	13,3%	32840
Belgium	1,5%	0,3%	0,4%		0,06%	0,8%	43,7%	1623
UK	1,5%	0,5%	0,3%		0,1%	0,6%	25,7%	5991
Spain	1,4%	0,2%	0,5%		0,2%	0,6%	26,8%	1055
Netherlands	1,3%	0,4%	0,2%	0,03%	0,2%	0,5%	22,3%	3758
Ireland	1,2%	0,4%	0,4%			0,4%	36,5%	260

Source: OECD patent database, June 2007

Table 15A. All patent applications by domestic/foreign applicant/inventors, EPO, 1994

Country/area	Domestic Applicant Domestic Inventor	Domestic Applicant Dom.+For. Inventors	Domestic Applicant Foreign Inventor	Foreign Applicant Dom.+For. Inventors	Foreign Applicant Domestic Inventor
Iceland	16,7%	0,0%	8,3%	33,3%	41,7%
Norway	54,7%	7,8%	17,4%	12,0%	8,1%
Denmark	64,1%	5,3%	9,7%	18,5%	2,3%
Sweden	70,8%	5,5%	12,3%	6,0%	5,4%
Finland	77,6%	4,2%	9,0%	4,1%	5,1%
Nordic	69,7%	5,3%	11,4%	8,4%	5,1%
EU22	70,1%	1,1%	12,0%	9,7%	7,2%
World	74,7%	0,2%	12,6%	8,8%	3,7%
Japan	77,6%	3,7%	10,3%	4,3%	4,2%
USA	91,5%	0,8%	2,8%	2,4%	2,4%
Luxembourg	2,3%	14,8%	62,5%	11,4%	9,1%
Ireland	26,5%	4,5%	34,2%	20,6%	14,2%
Belgium	42,6%	1,9%	13,7%	23,8%	18,0%
Netherlands	44,8%	2,9%	37,8%	8,8%	5,6%
Switzerland	47,3%	11,0%	25,5%	8,4%	7,9%
Austria	52,0%	8,0%	15,7%	9,2%	15,0%
UK	54,6%	0,0%	16,0%	14,2%	15,2%
Spain	65,1%	1,9%	6,5%	17,0%	9,5%
France	76,2%	1,4%	9,6%	7,6%	5,2%
Italy	78,2%	0,0%	4,7%	7,1%	10,0%
Germany	80,6%	0,8%	7,2%	7,4%	4,0%

Table 15B. All patent applications by domestic/foreign applicant/inventors, EPO, 2003

Country/area	Domestic Applicant Domestic Inventor	Domestic Applicant Dom.+For. Inventors	Domestic Applicant Foreign Inventor	Foreign Applicant Dom.+For. Inventors	Foreign Applicant Domestic Inventor
Iceland	37,8%	15,6%	17,8%	17,8%	11,1%
Sweden	52,6%	8,0%	23,4%	7,3%	8,6%
Denmark	62,0%	8,9%	10,3%	10,5%	8,3%
Norway	65,8%	3,5%	9,9%	12,7%	8,1%
Finland	67,8%	8,1%	17,2%	3,6%	3,2%
Nordic	59,3%	8,0%	18,2%	7,4%	7,1%
EU22	62,8%	3,1%	13,2%	13,6%	7,3%
World	69,2%	1,1%	15,0%	11,1%	3,6%
Japan	71,2%	6,9%	9,9%	5,1%	6,8%
USA	92,0%	0,7%	3,7%	2,1%	1,4%
Luxembourg	5,8%	14,4%	51,4%	14,4%	14,0%
Ireland	29,3%	13,7%	31,4%	11,3%	14,2%
Switzerland	34,3%	16,1%	33,9%	10,2%	5,6%
Belgium	34,9%	8,6%	16,5%	27,8%	12,1%
Austria	41,0%	10,0%	17,9%	13,1%	18,1%
Netherlands	44,9%	4,7%	36,3%	9,6%	4,5%
UK	51,9%	2,4%	10,8%	20,6%	14,4%
France	60,3%	1,5%	15,8%	15,6%	6,8%
Spain	61,8%	0,4%	5,8%	24,9%	7,1%
Germany	73,6%	3,2%	8,2%	9,9%	5,1%
Italy	77,8%	0,2%	4,3%	11,2%	6,5%

Source: OECD patent database, June 2007

**Table 16. Net share of (Domestic Applicant/Foreign Inventor – Foreign Applicant/Domestic Inventor),
EPO-patents, 1994,2003**

Country/area	Domestic Applicant/Foreign Inventor - Foreign Applicant/Domestic Inventor	
	1994	2003
Finland	4,1%	18,5%
Sweden	6,4%	15,5%
Iceland	-66,7%	4,4%
Denmark	-5,8%	0,4%
Norway	5,0%	-7,3%
Nordic	3,2%	11,7%
USA	5,4%	4,9%
World	0,4%	1,3%
Japan	-1,2%	0,8%
EU22	-3,8%	-4,6%
Luxembourg	56,8%	37,4%
Switzerland	20,2%	34,2%
Netherlands	26,3%	26,9%
Ireland	3,9%	19,5%
Austria	-0,6%	-3,3%
Germany	-3,5%	-3,6%
France	-1,8%	-5,2%
Italy	-12,4%	-13,2%
Belgium	-26,1%	-14,9%
UK	-13,4%	-21,8%
Spain	-18,1%	-25,9%

Source: OECD patent database, June 2007