Why collect data on patents?

Patents reflect part of a country’s inventive activity. Patents also show the country’s capacity to exploit knowledge and translate it into potential economic gains. In this context, indicators based on patent statistics are widely used to assess the inventive performance of countries or regions.

The grounds for the assumption that a patent represents a codification of inventive activity rely on the novelty, utility and inventiveness that an invention requires to be subject to be patented. On the basis of this assumption, Eurostat collects patent statistics to build up indicators of research and development (R&D) output.

General information

Patents, as a legal instrument to protect invention, are strongly influenced by the legal system that surrounds them. The European patent framework, in particular, is rather complex, since national systems co-exist with the European patent, and a third system, the Community patent, is currently under regulation. As a result, the process of patenting is not straightforward. This section aims to clarify the conceptual and legal frameworks in the field of patents, so as to facilitate understanding of the data contained in Eurostat’s database and to provide some basic guidelines for the interpretation of patent data as an indicator of regional potential for innovation.

1. Patents as a S&T indicator

1. 1. What is a patent?

A patent is a legal title of industrial property granting its owner the exclusive right to exploit an invention commercially for a limited area and time. The patent confers its owner the right to stop others from, among other things, making, using or selling such invention without authorisation. In return for the exclusive right to exploit it, the technical details of the invention are published. Patentability requires novelty, inventiveness and industrial applicability of the invention.

1. 2. What do patents help to illustrate?

Technological change and innovation have become two main areas of economic analysis in the industrialised countries, as they are determining factors for the productivity and competitiveness of a nation. Science and technology (S&T) activities are crucial for fostering technical innovation, and therefore there is an increasing interest for describing the countries’ S&T activities in both quantitative and qualitative terms. In this context, S&T activities are mainly measured by using indirect input, output and impact indicators. It is in the framework of output indicators that patent data are used. In particular, indicators based on patents can be very interesting for assessing the performance of application-oriented types of R&D. Although patents do not cover all kinds of innovation activity, they do cover a considerable part of it. However, patent indicators should be complemented with other S&T indicators, so as to obtain a complete view of the innovation activities of the countries and regions.

1. 3. Advantages and disadvantages of using patents as an indicator of R&D output

Advantages

There are some good reasons that have made patents one of the most widely used sources of data to construct R&D indicators:

- Patents have a close link to invention and cover a broad range of fields.
- Patent data are readily available from the various national and regional patent offices.
- Patent documents contain detailed information including the year of invention, technical classification, country of applicant, country of inventor etc., with data going back many years.
- Due to the efforts and costs involved with patenting, the economic weight of the inventions for which a patent is applied for is guaranteed to a large extent.
• Being closer to the time of invention, patent statistics are more accurate than production or trade statistics, which may comprise a greater time lag between actual innovation and commercialisation.

Disadvantages

However, using patent indicators does also have several shortcomings, namely:

• Not all inventions are patented and not all patents have the same value.
• There are other means to reap market success from an invention, such as secrecy, rapid launching or low prices.
• There are differences in the propensity to patent across firms, sectors and countries, influenced by different national patent systems as well as the patterns of international trade and direct investment.
• In areas where developments change rapidly, patent protection may be of little value because inventions quickly become obsolete and it takes a long time to grant a patent.
• Although patents cover a wide range of fields of technology, not all inventions can apply for patent protection. This is the case, for example, of computer software under the European Patent Convention (Article 52, paragraphs 2c and 3). Nonetheless, in February 2002, the European Commission submitted a proposal for a directive on the patentability of computer-implemented inventions. In the context of the directive, computer software as such is excluded from patentability. In order to be patentable, the proposal requires that the invention implemented through the execution of software on a computer or similar apparatus, makes a contribution in a technical field that is not obvious to a person of normal skill in that field. Thus in Europe, unlike in the US, computer software will continue being protected by copyrights.
• The requirement of novelty for the granting of patents means that although the indicators are particularly appropriate for advanced countries, they may not adequately portray technological activity in less developed countries and regions.

2. Patent systems in Europe

In the European Union, patent protection is currently provided by two systems: the European patent system and the national patent systems. The former is regulated by the Munich convention adopted in 1973, whereas national patent systems are defined by national laws. However, as all the Member States of the European Union have ratified the Munich convention, the patent law across Europe is largely harmonised, at least de facto.

Patent protection in Europe can also be obtained via the Patent Co-operation Treaty (PCT), by filing the application at the World Intellectual Property Organisation (WIPO) and designating a European country or the EPO for protection.

In addition to the existing systems, the European Union is now willing to implement the 1975 Luxembourg agreement on the Community patent. After various attempts of implementation using international tools, the European Commission proposed a council regulation on the Community patent in 2000. After intense discussion the Council of the European Union has prepared a proposal for a Council Regulation on the Community patent. If this regulation is approved, a third system will enter into force: the Community patent system, which aims to establish a unitary and autonomous patent system for the entire European Union, coexisting with the actual patent systems.

2. 1. European Patent Convention (Munich Convention)

The European Patent Convention (EPC) was signed in Munich in October 1973 and entered into force on 1\textsuperscript{st} June 1978. The Munich Convention establishes a uniform patenting system for all countries signatory to the Convention, providing applicants with protection in as many of the signatory states as they wish. Once granted, the European patent is protected under the national law in each of the countries designated in the application. The Munich Convention created the European Patent


\footnote{See World Intellectual Property Organisation’s (WIPO) website at \url{http://www.wipo.int}}
Organisation (the legislative body) and the European Patent Office (the executive body), establishing a centralised procedure for granting European patents.

The 1st of January 2008, 34 countries have ratified or acceded the revised Convention (EPC 20/11/2000): Austria, Belgium, Bulgaria, Cyprus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the UK. European patent applications and patents can also be extended to countries signing agreements to that effect with the European Patent Organisation.

The extension states at present are Albania, the former Yugoslav Rep. of Macedonia, Serbia and Montenegro, and Bosnia and Herzegovina.

Further countries are expected to join the EPO in due course (probably the former Yugoslav Rep. of Macedonia).

Although applying for a European patent is cheaper than applying for the patent in each of the National offices where protection is desired, the cost of a European Patent is still considerably higher than in Japan or the US. The Commission estimated that whilst the overall cost of a European patent including translation costs and other fees is around EUR 49 900, Japanese and US patents cost on average EUR 16 450 and EUR 10 330 respectively.

Two Intergovernmental Conferences (Paris 1999 and London 2000) have addressed the two major problems faced by users after the grant of a European patent:

- the high costs of translating the full patent specification into the national languages of the States where the patent shall take effect and
- the absence of a common European litigation scheme to deal with infringement and validity of European patents.

So far, the outcome of the reform initiatives at intergovernmental level is

- the London Agreement on the application of Article 65 EPC, which entered into force on 1 May 2008 and
- the draft European Patent Litigation Agreement (EPLA).

2.2. National Patent systems

Each European country has its own national patent office, which grants patents that protect their owner within the national territory. These patents are awarded by the corresponding national authority and are ruled by national law. However, the national patent law of all the Member States of the European Union has been de facto harmonised. This is because all the Member States are parties of the Paris Convention for the Protection of Industrial Property of 20 March 1883, the European Patent Convention and the Agreement of Trade related aspects of Intellectual property Rights (TRIPS agreement) reached at the Uruguay Round concluded in 1994.

2.3. Patent Co-operation Treaty (PCT)

The Patent Co-operation Treaty was signed in Washington on 19 June 1970 and came into force on 1st June 1978. The PCT allows for a filing of an international application to have the same effect as a national application in each of the contracting countries designated in the application.

All the PCT applications are centralised through the World Intellectual Property Organisation (WIPO). In November 2005, one hundred and eighty-three States are members of the WIPO, and therefore any applicant can designate for protection in all these states or in a regional office such as the EPO. In the cases were the EPO is designated, the patent is known as a Euro-PCT patent. The PCT system is superimposed upon the national and European systems, but patents are always granted nationally.

For a patent application filed under the Euro-PCT route, two phases are identified, the international phase and the national or regional (European) phase. During the international phase, a search is

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3 See the European Patent Office's (EPO) website at http://www.european-patent-office.org/
5 http://www.epo.org/patents/law/legislative-initiatives.html
carried out, and eighteen months after the priority date (the date of the first application at any patent office), the application is published. When the international search report is finalised, the applicant has to choose between three alternatives: transferring the application to a national or regional patent office among those designated in the application (in which case it will enter the national or regional phase); electing an international preliminary examination; or withdrawing the application. If the application enters the regional or national phase, formal search and substantive examination are undertaken, ending with the application being either granted, refused, or withdrawn by the applicant.

2. 4. The community patent

The Community Patent has its origins in the Luxembourgeois convention, which was signed on 15 December 1975. Although it was amended by an agreement signed in 1989, the Luxembourg Convention has not yet entered into force since only France, Germany, Greece, Denmark, Luxembourg, the United Kingdom and the Netherlands have ratified it.

In view of the lack of effectiveness of the international convention and the discussions of the European Council in Lisbon on 23 and 24 March 2000, where the importance of introducing a Community patent without delay was underlined, the European Commission proposed a Council regulation on the Community patent in August 2000.

The difference between the council regulation and the Convention is that once approved, the regulation shall be directly applicable to all the Member States, and therefore the Community patent system shall enter into force. Also, the regulation tried to overcome the problems arisen in the context of the Convention (especially costs and jurisdiction). In this framework, the regulation proposed a Community patent characterised by unity and autonomy that arises from a body of Community patent law, affordable, with appropriate language arrangements and information requirements and that guarantees legal certainty. The Community patent system shall coexist with the national patent systems and the European patent system.

The differences between the Community patent and the European patent would basically be that the Community patent would always be granted for protection in all the Member States; the Community patent would not be regulated by national law, but by Community law; and litigation on infringement and validity of a Community patent as well as other issues would be handled not by national courts (as in the European Patent) but by the "Community Intellectual Property court" to be created in the framework of the European Court of Justice, guaranteeing thus legal certainty.

After multiple discussions, the Competitiveness Council of Ministers reached an agreement on a common political approach concerning the proposed Community Patent on 3rd March 2003. This common political approach includes the main outlines of the system of jurisdiction whereby a centralised Community Court would rule on disputes, the language regimes, costs (it is estimated that this agreement reduces translation costs by 50%), the role of national patent offices and the distribution of fees.

On the basis of this common political approach, the Council of the European Union prepared a Proposal for a Council Regulation on the Community patent. Further progress was made towards overall agreement at the November 2003 Council.

At the Competitiveness Council of Ministers on 11th March 2004 the Council failed to reach agreement on the proposed Regulation creating a Community Patent, despite the agreement on the broad outlines reached by the same Council in March 2003. The main sticking point was how infringements of patents which might arise as a result of mistranslations should be treated. In the absence of agreement, the Presidency concluded that it would reflect on how to proceed further.

In January 2006, the Commission launched a public consultation on how future action in patent policy could best take account of stakeholders' needs. The Questionnaire on the patent system in Europe published on that occasion by the Commission focuses on three major issues:

- the Community patent,

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8 See 2490th Council meeting, COMPETITIVENESS, Internal Market, Industry and Research, Brussels, 3 March 2003, 6874/1/03 (Presse 59).
9 See Proposal for a Council Regulation on the Community patent - Text revised by the Presidency - Document 8539/03 (16 April 2003).
- how the existing European patent system could be improved in the near future and
- possible areas for harmonisation.

The EPO’s reply to the Questionnaire has been made public.

The consultation process has brought renewed attention to projects which have been suffering from the deadlock of the years 2004-2005 as well as new momentum to the arduous endeavour of reforming patent law in Europe. On 12.7.2006, the Commission hosted an open hearing in Brussels. The stated aim of the hearing is to initiate a second phase of the consultation, at the end of which the Commission will present its views on the future patent policy in Europe.

In preparation for the hearing on 12.7.2006, the Commission published its preliminary findings of the consultation\textsuperscript{11}. In addition, a short report on the hearing has been made available together with most speeches and ppt-presentations given at the hearing, including the intervention by Professor Pompidou, former President of the EPO.

On 29.3.2007, the Commission adopted the communication "Enhancing the patent system in Europe"\textsuperscript{12}.

The latest revised Proposal for a Council Regulation on the Community patent\textsuperscript{13} is dated 7.4.2009.

2.5. The patenting process and the European Patent application procedure

The complex framework described above shows that invention owners are provided with multiple possibilities to protect themselves in Europe. Usually, a patent application is initially filed with the national patent office of the country in which the inventor’s laboratory or company is located. The patent application is then provisionally protected until examination of the application is complete and the patent is either granted or rejected or withdrawn.

For various reasons, it could also be worthwhile to apply for patent protection in other countries. Within one year, the same invention can also be filed in other countries. This can either be done by filing a patent application in each desired country, or by filing a regional application, e.g. with the EPO, for a number of European countries (based on the European Patent Convention), or by filing an international application under the Patent Co-operation Treaty. Besides the possibilities outlined above, direct filing for several countries either under the PCT route or with the EPO (Euro-direct application) is also possible. In all cases, the protection starts from the date of first filing at any patent office (priority date).

In addition, inventors that are seeking protection outside Europe can also apply for patents in other offices, such as the United States Patent and Trademark Office (USPTO) and the Japanese Patent Office (JPO).

In the context of the European Patent office, it takes on average just over four years for a patent to be granted. The European patent grant procedure comprises two (sometimes three) phases:

**Phase 1:** Filing the application, examination on filing and formalities examination, search, publication of application and search report

European patent applications may be filed either with the European Patent Office or with national patent offices in the contracting States. Within 12 months of the date on which a national or European patent application was filed, applicants may claim the date of this first application for a subsequent national filing for the same invention. The application is published 18 months after the priority date and the search report is published either with the application or later on. Then applicants have six months to decide whether or not to follow their application by requesting substantive examination.

Applicants can designate as many states signatory of the European Patent Convention as they want, either at the moment of filing the application or at the moment the Euro-PCT enters the regional (European) phase.

**Phase 2:** Substantive examination (grant of patent or refusal of application)

If a European patent is granted, competence is transferred to the designated contracting states, where it affords the same level of legal protection as a national patent. A European patent is valid for 20 years from the date on which the application was first filed.

\textsuperscript{11} http://ec.europa.eu/internal_market/indprop/docs/patent/hearing/preliminary_findings_en.pdf
**Phase 3: (in some cases) Opposition, appeal**

Within nine months of the date of grant, any third party may file opposition against a patent they believe does not comply with the substantive provisions of the European Patent Convention. The decision of the EPO's opposition division in such matters is applicable to all the contracting States designated for the patent concerned.

### 3. The US Patent system

In order to protect an invention in the US, patents need to be applied for at the United States Patent and Trademark Office (USPTO), either directly or via the WIPO and designating the USPTO for protection (See PCT procedure above).

The basic role of the US Patent and Trademark Office is to promote the progress of science and the useful arts by securing for limited times to inventors the exclusive right to their respective discoveries (Article 1, Section 8 of the United States Constitution). The USPTO is a non-commercial federal entity and one of 14 bureaus in the Department of Commerce (DOC).

The USPTO’s mission is to promote industrial and technological progress in the United States and to strengthen the national economy by:

- Administering the laws relating to patents and trademarks.
- Advising the Secretary of Commerce, the President of the United States, and the administration on patent, trademark, and copyright protection.
- Advising the Secretary of Commerce, the President of the United States, and the Administration on the trade-related aspects of intellectual property.

Unlike at the EPO, patents have traditionally only been published once they were granted. However, this policy has recently changed and the USPTO has started publishing data on applications too.

The definition of what can be patented depends on the US legislation and therefore it is not necessarily the same as what is subject to be patented in the EU.

According to estimations made by the European Commission, patenting in the US is cheaper than in the EU. The Commission estimated that whilst the overall cost of a European patent including translation costs and other fees is around EUR 49 900, US patents cost on average EUR 10 330\(^\text{14}\). The main reason for this is that US applicants do not face the same translation costs as Europeans do.

It takes on average 2 to 5 years for a patent to be granted by the USPTO.

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