

## Substantive patent law

Patent scope, duration, subject matter, disclosure and inventive step are, principally, the main dimensions of substantive patent law. These aspects of patent law can shape the innovation process in different ways. Thus, understanding these concepts and how they are related to innovation matters for assessing their implications for policy.

### What are the basic components of dimensions of substantive patent law?

#### Patent scope

**Patent scope is the extent of protection granted to patent holders over their inventions**. In other words, it is the rights owners can enforce against imitators and follow-on inventors (OECD, 2004).

Patent scope is largely a function of two doctrines: (1) the enablement doctrine, by which a patent specification must teach a person skilled in the relevant art how to make and use all the embodiments of the invention encompassed by the claims (Merges and Nelson, 1990); and (2) the doctrine of equivalents, which allows patentees to obtain exclusive rights to their own invention, but also to other inventions which are deemed “functionally equivalent”, and to a certain extent on improvements of their inventions.

#### Duration

**The length or duration of a patent is simply the lifetime of the patent grant.** The duration of protection matters to the extent that it limits monopoly rights by making the invention available to the general public after a lapse of time. The patent statute fixes a statutory duration, an upper limit to the patent term, which is usually 20 years after application (a minimum set in the TRIPs). In research-intensive fields like pharmaceuticals, the duration of patent protection is critical (especially when they face long marketing approval procedures). However, in other industries only a few firms exhaust the available term for patent protection, allowing early entrance of competitors in the relevant markets (OECD, 2009).

#### Subject matter

**Subject matter in patent law is the domain of knowledge that is not excluded from patentability.** To be patentable, an invention must concern certain fields of knowledge, most of which are “technological” (OECD, 2009); for example, scientific discoveries, aesthetic creations, laws of nature and abstract ideas are generally excluded.

#### Disclosure

In return for the exclusive rights granted to a patent owner, applicants must disclose the invention in the text of the application, which is published 18 months after application. Three types of information are disclosed by a patent document: technical description of the invention, development and ownership of the invention, and history of the application (OECD, 2009). **The disclosure requirement must be sufficient to enable someone skilled in the art to make and use the invention claimed in the patent.**

#### Inventive step

The inventiveness of an invention resides on its contribution to the state of the art in a particular technology field. **An invention is not inventive if it would have been obvious at the time the invention was made to a person with ordinary skill in the relevant art.** The term “obvious” is a legal term of art and is used in different senses from country to country (OECD, 2009). In essence, it refers to the requirement for an invention to be sufficiently “inventive”. The expression “inventive step” is predominantly used in European countries. In Europe, an invention is inventive if it offers a non-obvious technical solution to a technical problem. In the United States, inventiveness is referred

to as “non-obviousness”. In U.S. patent law, an invention is obvious if the differences between the claimed subject matter and the prior art are such that the invention as a whole would have been obvious at the time the invention was made to a person having ordinary skills in the art to which the relevant subject matter pertains.

## **How do substantive patent law affect innovation?**

### **Patent scope**

Determining the optimal scope of patent rights has important implications for innovation. Patent rights that are too narrow will not give inventors sufficient incentives to develop innovative projects, while overly broad rights might constrain competitive R&D efforts (Merges and Nelson, 1990). **Patent breadth involves the idea that broader patents allow innovator to earn a higher flow rate of profits during the lifetime of the patent** (Gilbert and Shapiro, 1990). The broader the scope, the larger the number of competing products and processes that will infringe the patent (Merges and Nelson, 1990), and the larger the amount of rents that the patent holder can extract from other inventors and customers. In fields where pioneer inventions occur (such as biotechnology and software), it is more difficult for patent offices to identify the novelty and inventiveness of a claimed invention. Because of this difficulty, broad scopes of protection have sometimes been granted in such sectors (OECD, 2004).

### **Duration**

**The lifetime of a patent determines the moment in the patent trade-off in which monopoly rights end and the general public gain access to the patented technology.** Statutory patent term, if too short, can weaken innovative incentives (Horowitz and Lai, 1996). However, the longer the patent is outside of the public domain, the higher will be the deadweight loss incurred. In practice, however, with the exception of some patents (notably those in pharmaceuticals), few patents are maintained until the statutory term, and patent maintenance fees play a critical role in providing public access.

### **Subject matter**

Expanding or restricting the range of technologies that fall within the patentable subject matter will affect how patents support or hinder innovation in the concerned sectors. Particular debates are going around subjects like software or genetic material. **A clear delimitation of what is patentable is crucial for enhancing legal certainty, avoiding unnecessary enforcement costs, and improving the effectiveness of patent systems for encouraging innovation.**

### **Disclosure**

The disclosure of information about inventions in patent application files is an additional contribution of patents to invention. **Patents reveal new knowledge through disclosure of inventions and diffuse information that might otherwise be kept secret, thereby enabling other inventors to develop new inventions.** By diffusing information on inventions that have been achieved and are protected, the patent system also deters needless duplication of R&D efforts, encouraging researchers to focus on really new areas (OECD, 2009). While disclosure benefits society, it does not necessarily benefit IP owners. Thus, patent systems need to establish clear provisions to ensure that inventors reveal useful information, so that inventions can be shared to the benefit of society.

### **Inventive step**

The patent law requirement of inventiveness avoids the protection of inventions that would have been created and made available to society anyway (WIPO, 2004). **The lower the level of inventiveness required, the fewer patents will incorporate substantial inventions with value to society** (WIPO, 2009), and the higher will be the rate of destruction of previously held patents. It is important to ensure that patents are really inventive to guarantee high patent quality.

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Thus, patent applications for trivial inventions require examination as much as others (Cowin et al., 2007).

Moreover, if the inventiveness standards are too low, the patent system will be costly because it will have to deal with many more applications than if it applied a tougher rate (Cowin et al., 2007). However, if inventive standards are set too high, many inventions would be left outside of the patent systems, which could in turn act as a disincentive to innovation and, what is more, might lead to fewer inventions being made public via the patent system.

### **What are the policy implications of patent laws?**

By carefully balancing the different elements of substantive patent law, policy makers can design patent regimes that are favourable to both innovation and knowledge diffusion (OECD, 2004).

#### **Patent scope and duration**

Life and breadth of a patent are closely related, having to do with the extent of protection granted to an invention. It is important for policy makers to determine the socially optimal mix between both (Gilbert and Shapiro, 1990). **If patents are of narrow scope and short length patents, it may encourage inventors to keep their inventions secret** instead of patenting them, hence hindering diffusion of technology. The opposite characteristics, on the other hand, may open the door to undesired strategic behaviour by patent holders, who may use their titles to appropriate undue rents from competitors. Too broad patent rights mean that society will have to rely solely on the inventors for any development of the protected invention, and not on a collective effort (Cowin et al., 2007).

Specific policy debates regarding patent scope and duration include the following:

- Concerns regarding patent scope and duration have recently been raised in emerging fields like biotechnology and software. In particular, in genetics inventions that are demonstrations of certain causal relations or information processes in the cell are broad product patents and as such may block further utilization and innovation (Cowin et al., 2007).
- Also **related to patent duration is the issue of “evergreening”**, when patents' holders strategically try to extend the life of a patent by making minor changes in existing patented inventions. These tactics have been argued to provide only limited incentives for innovation but extend the deadweight loss associated with providing monopoly powers to firms.

#### **Subject matter**

The categorization and conception of individual subject matter becomes more important as inventions trigger difficult sociological and methodological questions (Pila, 2010). Policies defining subject matter must be very specific so that legal provisions concerning subject matter can establish a clear line between the kinds of inventions that are patentable and those that are not.

**The boundary between what is and what is not patentable is more difficult to define in science-based technologies like gene technology**, which has seriously challenged the concept of patentable subject matter (Cowin et al., 2007). Similarly, there has been some debate regarding the scope of patentable subject matter for different types of software running on a computer including if the alleged invention is the general application of modern technology (e.g. the Internet) to well-known business procedures or the implementation of a new business procedure or other non-technical features by normal technological means (Cowin et al., 2007).

#### **Inventive step**

Setting the appropriate threshold for inventiveness is crucial for fostering innovation. **Reasonable inventiveness criteria are essential for striking the balance between encouraging**

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**substantial inventions and excluding many relevant incremental innovations from the system** (Cowin et al., 2007; WIPO, 2009).

In general, inventiveness is the most difficult of the standards to determine in the examination and determination of the substance of patent applications (WIPO, 2004). The requirement of inventive step/non-obviousness conveys the idea that it is not enough that the claimed invention is new, that is, different from the state of the art, but the invention has to be notably inventive and different from the state of the art (Barton, 2003; WIPO, 2004). There is a question as to how high the inventive step should be set. Setting a higher inventive step might encourage more substantial inventions, but could have the downside of excluding many potentially valuable inventions from the patent system and, thus, from disclosure.

It is also critical to assess inventive step in an objective and predictable manner. To do so the European Patent Office (EPO) applies the so-called “problem-and-solution approach”. The problem-and-solution approach comprises three stages: determining the closest prior art, establishing the objective technical problem to be solved and considering whether or not the claimed invention, starting from the closest prior art and the objective technical problem, would have been obvious to the person skilled in the art (EPO 2012). The EPO has recently reviewed its standards and practices regarding inventive step, as well as the economic consequences of a low level of inventive step. It has also reviewed the abilities, knowledge and use of the person skilled in the art as mentioned in the European Patent Convention (EPC) (EPO, 2009).

**Disclosure**

Adequate policies regarding disclosure and their practical implementation are important in order to ensure that other inventors and the general public have access to innovative knowledge. The principal means for diffusing patent information are online patent databases, which can be provided by intellectual property (IP) offices. Patent data can be used to: (1) find out what already exists and build on it; (2) know your competitors and identify technology trends; and (3) avoid infringement of patent owners’ rights.

Training might be needed to help make information provided in patents/patent data bases useful in different contexts and to different users. In particular, it is important that end users are aware of how patents are relevant to their businesses. If firms are not sufficiently informed, they might not know how to use the patent system or use it inadequately and the result will be low returns to the firm (OECD, forthcoming).

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