A PATENT SYSTEM FOR THE 21ST CENTURY

Stephen A. Merrill, Richard C. Levin, and Mark B. Myers, Editors

Committee on Intellectual Property Rights in the Knowledge-Based Economy
Board on Science, Technology, and Economic Policy
Policy and Global Affairs Division

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Seven Criteria for Evaluating the Patent System

PATENTS AND INNOVATION

Ultimately, the test of a patent system is whether it enhances social welfare, not only by encouraging invention and the dissemination of useful technical information but also by providing incentives for investment in the commercialization of new technologies that promote economic growth, create jobs, promote health, and advance other social goals. Assessing the system's overall economic impact is no simple task, perhaps an impossible one. For one thing, the dual functions of patents are in some degree at odds with each other. The exclusivity that a patent confers is undermined by its publication, which may help others circumvent the patent. Furthermore, patents entail a trade-off between the incentives provided for innovation and the costs resulting from a monopoly that may curtail competition and raise consumer prices or hinder further incentive efforts. Both sides of that ledger are exceedingly complex. Innovation in any technology area may benefit from the incentive created by a patent on a new product or process development, but it may suffer if patents discourage the combining and recombining of inventions that would have been made absent the patent or inhibit follow-on discovery. Competition may suffer when an inventor is granted a temporary monopoly right or a combination of patents is used to bar entry or to maintain a cartel in an industry. On the other hand, competition will benefit if this right facilitates investment by new, innovative firms lacking assets other than intellectual property. Patents can also foster the creation of markets for technology, enabling efficiencies in the research and development (R&D) process and promoting the transfer of discoveries from entities skilled at conducting R&D to firms potentially better suited to commercializing and marketing innovations.

We have previously cited evidence that patents function differently in different industrial sectors. There is also a growing body of research on the relationship between patents and innovation across countries and time. Using mainly 19th-century data, Lerner (2002) and Moser (2003) find that instituting a patent system or strengthening an existing patent system does not produce more domestic innovation although the latter does induce inventors from other countries to patent more in the country making the change. It may also induce foreign multinationals to transfer more technology to affiliates in the country (Branstetter et al., 2003). Sakakibara and Branstetter (2001) studied the effects of a statutory change in Japan allowing multiple claims per patent, as has always been the case in the United States. They found that the effective broadening of patent scope had a very small positive effect on R&D activity by Japanese firms. Lanjouw and Cockburn (2000) found some limited evidence for attributing an increase in Indian research addressing developing country needs to patent reforms of the 1980s, which provided increased protection.[1] The effect leveled off, however, in the following decade. Scherer and colleagues (1959) investigated the consequences of Italy's moving from a no-patent to a patent regime in pharmaceuticals; they did not find a significant effect. Using firm-level survey data for Canada, Baldwin and colleagues (2000) found a much stronger relationship running from innovation to patenting than in the reverse direction. Firms that innovate take out patents, but firms and industries that make more intensive use of patents do not tend to produce more innovation. In the United States manufacturing sector, however, in a model that explicitly controls for mutual causation between patenting and R&D, Arora and colleagues (2002) find evidence that patenting is an important stimulus for R&D.

Other positive results are those of Park and Ginarte (1997) using data across 60 countries for the period 1960-1990. They found that the strength of intellectual property (IP) protection (an index of pharmaceutical coverage, participation in international agreements, lack of compulsory licensing, strength of enforcement, and patent duration) was positively associated with R&D investment in the 30 countries with the highest median incomes. Elsewhere, the relationship was positive but not significant. These results, however, are cross-sectional and fail to account for the reverse causality between conducting R&D and having a robust patent system.

The conclusions from this body of empirical research on the effects of patents are several but mostly tentative (Hall, 2003b). In developed countries, at least in manufacturing, patenting stimulates innovative activity broadly, but the stimulus varies among industries. Introducing or strengthening a patent system, however, unambiguously results in an increase in patenting and may encourage the strategic and tactical use of patents with attendant costs and possibly adverse

[1]Although not a level of protection comparable to that in North America, Europe, or Japan.

impacts on innovation and competition. One may legitimately question whether the impact of patenting on innovation and its consequences for social welfare are, on balance, positive outside of the handful of industries, such as pharmaceuticals, biotechnology, medical devices, and specialty chemicals where the benefits are well established, and possibly to a lesser extent, computers and auto parts.

More subtle effects are suggested by recent economic studies and deserve more attention. Patents may enable the creation and affect the organization of knowledge-based industries by allowing trade in knowledge and facilitating the entry of firms with only intangible assets. As this abbreviated literature review suggests, the empirical economic research on the uses and impacts of patenting is more robust than it was nearly 20 years ago when George Priest (1986) complained about the dearth of useful economic evidence on the impact of intellectual property: "Economists know almost nothing about the effect on social welfare of the patent system or . . . other intellectual property." Nevertheless, knowledge is still quite limited and the range of industries examined in any detail is quite narrow.

EVALUATION CRITERIA

In circumstances that at this stage defy a comprehensive evaluation, the committee posits a series of criteria for evaluating the patent system in terms of its impact on innovation rather than addressing its competitive or overall welfare effects. These criteria, although requiring judgments, can in varying degrees be assessed empirically and tracked over time to observe significant changes. In most cases they relate to factors widely thought to be important if not necessary and sufficient conditions for innovation.

First criterion: The patent system should accommodate new technologies. A system granting even temporary monopoly rights to developers of one technology but providing no incentives to developers of other, including substitute, technologies obviously would be hostile to innovation over the long run.

Second criterion: The system should reward only those inventions that meet the statutory tests of novelty and utility, that would not at the time they were made be obvious to people skilled in the respective technologies, and that are adequately disclosed. In the extreme case where an invention is already accessible to the public, or the full scope of what is patented cannot be carried out in practice, there is nothing to be gained and potentially a great deal to be lost by granting a monopoly.

Third criterion: The patent system should serve its second function of disseminating technical information. That means that descriptions of patented inventions should be as complete, clear, and accessible as possible and disclosed in a reasonably timely manner, and there should not be deterrents to consulting the patent or any other technical literature.

Fourth criterion: Administrative and judicial decisions entailed in the patent system should be timely, and the costs associated with them should be reasonable and proportionate. Protracted uncertainty about whether a patent on an application will issue or about whether a patent that is challenged in an infringement dispute will be upheld or found not infringed is not conducive to the investments necessary to innovate. In the same vein, high transaction costs entailed in obtaining or defending a patent are likely to discourage innovation. Such costs tend to escalate the longer the resolution of the issue, whether patentability or infringement, is delayed.

Fifth criterion: In scientific research and in the development of complex or cumulative technologies, where one advance builds upon one or more previous discoveries or inventions and full exploitation of the technology is beyond the capacity of any single entity, reasonably broad access to patented inventions is important. Access depends upon at least three factors: (1) the scope of the patent claims, (2) the availability of licenses on reasonable terms, and (3) the complexity of the patent landscape. Of course, technology must first be created for access to be an issue. Thus, access must be balanced against the incentive to invent and disseminate technology.

Sixth criterion: In an economy where a significant share of its technology-intensive products are bought and sold internationally, the compatibility of national patent systems can be a facilitator of trade and investment and therefore innovation. Indeed, there is an efficiency argument for the integration of the U.S., European, and Japanese patent systems to reduce public and private transaction costs.

Seventh criterion: There should be a level field, with intellectual property rights holders who are similarly situated (e.g., state and private institutions performing research) enjoying the same benefits, while being subject to the same obligations.

Accommodating New Technologies

As the examples of the extensions of patenting in Chapter 2 illustrate, the patent system has proven highly adaptable to changes in technology. This includes not only emergent technologies in advance of or in tandem with their commercial application—for example, biotechnology and nanotechnology—but also technologies that at least in their early stages exhibited rapid progress and substantial commercial success without patents, such as software.

The flexibility of the patent system is a function of at least three features. First, it is a unitary system with few a priori exclusions. Second, the initiative to extend patenting to a new area lies in the first instance with inventors and commercial developers, not with legislators, administrators, or judges. Third, some statutory features of the patent system, as well as administrative and court-

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Seven Recommendations for a 21st-Century Patent System

The committee supports several steps to ensure the vitality and improve the functioning of the patent system.

• ***An open-ended, unitary, flexible patent system.*** The system should remain open to new technologies with features that allow flexibility in protecting new technologies. Among the features that should be exploited is the United States Patent and Trademark Office's (USPTO) development of examination guidelines for new or newly patented technologies. The office should seek advice from a wide variety of sources and maintain a public record of the submissions in developing such guidelines, and the results should be given appropriate deference by the courts. The Court of Appeals for the Federal Circuit ("Federal Circuit") also should ensure its exposure to a variety of expert opinions by encouraging submission of amicus briefs and by exchanges with other courts. In addition to qualified intellectual property professionals, appointments to the Federal Circuit should include people familiar with innovation from a variety of perspectives—management, finance, and economics, as well as nonpatent areas of law affecting innovation.

• ***Non-obviousness standard.*** The requirement that to qualify for a patent an invention cannot be obvious to a person of ordinary skill in the art should be assiduously observed. In an area such as business methods, where the common general knowledge is not fully described in published literature that is likely to be consulted by patent examiners, another method of determining the state of general knowledge needs to be employed. Given that patent applications are examined *ex parte* between the applicant and the examiner it would be difficult to bring in other expert opinions at that stage. Nevertheless, the Open Review procedure

described next provides a means of obtaining expert participation after a patent issues. With respect to gene-sequence-related inventions, a low standard of nonobviousness results from Federal Circuit decisions making it difficult to make a case of obviousness against a genetic invention (for example, gene sequences). In this context the court should return to a stricter standard, which would also be more consistent with other countries' practices in biotechnology patenting.

- ***Open Review procedure.*** Congress should seriously consider legislation creating a procedure for third parties to challenge patents for a limited period after their issuance in an administrative proceeding before administrative patent judges of the USPTO. The speed, cost, and design details of this proceeding should make it an attractive alternative to litigation to determine patent validity and be fair to all parties.
- ***USPTO capabilities.*** To improve its performance the USPTO needs additional resources. These funds should enable hiring additional examiners, implementing a robust electronic processing capability, and creating a strong multidisciplinary analytical capability to assess management practices and proposed changes. In addition, the funds should be used to provide early warning of new technologies being proposed for patenting, and to conduct reliable, consistent, reputable quality reviews that address office-wide as well as subunit and examiner performance. The current USPTO budget does not suffice to accomplish these objectives and to administer an Open Review procedure.
- ***Research liability for patent infringement.*** In light of the Federal Circuit's 2002 ruling that even noncommercial scientific research enjoys no protection from patent infringement liability, and in view of the academic research community's belief in the existence of such an exemption, and behavior accordingly, there should be some level of protection for noncommercial uses of patented inventions. Congress should consider appropriately narrow legislation, but if progress is slow or delayed the Office of Management and Budget and the federal government agencies sponsoring research should consider extending "authorization and consent" to grantees as well as contractors, provided that such rights are strictly limited to research and do not extend to any resulting commercial products or services. Either legislation or administrative action could help ensure preservation of the "commons" required for scientific and technological progress.
- ***Litigation elements.*** Three provisions of patent law that are frequently raised by plaintiffs or defendants (rarely by the courts) in infringement litigation depend on determining a party's state of mind, and therefore generate high discovery costs. These provisions are (1) "willful infringement," which if proven, exposes an infringer to possible triple damages; (2) the doctrine of "best mode," which addresses whether an inventor disclosed in an application what the inventor considered to be the best implementation of the invention; and (3) the doctrine of "inequitable conduct," concerning whether the applicant's attorney intentionally misled the USPTO in prosecuting the original patent. To reduce the cost and

increase the predictability of patent infringement litigation outcomes, and to avoid other unintended consequences, these provisions should be modified or removed.

• ***International harmonization.*** The United States, Europe, and Japan should further harmonize patent examination procedures and standards to reduce redundancy in search and examination and eventually achieve mutual recognition of results. Differences that among others are in need of reconciling include application priority ("first-to-invent" versus "first-inventor-to-file"), the grace period for filing an application after publication, the "best mode" requirement of U.S. law, and the U.S. exception to the rule of publication of patent applications after 18 months. This objective should be pursued on a trilateral or even bilateral basis as well as a multilateral basis.

Although some of our recommendations parallel those of previous commissions and reports, the most relevant comparison is with the proposals of the Federal Trade Commission (FTC) in its report released in October of last year. Although we approached the operation of the patent system from different perspectives, addressed somewhat different topics, and employed quite different methodologies, there are several areas of agreement.

• The USPTO and the Court of Appeals for the Federal Circuit should broaden their consideration of relevant economic and technical analysis.

• The non-obviousness standard should be more vigorously applied, at least in some technological fields.

• Congress should create a review procedure for challenging and reviewing issued patents.

• The financial resources of the USPTO should be increased.

• All patent applications should be published after 18 months.

• The legal doctrine subjecting "willful" infringers to enhanced damages should be modified or eliminated.

PRESERVE A FLEXIBLE, UNITARY, OPEN-ENDED PATENT SYSTEM

Innovation processes differ markedly from one industrial sector to another. There is ample evidence that development lead times, product cycles, the relative dominance of cumulative or interoperative or stand-alone innovations, capital investment requirements, and even sources of innovation all vary greatly. We know, too, that firms in different industries acquire, value, and exercise patents differently. Accordingly, the optimal number, coverage, and division of patent rights to encourage innovation may vary. These circumstances, some might argue, call for designing a formal (that is, statutory) system in which patent standards, strength, duration, and other features vary from technology to technology and, conceivably, certain technologies are excluded from patenting altogether.