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## Patent sense

Oct 20th 2005

From The Economist print edition

### How the system works

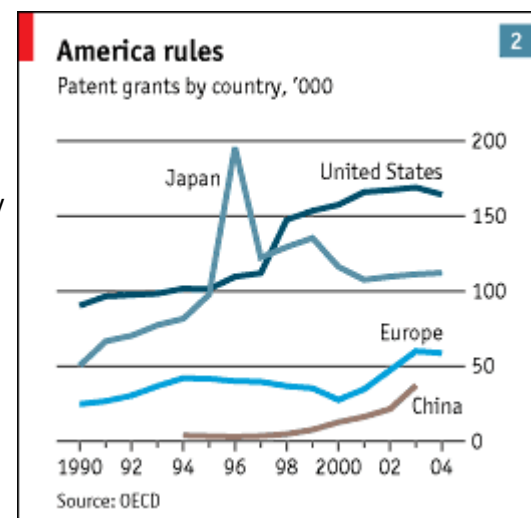
THE first modern patent law was introduced in Venice in 1474 to attract skilled merchants to the city-state. Anyone who came up with a technique deemed novel was given a ten-year right to its exclusive use; infringers were fined 100 ducats.

These days, patents are granted on a national basis after close scrutiny by government patent offices. The laws differ in detail, but the main points are similar (thanks to intergovernmental treaties). Generally, the technology to be patented must pass four tests: that it is novel, useful, non-obvious and man-made. A mere discovery of a natural phenomenon would not qualify. A patent confers the right to exclude others from using an invention for around 20 years.

Patents are enforceable only in the jurisdiction that grants them, so a patent awarded in America, for instance, is valid only in that country. But as the country with the world's largest economy, America in some respects acts as the world's patent office; around half of all patents there are awarded to foreign applicants. The cost of applying for a patent in America is around \$2,000, but the legal fees for preparing it can easily run to \$35,000. Applicants also have to find around \$7,000 in renewal fees. Once the patent has expired, the technology enters the public domain and can be used freely.

The three main patent offices, accounting for nearly 90% of the world's patents, are in America, Europe and Japan. A European patent does not confer the right to enforce it in all EU countries, only those that are requested, and for which an official translation into that language is made. Since patent disputes can hinge on the meaning of a single word, and some applications can be hundreds of pages long, this is a cumbersome rule. Attempts over three decades to establish an EU-wide patent have been blocked because of bickering over what the legal languages should be.

Software was unpatentable until 1981, when an American court changed the rule. Likewise, an American court in 1998 allowed "business methods" to be patented, which brought a torrent of applications. Europe has resisted patents on business methods, and closely scrutinises software patents. A proposed EU directive to harmonise software patents was scuttled in July after protests from open-source advocates.



As time has gone on, the patent system has accumulated a number of problems that will have to be resolved before it can operate effectively. For example, the number of applications has roughly doubled in the past decade, so patent offices are swamped. This means it now takes around three years to decide on an application, which has created a backlog of around 500,000. If nothing is done, that figure will double by 2010.

Experts also claim that the quality of patents—measured by whether the invention is truly new and meets its claims—is deteriorating. This can cause trouble if the holder uses a “junk” patent to extract royalties from others on things that ought be in the public domain. Litigation is already becoming more frequent and more costly.

To improve matters, America is considering legislation that would specify a period after the granting of a patent during which it can be challenged. It would also increase the funding of the patent office to hire more examiners with greater expertise. Controversially, it would bring America in line with most other countries by changing the criterion for a successful application from “first to invent” to “first to file”. Small inventors oppose this, but companies prefer it because it provides greater legal certainty.

For the longer term, there is talk about harmonising patent policy worldwide, which would be good for global business. Meanwhile, competition regulators have begun taking an interest in patents. They see them as a commercial weapon that could violate antitrust law. Offenders can expect penalties exceeding 100 ducats.

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## A market for ideas

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**Intellectual-property protection can be good for the technology industry as well as for its customers, says Kenneth Cukier (interviewed [here](#)). But it requires careful handling**

"The granting [of] patents 'inflames cupidity', excites fraud, stimulates men to run after schemes that may enable them to levy a tax on the public, begets disputes and quarrels betwixt inventors, provokes endless lawsuits...The principle of the law from which such consequences flow cannot be just."

*The Economist* may have put it rather strongly in 1851, but its disapproval of patents represented conventional wisdom at the time. A century earlier, Adam Smith had described them as necessary evils, to be handed out sparingly, and many other economists have since echoed his reservations. Patents amount to temporary monopolies on useful new inventions.

In recent years intellectual property has received a lot more attention because ideas and innovations have become the most important resource, replacing land, energy and raw materials. As much as three-quarters of the value of publicly traded companies in America comes from intangible assets, up from around 40% in the early 1980s. "The economic product of the United States", says Alan Greenspan, the chairman of America's Federal Reserve, has become "predominantly conceptual". Intellectual property forms part of those conceptual assets.

In information technology and telecoms in particular, the role of intellectual property has changed radically. What used to be the preserve of corporate lawyers and engineers in R&D labs has been speedily embraced by the boardroom. "Intellectual-asset management" now figures as a strategic business issue. In America alone, technology licensing revenue accounts for an estimated \$45 billion annually; worldwide, the figure is around \$100 billion and growing fast.

Technology firms are seeking more patents, expanding their scope, licensing more, litigating more and overhauling their business models around intellectual property. Yet paradoxically, as some companies batten down the hatches, other firms have found ways of making money by opening up their treasure-chest of innovation and sharing it with others. The rise of open-source software is just one example. And a new breed of companies has appeared on the periphery of today's tech firms, acting as intellectual-property intermediaries and creating a market for ideas.

## Mind the keep-out signs

At the same time, however, the legitimacy of many patents granted is in question as patent offices struggle with the huge increase in demand. Over the past decade the number of patent applications has nearly doubled and continues to climb. Much of that growth has been in the IT and telecoms field: in America alone, that sector's overall share of patents has increased from around 30% in 1990 to almost 40% today. Also climbing, alas, is the number of lawsuits over patent infringement, the cost of litigation, and the amount of money plaintiffs are winning.

Meanwhile, emerging technology powerhouses such as China and India are competing to move up from lower-end work such as hardware manufacturing and software coding to more sophisticated projects requiring their own innovation. This could pose serious challenges to today's incumbents. The number of patents granted at China's patent office has trebled in the past four years alone.

"Intellectual property has become more central to the industry," says Greg Papadopoulos, chief technology officer of Sun Microsystems. "I don't know if that is a function of a mature industry, or simply a confused one."

## Licensed to make money

The facts and figures speak for themselves. IBM alone now earns over \$1 billion annually from its intellectual-property portfolio. HP's revenue from licensing has quadrupled in less than three years, to over \$200m this year. Microsoft is on course to file 3,000 patents this year, when in 1990 it received a mere five. Earlier this year it set up an entirely new corporate division to exchange its technology for cash or equity in start-up firms. Nokia has recently started licensing its technology to other firms and plans to do more. And some companies, such as ARM, a British firm that designs the blueprints for microchips used in wireless devices, do little other than create and sell intellectual property.

According to a survey of business executives last year by McKinsey, a consultancy, 54% of companies saw growth in licensing of 10-50% between 2000 and 2002. Almost 75% of executives say they expect to buy as well as sell more licences over the next two to five years, and 43% expect a dramatic increase in their licensing

revenue. And they think the market is still embryonic. "Many companies generate a lot of intellectual property and do not capture the value from it," says Jay Jubas of McKinsey.

The new predominance of intellectual property in technology industries is fed by a number of broader industry trends. First, IT and telecoms have become so complex that there is a greater willingness to accept the innovations of others. Gone are the days when vertically integrated firms handled every step of a product, from initial design to final sale. Now, a small army of specialist firms focus on narrow portions of technology, using intellectual-property rights to protect their inventions when they are licensed out.

Second, as many new technologies quickly turn into commodities, firms increasingly rely on innovation to remain competitive. Yet the return on investment in R&D is short-lived because more people innovate at a far faster pace than before. That means margins have shrivelled, explains Ragu Gurumurthy of Adventis, an IT and telecoms consultancy. "How to recoup the cost of innovation? By licensing the technology," he says.

Third, customers are demanding "interoperability" and common standards rather than proprietary systems, which means different firms' technologies must work together smoothly. This often requires pooling patents or cross-licensing agreements.

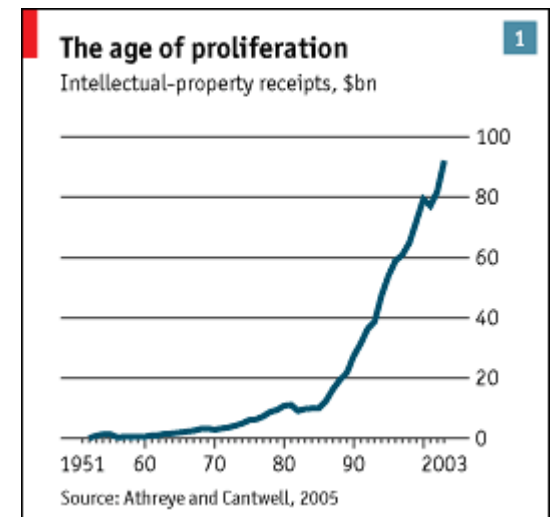
Fourth, generating intellectual property is less capital-intensive than other aspects of the IT businesses because it relies mainly on people rather than bricks, mortar and machinery. That makes it attractive to many start-up firms. Venture capitalists often demand that firms patent technology, both to block rivals and to have assets to sell in case the firm flounders. This was particularly apparent during the internet boom in 2000. "In addition to the dotcom bubble, we had a patent bubble," says Mark Webbink of Red Hat, a firm that sells Linux, an open-source operating system.

Companies cannot simply turn their back on what is happening in intellectual property. Even if they refuse to play the game, they may be unwittingly infringing someone else's patents because there are so many more of them around. Unless firms have patents of their own to assert so they can reach a cross-licensing agreement (often with money changing hands too), they will be in trouble. Thus many companies are acquiring large numbers of patents for purely defensive reasons, for use only to keep others' patent threats at bay.

Legally, the intellectual-property system covers four areas: copyrights (used to protect artistic, musical or literary works); trademarks (for things like brands); patents (for inventions); and an ill-defined category of "trade secrets", for practices that are kept confidential. The system provides legal protection against counterfeiters and copiers and is vital to many fields, such as biotechnology and nanotechnology. And it matters not only to companies: universities, too, have recently become big patent holders and licensors.

In IT and telecoms, the area of intellectual property that is creating particular upheaval is patents (see [article](#)). This is because patents confer a "negative right" to exclude others from using the same technique; yet information technology and telecommunications rely on "network effects", meaning that as more people use a system, it becomes that much more useful. To make the most of such network effects, interoperability between different technologies is essential. This can be achieved either by a single standard set by a dominant firm (which tends to generate resistance from customers and competitors), or by using a mixture of different technologies, with the patent system providing legal protection for inventions.

## The more the merrier



As the system of intellectual property evolves, the ethos seems to be that if a little is good, then more is better. That is to say, if some property rights on inventions are beneficial, then increasing those rights—in scope, strength or duration—will increase the benefits. But that is a large assumption. There is even a body of evidence to suggest it is flatly wrong.

The technology industry faces the question of whether today's abundance of patents, rather than lubricating the gears of innovation, may be clogging them up. Already, businesses are having to negotiate with other firms in order to do basic things such as reading files from different proprietary formats; and the design of new technology products now involves lawyers as well as engineers. The proliferation of patents might prove a serious encumbrance to businesses, just as travellers along the Rhine in medieval Europe were slowed down by having to pay a toll at every castle.

James Boyle, a legal scholar at Duke Law School in North Carolina, claims that the current increase in intellectual-property rights represents nothing less than a second "enclosure movement". In the first enclosures, in 18th- and 19th-century Britain, the commons—open fields used by many, belonging to all, owned by none—were fenced in, and nearly all land became private property. By analogy, the granting of property rights on ideas, to the extent it is happening today, is plundering the intellectual commons of our public domain.

Others see the expansion of intellectual-property rights as hugely beneficial, leading not only to more innovation but to more openness. The standard justification for the patent system is that it provides an incentive for innovation, allowing the inventor to reap rewards by protecting the work from imitators who would otherwise hitch a free ride on the investment. But that is a simplification. The initial intention was in fact to make inventions available to the public as well.

Before the 18th century, innovations were mainly kept secret through trade guilds. Sometimes monarchs capriciously granted indefinite exclusive rights to someone they favoured. Intellectual-property law was meant to remedy this by requiring the invention to be vetted by experts, limiting the right to a set period and making knowledge more widely accessible through public disclosure. Its development was part of the drive towards democracy and capitalism and the abolition of royal privileges and monopolies.

In principle, patents open up innovations in two ways. First, they confer only temporary rights; once patents expire or are abandoned, the intellectual property they are designed to protect passes into the public domain. Second, they require the details of the invention to be disclosed so they can be replicated. This permits follow-on innovation, which is essential for industrial progress.

More recently, as the patent system has evolved, it has been seen to provide other benefits. It leads to a degree of economic specialisation that makes business more efficient. Patents are transferable assets, and by the early 20th century they had made it possible to separate the person who makes an invention from the one who commercialises it. This recognised the fact that someone who is good at coming up with ideas is not necessarily the best person to bring those ideas to market.

Such specialisation is now so common that it is taken for granted. Semiconductors, the silicon chips that power digital devices, are typically designed by specialist firms that are good at engineering, but physically produced by other firms whose expertise lies in manufacturing. As the patent system has matured and licensing has become much more widespread, these transfers are turning business relationships on their head. Some economists argue that the growth of patent transactions is establishing a proper "market for technology". The creation of any market takes time and trouble. When such an institution develops, those outside the system feel threatened by it and condemn it. Yet just as the banking system created a market for capital and the insurance industry created a market for risk, the growth of the patent system may be creating a market for innovation.

This provides a sort of "liquidity" to knowledge that did not previously exist, argue Ashish Arora, Andrea Fosfuri and Alfonso Gambardella in their 2001 book, "Markets for Technology, the Economics of Innovation and Corporate Strategy". Seen that way, the evolution of the patent system in IT and

telecoms is simply part of a broader movement to create an institutional mechanism for the transfer of ideas to fuel economic progress.

## Mutually assured destruction

That is the context in which commercial battles are taking place in the technology industry today. The convergence of IT and telecoms is forcing companies to work together in new ways in order both to protect and exchange their technology. "How do you create a marketplace for ideas in that converged marketplace?" asks David Kaefer, director of intellectual-property licensing at Microsoft. "That is really the big question. In the past, two parties would haggle over a pound of wheat. Today, they haggle over the patent of the week."

These markets for technology are expanding. For instance, 60% of technology and telecoms firms report an increase in licensing compared with the previous decade, and 70% report fewer obstacles to reaching such agreements, according to a survey by the Organisation for Economic Co-operation and Development in 2004. "Intellectual property is the next asset class. Companies are creating a market," says Eric Gillespie, the co-founder of ipIQ, one of the new crop of firms that are fuelling patent transactions.

But when talking to executives in the technology firms themselves, the language you hear most often is that of "the arms race" and "mutually assured destruction". Companies amass patents as much to defend themselves against attacks by their competitors as to protect their inventions. Many technology companies have recently championed reform of the patent system to deal with spuriously awarded patents, licensing extortion and massive lawsuits. "There is a broad recognition in the US that the patent system, if not reformed, will...begin to impede American competitiveness around the world," says Bruce Sewell, general counsel of Intel, the world's biggest chipmaker.

This survey will argue that, despite such adjustment problems, the huge changes in intellectual property currently taking place in the IT sector will in time produce more efficient markets. But what do the IT firms themselves make of it all?