Needed: A New System of Intellectual Property Rights

by Lester C. Thurow
Squeezing today’s innovations into yesterday’s system simply won’t work.

NEEDED: A NEW SYSTEM OF INTELLECTUAL PROPERTY RIGHTS

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Fundamental shifts in technology and in the economic landscape are rapidly making the current system of intellectual property rights unworkable and ineffective. Designed more than 100 years ago to meet the simpler needs of an industrial era, it is an undifferentiated, one-size-fits-all system. Although treating all advances in knowledge in the same way may have worked when most patents were granted for new mechanical devices, today’s brainpower industries pose challenges that are far more complex.

Consider the case of the physician who noticed a relationship between an elevated level of a particular human hormone and a congenital birth defect. He was awarded a patent for his observation.

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although by itself his test had too many false positives to be useful. But later developments showed that if his test were used along with two others, they would accurately forecast whether a baby would be born with Down’s Syndrome. Today the physician is suing to get a $9 fee from every laboratory that uses his part of the test. If he wins, the cost of testing will more than double.

Should the physician who first observed how the existing gene works get some intellectual property rights? Probably. But they should not be the same kind of rights as those granted to someone who invents a new gene to replace the defective one. Noticing what an existing gene does is simply not equivalent to inventing a new gene. Such distinctions are necessary, yet our patent system has no basis for making them. All patents are identical—you either get one or you don’t.

The prevailing wisdom among those who earn their living within our system of intellectual property protection is that some minor tweaking here and there will fix the problem. Much of this wisdom flows from nothing more profound than the belief that to open up the system to fundamental change would be equivalent to opening Pandora’s box. All can vividly see themselves as potential losers. Few consider the private and public gains that might accrue from a different system.

The prevailing wisdom is wrong. The time has come not for marginal changes but for wide-open thinking about designing a new system from the ground up.

Why the Old System Doesn’t Work

Today it is both more important than ever to protect intellectual property rights—and more difficult to do so. To understand why, consider the following four shifts in the economic landscape:

The Centrality of Intellectual Property Rights. With the advent of the information revolution—or the third industrial revolution (call it what you will)—skills and knowledge have become the only source of sustainable long-term competitive advantage. Intellectual property lies at the center of the modern company’s economic success or failure.

Raw materials can be bought and moved, and they are falling in price and decreasing in value as a share of U.S. gross domestic product. Capital is a commodity that can be borrowed in New York, Tokyo, or London. Unique pieces of equipment that cannot be obtained by—or are too expensive for—one’s competitors simply don’t exist. What used to be tertiary after raw materials and capital in determining economic success is now primary.

Major companies such as Microsoft own nothing of value except knowledge. Fighting to defend and extend the domain of their intellectual property is how they play the economic game. With this reality.

For more than a century, the world’s wealthiest human being has been associated with oil. Now he’s a knowledge worker.
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plays. Fast knockoffs makes it difficult to sell anything that is truly unique.

More directly, the rising importance of intellectual property can be seen in the earnings gained from the licensing of technology. In the past, companies were willing to share their technology because it did not seem to be the source of their success and could not be sold for much anyway. But those days are gone. For example, Polaroid and Kodak settled a patent infringement case for almost $1 billion. And Texas Instruments, after shifting to an aggressive licensing program, earned more than $1.5 billion in fees; in some years its licensing fees have been bigger than its operating income. Having noticed these numbers, many other corporations are now ordering their technology-licensing officers to step up their efforts.

Increasingly, intellectual property is becoming central to strategic battle plans. Companies such as Intel have big legal budgets to defend what they think is their property, but they are also accused of aggressively attacking what others think is theirs in order to create uncertainties, time delays, and higher start-up costs for their competitors. For example, Digital Equipment Corporation, unsuccessful in the marketplace, filed a huge triple-damages patent suit against Intel for infringing on its Alpha chip technologies. Perhaps DEC will gain in the courts what it could not gain in the economic arena. If it wins, the damages awarded will be in the billions. Or perhaps DEC’s strategy is to make Intel more cautious, and hence slower, in designing its next generation of microprocessors.

DEC’s suit was triggered by a remark in a Wall Street Journal article in which a top-level executive on an Intel chip-research team was reported as saying, “There’s nothing left to copy.” Wherever the truth lies in this case, reverse engineering is a way of life in the corporate world. But where should the limits be? Surely the answer is not where a patent system more than a century old sets them.

The Decline of Public Knowledge. For most of the period since World War II, knowledge has flowed easily and cheaply around the world. The U.S. government paid for most of the basic research and, with the exception of military technologies, encouraged its worldwide dissemination. During the Cold War, economic success by other countries was seen as almost as important to the United States’s strategic geopolitical position as its own internal economic success.

Arrogance also contributed to this free flow of information. Americans believed that the rest of the world would not be able to catch up with American ingenuity. While foreigners were copying the last generation of technology, the thinking went, Americans would be inventing the next generation. But
At the same time, the U.S. government is cutting its support for research and development—in both real dollars and as a share of total spending. What used to be a fifty-fifty split between government and the private sector is now a one-third versus two-thirds split. Under the current budget-balancing agreement, sharper cuts lie ahead. A Democratic president has promised to cut federal R&D spending by 14% by 2002; a Republican Congress has promised to cut it by 20%.

As a consequence, less new knowledge will be freely available in the public domain. If the nation is to fill this gap and generate the knowledge needed to maintain its economic progress in the future, companies will have to be enticed—through new incentives—to put more private money into R&D. Stronger systems of protection for intellectual property rights are clearly part of the answer.

In the past, U.S. antitrust laws explicitly forced some privately financed laboratories, such as the Bell Labs of AT&T, to share their technologies with everyone and implicitly forced others, such as the IBM labs, to do the same. But the monopolistically funded private research laboratories are gone. IBM and AT&T are now in competitive businesses in which they cannot afford to fund the general knowledge that they used to generate. Private companies now expect to get big money from their inventions and will vigorously defend their rights. The days of the low-cost sharing of private knowledge are over.

Without stronger systems of protection, companies will defend their economic positions by keeping their knowledge secret. Articles about research papers whose publication is deliberately delayed often pop up now in the scientific press. Secrecy is a much bigger deterrent to the expansion of knowledge than any monopolistic system of protection for intellectual property rights. An investigator who knows what is known can go to the next step. One who doesn’t wastes time reinventing what is known or wandering in an intellectual wilderness looking for a path that someone else has already found. A recent study found that 73% of private patents were based on knowledge generated by public sources such as universities and nonprofit or government laboratories. Private, secretly held knowledge simply does not generate the next generation of knowledge.

The Emergence of New Technologies. New technologies have both created new potential forms of intellectual property rights (can pieces of a human being be patented?) and made old rights unenforceable (when books can be downloaded from an electronic library, what does a copyright mean?). We need to rethink fundamentally what should and should not be appropriable as private property. At the same time, we need to generate new ideas and technologies to offer effective protection of intellectual property rights.

How should we think about what should be patentable? It is clear that the invention of a new gene for making human beings different or better cannot be handled in the same way as the invention of a new gearbox. And society isn’t going to let someone have a monopoly on the cure for cancer. Nor will biologists be allowed to clone and own whole human beings.

But it is equally clear that companies engaging in biological research must be allowed to own pieces of human beings; otherwise, no one would invest the funds necessary to find genetic cures for diseases such as Alzheimer’s. Since patents on genetic cures for diseases cannot be differentiated from patents on genetic materials that make humans taller, smarter, or more beautiful, the exact line between what is and is not allowed is going to be difficult to draw. But inventing a new piece of biology that alters the natural characteristics of plants, animals, or humans is not equivalent to discovering how an existing piece of biology works. What a patent means has to be different in those two areas.

We also need to differentiate between fundamental advances in knowledge and logical extensions of existing knowledge. Each deserves a different kind of patent. One of the objections to the “first to file” system used outside the United States is that it allows smart, knowledgeable people to guess where technology is going and to file patents on things that have not yet been invented. If they guess right one out of ten times, they more than cover their costs of filing multiple patents.

New technologies make enforcement of property rights much tougher. People can use high-quality scanning technologies with optical character recognition to build electronic libraries quickly and
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easily. Electronic publishers can in turn just as quickly and easily convert that material back into printed form. When anything can be rapidly, cheaply, and privately replicated in low volumes at high levels of quality and then distributed in whatever form the user wants, the choke points available to prevent reproduction of what used to be printed materials have essentially evaporated.

With that evaporation comes the end of the copyright system—not just for books but for all information and data systems. A system designed to allow people to browse and borrow books from physical libraries cannot provide the right framework for dealing with the issues raised by the possibility of downloading a book from an electronic library.

What initially may seem relevant only to authors and book companies isn’t. If books can be freely downloaded, then those selling financial information will also find that their databases can be downloaded and resold by lower-cost competitors—whose costs are lower precisely because they did not have to incur the costs of creating the databases! Telephone companies are trying to stop that practice by putting some phony numbers in their telephone books in order to prove in court that competitors have not generated their own list of names and numbers.

Magnify what is now happening in the recorded music business and you can see the future in printed materials. Even though the equipment needed to record compact discs is too expensive to be found in every household, CD pirates may hold as much as a 20% share of the market. In contrast, in personal electronic publishing the equipment is as cheap and available as a personal computer plus a scanner. The fully electronic library does not yet exist, but it soon will. One has to expect that pirated works will end up with an even bigger market share of what used to be conventionally printed materials than they now have of CDs and tapes. The legal system may be able to stop factories from copying and selling CDs or books in volume, but it cannot stop individuals from replicating the materials for themselves or selling small numbers to their friends.

And consider software piracy. When computer makers ship their products “naked”—that is, without an operating system—as they often do in Asia, the only reason they do so is to allow the use of pirated software. Effectively, these computer makers have the tacit approval of local governments to violate patents and copyrights. In Thailand, up to 97% of the software in use has been illegally copied, and even in the United States as much as 40% of the software in use may have been illegally copied. Estimates of pirated software in Europe range from a high of 80% in Spain to a low of 25% in the United Kingdom.

Computer software provides a good illustration of what happens when patent and copyright laws do not keep up with technology. Judges end up making decisions that they should not be making. One such decision ruled that the “look and feel” of a software program could not be patented—which means, effectively, that any successful program can be legally copied. The copiers need to write their own code, but they start knowing exactly what the program is supposed to do, how the internal programming components are structured, how the final program is supposed to look and feel, and that a viable mar-

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ket exists for the product. Knowing exactly what to create lowers costs; but more important, the copier faces much less market uncertainty and risk than the original writers of successful software programs.

When software programs cannot be protected effectively, it is not just the Apples that will lose. Retailers, for example, that develop software to sell their products over the Internet will find their software copied and freely used by their competitors.

The Globalization of the Economy. Increasingly, the acquisition of knowledge is central for both “catch-up states” and “keep-ahead states.” Smart developing countries understand that reality. Operating as a monopsonist (a buyer that controls a market) and dangling access to its domestic market as the enticement, China demands the sharing of technology from companies such as Boeing and Reuters that sell in its markets. It doesn't need their capital—it saves 30% of its income and has accumulated $100 billion in international exchange reserves—but it demands their knowledge in return for the right to operate in China. Americans deplore China's demands but remember fondly from their high-school history classes the clever Yankee engineers who visited British textile mills in the early 1800s and then reconstructed them in New England. Initially, Americans were amused in the aftermath of World War II when Japanese businessmen with their cameras were ubiquitously touring U.S. factories. They are no longer amused. Few today will let Third World visitors into their plants.

Yet copying to catch up is the only way to catch up. Every country that has caught up has done it by copying. Third World countries know that unless they can acquire the necessary knowledge, they will never make it into the First World. They cannot afford to buy what they need—even if those who have the knowledge were willing to sell, and they are not. So they have to copy.

Recently I heard a talk given by the managing partner of a large U.S. consulting firm. The partner urged his fellow consultants to recommend relocation to India because Indians were very good at copying, had few laws making copying illegal, and often did not enforce the laws that did exist. He remarked that India recognized patents only on the processes for making drugs, not on the drugs themselves, but then went on to say that Indians were very good at developing alternative manufacturing processes. The fact that no one checks those processes very closely to see that they are really different was left unsaid. Nor did he need to say that what was made in India could be slipped quietly into the channels of world commerce without anyone having to pay for knowledge that would be considered proprietary elsewhere.

The issues are not just those of where a country stands in the invention cycle or where it stands on the economic development ladder. Different cultures and different parts of the world look at intellectual property rights quite differently. The idea that people should be paid to be creative is a point of view that stems from the Judeo-Christian and Muslim belief in a God who created humankind in His image. It has no analogue in Hindu, Buddhist, or Confucian societies. There are real differences in beliefs about what should be freely available in the public domain and what should be for sale in the private marketplace. Countries also differ enormously in their propensities to use their patent systems. Switzerland, for example, issues four and one-half times as many patents per capita as the United States. Does anyone believe that the Swiss are really that much more creative than Americans?

Yet despite these differences in economic positions, cultures, and practices, no system of protecting intellectual property rights can work unless most of the governments of the world agree to enforce it. A law that does not exist or is not enforced in country X is essentially a law that cannot be enforced in country Y. Production simply moves to country X. What different countries want, need, and should have in a system of intellectual property rights is very different, depending on their level of economic development. National systems, such as that of the United States, are not going to evolve into de facto world standards. The economic game of catch-up is not the game of keep ahead. Countries playing either game have the right to a world system that lets them succeed.

Building a New System: Basic Principles

As those who launched capitalism two centuries ago discovered, enforceable property rights had to be defined and enforced for capitalism to work. The old Communist countries now trying to convert to
market economies are discovering the same reality today. Closer to home, the failure to develop adequate property rights lies behind many U.S. problems with air and water pollution. Free usage—that is, no enforceable property rights—is sensible for each individual, but it ends up depriving the whole community of clean air and water. So, too, with intellectual property rights: free usage of knowledge ends up with societies that create too little new knowledge.

The Industrial Revolution began with an enclosure movement that abolished common land in England. The world now needs a socially managed enclosure movement for intellectual property rights or it will witness a scramble among the powerful to grab valuable pieces of intellectual property, just as the powerful grabbed the common lands of England three centuries ago. Three basic design principles are needed:

A new system must strike the right balance between the production and the distribution of new ideas. In thinking about protecting intellectual property rights, one starts with an inherent tension in the system. To develop new products and processes, individuals must have a financial incentive to undertake the costs, risks, and efforts of developing new knowledge. Not surprisingly, bigger incentives lead to the production of more knowledge than do smaller incentives. A recent change allowing patents on plants, for example, has led to an explosion of new developments.

As the government role in R&D fades, the need for stronger private incentives grows. The standard incentive is to give inventors a monopoly on the right to produce the products that can be created with their knowledge—a right that they can use or sell. Whether we like it or not, the corollary of fading government efforts is the need for stronger private monopoly rights.

At the same time, once any piece of knowledge exists, the social incentives are reversed 180 degrees. The wider the use and the faster the distribution of that new knowledge, the greater the benefit to society. Free usage leads to the widest and fastest distribution. For this reason, whenever anyone has a really important patent it is often suggested that antitrust laws should be used to take away the monopoly rights that have been bestowed by the patent laws.

Any system of intellectual property rights must make a trade-off between these two inherently conflicting objectives—more production versus faster distribution. There is no single right answer about how to make that trade-off. It is a judgment call. But it is a call that should not be made by a judge.

Judges do not think about what makes sense from the perspective of accelerating technological and economic progress. Their concern is with how new areas of technology can be inserted into the legal framework with the least disruption to existing interpretations. Such lazy law-writing practices do not make for good economics or sensible technology policies. The right approach would be to investigate the underlying economics of an industry in order to determine what incentives are necessary for its successful development. Those are socioeconomic decisions that should be made in our legislatures, not in our courts.

In our modern economies, private monopoly power should be less worrisome than it was when our patent system was originally set up. As alterna-
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tive technologies proliferate, there are fewer and fewer products with inelastic demand curves that would allow companies to raise their prices arbitrarily and earn monopoly returns. Today customers have many alternatives—very few products are necessities that lack close substitutes. And small amounts of monopoly power, which translate into slightly higher prices, simply don’t matter as much with today’s higher incomes as they did in the past.

As monopoly power wanes and social interests in encouraging the development of new intellectual property grow, the balance in our system should shift toward encouraging the production of new knowledge and be less concerned about the free distribution of existing knowledge. Tighter or longer-term patents and copyrights would seem to be warranted.

**Laws on intellectual property rights must be enforceable or they should not be laws.** Although the need for the protection of intellectual property has never been greater, the same technologies and developments that have made intellectual property rights more central to economic success have also made enforcement of those rights much more difficult. Laws can be written, but they are meaningless—and should not be written—unless a technological choke point exists to make enforcement is possible. Laws that cannot or will not be enforced make for neither good law nor good technology policies. The honest end up being suckers who pay more precisely because they are honest. And a law that is widely violated leads to disrespect for the law and more violations. Put bluntly, if someone cannot think of how a legal right can be enforced, it should not be a legal right.

**The system must be able to determine rights and resolve disputes quickly and efficiently.** Many of the problems with the patent system flow from the lack of consistent, predictable, rapid, low-cost determinations about intellectual property rights and a means of quick, cheap dispute resolution. The first problem is easily solved, at least in part. In the United States, people who file for patents pay user fees that exceed the costs incurred by the patent office. Those fees are put into the general budget, and Congress then appropriates funds—less than the amount collected in fees—to run the patent office.

In no other market do we decide that everyone wants—and must buy—exactly the same product.

One easy change is to establish a system in which the user fees directly finance what they are supposed to finance but are set high enough to ensure speedy decisions. Like an income tax, fees could be adjusted to reflect the income levels of the applicants and equalize the burdens on large corporations and on small, individual inventors. The relevant agencies should be taken out of the civil service system, and salaries should be set high enough to attract and keep the people who could run the system efficiently and speedily.

For inventors of technologies that have very short useful lives, making use of today’s system of dispute resolution—with its delayed, lengthy, and expensive court trials—is equivalent to losing one’s rights. In seeking an alternative approach, the U.S. system for settling water rights disputes in irrigated areas might serve as a model. Federal water masters are given the authority to allocate water in dry years and to settle disputes quickly because crops die quickly.

**One Size Doesn’t Fit All**

Although simplicity can be a powerful virtue, builders of a new system must reconcile a number of competing interests and allow for some critical distinctions.

**Public Versus Private Knowledge.** To accomplish society’s interest in expanding knowledge as rapidly as possible, certain classes of knowledge ought to be in the public domain and freely available to everyone. One can argue that basic scientific knowledge should be public while those who develop products from that knowledge should receive private monopoly rights. But the line between scientific principles and the knowledge that is necessary to allow products to be built is, in practice, hard to draw. Here again, the issue is a judgment call.

There are other reasons for keeping knowledge in the public domain. A society may determine, for example, that its interests in educating the young justify placing some types of knowledge—educational technologies, for example—in the public domain. And egalitarian democracies may want, say, lifesaving technologies to be generally available to everyone, not just to the rich.

Such considerations mean that we need principles to determine when knowledge should be publicly available and when it should be kept private. This does not mean that patents or copyrights should be forbidden in areas where there is a social interest in allowing general access to knowledge at
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little or no cost. That would be unacceptable because no one would have the incentive to produce such generally useful knowledge. Inventors who happened upon such discoveries would have an enormous incentive to keep them secret. We must ensure that those who generate knowledge in the public domain get paid.

The solution to this problem is found not in the patent system itself but in the establishment of some public agency—perhaps a branch of the National Science Foundation. Armed with funds and the power of eminent domain, the agency could decide to buy knowledge for the public’s use when it seemed warranted. If the seller would not agree to sell at a reasonable price, adjudication principles very similar to those used in eminent domain land-acquisition proceedings could be used.

Developed Versus Developing Countries. In a global economy, a global system of intellectual property rights is needed. This system must reflect the needs both of countries that are developing and of those that have developed. The problem is similar to the one concerning which types of knowledge should be in the public domain in the developed world. But the Third World’s need to get low-cost pharmaceuticals is not equivalent to its need for low-cost CDs. Any system that treats such needs equally, as our current system does, is neither a good nor a viable system. Depending on the income level of the country and the importance of the technologies to basic human needs, different predetermined levels of fees might be internationally imposed on those who want to use what others have invented.

Different Industries, Types of Knowledge, Types of Inventors, and Types of Patents. The optimal patent system will not be the same for all industries, all types of knowledge, or all types of inventors. Consider, for example, the electronics industry and the pharmaceutical industry. The first wants speed and short-term protection because most of its money is earned soon after new knowledge is developed. The second wants long-term protection because most of its money is earned after a long period of testing to prove a drug’s effectiveness and the absence of adverse side effects.

Different types of advances in knowledge should be distinguished from one another and alternative patents awarded on that basis. Again, fundamental advances are not equivalent to logical extensions of existing knowledge and should not be treated as if they were. And individual inventors should not be treated in the same way as large corporations. As noted above, filing fees could be linked to income in order to level the playing field for all inventors.

Finally, inventors should be able to choose from a selection of patents or copyrights. A differentiated system might offer different levels of monopoly rights to inventors. Costs, speed of issuance, and dispute-settlement parameters could vary. Let filers decide what type of patent they wish to have. In no other market do we decide that everyone wants—and must buy—exactly the same product.

The world’s current one-dimensional system must be overhauled to create a more differentiated one. Trying to squeeze today’s developments into yesterday’s system of intellectual property rights simply won’t work. One size does not fit all.  

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