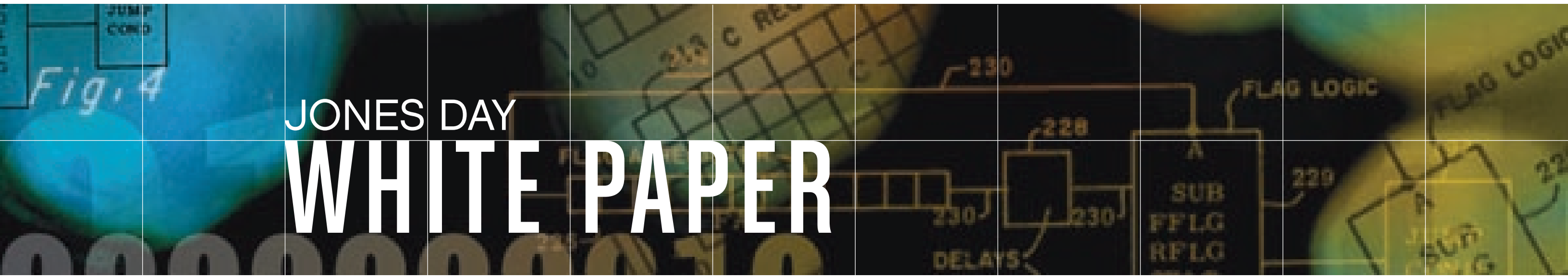
JONES DAY



CONTENTS

GUARDING PROFITS FROM INNOVATION: SUCCESSFUL IP STRATEGIES

Legal property rights over technology have a tremendous impact on the profits earned by technology innovators and by product imitators. Intellectual property laws are critically important for any business involved in new product development or any other form of innovation. Yet many firms do not properly integrate intellectual property strategy with competitive intelligence and product development practices.

This paper examines the economic purpose and operation of the relevant laws, with an emphasis on patent law. Drawing on years of experience with client engagements, it illustrates some of the more basic IP strategies and tactics with examples from various industry types and categories of new product development activities. It also provides a framework to examine management activities that companies can customize to their own specific situations to integrate the management of IP strategies with project management and competitive strategy.

This paper is the result of years of client consultation, advice and instruction by the author and his colleagues. The author is a partner in Jones Day's Intellectual Property Practice with more than two decades of consulting and litigation experience with clients in the United States, Europe and Asia.

I. PUBLIC AND PRIVATE FAILURE

Companies preparing to launch a new product should imagine this case, in a land with no intellectual property laws: Three years ago, the executive team of MedCo considered launching a new product initiative. MedCo's investors were pressing for increased revenues or staff cuts to improve profit margins. Management decided to apply the company's technical expertise to emerging treatments for heart disease.

After 18 months of intensive effort, the WIDGET™ was ready. The new device had a nice modular design, it used diagnostic electronics, and it was adaptable to add features for a range of models built on a single platform. A year later, there was disturbing news. MedCo's chief rival, Lifetech, was about to introduce a product nearly identical to the WIDGET.

Sales slowed in the following months despite growing acceptance among medical professionals. The profit margin was further eroded ten months later as a third competitor entered the market with another me-too product. MedCo's rising star seemed destined to mediocre profit performance. The board of directors succumbed to investor pressure and began staff cuts to improve profits. The first area of deep cuts was research and development.

Why did this happen? Didn't the WIDGET benefit patient health and well-being? Should we care whether MedCo is about to abandon its R&D?

In economic terms, MedCo, and the patients that its products serve, experienced a "market failure." Due to *imitation* of the WIDGET, MedCo's competitors enjoyed a free ride on MedCo's R&D investment. Due to *imitation*, the operation of the free market failed to return a profit to MedCo that was commensurate with the cost of development (*or*, more importantly, with the *value* of the innovation to patients). The true value of the new technology leaked away from MedCo like water through a sieve. No rational firm in such a world will undertake such developments, and the invisible hand of the free market will fail to advance medical technology. Everyone suffers as a result.

II. PROFITING ADEQUATELY FROM INNOVATION

Businesses should keep in mind that the market failure described above would have been reduced if MedCo had been given the legal right to prevent imitation by Lifetech and others. This is the central idea behind intellectual property rights.[1] Indeed, this body of law might just as well be called "anti-imitation law." The power to prevent imitation allows innovators to charge a higher price than the price charged on the old technology, and thereby capture a return on product development investment. In the long run, everyone benefits.

Technological innovation is a key source of economic growth and prosperity. One study, for example, concluded that 87.5% of the economic growth in the United States between 1909 and 1949 was brought about by the advancement of science and technology. Another study found that the combined private return and public return on investments in R&D, on average, was 30-60% higher than the return on investments in ordinary capital such as machinery. We are wealthier today, individually and collectively, due to technological innovation. Yet many believe that U.S. industry tends to underinvest in R&D due, in part, to the appropriability problem—*i.e.*, the difficulty in capturing an adequate return on R&D investment from the marketplace.

As we all know, product innovation is risky business. In fact, studies show that only one in perhaps 20 projects yields a return on investment. Without a reasonable expectation of a significant return, firms will not direct significant capital to the risky business of R&D, and overall economic progress suffers.

Experience shows that a firm's likelihood of profiting from product innovation depends on three fundamental factors: (1) the appropriability regime; (2) the involvement of complementary assets; and (3) the dominance of a design model. A close look at this framework reveals that only two variables in this mix are controllable. The controllable variables are: (1) the steps taken to secure intellectual property rights; and (2) the steps taken to gain control over complementary assets through contractual alliances or investments. We have found

1 Intellectual property rights include the rights provided by the law of patents, trade secrets, copyright and trademarks. Each of these sets of legal doctrines helps to ensure that an innovator receives a return on its investment in the innovation.

that these factors, therefore, must be the focus of a firm's successful innovation and IP strategies.

A. CONTROL THE APPROPRIABILITY REGIME

The appropriability regime means those factors that influence a firm's ability to capture profits, which are: (i) the nature of the technology; and (ii) the strength of legal barriers against imitation. The first aspect of the appropriability regime—the nature of the technology—may be thought of as the location along a spectrum ranging from highly accessible to highly inaccessible. For example, a process technology that cannot be observed by the naked eye and is known only to a small circle of people is highly inaccessible. Likewise, an extremely sophisticated technology that is difficult to understand may be relatively inaccessible. In contrast, a plastic hair-styling tool like the Topsy Tail[2] is easily accessible. The less accessible the technology, the better suited it is to appropriating private returns on innovation because imitation is more difficult, even without the benefit of legal rules. While this is largely an *inherent* feature of the company's technology, we have found that it often can be influenced by sound management decisions.

The second aspect of appropriability is the strength of legal remedies. It has been our experience that innovators often lack sufficient "excludability" of imitation to recover the *full* value of an innovation. Indeed, studies have shown that the free ride benefits that accrue to imitators and customers generally are more than *double* the private returns to the innovating firm.

The strength of legal protection varies across industries and from one technology to another. And as we have found, the legal regime often defies logic because the laws governing intellectual property are a patchwork quilt stitched from competing philosophical and political threads over many decades. Consequently, we advise our clients to do their best to get the most out of this aspect of the appropriability regime. Quite often, it is one of the most important levers of control, even though this is seldom understood because it is very abstract and requires long-term diligence. It cannot be left to chance or to amateurs.

2 Topsy Tail is shown and discussed on page 5.

SECURING THE FRONTIERS

Intellectual property law allows a firm to stake out property rights in new technological fields while they are at the conceptual stage, and far from commercialization. When a leading firm stakes out sufficient territory through its patenting activity, the theory goes, other firms will be unlikely to waste resources engaging in closely related research and development projects because the new technological field already has been claimed. The result is to minimize duplicative—and wasteful—research efforts.

This "prospecting" function of intellectual property law can be realized through a deliberate program of brainstorming. In these sessions, leading designers and technologists gather to brainstorm about future development paths they anticipate will gain favor in the marketplace. Patent applications are written and filed based upon these projections. Because these prognostications occur far ahead of commercialization, many of the guesses will be wrong. It only takes one on-target projection, however, to yield a nice return.

A more sophisticated use of this concept derives from portfolio analysis and science modeling. Most leading-edge commercial products represent practical implementations of scientific principles learned or mastered years earlier. In other words, the advancement of science is a necessary precursor to the development of technology. According to one theory, the progression of scientific knowledge at the leading edge resembles the formation of ice in a pool of water. Established scientific knowledge exhibits chaotic randomness (like liquid water molecules). The interface (where the crystalline structure is beginning to penetrate the chaotic water) is where important developments occur. This scientific knowledge, developed at the interface, provides the feedstock for technological development opportunities. We recommend that firms study and understand this evolution so that they can use it as a tool to guide their technology planning and patent prospecting in emerging technical fields.

B. CONTROL COMPLEMENTARY ASSETS

Another factor affecting profits is the degree of interdependence between the innovation and the complementary assets needed to produce and/or market the innovation. In some cases, these assets are quite generic and readily accessible to any potential player, making market entry and imitation easier. Examples include general purpose manufacturing and fabricating equipment that can be purchased anywhere.

In other situations, the complementary assets are less available to imitators, which makes market entry and imitation more difficult. In this regard, "specialized assets" are those assets that have a one-way interdependence between the innovation and the complementary asset. One example is the relationship between containerized shipping and trucking. The innovation of containerized shipping is dependent upon available trucking assets, but trucking is not dependent upon the features or properties of containerized shipping assets, so it is a one-way interdependence. "Co-specialized assets" are those in which a two-way dependence exists. The innovation of a rotary engine in Mazda automobiles, for example, depended upon the availability of specialized repair facilities and, conversely, the presence of specialized repair facilities depended upon the existence of rotary engines in need of repair.

Where only generic assets are involved in production and marketing of a product, we find that no competitor has a clear advantage. As the manufacturing and/or marketing of the innovation becomes more dependent upon specialized or co-specialized assets, competitors already in possession of those assets have an advantage in reaping the profits from an innovation, sometimes to the detriment of the innovator. This fact has been recognized by every entrepreneur who has lost sleep worrying that her innovation will be "stolen" by a large, established business with the preexisting manufacturing and marketing assets to dominate the start-up enterprise.

C. UNDERSTAND PRE- OR POST-MODEL

The third factor mentioned above is whether the technology has a dominant design model. In the early stages of a new industry or a new product, the designs are fluid, the production capital is of a general nature, and the manufacturing processes are adaptively organized. Eventually, the design competition begins to narrow the field to a range of dominant designs that revolve around only a few design models. So when the game of musical chairs stops, and a dominant design emerges, the innovator might well end up positioned worse than a follower. While innovation continues, competition begins to shift towards price and away from fundamental design alternatives.

III. TOOLS IN THE BOX

We advise clients on a customized approach to several IP tactics that affect the controllable factors discussed above. In the broadest sense, these legal tactics can be grouped into three legal categories—contracts, intellectual property and antitrust.

Intellectual property laws include the laws of trade secrets, copyright, trademark and patent. These laws can be traced back several centuries to basic concepts of economic fairness and public gain. Each has its own set of rules to prohibit particular kinds of imitation.

Antitrust laws operate to promote competition. They limit the use of intellectual property laws and/or contractual arrangements that may harm the public by unduly preventing competition.

Contract law is the most basic and intuitive of these three legal categories. A contract is a promise that can be enforced by the machinery of the legal system. The promise can be a promise to take some specified action, or to not take some specified action. Examples of contracts relevant to this discussion include employment agreements, confidentiality arrangements with suppliers, distribution or franchise agreements with marketers, service agreements with manufacturers, and joint ventures or similar alliances with other companies. All of these arrangements involve legally enforceable obligations that influence control over complementary assets and barriers to imitation.

IV. VARIATIONS AMONG INDUSTRIES

In a perfect world, a project manager could determine exactly what level of time and money to direct toward securing imitation barriers like patents. But as we all know, perfect knowledge is impossible. As a substitute, many executives rely on crude benchmarks, such as a fixed percentage of R&D spending. Our experience has shown, however, that the IP strategy and tactics must be tailored to the industry, to the product and to the firm's competitive strategy. The following case studies illustrate various strategies.

A. HIGH DEVELOPMENT COST, EASY IMITATION PRODUCTS

Experience shows that in some industries and/or product types, the investment in high quality legal barriers is *essential*. Where the development cost of the innovation is high, but imitation is technically easy, or other firms are competitively situated with the complementary assets needed to commercialize an imitation, it is *essential* to secure the best possible protection.

Examples of such industries where we have advised clients include pharmaceuticals, medical devices and chemicals. Members of these industries that are engaged in product innovation must do their utmost to secure the best possible IP protection against imitation. Firms in these industries are *compelled* to optimize the appropriability regime, or face the risk of steep declines in profit caused by imitators. The technological "followers" in these industries may spend less on patent work, but they also must be careful to avoid the liability that can arise if they follow the innovators too closely and step over the IP line.

Consider the example of Tom Lochtefeld's wave machines.[3] Lochtefeld spent over $1 million in development, selling his oceanfront house to help pay for it. He also spent over $200,000 for patents to protect this investment. He now sells his machines for $450,000 each, with a healthy, patent-protected profit of $200,000 or so.

B. HIGH VOLUME OR HIGH-PRICED PRODUCTS

The case of high volume producers is another category in which the investment in high quality IP barriers, and the enforcement of those barriers, is essential. If the product will be sold in high volume, even a tiny price gain per unit is well worth the cost of securing strong IP protection.

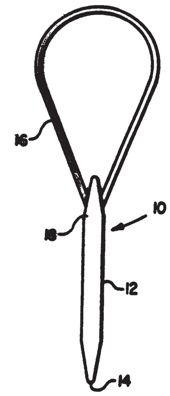


FIG. 1

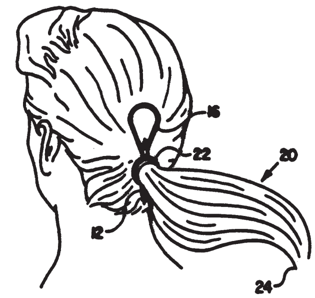


FIG. 2A

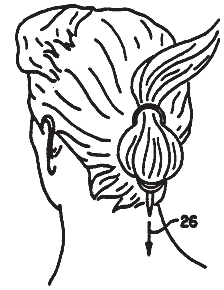


FIG. 2B


FIG. 2C

Consider the case of the Topsy Tail. The Topsy Tail is a simple plastic hair-styling tool that enjoyed widespread commercial success. It is easy to imitate and only generic manufacturing and distribution assets are needed to compete, so only IP barriers and perhaps strategic marketing alliances could be expected to ensure a return to the innovator. Reports indicated sales of $80 million in its first four years. The developer secured patent protection and sued a number of imitators. With this sales volume, her only choice was to maximize IP barriers. The potential profit to be gained by having exclusive control over the market compelled a maximum effort to secure the best available legal protection. Similarly, in the case of high-priced products like medical diagnostics equipment with high margins, our experience shows that even a small price premium can yield significant net profit from well-planned IP tactics.

C. LOW DEVELOPMENT COST AND LOW VOLUME PRODUCTS

For industries and/or products where the innovation costs are low, and sales volumes are low or moderate, we have found that the decision to invest in IP barriers often is difficult. The

3 *Forbes*, November 14, 2005, pp. 96-98.

financial leakage from weak imitation barriers is less apparent, and the net profit potential from strong imitation barriers may not be so large. As a result, these businesses often overlook the opportunity to improve profit margins with the proper use of IP tactics.

V. VARIATIONS AMONG PROJECT TYPES

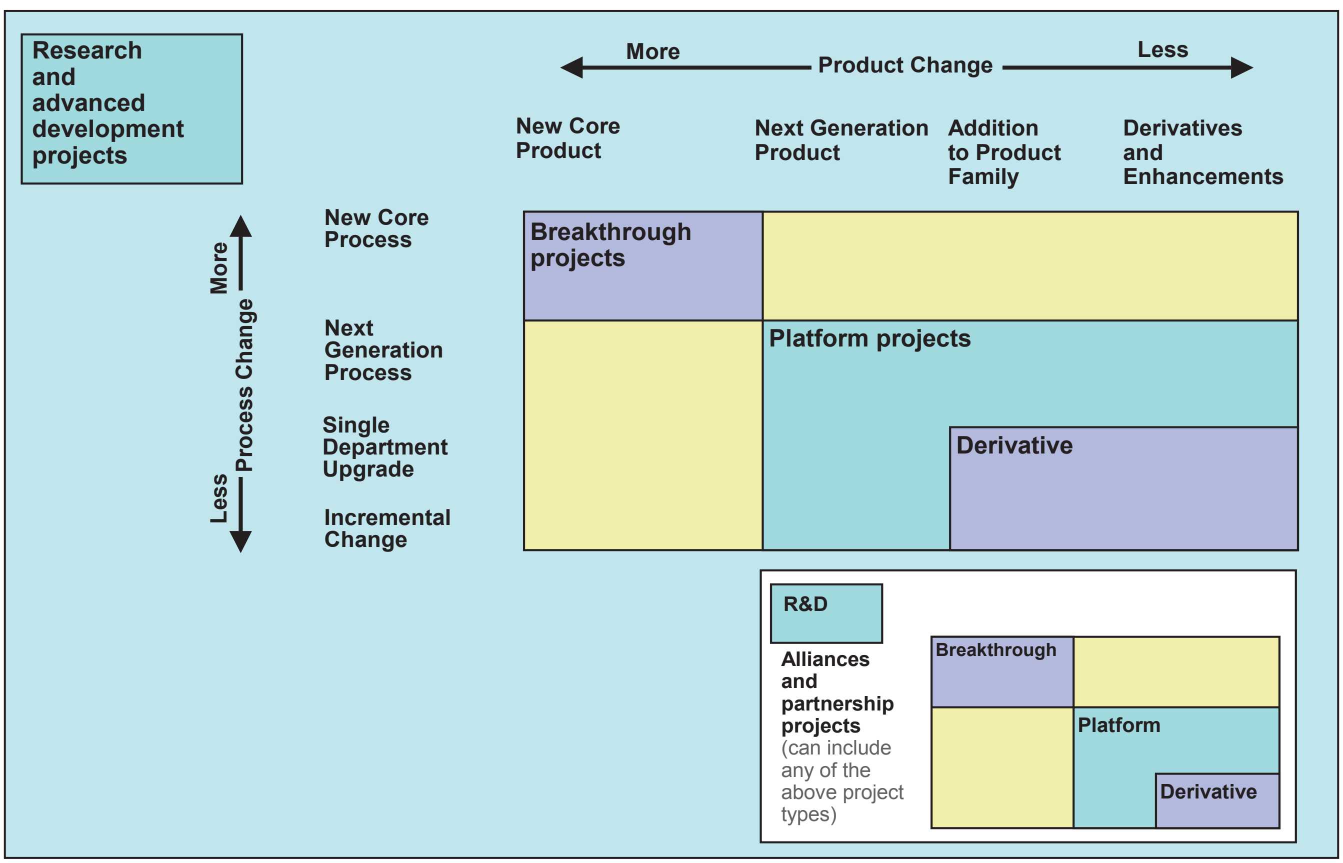
The literature on R&D activities emphasizes techniques for organizing and prioritizing development projects to improve market focus and efficiency. One model divides projects into three categories—breakthrough, platform and derivative projects. Each of these categories presents different opportunities to create an environment that will improve financial returns if a successful IP strategy is followed.

Breakthrough Projects — Most technology managers expect and hope that breakthrough projects will yield IP opportunities. While this usually is correct, we have seen significant variations in how firms have capitalized on the opportunity to erect barriers to imitation.

Platform Projects — Platform projects are aimed at the development of a new generation of an existing product or process. Several years ago, Hill-Rom Company provided an example of such a project. Hill-Rom developed a hospital bed with basic features that could serve as a single platform for an entire product line. Hill-Rom secured patent protection to minimize imitation of its developments. The patent titles appear below:

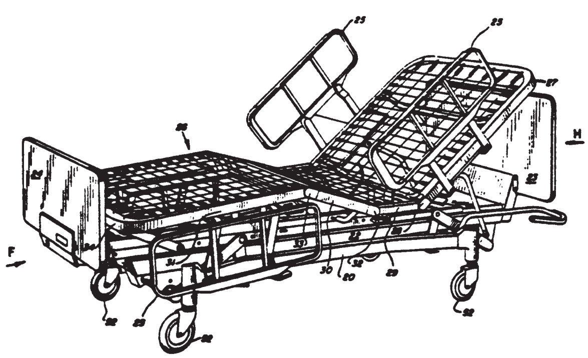
- Elevating and Trendelenburg Mechanism for an Adjustable Bed (2 patents)
- Guard Including Electrical Controls and Slidable Underneath the Bed
- Side Guard for Bed Including Means for Controlling Remote Electrical Devices
- Hospital Bed Having Automatic Contour Mechanism
- Control Circuit for Hospital Bed
- Ground-Test Circuit with Minimal Ground Current
- Pulsing Ground-Test Circuit

None of these patents prevents a competitor from making a basic hospital bed, of course. But each patent prevents some degree of imitation, and could help Hill-Rom to reap the total value of its platform through the price it could charge. Much



of our IP consultation is directed to a well-integrated strategy for "platform" projects, not just "breakthrough" projects.

Derivative Projects — Derivative projects involve enhancements to an existing generation of products or processes. These projects often are overlooked when it comes to IP strategy. In our experience, even small technical advances in mature technologies can be shielded from imitation with careful attention. Consider another example. The technology for manufacturing beverage cans is well developed.



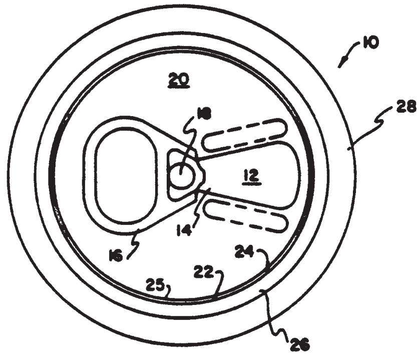


FIG. 1

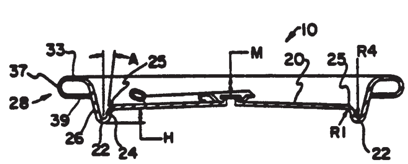


FIG. 2

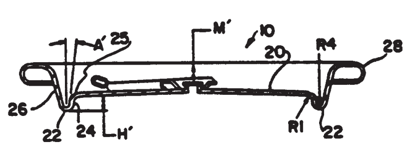


FIG. 8

Employees of Ball Corporation developed an improvement that could be described as a derivative project. The invention involved a technique to flow the metal from around the periphery of the lid so as to cause "compression doming." The result was meant to be a small cost reduction, but on each one of *millions* of cans.

VI. ORGANIZING AND MEASURING THE PROCESS

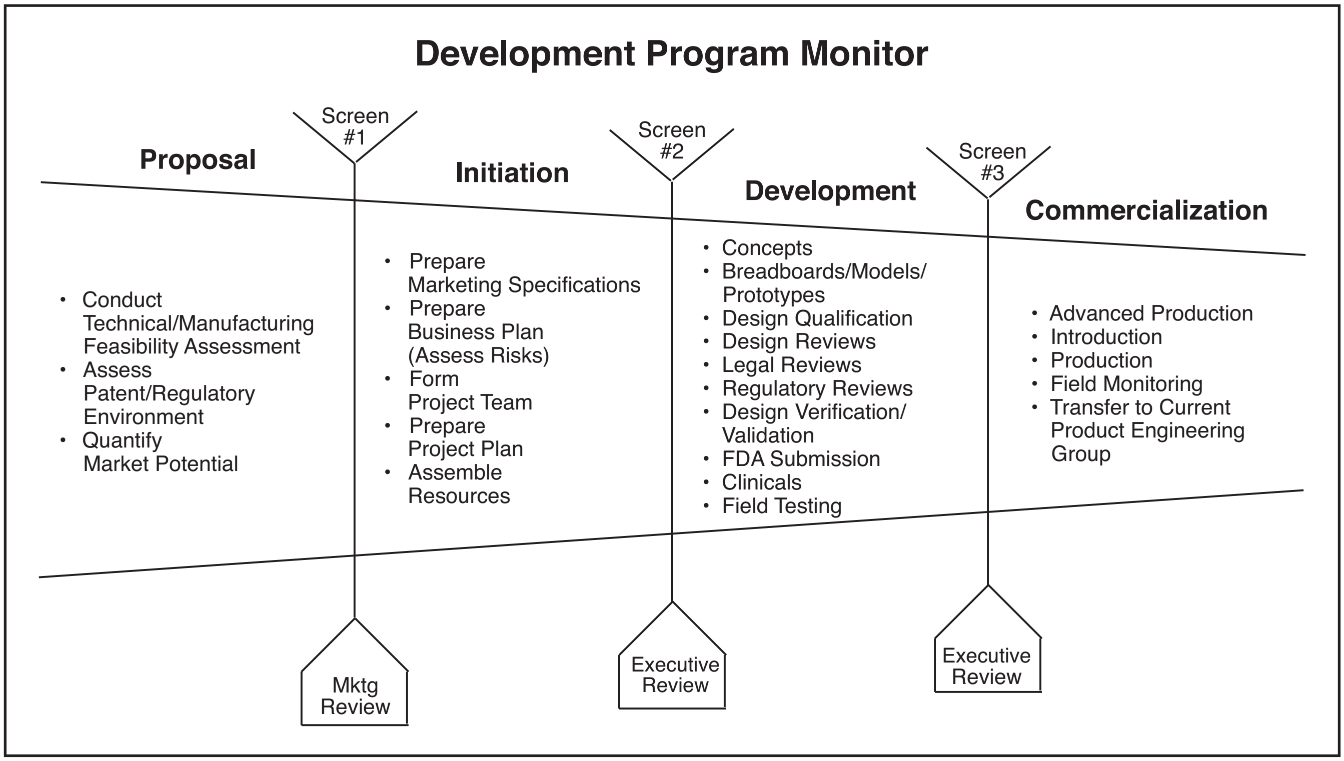
The factors that influence profits from innovation include inherent factors that are difficult to change (*e.g.* the nature of the technology and the dominance of a design model), and other factors that can be managed more easily (*e.g.* the quality of legal protection against imitation and control over critical complementary assets). Unfortunately, relatively few firms monitor and manage these factors as well as they might.

A. BEST PRACTICES

In the best companies, intellectual property opportunities are: (i) part of business strategy; (ii) part of project selection criteria; and (iii) part of project management criteria. Licensing in and out is regularly considered as a way to help maintain focus, speed and learning opportunities. Comprehensive trade secret policies are in place, and technical personnel are given exposure to the intellectual property function.

In a well-integrated organization, these activities are ongoing. In the early stages of a project, the development team ordinarily is gathering ideas from published patents and technical literature. This stage presents an ideal time to manage the need for specialized assets and the legal and technical issues affecting imitation. It also is the time to develop a preliminary assessment of infringement threats from competitive patents and to assess patent opportunities from development efforts. Later in a project, the details of the development efforts begin to emerge. As the ideas develop, the imitation protection can be refined.

It has been our experience that many firms fail to develop or to implement effective intellectual property strategy because they follow outmoded procedures that produce random results. In many organizations, for example, the technical staff sends a description of the innovation to an attorney



for a patentability opinion. If it appears to satisfy legal standards, it is passed on to a committee to critique the value of the invention as described by the inventor. If it passes this screening, a legal technician (patent agent or attorney) is instructed to file an application and to proceed with a patent on what he was told of the invention.

The problem with this common procedure is that it fails to ensure the communications needed to integrate the IP specialist's task with the company's business and technical strategy. The technicalities of securing a patent, for example, present a *huge* range of opportunities to steer the process in one direction or another. The United States Supreme Court once noted that "[t]he specifications and claims of a patent . . . constitute one of the most difficult legal instruments to draw with accuracy." Consequently, various tactics must be kept in mind throughout the process. We have observed that good decision making is impossible, however, if the effort is compartmentalized and the IP specialists are kept in the dark about broader strategies of the technology and business. One person, or a cohesive group, must provide integration. Whether the leader is an outside IP advisor or a knowledgeable in-house manager, that individual must have the authority and management access needed to guide the process. Otherwise, the process will fall into neglect or randomness.

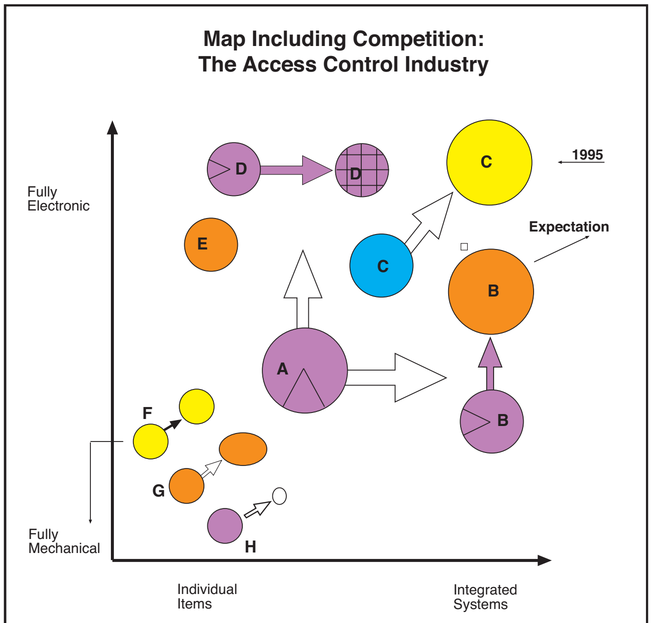
In all but the smallest business, the process will require input from several people from different functional groups. The best practice, we have learned, is for the appointed manager or group to conduct periodic meetings with the various functional groups.

One way to enhance strategy is to use mapping techniques. Graphical depictions like these shown here can be developed for each category of new product to provide a common vision of the firm's posture and direction in relation to its competitors. Similar graphics can be used to focus the efforts of the managers and legal technicians on the important features of each product development program as it evolves from concept through commercialization.

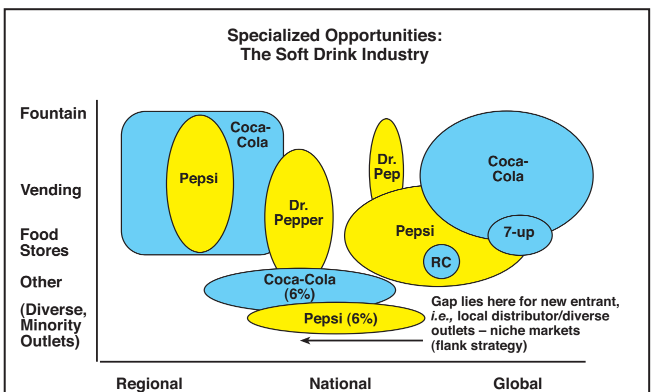
B. METRICS

Net Present Value

In most situations, IP barriers will guard against imitation of facets of an innovation, but will not broadly dominate the technology. Therefore, we advise technology managers to determine how much should be invested in securing contracts, patents, trade secrets, copyrights and other forms of imitation barriers.



Key: Competitors A, B, C, D, E, F, G and H position on map. Area of circles proportional to present sales. Outlined circles estimates of 1995 position. Thickness of arrows proportional to expected competitor commitment to thrust. Outlined arrows represent uncertainty of achieving expected future position. Pies represent relative profitability of the competitors.



Some key points:
- Opportunities for players are competition against Slice and potentially Dr. Pepper (different strategy than Mr. Pibb—*i.e.,* local niches for Pepper type drinks).
- Opportunities for niche players are regional/other outlet (*e.g.* Jolt Cola, NY Seltzer through convenience stores, etc.).

Earlier this paper examined, in qualitative terms, the differences among various types of industries and their dependence on imitation barriers. The analysis behind that discussion can be expressed more directly in quantitative terms using net present value analysis. Under this analysis, if the net present value of an effort exceeds zero, the investment adds value to the firm.

We begin with a technical innovation having an annual value to its users of V_t. Such an innovation can take various forms, such as a lower-cost manufacturing method or a labor-saving consumer product. In the absence of any imitation, the innovator should reap the full value of the innovation, V_t, through an improved profit margin, or an increased market share or a combination of the two. If the cost of conceiving and developing the innovation to the point of commercial use is RD, then the net present value NPV is given by:

$$NPV = \sum_{t=1}^{n} \frac{V_t}{(1+k)^t} - RD$$

where n is the number of years that the value V_t continues to be captured solely by the innovating firm, and k is the cost of capital. We can see from this simple equation that in industries with high RD, such as pharmaceuticals, the net present value can easily be *negative* if prompt imitation produces a low value for n, thus preventing the innovator from reaping the value of the innovation.

The value of an innovation V_t is captured through the pricing mechanism. If an innovation provides customer-preferred features over the old technology, the market will allow the innovator to charge a price premium over the price charged on the old technology. Alternatively, the innovator could hold to the old price and gain market share. Thus, V_t can be expressed as

$$V_t = \Delta P \times Q_t$$

where ΔP is the per unit price increase made possible by the innovation and Q_t is the quantity of units sold in time t; *or* as

$$V_t = M \times \Delta Q_t$$

where M is the normal profit margin and ΔQ_t is the increased quantity of unit sales made possible by the innovation in time t. We can see from these equations that the value of V_t, and thus the net present value of an innovation project, is likely to vary most in those cases where Q or P is large, because those are the situations in which even a slight percentage change in price or in sales quantity could yield significant net dollars if prompt imitation can be prevented.

If we assume further that at least one competitor is in a position to imitate the innovator, we can expect that the number of years n that the innovator can capture V_t from the marketplace will be very limited in the absence of barriers to imitation. In industries with high development costs or with high volume or high-priced products, the transaction costs of securing imitation barriers (*i.e.*, government fees and professional service fees) are relatively small in comparison to the profit that these barriers can provide. In industries with low development cost, low sales volume or low price, these transaction costs become proportionately larger. The decision of whether to make the investment in IP barriers again may be expressed in a net present value analysis as:

$$NPV = \sum_{t=1}^{n} \frac{CFS_t}{(1+k)^t} - TC$$

where CFS_t is the cash flow surplus in time period t that is made possible by the imitation barriers (*i.e.*, the cash flow that would *not* be captured if unrestrained imitation occurred); k is the cost of capital; and TC is the transaction cost of building the IP barriers. In the case of patent protection, n can be taken as the life of a patent. TC can vary over a very broad range, from several thousand dollars to many tens of thousands, depending on the geographic reach and the complexities and sophistication of the IP protection program. If we assume the presence of serious competition and that imitation could occur quickly (*i.e.*, first mover advantage is short-lived), then CFS_t nearly equals V_t for all time periods beyond the first year or two, and the equation may be restated approximately as:

$$NPV = \sum_{t=2}^{17} \frac{V_t}{(1+k)^t} - TC$$

If NPV is positive, then the investment in the imitation barriers adds value to the firm. So technology managers should keep in mind, as this equation shows, that even a V_t of just a few thousand dollars makes the investment worthwhile.

Thus far we have focused only on one of the economic effects of IP barriers—the increased cash flow they can provide to the owner. Another effect is the toll they can impose on a would-be imitator.

The most obvious and most significant toll is a reduction in profitability from selling the old technology. The competitor who is barred from imitation will either lose market share or be forced to reduce its price. In the case of a two-supplier market, this cost roughly equals V_t. In a market with multiple competitors, each competitor will suffer its market-share pro rata portion of V_t. This cost, C, may be expressed as:

$$C \cong \left(\sum_{t=1}^{17} \frac{V_t}{(1+k)^t} \right) \times \text{mktshr}$$

where mktshr is the percentage of the market held by the competitor.

In addition, each competitor will suffer a cost associated with trying to circumvent the imitation barriers. One study indicates that patents, on average, increase a competitor's cost of imitation by as much as 10%. This added cost represents, among other things, the cost associated with developing marketable alternatives to the patented innovation. Assuming a 10% cost of capital (for ease of math), we can get some idea of this effect. Assume, for example, that Leader Corporation invests $1 million in a project to introduce a new widget. Follower Corporation later studies Leader's widget and attempts to imitate the product's popular features. Assume a cost of $750,000 to Follower Corporation to study and imitate Leader's product in the absence of legal barriers to imitation.[4] By applying the percent added cost benchmark mentioned above, Follower Corporation would be expected

One Evaluation Methodology

Assumptions: Static Market Size;
Technical Advance of Value

Benefits to Rightsholder

If No Design-Around is Possible	=	Price Premium Gain or Gain in Market Share for Duration of Rights.
If Design-Around is Possible	=	Price Premium Gain or Gain in Market Share (Until Design-Around Marketed) and Improved Margin or Market Share from Use of the Technology.

Cost to Non-Holder

If No Design-Around is Possible	=	Loss of Market Share or Margin Squeeze.
If Design-Around is Possible	=	Design-Around Cost (Design and Implementation Costs plus Operating Costs).

4 Studies suggest that the technological follower's costs are at least 60% of the innovator's costs.

to incur at least an additional $75,000 in development costs if Leader Corporation had secured some form of patent protection. If Leader had devoted, say, $25,000 to erecting the patent barriers, it could expect about three times that amount to be imposed on Follower as a "toll" over and above the market share and/or profitability losses mentioned above. Taken together, these costs can be significant and help to ensure profits to the innovator by deterring close imitation by competitors.

As we have counseled our clients, there is a valuable lesson in this analysis for the technology manager. The IP strategy deserves a good deal of attention because it both imposes an imitation toll and can improve profit margins and/or market share at the expense of competitors.

VII. CONCLUSION

Technology managers must stay focused on those variables that, in the long run, can have the greatest influence on profits from innovation—*i.e.*, controlling complementary assets and optimizing barriers to imitation. These are difficult, abstract issues to manage. But we have found that if they are managed properly, they can ensure proper rewards from innovation.

LAWYER CONTACT

For further information, please contact your principal Firm representative or the lawyer listed below. General e-mail messages may be sent using our "Contact Us" form, which can be found at www.jonesday.com.

Timothy J. O'Hearn
1.216.586.1080
tohearn@jonesday.com

SUGGESTED READING AND BIBLIOGRAPHY

Adler, Paul S., et al., "Strategic Management of Technical Functions," *Sloan Management Review*, Winter 1992.

Baily, Martin Neil, and Chakrabarti, Alok K., *Innovation and the Productivity Crisis*, The Brookings Institution, Washington, D.C., 1988.

Baumol, William J., *Entrepreneurship, Management, and the Structure of Payoffs*, The MIT Press, Cambridge, Mass., 1993.

Bernstein, Jeffrey I., and Nadiri, M. Ishaq, "Interindustry R&D Spillovers, Rates of Return, and Production in High-Tech Industries," *NBER Working Paper Series*, Working Paper No. 2554, National Bureau of Economic Research, Cambridge, Mass., 1988.

Covey, Stephen R., *The Seven Habits of Highly Effective People*, Simon and Schuster, New York, 1989.

Ellis, R. Jeffery, "Proactive Competitive Intelligence: Using Competitor Scenarios to Exploit New Opportunities," *Competitive Intelligence Review*, Vol. 4, No. 1, pp. 13–24, Society of Competitive Intelligence Professionals, Alexandria, Va., Spring 1993.

Grady, Mark F., and Alexander, Jay I., "Patent Law and Rent Dissipation," *Virginia Law Review*, Vol. 78:305, 1992.

Griliches, Zvi, "The Search for R&D Spillovers," *NBER Working Paper Series*, Working Paper No. 3768, National Bureau of Economic Research, Cambridge, Mass., 1991.

Ingram, Gregory, review of *Innovation and Growth in the Global Economy*, by Gene M. Grossman and Elhanan Helpman, in *Finance & Development*, Vol. 30:52, March 1993.

Jorde, Thomas M., and Teece, David J., *Antitrust, Innovation, and Competitiveness*, Oxford University Press, New York, 1992.

Jorde, Thomas M., and Teece, David J., "Rule of Reason Analysis of Horizontal Arrangements: Agreements Designed to Advance Innovation and Commercialize Technology," *Antitrust Law Journal*, 61:579, 1993.

Kaufer, Erich, *The Economics of the Patent System*, Harwood Academic Publishers GmbH, Philadelphia, Pa., 1989.

Kitch, Edmund W., "The Nature and Function of the Patent System," *The Journal of Law & Economics*, Vol. 2:265–90, October 1977.

Levin, Richard C., et al., "Appropriating the Returns from Industrial Research and Development," *Brookings Papers on Economic Activity*, 3:1987.

Link, Albert N., *Technological Change and Productivity Growth*, Harwood Academic Publishers GmbH, Philadelphia, Pa., 1987.

Mansfield, Edwin, "Contribution of R&D to Economic Growth in the United States," *Science*, Vol. 175, No. 4021, February 4, 1972.

Mansfield, Edwin, et al., *The Production and Application of New Industrial Technology*, W. W. Norton & Co., New York, 1977.

Merges, Robert P., "Commercial Success and Patent Standards: Economic Perspectives on Innovation," *California Law Review*, Vol. 76, 1988.

O'Hearn, Timothy, "The Reason for the Patent Wars," *Business Horizons*, pp. 33–42, July–August 2000.

Roussel, Philip A., et al., *Third Generation R&D*, Harvard Business School Press, Boston, Mass., 1991.

Scherer, F.M., "Firm Size, Market Structure, Opportunity, and the Output of Patented Inventions," in *Innovation and Growth: Schumpeterian Perspectives*, MIT Press, Cambridge, Mass., 1984.

Solow, Robert M., "Technical Change and the Aggregate Production Function," *Review of Economics and Statistics*, pp. 312–320, August 1957.

Steiner, Christopher, "Making Hay Of Haymakers," *Forbes*, pp. 96–98, November 14, 2005.

Stewart, Thomas A., "Your Company's Most Valuable Asset: Intellectual Capital," *Fortune*, p. 68, October 3, 1994.

Szakonyi, Robert, *Technology Management: Case Studies in Innovation*, Auerbach Publications, Boston, Mass., 1992.

Teece, David J., "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy," *Research Policy*, Vol. 15, No. 6, p. 285, Elsevier Science Publishers B.V., North-Holland, December 1986.

Wheelwright, Steven C., and Clark, Kim B., *Revolutionizing Product Development: Quantum Leaps in Speed, Efficiency, and Quality*, The Free Press, New York, 1992.

Zangwill, Willard I., *Lightning Strategies for Innovation*, Lexington Books, New York, 1993.