External Search For Technology Fueled by Savings

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Location, selection, and acquisition of technology receives heightened awareness as companies look outside for technology

As competition has increased in markets throughout the world, technology has emerged as a significant business factor. Today, new technology is necessary for a business to remain competitive. In rapidly evolving markets, such as electronics, new products based on new technology are essential. But, even in mature markets, new technology is necessary to remain competitive in cost and quality.

In the 1960s and 1970s, many businesses emphasized internal development of technology. In the U.S., this emphasis on internal development was particularly strong. But today, many consider internal development too uncertain, too expensive, and, most significantly, too slow for the rapid technical changes in the market. More and more companies are looking for outside sources of either basic technology to shorten product development time, or of commercial technology to avoid the costs and delay of research and development. Thus, the transfer of technology and of the rights to use it has become increasingly significant in today's commercial world.

A recent U.S. Government study on technology transfer stated: "Corporations trade in technology in world markets just as they do in other services and goods — that is, they trade in the knowledge used to produce other goods and services."[1] The study also noted: "Increasingly, American companies view technology licensing as an integral part of their business strategies."[2]

The change in attitude toward technology transfer has caused many to rethink concepts considered unquestionable only a few years ago. Until recently, companies jealously guarded their internal developments and licensed out only technology unrelated to their business or becoming obsolete. The U.S. Government study, however, observed a change in attitude toward licensing out. "Licensing has always been an alternative for exploiting proprietary technology internationally. But most companies would choose when possible to maintain a tight hold over their technical know-how by using it to produce for export, or transferring it to controlled subsidiaries abroad. Today, these choices may be less practical than in years past."[3]

Attitudes are also changing toward the acquisition of technology. According to this same study, U.S. companies used to denigrate foreign technology believing that they could do it better themselves. The report, however, concludes that:

> "Given that many foreign corporations particularly those in Japan, now have technologies in some respects as good or better than those of American companies, the U.S. economy could benefit from greater inward flows of technical know-how. Access to the world's stock of technology is quickly becoming an issue comparable in significance to the ongoing task of supporting R&D and technology diffusion within the United States. Some U.S.-based firms do not seek out and license technologies from overseas, but a broad shift in attitude toward foreign know-how on the part of American corporations seems called for.[4]

Interestingly, this study also concludes that:

> Technology flows around the world through many channels. Almost any technology will be available to almost any firm with the money and skills to make us of it.[5]

In today's business, if you wait until your competitor's new product is on the shelf, you have lost the race. Your product is obsolete. What does a business enterprise do in such a competitive climate? How can a business stay ahead in a market where technology-based products and services change rapidly?

Today, many companies, particularly the larger ones, systematically gather information on existing and emerging technologies that may affect the competitive market. After identifying technical areas in which it may be necessary to compete, these companies increasingly seek to acquire existing technology, either basic or commercial, to shorten the time to market and decrease the costs and risks of development.

Increased market competition is leading to increased competition for access to technology. There is a technology market, but unlike traditional product, commodity or even service markets, the technology market has no definition, has no tradition of marketing or advertising, has no public exchange.

It is a market of increasing importance, but a market in which the sellers and buyers generally are unknown to each other and the nature of the products (the technology) is secret and not advertised. Frequently, the seller does not know he has a technology product of market value and thus, does not advertise its existence, and has not considered being a seller. Further, the value of the product frequently

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is unknown by buyers until long after the sale, and the price of the product is often secret, yet varies dramatically among different sellers.

The increasingly competitive and difficult technology market has led to elaborate mechanisms for gathering information and assessing the value and significance of particular technologies. Whatever phrase is used to identify this effort, it is basically an effort by competitive companies to learn as much as possible about existing and potentially competitive technologies, to identify sources of such technology, to evaluate such technology, and where possible, legally to gain access and the right to use that technology.

INFORMATION GATHERING

Business enterprises gather information about existing and emerging technologies from a variety of sources. This information gathering process is continuous and is designed to develop an overall appreciation of what is happening in a given field, what technologies exist or are being developed that might be of benefit to the business enterprise, and what technology directions can be expected from its competitors.

The information routinely uncovered by this gathering process is evaluated by the company. This internal process, which may involve only one person, the manager of every division, or an outside consultant, is used to decide in what technology direction or directions the company should go, where the competitors are going, and what technologies may be available to help the company stay ahead of the competition.

There is a variety of sources of technical information used by business enterprises. The value or significance of each depends on the industry involved and the contacts a business enterprise has in that industry.

Patent Literature

It is common for business enterprises to routinely review abstracts of newly issued patents in given fields and to obtain patents and study patent disclosures. The patent offices of most countries publish a summary of all recent patents issued. In the U.S., for example, it is the Official Gazette. In many other countries, similar publications listing issued patents or recently filed applications for patents are available for regular subscription. In a sophisticated information gathering program, these publications are separated by technical subject matter and distributed within a company for review. Some companies routinely buy a copy of each patent issued in a technical field of interest. This permits more detailed analysis of issued patents. In the U.S., the PTO will sell a subscription to all patents issued in defined technical classifications. The U.S. Patent and Trademark Office also lists in its weekly Official Gazette, patents available for license.

Searches of patent office records are frequently conducted to learn what companies are active in a particular technical field and the direction of their past development efforts.

While patent disclosures may not contain all the know-how necessary to produce a commercial product, they contain enough information to alert a business enterprise to the need to gather further information. One disadvantage of patent literature is its timeliness. Published patents may describe developments that occurred several years before. In a market based on rapidly evolving technology, patent information may be outdated.

Scientific Literature

Scientific literature is typically well classified and indexed. Abstracts of professional papers are available through a variety of sources. Chemical Abstracts, for example, is widely reviewed by U.S. chemical companies. Because of the demand for information, many services for publishing abstracts have begun in recent years. These may have only recent articles, but generally no more is needed.

Because of the desire of many, particularly university personnel, to publish as quickly as possible, scientific literature is often more timely than patent disclosures.

While most scientific papers are subject to rigorous peer review, which provides some assurance as to accuracy, much of the scientific literature is academic or very early basic research. Patent disclosures, on the other hand, are usually directed more to commercial technology and, in some countries, are subject to examination for utility and completeness of disclosure.

Scientific literature not only provides information on new basic technical developments, but also identifies sources of that technology. Much of the scientific literature is published by research scientists at public and private universities. In recent years, these universities have become very active in licensing the developments of their research staff. Such licenses may be accompanied by offers to conduct further product development sponsored by the licensee. At a much lower cost than internal development, a company may obtain from a university the latest technology plus highly skilled assistance in further development.

Trade Publication

It is very common for marketing and research staffs to closely review trade journals and publications. The marketing staff learn of their competitor's activities. The research staff gains good information on new product and process developments. While in some industries such publications do not provide much technical detail, trade journals do alert companies to the existence of new technology that might bear further exploration. They also serve to identify potential sources for the new technology.

Trade Shows

Many business enterprises attend and participate in trade shows as much to keep track of competition as to display their own products. Product introductions at trade shows often include detailed disclosure of the benefits and technical advantages of the product. The new products are also displayed for close public examination. Large trade shows bring together an entire industry and permit an easy opportunity to survey the products of

an industry and to gain information about the industry members.

Sales Brochures, Engineering Catalogs and Other Published Product Data

A great deal of technical information on product design, and sometimes on the process of manufacture of such products, is available in company promotional materials. The sales and marketing departments of many businesses are far more interested in selling the product than in hiding technology. Engineering catalogs and technical bulletins also provide valuable technical information.

University Cooperation

Many business enterprises maintain long-term relations with certain universities. These relationships take a variety of forms, such as (a) periodic meetings to discuss specific technical problems and to learn about the research that's being conducted at the university, (b) company-sponsored research programs at the university in specific technical areas, and (c) consulting agreements with professors. Contractual relationships with universities, particularly in regard to sponsorship of research, may provide early, prepublication disclosure of new information as well as certain rights in the technology.

Personal Contacts

It is typical for large business enterprises to send technical people to seminars, professional meetings, trade shows and other professional or trade gatherings. While one purpose of attending these gatherings is to learn from the presentations, an equally important purpose is making personal contacts and having discussions with people in the field. It's an opportunity to get to know people who are working in the same industry or similar industries and to acquire information from them about their own company efforts or those of others. A great deal of information concerning available technologies can be generated in this personal atmosphere. By getting to know the people in an industry or field, it is also easier to telephone for information, particularly when looking for specific technology.

Equipment Vendors/Subcontractors

Equipment vendors often have detailed information about technology in a given industry. They are involved in the details of processes of various companies and in some instances, such information is not protected by a confidential disclosure arrangement. Equipment vendors are anxious to sell equipment. They will be very cooperative in disclosing technical information on new processes or products with which they have been involved in order to encourage purchase of their equipment.

Many industries today are changing to component manufacturing. New products are designed to use components developed and manufactured by subcontractors. The subcontractors own the rights to the components, and they will provide detailed technical information to encourage use of their components in a new product. The components from which a competitor's new product is made may be freely available to everyone in the industry. Many companies spend more time investigating subcontractors and their products than studying competitor's products.

Customers

Customers obtain product specifications and other technical product data from many different competitors. Much of this is not restricted by a confidential agreement. A company's customer may freely disclose this information on the assumption it may result in greater competition and lower prices.

Technical Consultants

Technical consultants sell their experience and knowledge. Most technical consultants focus on a particular industry and may work at the same time for several competitors. Acquiring technology information from consultants can raise questions of legality since they may be under secrecy agreements with other companies. On the other hand, technical consultants have information that they are not bound to keep secret. Unrestricted information results from their being active in a given industry, talking to a lot of people in that industry, and doing work not all of which is covered by a confidentiality agreement.

Research Grants

Often, companies and universities submit proposals to obtain government or other organization research grants. These proposals may be publicly available and provide information concerning the technology level of a particular enterprise at a given time. Of course, the reports generated as a result of the grant are often publicly available and contain considerable detail on a particular technology. One such organization in the U.S. is the National Science Foundation, which provides grants to universities and companies for research.

Government Information

Some industries maintain a close watch of bid proposals published by the government. Such proposals may contain drawings and specifications that relate to specific products or include information on technologies related to those products. In the United States, some of these bid proposals are publicly available. Others can be obtained through the Freedom of Information Act.

Many government agencies have substantial bodies of technology information available to the public. In the U.S., for example, regulatory agencies such as the Environmental Protection Agency and the Food & Drug Administration receive detailed technical information from companies seeking agency approvals. While some of the information is kept secret by the agency, much of it is available if requested.

Government agencies also sponsor research and publish the results. In the U.S., the Government Printing Office publishes and sells the results of many technical research studies.

Certain government agencies, such as the Commerce Department in the U.S., continuously study markets and technology trends. This information is also available, although it may not be published. Many companies identify individ-

uals within the government who study their industry and contact them personally on a periodic basis merely to learn of new market and technical trends.

Literature On Data Bases

There are various services that have computerized listings of technologies available for licensing. Indeed, there are data bases that permit efficient searching of much of the published technical information. Dialog is an example.

Licensing Information Supplier

Organizations will provide information concerning existing technologies, the entities that control such technologies and other particulars of an industry or industry segment. Some of these are government funded or sponsored agencies designed to aid business. Many U.S. states, for example, have agencies or state universities which try to match state businesses with other companies. There also are professional technology licensing consultants. They are matchmakers working for a fee.

Technology Fairs

Exhibitions of technologies that are available for acquisition are held throughout the world. Some are directed to technology broadly, others to specific fields or industry. LES Britain/Ireland is currently organizing a Technology Fair in England for the British government.

LES Technology Transfer Directory

LES maintains a directory, available to its membership, in which members list technologies available for licensing "out" or technology areas where their company may have a particular interest in licensing "in" technology.

SELECTION OF APPROPRIATE TECHNOLOGIES

If a company diligently pursues technical information, it will then be faced with selecting technology of potential value. Such technology has been called "appropriate technology." This phrase has been used in a variety of ways by different people over the years. It became a key phrase in the debate between developed and developing countries in the 1970s and early 1980s. Publications emerged such as "Appropriate Technology Directory" and the "World of Appropriate Technology: Theory and Practice in Appropriate Technology." When first used in the 1970s, it meant something fairly simple. Technology was appropriate if it satisfied the needs and conditions of the transferee, i.e. the buyer. But, after the economists and others got hold of the phrase it became more and more complex. A recent definition is:

Appropriate technology (AT) is now recognized as the generic term for a wide range of technologies characterized by any one or several of the following features: low investment cost per work place, low capital investment per unit of output, organizational simplicity, high adaptability to a particular social or cultural environment, sparing use of natural resources, low cost of final product or high potential for employment.

Although the definition by economists is complex, in basic terms "appropriate technology" is simply whether the technology is appropriate for the needs and conditions of the buyer. Every company has to evaluate technology to determine whether that technology meets its needs and whether it has the capability in personnel, raw materials, capital, plant, and so on, to use the technology. Let me give you some examples.

For 10 years I have worked with a particular technology that has been licensed extensively. In one instance, a very sophisticated licensee obtained access to drawings and specifications that included confidential data on the manufacture of a certain product. After gaining access to this information, the license arrangement began to fall apart because of the attitude of the licensee. Subsequently, the license was terminated by the licensee who insisted he had a right to continue using the licensed information. The licensee then tried to commercialize the technology without technical assistance from the licensor. Even though the licensee had tremendous resources in terms of engineering and scientific personnel and money, he was never able to successfully use the technology. Why? Because he lacked people familiar with the specific technology who were capable of adapting the technology to the specific needs of the licensee. They failed to recognize that they lacked the technical expertise in-house for this specific technology. Even translating product specifications from metric to English can produce significant problems. Thus, whether a technology is appropriate for a given licensee will depend on the capabilities of the personnel of the licensee to use the technology, even if the situation is one where the licensor is cooperating.

◄ Raw Materials ►

Second, the raw materials accessible to the licensee must be of such a nature that they are capable of use in the process. Severe problems resulted in one technology transfer where a process component required certain purity levels to achieve a successful use of the process. Neither party recognized this requirement in the beginning. It only became apparent when troubles surfaced in the licensee's plant. Materials possessing the required purity levels were not readily available at the licensee's location at reasonable prices. Thus, the appropriateness of the technology in a given location can depend upon the availability of required materials.

In another instance involving the transfer of technology for a particular material that the licensee wanted to use for underground pipe, severe problems developed that required the pipe to be dug up and replaced. The material simply had not been appropriately tested or used for this purpose and the problems were not anticipated.

How then does an enterprise undertake to evaluate and select appropriate technology? Quite often this is done in the following manner: (a) identifying or targeting specific technologies; (b) evaluating available technical information to ascertain the technical merits, costs and potential of the available technologies; (c) considering alternative

sources of technologies which will achieve or meet the same needs; (d) evaluation of the patent situation relevant to targeted technologies; (e) investigating the owner of the technology; (f) determining the costs and conditions under which the technology can be acquired; (g) undertaking negotiations for the purpose of gaining additional information on one or more technologies for further evaluation, and (h) finally negotiating a technology transfer.

Identifying or Targeting Specific Technologies

Once a business decides what product or products it wants in order to expand or augment its product lines, it is necessary to target specific technologies that may be capable of providing the desired products. The sources of technology information previously discussed provide the basis for beginning this targeting exercise. Generally, detailed technical information will be obtained through university relations and information acquired from one or more of the literature, computer or patent search sources discussed above. It is my impression, however, that a good deal of technology location occurs through personal contacts. It is for this reason that the network of licensing professionals provided by the Licensing Executives Society is so valuable.

Evaluating Available Technical Information to Ascertain the Technical Merits, Costs and Potential of Available Technology

Initial reviews by technical personnel of available information related to specific technologies will provide insights and assist in narrowing the search to a target or targets where the most potential exists. If potential sellers or licensors know you have an interest in a particular technology, they may be willing to provide information in addition to that publicly available without the requirement of a confidentiality agreement. The potential seller may also be willing to compile publicly available information for you which will facilitate a technical evaluation.

Considering Alternative Sources of Technology

Competitive products are typically made by a variety of companies around the world. Thus, the technology for the manufacture and design of such products may be available in the same or similar forms from more than one source. It is important to consider such alternative sources rather than focusing on a single source of technology. Obviously, the terms and conditions of a transfer may vary from source to source. In addition, the ability to work with one source may be better than with another. For example, the same technology may be available from a competitor and from a noncompetitor, either in a different product or geographic market. It is frequently easier to work with a noncompetitor.

Moreover, the technology from a particular source may be more appropriate for the company's needs and abilities.

Evaluation of Patent Situation Relevant to Targeted Technologies

The scope of the patent rights held by a source may provide very real benefits in terms of exclusivity in the marketplace that should be carefully evaluated as a part of the overall analysis. The exclusive rights afforded by patent protection can pertain either to the specifics of the product itself or to aspects of the manufacture of the product which provide for enhanced quality or cost savings.

Investigating the Owner of the Technology

It is a good idea to investigate the business and financial standing of the technology owner. Such investigations may show that the continued viability of the owner's business is in doubt or may reflect on its reputation for fair dealing. A company may want to check with other licensees of a particular source to determine the source's reputation. Clearly, such information must be considered where the owner will have continuing obligations to provide improvement technology or technical assistance. An owner's propensity for litigation and the manner in which the owner has dealt with other technology transfer is also very useful information.

Determining the Costs and Conditions Under Which the Technology Can be Acquired

The cost of the transfer and the conditions or restrictions that the owner will place on technology use or the sale of products should be determined as early as possible and evaluated when considering alternative sources of technology supply.

Undertaking Negotiations for the Purpose of Gaining Additional Information

Frequently, a complete evaluation of a technology requires cooperation with the owner to obtain detailed information on the technology. Such detailed information may be available either on a confidential or nonconfidential basis. If a confidential agreement is necessary to obtain information for evaluation, the company seeking the technology must be careful to avoid restrictions on its ability to select and use other technologies.

First, it is very important to record precisely what is being transferred for the purpose of evaluation. Second, the rights of the potential buyer, should the technology not be acquired, must be protected to provide freedom for the buyer either to develop technology internally or to acquire the technology from other sources. For a variety of reasons, the evaluated technology may prove to be technically inadequate or inappropriate or financially impractical. The buyer must be in a position, should it make that decision to continue its search through either external or internal development, to do so without restriction.

One way to avoid uncertainties concerning the financial aspects of the transfer itself is to include, as a part of the evaluation agreement, the terms and conditions of the ultimate license should the buying company want a license. This is easier said than done. The buyer is not in a good position to negotiate a license agreement without the required information to evaluate the technology. On the other hand, in many instances, the seller may lack

flexibility in negotiating a license because of restrictions in other, preexisting licenses on the same technology. It may be possible to get the seller to agree to transfer the technology at no greater cost than it granted to others.

The question of the terms and conditions of an ultimate transfer become very important in certain technical areas where it's quite expensive to evaluate the technology. There the transferee may want some assurances that the transfer will be on practical terms and conditions if he undertakes the costs and effort to give a full evaluation to the technology. Flexibility is required at this stage in order to fully accommodate the needs and concerns of both parties to the potential transfer.

Negotiating a Technology Transfer

This is a topic that requires several papers to cover. It is important, however, to negotiate technology transfers that constitute a win-win result. Each side should be placed in a winning position. Each side must obtain a fair deal if a technology license involving ongoing obligations and relationships is to be successful.

SUMMARY

While external technology acquisition can require significant expenditures of time and money, many believe that significant savings can be achieved. Market entry can be accelerated, risks of R&D failure avoided, and the cost of product development reduced. These savings are driving business to more favorably consider external acquisition. Clearly, the bias for internal research and development is giving way, for strong practical reasons, to increased use of external acquisition.

NOTES

1. *International Competition in Services - Banking, Building, Software, Know-How.* Congress of the United States, Office of Technology Assessment (1987), p. 191.
2. *Id.* at 208.
3. *Ibid.*
4. *Id.* at 194.
5. *Ibid.*