

Technology Transfer Practice in Japanese Corporations: Meeting New Service Requirements

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Japanese corporations are undergoing radical transition: they have begun to reassess the role, organization, and management of their internal R&D and technology commercialization activities in response to changing market, business, and technical conditions. From large consumer electronics firms such as Matsushita and Sony to the semiconductor and computing conglomerates such as Fujitsu and NEC, these organizations are under considerable pressure to both invent and innovate more rapidly and cheaply than ever before. As technologies become more complex and integrated—such as the convergence of electronics, computing, video, and broadcast television—it is no longer practical to assume that all of a firm's R&D needs can be met internally.

This paper looks first at how major Japanese corporations have embraced technology transfer mechanisms such as licensing, joint collaboration, and the outsourcing of R&D to manage these changes dynamically and effectively. Secondly, this paper looks at why Japanese firms' record of managing collaboration and licensing, particularly on an international basis, has been disappointing because of a number of problems and barriers.

These difficulties, which are compounded by the further externalization of research and technology and by increased licensing activity, have given rise to a need for new technology transfer services which, until recently, have not been available either within the organization or through local consulting firms in Japan. This paper concludes by outlining strategic and operational guidelines for managing licensing and collaboration arrangements between U.S. and Japanese firms which are also applicable in the general case.

These insights are based on the experiences of managing licensing and collaboration programs between Japanese and U.S. organizations from the dual perspectives of two licensing firms—Innovation Partners, k.k. in Japan and Competitive Technologies, Inc. of the United States.

The Changing Nature of Technology Transfer in Japan

The Japanese have a long and distinguished history of technology transfer, dating back to the Meiji Era in the late 19th century. Traditionally, this has taken the form of the inward flow of inventions and research ideas which, when combined with Japanese design, engineering, and manufacturing know-

how and expertise, led to the development of a continuously improving range of world-class products. Complementing this form of operational innovation, Japanese corporations developed large R&D centers to establish their own scientific base and develop next-generation product and process technologies, and inventions of a more radical nature which have longer term significance. Over time, these R&D centers have grown in size and competence so that now companies like Hitachi and Canon are net worldwide exporters of not only

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products but also intellectual property. Japanese corporations now spend more total revenue on R&D than any other nation (Lindsey et al. 1993), although this has not resulted in a proportionately higher rate of inventiveness. (It is not appropriate to discuss the sociocultural factors which inhibit Japanese creativity relative to other Western countries, although it is well documented in the academic literature—see Kodama 1995, for instance).

The old models of technology transfer which have so well served corporate Japan until recently are losing their significance. Traditional technology transfer is characterized by the import of technology rather than today's reciprocal collaboration and joint development. Indeed, the old "hands-off" models of technology transfer no longer serve Japanese companies well; in their place is the need for a more dynamic, interactive process balancing internal R&D competencies with those of strategic and "virtual" partners around the world. Technology is licensed more frequently than it is bought or sold. The central R&D function is being replaced by outsourcing, or the externalization of R&D to world-class centers which are best equipped to conduct the R&D. Finally, the process of technology transfer itself has become more complex because of the need to integrate legal, intellectual property, technical, business, financing, and market factors into the process as never before.

For these reasons, Japanese corporations have begun to search outside of their organizations for solutions, prompting the start-up of a fledgling consulting industry specifically geared to meeting Japanese firms' collaboration and licensing requirements. These requirements will vary according to the many different types of technology planned: in working with Japanese firms, we identify two broad categories of technology transfer, *progressive* and *defensive*.

Progressive Technology Transfer

Progressive technology transfer uses mechanisms to enhance technical capability, innovation performance, and business competitiveness. Actions are planned in advance, or are proactive, and are managed from a strategic perspective. Japanese firms use it to do the following:

- Accelerate the process of R&D
- Enter new markets more quickly
- Act as a vehicle for change, restructuring, and so on
- Create new internal capabilities
- Maintain existing R&D presence
- Access other companies' technologies
- Enter new R&D areas
- Use new tools and techniques
- Prevent duplication of internal R&D effort
- Achieve a critical R&D mass

Defensive Technology Transfer

Defensive technology transfer is more likely to be implemented because of the difficulties of in-house R&D or because there is no other option but to leverage outside capabilities. Technology transfer in this case may be focused at an operational rather than at a strategic level and often meets short-term needs only. Reasons for this form of transfer include:

- Uncertainty about the costs of internal development
- Uncertainty of scheduling for internal development
- Current in-house R&D activity which may lead to patent infringement
- Risks which may be shared by collaborative partners
- Pressure to acquire new technology at a fixed cost
- Scaling down of internal R&D effort
- Pressure to become part of an industry club or semiofficial cartel
- Control of standards and market access

Japanese firms, struggling in the early 1990s, have adopted more defensive technology transfer strategies in response to increased economic pressures, yen appreciation, and increased competition from both the United States and other Asia Pacific countries. However, over time, progressive mechanisms will continue to be used because of new growth opportunities, some of which are described in the next section.

The New Growth of Technology Transfer in Japan

Some factors explaining the growth of technology transfer are discussed below and defined in two categories: (1) market, commercial and business factors; and (2) technical and research change factors.

Changes in Global Markets and Business Conditions

Numerous political, commercial, market, business, and organizational changes at both national and international levels have added preeminence to TT. These include:

Shifting boundaries in world markets. The growth of new markets and the shifting of boundaries between economic blocks will provide new opportunities for technology transfer. The last few years have seen the emergence of free-trade alliances, such as NAFTA and EU; the growth in superiority of new markets, such as China, India and the newly industrialized countries (NICs) of the Asia Pacific Rim; and the reshaping of old developed regions such as Europe and the former Soviet Union. More recently, we have also witnessed increased open competition, and intense pressures for countries like Japan to open up their economy, thereby improving the prospects of increased international technology transfer activity.

Structural changes in competition. Because of shifting international boundaries, the nature of markets in developed regions has had to adjust to changes. These include a move away from mass production towards "flexible" production; an increased focus on R&D as a business activity; and a drive to identify and enter new "added-value" markets where companies can compete by using advanced technology and not depend on low-cost labor. These changes demand an increase in the flow of technology transactions.

New commercial pressures. Technology cannot be separated from the markets it serves. Markets in major areas such as electronics, computing and consumer goods have become truly saturated. Organizations are faced with increased international

competition and are under considerable pressure to utilize new technology in two ways: to improve the efficiency of manufacturing and business operations; and to enter new "added-value" technology-driven markets. New technology can improve competitiveness in these ways and help restructure the organization to meet new market demands, such as reducing the lead time to market from the design phase and integrating business operations.

Changes in business conditions. U.S. companies have used technology and their R&D capability to rise out of recession and facilitate organizational changes such as down-sizing and corporate restructuring. These firms have increased their focus on technology commercialization and, in industries like multimedia, major strategic alliances have enabled adjustments to changes in business conditions. These activities, together with major government initiatives such as defense conversion and national research exploitation, have considerably advanced the image of technology transfer.

Changes in the R&D Process

Besides commercial pressures, a number of technologically motivated pressures for change are redefining the research and development process itself and the organization of R&D at the firm and interfirm levels.

New R&D pressures. In-house R&D is costly and risky—these liabilities can be shared between partners. Furthermore, with the increase in complexity of multitechnologies—multimedia systems, for example, combine opto-electric-mechanical-telecommunications technologies—a single company may not have all the necessary internal capability for developing these systems. Thus, technology transfer is essential. For many companies in Japan, internal R&D effort are failing or are not world class. Technology transfer is therefore critical to these corporations' future capability to develop radical innovations and not simply product upgrades or incremental improvements.

New R&D strategies. The function of R&D in firms is changing dramatically. Corporate research centers are shifting from a diversified R&D approach and focusing upon strategic core competen-

cies in line with business needs. All other R&D requirements are gained through collaboration and other mechanisms—licensing, for example. This has led to the externalization of R&D, followed by globalization whereby corporations identify world centers of excellence with which to work. Within the firm, the central R&D function has been deregulated to create multidivisional and multitechnology R&D groups. These groups are not constrained by the organizational structure of the company, but are driven instead by the logic of the markets in which they operate and their subsequent technology requirements. Furthermore, R&D has become more commercially accountable with increased pressure to produce inventions more quickly and more cheaply. All these factors increase the importance of technology transfer and related activities.

Pressures for organizational changes. Finally, technology transfer will increase in importance because of changes in organizational culture. Where traditionally many corporations suffered from the “Not-Invented-Here” syndrome and were reluctant to use outside technology or to collaborate, the reverse is true: now corporations are less concerned about the source of the technology than about whether it will improve the competitiveness of their products. These firms are striving to become more innovative and creative internally and more responsive to external technology developments. For Japanese firms, which are notoriously sales/engineering oriented, it is critical that they develop their R&D culture to take advantage of these changes.

In response to the above pressures, Japanese companies are being forced to reassess their intellectual property (IP) position and define new strategies. These methods must favor the more aggressive and proactive use of IP as a business opportunity and not as a product defense mechanism in order to improve the creativity of their organizations (Murakami et al. 1994).

New Opportunities for Technology Transfer in Japan

Other than the necessity of technology transfer in response to the above pressures, there have also

been a number of structural, economic, and political developments that have made it more possible for Japanese firms to become involved in the licensing and outsourcing of R&D. These include the following.

The Availability of New Sources of Technology

New sources of technology that were previously unattainable are now available to firms. For example, Japanese corporations have begun to license out their “sleeping technologies.” These are technologies which may be unique but are not presently being used by the inventing company, and which may be used to great effect by SMEs or specialist companies. The firms have also improved their capability to access new sources through their improved technology transfer networks and searching capabilities. The technology market recently has increased significantly because of two further additional sources:

New sectorial sources. The sources include new technologies from defense and aerospace conversion in Europe and the United States as a result of improved international relations, the end of the Cold War, and the shrinking in public spending and privatization of these sectors. Among others, Japanese firms are now in collaboration with the following organizations:

- *Aerospace:* NASA, AeroSpatale, Novespace, European Space Agency
- *Government Defense:* USA, DRE, French Defense Research Centers, etc.
- *Federal Research Centers:* Lawrence Livermore, Oak Ridge, and others

New geographic sources. New geographic sources of R&D and technology are available for technology transfer. The most prominent of these, as a result of the decline of the former communist block, are Russia, Czechoslovakia, and Hungary. Sources used by IPI and its partners in these regions include a mixture of agencies such as Novecon and Tetra Consulting (Moscow), or consist of direct links with major universities such as the Hungarian Academy of Science & Technology, Moscow State University and others.

New Technology-Driven Market Opportunities

The demand for new technologies has also been driven by the emergence of new leading-edge, high-value markets. Technology transfer in these areas is very active and is growing rapidly because these markets are characterized by being highly complex, and are multitechnology and globally oriented. Three market sectors in Japan in particular will benefit from technology transfer:

- **“New Age” Markets**—These markets include environmental and “green” technologies, leisure and quality-of-life amenities, and consumer goods. Such markets are emerging not only in the United States, Japan, and Europe, but also in NICs.
- **“Old Age” and Home Care Markets**—The growing industry associated with aged people include technologies such as electronics for mobility, age retardation, and home diagnostics serving the home care and special-needs markets. In Japan, 60% of the population will be over 65 years old by the year 2000.
- **Home Entertainment**—The relative complexity of multimedia which combines audio, video, telecommunications, computing and movie technologies demands the formation of international collaborative partnerships. IPI is involved in technology transfer ventures in areas such as video compression, encoding/decoding chips, image projection and wide screen displays, and set-top box multimedia consoles.

Although technology transfer has been actively pursued in the above market sectors, it has not always been successful. Strategies for effective TT are discussed in the next section.

Experiences in Managing Technology Transfer

Technology transfer is certainly not a new phenomenon, but more could be learned about improving its methods. Experiences with Japanese firms have been mixed. IPI and CTI jointly conducted a major

consulting study (IPI and CTI 1995) identifying the benefits, problems, and barriers that Japanese corporations had experienced in managing technology transfer transactions—whether it be licensing or technical collaboration—with organizations in Europe and North America. The main findings are illuminating and warrant detailed commentary in this paper.

1. Technical transfer is a difficult process but the benefits of success are considerable. International collaborations are even more difficult because of the cultural and communications difficulties and the demands for very high quality management and organizational skills. Furthermore, technical success does not always mean business success.

2. Japanese firms are aware of the potential advantages of collaborative R&D: notably, how it may allow their companies to exploit technological complementarities in new technologies, products and markets; how some costs and risks may be shared; how it may enable companies to reduce the innovation cycle time; or how it may help an organization respond flexibly to changing market conditions. Their experiences have shown that these potentials are real, though not always reciprocal.

3. Technology transfer is not a science. The case studies show human and “soft” factors to be critical, as well as simple good luck and good timing. A key to successful collaborations appears to depend not on doing a few things brilliantly, but on doing all of them competently.

4. For larger Japanese firms, technology transfer provided the means of rapidly acquiring scientific know-how, new technology and intellectual property rights in new or peripheral business areas. For these firms, collaboration proved to be an effective way to improve the flexibility and responsiveness of their organizations to emerging opportunities.

5. For U.S. and European firms, many of which were smaller than their Japanese counterparts, collaboration enabled them to reach the “critical mass” of financial and human resources for commercializing their technologies and for entering new markets.

6. However valuable and tangible Japanese corporation’s contributions to international R&D,

U.S. and European firms' *perceptions* of working with Japanese firms at a technical level range from bad to poor. Foreign firms saw the main contribution of the Japanese partner as either providing commercialization support, manufacturing capability, funding support, world sales and marketing capability, or an enhanced image. U.S. firms in particular did not believe that their Japanese partners could add much to the technical content of the R&D. Indeed, they were reluctant to work with Japanese corporations at early stage R&D for fear of losing their competitive edge. It is important for Japanese firms to manage these reservations and redefine expectations.

7. A closer look at foreign firms' problems in being able to exploit their in-house technology reveals a lot about why they wish to collaborate with Japanese firms. In the questionnaire and interviews, U.S. firms consistently mentioned four major problems: (1) a lack of manufacturing capability and/or capacity; (2) a lack of market window and global sales/marketing expertise; (3) a lack of funds; and (4) a lack of commercialization support. These were important considerations in deciding to work with Japanese firms. Furthermore, Japanese firms used their capabilities in these fields to considerable effect in negotiating terms and conditions of collaboration.

8. While foreign firms had significantly differing experiences with Japanese firms at a technical level, a number of common and recurring problems were expressed:

- Slow decision making by Japanese partner
- Considerable communication difficulties and cultural barriers
- Failure to anticipate the costs and time required to complete the collaboration
- Failure to define rights to technology and know-how explicitly at an early stage
- Lack of technical and scientific input by Japanese partner
- Lack of input into the direction of R&D
- Lack of coordination and management between U.S. and Japanese technical staff
- Poor management of intellectual property by Japanese partner

9. An important first question to avoid some of the above problems is: Should the project be undertaken at all? There are many cases of projects that have been undertaken between U.S. and Japanese firms that have no apparent link to business aims and strategy. The scientific thrills of research often appears to introduce spurious goals, leading participants into new areas irrespective of their organization's strengths, capabilities, and declared aims. The goals of research must be locked firmly into the company's goals. Government funded programs (such as MITI) often encourage the formation of collaborations with too many participants where often the goals are more politically than business driven (for example, national excellence).

10. A number of factors central to the successful management of technology transfer deals were identified from this study. The following were repeatedly cited as being important:

- Excellent project management skills
- Strong, and effectively used, communication paths
- Flexible and adaptive systems and structures of collaboration
- Selection of partners based on complementary technology *and* business interests
- Both high-level and operational support by both parties
- Trust and mutual respect for each other's capabilities
- Commitment to commonly defined objectives
- Good timing (and perhaps a bit of luck)
- A clear statement on sharing of intellectual property rights

11. Technological knowledge is often particular to individual firms. It is therefore difficult to share and transfer. Cooperative technological development requires extensive and effective communication between firms. The systems and interpersonal relationships necessary to promote open communications and mutual trust and respect cannot be built overnight. They require time and often expense. Because of the nature of technology, efficient collaboration is a long-term process.

The above experiences show that technology transfer is not a “zero-sum” game. Mutual benefits can and should occur and ensuring that they do is a major challenge in collaboration. Short-term, quick-gain, opportunistic behavior by a firm is unproductive and will give it the reputation of being a bad collaborator and will be counterproductive in the long term. U.S. firms’ overall perception of Japanese firms is that despite the difficulties and lack of control, Japanese firms do make good, long-term partners.

The distinctions and synergies of U.S. and Japanese firms’ needs and abilities is reflected diagrammatically in Figure 1. For U.S. firms, we see a relatively advanced technical idea—the invention concept. This concept often lacks resources and innovation expertise, but is complemented by Japanese resources, manufacturing know-how, and marketing skills, and advances the concept to a stage where it may be commercialized in new and emerging markets. Indeed, it is our experience that the more successful U.S.-Japanese technology

transfers were based on this premise of “complementary assets” (Teece 1986), or what Okimoto in a study of alliances in the semiconductor industry calls “technology fusion” (Okimoto 1992) and Kodama (1995) calls “coevolution.”

The Demand for New Services in Japan

The previous section has highlighted some problems, barriers, and needs of Japanese firms in managing cross-border technology transfer projects. Increasingly, Japanese firms are looking outside of their organizations for support in addressing these needs. Unfortunately, few firms are available that offer this support in Japan where, unlike the United States and Western Europe, the licensing and technology consulting sector is highly underdeveloped.

The bulk of consulting firms in Japan are unsuitable as providers of technology transfer consulting services for the following reasons:

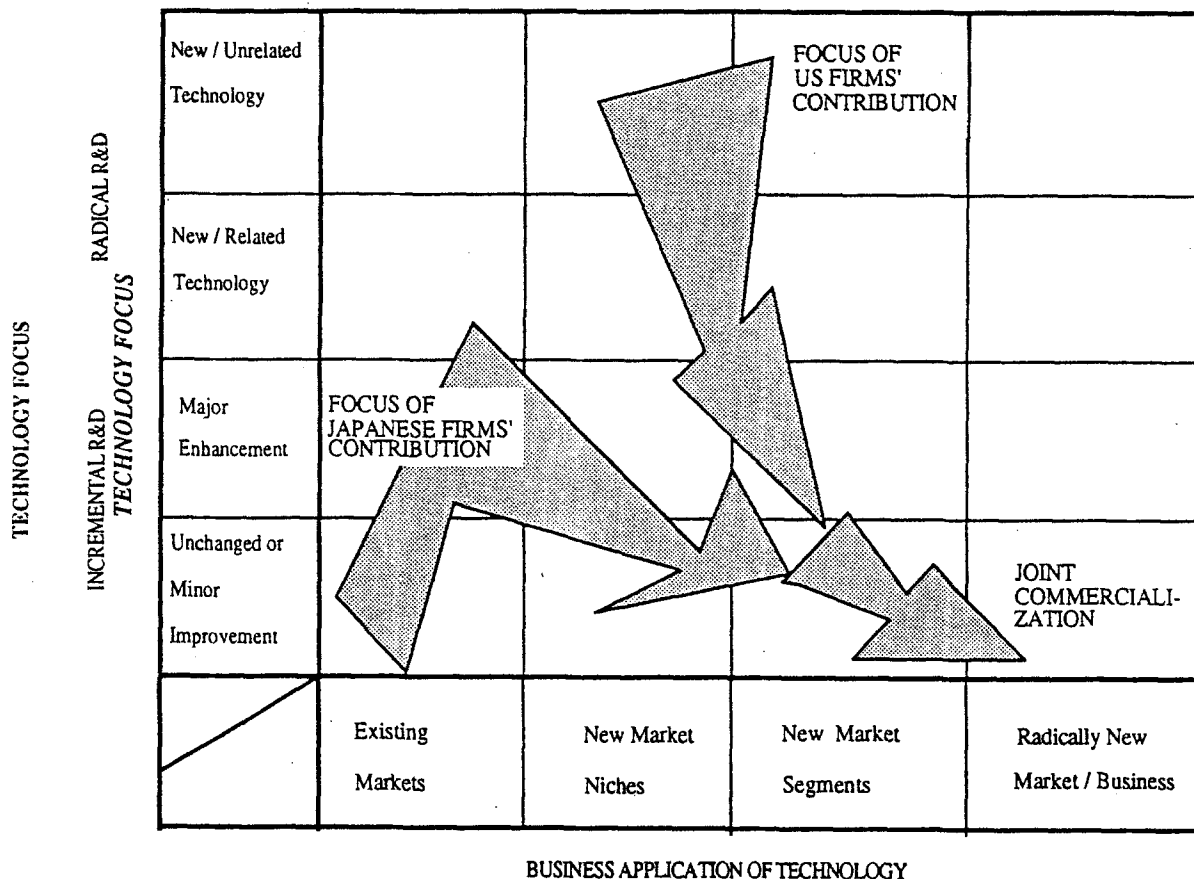


Figure 1. Complementary assets in the commercialization of technology (Framework adapted from Roussel et al., 1991)

Product oriented. Services are trade and product oriented and are not capable of handling R&D and complex technologies at a precompetitive stage.

Provincial. Other than two or three notable exceptions, such as Nomura and Daiwa, consulting firms are domestically biased with poor international links. A characteristic of technology transfer is that the best technical opportunities are more often generated from outside Japan.

Confidentiality. Many firms are unable to manage confidentiality and intellectual property issues properly because of a lack of qualified personnel and experience.

Limited services. Most Japanese "consulting" firms provide information and limited marketing and business intelligence services only. They have little or no experience with the process of licensing, technology commercialization, and collaboration. Furthermore, companies which purport to offer these services are very poor by U.S. standards.

Limited networks. Most Japanese consulting firms are restricted to one large organization only, such as a bank or trading corporation, and therefore offer limited access into the Japanese markets as a whole. They provide limited services designed around the needs of their single client.

Service fees. Japanese consulting services are prohibitively expensive for most users, and particularly so for small and medium-sized firms. It is necessary to change the basis of charging from that of a fixed payment or retainer to a more flexible success-based approach in order to gain more widespread acceptance.

In response to the above needs, corporations are either developing their own internal consulting facilities shared between divisions on a cost center basis, or seeking the support of a fledgling community of technology transfer consulting firms. These companies are able to offer a diversified but integrated array of technical, business, and intellectual property services, and are more qualified to support the *process* of technology transfer.

The appendix to this paper provides an overview of those services most frequently requested by Japanese and U.S. corporations in supporting international technology transfer programs. Common to these requests is the need for greater support for: finding suitable overseas partners; improved access to technical, market and business intelligence; technology assessment and the prioritization of licensing and commercialization opportunities; managing the exchange of intellectual property and proprietary information; and the process of in cross-border licensing.

Managing Technology Transfers More Effectively with Japan

Technology transfers, particularly international ones, require a high level of management skill, both at strategic and operational levels. However, it is no "science"—successful transfers depend not on doing a few things optimally, but on doing all of them competently.

What has emerged from managing numerous U.S.-Japan collaborations is that there is no single "best way" to handle technology transfers. The authors also would be averse to prescribing a particular approach or doctrine. However, there do seem to be a consistently proven set of guidelines that may prove useful to U.S. organizations intending to collaborate with Japanese firms. These may be separated into strategic and operational guidelines, as follows.

Strategic Guidelines on Technology Transfer

Partner selection. Japanese firms are extremely rigorous in evaluating the credentials of the partnering company as well as its technology. Especially in R&D collaboration, long-term relationships are preferred—stronger relationships between parties usually mean that technologies are more easily and comprehensively transferred. For the Japanese, partner selection is thus a strategic decision which often seems to overseas firms to be unnecessarily lengthy and protracted.

Scope. Those technology transfer arrangements that are deep and specific in scope rather than broad and all encompassing tend to be much more successful and easier to control. Technology

transfer deals with the Japanese should be known not for their quantity, as in the past, but for their quality.

Complementarity. In the most successful technology transfer projects, there were strong technical and business complementarities between parties. For this reason, Japanese firms are as interested in the development potential of the technology, future business goals, and market direction as the current status of the partnering firm. If any future conflicts are foreseen, then a deal is unlikely.

Access. When dealing with the Japanese, it is important to target the corporate technology collaboration and licensing service centers or their equivalent in the firm, and not just the divisional or R&D functions having limited language, business, negotiation, and technology transfer skills. This is valuable in the expedition of agreements and ensures that all necessary technical, legal, business, and intellectual property issues are addressed in an efficient and coordinated way. Many foreign firms have made a special trip to Japan only to face a junior engineer or middle manager with no authority.

Time horizon. Japanese firms tend to view collaboration, even if licensing, as a long-term commitment. It provides them with an opportunity for long-term learning. Just as collaboration may provide tangible outcomes, such as the development of a new product, it will also provide experience in the *processes* of collaboration. Not only does this allow firms to improve their performance, but it allows them to become more effective at integrating technology from external organizations.

Commitment. Top management commitment may seem an obvious precondition of collaboration, but often U.S. firms find themselves stuck with dealing with divisional and operational management in Japanese firms without the authority to conclude agreements or the expertise to complete projects. The identification of key senior management "champions" and their involvement, as a term of contract, should be stressed.

Serendipity. Timing and good luck often play a great part in technology transfer, whether it be through the chance meeting of an ideal partner or the fortuitous emergence of an opportunity. Rapid, though considered, responses to such opportunities are key if exclusive rights are to be secured.

Operational Guidelines on Technology Transfer

Organization. In terms of their organization, successful collaborative technology transfer arrangements demonstrated flexible and adaptive systems and structures. For the Japanese this meant trying not to apply the same fixed management processes and organizational practices to the management of these external collaborations as their internal R&D programs. Indeed, exposure to the different culture and working practices of their collaborating partner were seen as being as valuable as the technology itself.

Project management skills. This refers less to such conventional skills as scheduling, planning, financial control, and resource planning, though clearly important, and more to the special skills of tact, flexibility, and diplomacy required to interact with another organization having different systems, practices, structures, and cultures. Project managers need to understand this diversity and learn to operate despite these differences in a way that motivates both teams' members—a challenge indeed!

Communication pathways. The importance of good communications to the success of collaboration cannot be emphasized enough. Communication paths should be established in a number of directions: horizontally, between team members and between teams; and vertically, between the teams members and project manager. They also should be anchored between the project itself and senior management in both organizations. Often special communication mechanisms will be needed for optimal effectiveness between the joint team members and both participating organizations.

Management of intellectual property rights. Parties need to define a clear line of demarcation in who owns what as a result of the technology

transfer, particularly if it involves the transfer of people. Delineating the asset into technology, patents, trademarks, know-how, show-how, and other information will help resolve potential post-transfer conflicts, as will addressing the division of rights at the collaboration's beginning.

Termination option. As important as determining project goals and objectives, parties must agree upon terms of termination in which, for reasons of performance or changing needs, a party is given the right to leave the collaboration or alliance. Arbitration clauses, as well as the stipulation of termination conditions, should be included in the contract for these reasons.

In addition to the above strategic and operational considerations, there will be other case-sensitive factors that determine the success or failure of a particular technology transfer project. Furthermore, it is sometimes difficult to gauge whether a project has been successful or unsuccessful because of conflicting or hidden objectives between parties. Projects can be judged successful at one level (for example, achieving their technical or scientific goals), and failures at another level (for example, failure to meet commercialization targets). The fact that the researchers are satisfied with project achievements does not always mean that business or senior management will agree.

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Appendix

Services Most Frequently Requested by Japanese Corporations

1. **Information Services**
 - Technology searching
 - Technology monitoring
 - Company searches
 - Market research services
2. **Business Services**
 - Technology commercialization
 - Partner selection and negotiations
 - Business and market planning
 - Foreign sales and business audits
3. **Technology Services**
 - Technology evaluations
 - Managing R&D partnerships
 - R&D competitiveness analysis
 - Corporate technology audits

4. **Licensing Services**
 - Patent portfolio audits
 - Licensing feasibility assessments
 - Licensing agency implementation
 - Citation analyses
5. **Royalty Recovery Services**
 - Infringement identification and report
 - Patent validations
 - Litigation
 - Patent valuations
 - Enforcement planning
6. **Patent Administration Services**
 - Overseas patent filings
 - Legal services (miscellaneous)
 - Management of patent portfolios
 - Patent translations
 - Patent renewal services