

Strategic Alliances in High-Tech Industries

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As the next century approaches, significant trends now emerging in global economics and technology will have major implications for corporate international strategies. While Europe and North America are forming stronger regional trading blocs, Western firms are also pursuing increasingly attractive opportunities outside their regions, particularly in the fast-growing economies of the Asia Pacific region. Firms in the Asia Pacific region, meanwhile, are seeking to play larger roles in worldwide high-technology markets. To fully exploit the opportunities emerging worldwide, companies are increasingly considering strategic alliances with partners outside their regions.

How Strategic Alliances Work

Strategic alliances are new forms of traditional arrangements between competitive firms, such as joint ventures, outsourcing, licensing, marketing agreements, and cooperative research. These alliances differ from traditional arrangements in that they support the longer-term strategic objectives of both partners. They are emerging not out of convenience, but out of necessity, as firms find that global economics and the rapid development of technology require resources and connections that are impossible, inconvenient, or too costly to cultivate on their own. In the Asia Pacific region, international strategic alliances are particularly critical to companies in high-technology areas such as consumer electronics, telecommunications and information systems. Such alliances tend to be formed primarily between companies in the region's newly industrialized countries (NICs), especially Taiwan, South Korea, Hong-Kong, and Singapore, and companies in the OECD countries of Europe, North America, and Japan.

Just as, in the past, NIC and OECD companies forged partnerships to generate jobs and hard currency in exchange for cheaper goods, in the 1990s they will form partnerships under different terms to help each side satisfy a new set of needs and interests. The stakes will be larger and the terms of the partnerships more complex. The changing interests and needs of both OECD and NIC companies, as well as the resources and capabilities each has to offer, are summarized in Figure 1 and discussed below. These factors will become the bargaining chips to be used in establishing the alliances.

Interests and Needs of OECD Companies

Global Competitiveness. In the pursuit of global competitiveness, multinational firms are recognizing that they must look beyond the efficiency of their home-base operations and develop global strategies.

While Japanese firms have already mastered this art, American and European multinationals, by and large, are just beginning to think in terms of global strategies – e.g., designing products in one country, producing components in another, assembling them in yet another, and selling to markets that had previously been served by the home base.

Motorola, for example, makes telephone pagers in Florida as well as in Asia, but has moved its design and engineering center for this product to Malaysia. This decision was reached after a number of worldwide alternatives were evaluated. „We need our Far Eastern customers,“ commented Motorola's chairman, „and we cannot alienate the Malaysians. We must treat our employees all over the world equally.“

In another example, a multinational electronics firm has designed a strategy in which it established Singapore as its Asian headquarters because of the technical expertise and international networking available there. Then, seeking cheap and abundant labor, it moved its surface-mount operations to Thailand, while keeping its design and administrative activities in Singapore.

New and Growing Markets. The large and quickly growing high-technology market in Asia is another important factor attracting multinational firms to the NICs. High-tech firms that had originally come to the region to capitalize on its labor resources are now also seeing it as a potentially significant market for both intermediate and final goods.

This market is particularly strong for electronics. By the early 1990s, the market in the four NICs for semiconductors (a fair indicator of the size of the electronics industry) is expected to equal that of all of Europe. As the capacity to produce semiconductors in these countries has not kept pace with demand, this burgeoning market represents a substantial business opportunity for suppliers of both materials and equipment.

A number of ventures aimed at the region's attractive markets, and drawing on its competitive technical resources, have already been launched. In South Korea, for example, Samsung has linked up with Micron Technology and Intel; Goldstar is working with Micro Devices and LSI Logic; Hyundai has connections with ICT, Vitelic, and Texas Instruments; and Daewoo Electronics is allied with Zymos.

Figure 1

Bargaining Chips for Strategic Alliances

<i>Interests/needs of OECD companies</i>	<i>Resources/capabilities of NIC companies</i>
Global competitiveness	Technical resources, markets, infrastructure
New and growing markets	Fast-growing economies
New base technology	Skills, institutions, cost-effectiveness

<i>Interests/needs of NIC companies</i>	<i>Resources/capabilities of OECD companies</i>
New technology	Patents, licenses, economies of scale
Broad and niche markets	Very large and well-established markets
Long-term commitments	Development of complex systems

In Taiwan, UMC cooperates with Synertek; the governmental VLSI research institute has projects with Vitelic; and Texas Instruments recently formed a joint venture with Acer. The Acer/TI alliance will manufacture dynamic random access memory (DRAM) chips. The partnership provides TI with new capacity close to a large segment of its market and ensures Acer that it will continue to have a major role in TI's global semiconductor strategy.

New Base Technology. A growing number of multinationals are coming to realize that they can benefit from sharing in the development of new technology with some of the more sophisticated NIC companies. While technology transfer has traditionally referred to the passing of technology from OECD countries to developing economies, there is a growing recognition that the resources and capabilities of the NICs can contribute to developing technology that can then be transferred in the other direction.

Not only do the NICs have capable and growing cadres of competitively priced, second-generation research engineers, scientists, and technicians, but they also have institutions such as Taiwan's ITRI, Korea's KAIST, Singapore's EDB, and Hong Kong's HTDC, which carry out or support first-rate R&D. KAIST, for example, recently developed a new metal that resists heat up to 1,000° C and has been called the strongest alloy in the world. In fact, in many high-tech fields, technology leadership has been or will be shifting to NICs. OECD companies will have to be able to acquire technology from their Asian counterparts, much as the Asian companies acquired technology from the OECD companies in the past.

Until recently, OECD companies have largely overlooked opportunities to use the differences between Eastern and Western technical capabilities in complementary ways. For example, because of economic, cultural, educational, and other reasons, R&D capabilities and efforts in many parts of Asia (including Japan) are more appropriate for short-term technology cycles (such as those in electronics) than for long-term technology cycles (such as those in biotechnology). In the United States and many European countries, the comparative advantages tend to be reversed. Recognizing this distinction could suggest interesting and fruitful arrangements for dividing up R&D for complex systems, such as HDTV and ISDN.

Increasingly, NIC companies are entering into arrangements not as OEMs (original equipment manufacturers), but as OEDs (original equipment designers), with design specifications provided by the multinational firm. These arrangements can significantly reduce design-to-production lead times and costs. NCR, for example, recently named Winbond Electronics in Taiwan as its Southeast Asian design center. The reasons cited for the selection were Windbond's strong technical staff and manufacturing facilities. NCR expects that coupling the

technologies of the two firms will ease NCR's entry into certain markets.

In another example, IBM has identified Taiwan as its NIC partner (through quasi-governmental institutions) for carrying out competitive R&D. In addition to the human resources and high-technology infrastructure, the ROC government's enthusiasm and support for joint R&D led IBM to form Neotech Development Corporation (NDC), which undertakes design projects assigned exclusively by IBM.

Since its inception, NDC has completed 35 projects for IBM. Both sides have benefited greatly from the experience (see Figure 2) and have entered into another partnership, International Integrated Systems, Inc., which designs software for IBM but is free to develop other business as well. In the first year of operation, International Integrated Systems completed some 40 projects.

Interests and Needs of NIC Companies

New Technology. In their quest to stay ahead of the next group of emerging industrial economies – Thailand, Malaysia, Indonesia, the Philippines, and India – the NICs must capitalize on their own comparative advantages and seek new technologies on which to build. In consumer electronics, telecommunications, information systems, and automation systems, OECD companies have traditionally held a leadership position. However, NIC firms are seeking to establish their own technological base.

Examples of emerging technologies in which NICs have an interest include:

- **Chip technology** – e.g., gallium arsenide chips, which will support faster computer memory, optical transmission, and telecommunications switching
- **Optoelectronics** – integration of optical waveguide amplifiers, integrated optical switches, and optical multiplexers, which will have important applications in information systems (e.g., CD/optical disks, CAE workstations, and parallel processors); telecommunications (e.g., local area networks and telemetry); precision instruments (e.g., medical imaging and laser machining); and consumer electronics (e.g., advanced VCRs, electronic cameras, and HDTV)

Figure 2 NDC: Alliance Between IBM and Taiwan

What IBM has received

Control board for the IBM 5216 daisy wheel printer

Two-layer printed circuit board for IBM 4736 automatic teller machine

16-characters-per-second personal wheel-writer typewriter

Other products, including peripherals for banking computers and retail house computers, banking software, and a printer

What Taiwan has received

\$3 million contract to install equipment for designing ASIC chips

Improved salary structure for its electronics industry Turnover of IBM-trained engineers into local industry

Knowledge of strict R&D procedures and testing techniques

Independent business opportunities for developing custom software

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• **Optical storage technology** – new memory devices (CD-ROMs and WORMs), which permit vast amounts of data, voice, and video storage and will revolutionize the information industry, with applications in graphics, transaction-based activities (e.g., banks and brokerage services), and training and education (e.g., books and manuals)

• **Computer architecture** – parallel-processing computer architectures, which will support highspeed, low-cost engineering work stations, and mini-supercomputers with applications in mathematics, CAD/CAM/CAE, and artificial intelligence

- **Software** – new system development tools and programming languages such as computer-aided software engineering (CASE) tools, and application-specific fourth-generation languages (4 GLs), which will become essential requirements for success in developing software systems

OECD firms are making major R&D investments in these and other areas. NICs are also making investments, building up laboratories, creating research centers, establishing R&D projects, and administering training programs. In seeking to share in these developments, the NICs will require more direct assistance, through alliances, in the form of licenses or joint R&D programs.

Access to Broad High-Tech Markets. The markets for high-tech products, particularly in areas that are of interest to the NICS – i.e., electronics, telecommunications, computers, and automation equipment – are among the fastest growing in the world. By the year 2000, the world market for computer systems is expected to reach \$600-800 billion from the present level of \$250 billion; the consumer electronics market, \$120-150 billion from \$75 billion; and the process-control equipment market, some \$50-80 billion from \$15 billion.

In order to benefit from these markets, NIC companies will need to participate in them more directly than in the past. Except for a limited number of producers, such as Goldstar, Hyundai, Samsung, Acer, and a few others, the NICs do not yet serve these markets directly. They do so either through OEM relationships or as component manufacturers. Gaining direct access will require setting up direct sales and customer support forces and networks of distributors in the United States and Europe, or establishing alliances with full-time suppliers in OECD countries to provide part of the product line and share in marketing or manufacturing.

Access to Niche Markets. While NIC firms will continue serving the established high-tech markets through OEM relationships, they will also attempt to become niche players in narrow markets.

For example, over the next 10 to 15 years, most types of hardware in the information systems industry will likely become „commodities,“ under a standards umbrella. Product life cycles will be shortened and the industry will focus more on software and services, especially in systems integration. Since the bases of competition are cost, design, and understanding of end-user needs, ideal alliances will be those formed between low-cost producers in the Asia Pacific region and good, experienced marketers in the United States, Europe, and Japan.

The recent acquisition by Taiwan's Acer of Princeton Publishing Labs (PPL), a computer hardware and software firm in New Jersey, illustrates how some firms in the region plan to gain access to U.S. markets and technology. PPL manufactures monitors, display controller boards, and laser print controllers – all of which are under cost pressures. It focuses on developing and marketing hardware and software that integrates desktop publishing and word processing – business areas very sensitive to understanding and serving customer requirements. PPL offers Acer access to the U.S. market, technology that can be enhanced, and design criteria to meet. Acer offers PPL low-cost production, strong R&D capability, and financial resources.

The CAD/CAM/CAE industry, with a world market projected to reach \$10-12 billion by 2000, is another area in which NIC firms will be seeking to gain market share. As in other high-tech industries, prices are falling and the bases of competition are increasingly shifting to service and technology development. Opportunities for NIC firms include selling both generic hardware (e.g., workstations, plotters, digitizers, and scanners) and software (e.g., NC programming systems, manufacturing control systems, and special analysis techniques) to systems integrators in the United States, Europe, and Japan. However, in some niche markets NIC firms can provide entire turnkey systems (e.g., IC design, piping design, or network mapping), which can be marketed in the United States, Europe, and Japan by local firms that can provide the needed sales base, customer base, and support network.

Long-Term Commitments. The NICs are seeking commitments from potential partners for long-term developments. In high-tech areas, obtaining such commitments often means occupying a niche in the development of large systems. For example, NIC firms recognize that it will be difficult to penetrate the forthcoming HDTV market in the United States, Europe, and Japan (estimated at \$50-100 billion by 2000) without alliances with firms that have made – and continue to make – substantial R&D investments. Furthermore, they recognize that political forces in the OECD countries will be acting to protect their domestic markets from penetration by outside producers. However, HDTV requires the supporting manufacture of color TV tubes, chips, and electronic components. NIC firms will be interested in pursuing such opportunities through alliances with U.S., European, and Japanese firms to manufacture assemblies and subassemblies at the component or chassis levels.

Another area in which NIC firms seek long-term commitments is the development of the Integrated Services Digital Network (ISDN). This telecommunications system is expected to emerge as the dominant business service in the next 10 to 15 years, creating a \$5 billion worldwide market by 2000. ISDN may offer universally available access to a wide variety of services. It could function as a „wall receptacle“ utility, as electricity does today.

ISDN network interfaces and terminals will be large-volume items by 2000. They may substitute for PC and LAN products. NIC firms, with current capabilities in PCs and computer peripherals, will be looking to find a niche segment in the ISDN market through alliances with broad-line information systems and telecommunications firms in the United States, Europe, and Japan.

In the machine vision systems market, currently at \$0.5 billion and projected at \$1-2 billion by 2000, there is a continued need for R&D and new technology applications. NIC firms will be looking for opportunities to supply components (e.g., light sources, image processing boards, and chips) through OEM arrangements or to form alliances to serve niche markets and to supply specialized products (such as inspection systems for food and beverage packaging or for semiconductor wafers).

Making Strategic Alliances Work

For strategic alliances between NIC and OECD companies to succeed, both parties must subscribe to a set of attitudes and principles that were less important in traditional, short-term alliances.

- **Commitment.** The arrangements must show, at least implicitly, long-term commitment by both parties. Like a marriage, a strategic alliance poses the challenge of sustaining a relationship through good times and bad over an extended period.
- **Mutual respect and trust.** The parties must be willing to share control and must respect and trust each other – even if they are competitors in some markets.
- **Mutual benefits and expectations.** The alliance must be seen as a win-win arrangement in which each partner enhances the value chain of the other by satisfying one or more of the other's needs shown in Figure 1.
- **Flexibility.** What is exchanged may be more subtle than the satisfaction of immediate needs and present resources. The alliance may require trading potential requirements and capabilities, which will necessitate flexibility and a willingness to review and amend the particulars of the agreement.
- **Compatibility.** Compatibility of cultural values, goals, objectives, ethical principals, and work styles between the parties is important on all levels.
- **Appreciation of cultural differences.** Both parties will gain more from the relationship if they appreciate and understand the cultural differences between themselves and their partners.
- **Ability to learn.** NIC companies approach alliances with an intense focus on learning. If their Western counterparts do not do the same, the alliances are unlikely to prosper to everyone's benefit.

As we have shown, a growing number of strategic alliances are already being formed between NIC and OECD companies. Some sign formal contracts, while others operate under looser, more evolutionary arrangements. The key to their success will be not the form of the arrangement, but the partners' ability to satisfy their mutual underlying objectives. Thus, for example, the Asia Pacific procurement offices of multinational computer firms, whose current function is simply to purchase components in the NICs, might find that as their volume grows and the products become more sophisticated, they will benefit from investing in their local suppliers' operations and becoming involved in the planning, management, and quality assurance of these firms.

As NIC governments become increasingly aware of the importance of sound strategic alliances, they will replace traditional investment incentives (e.g., tax holidays) with more creative programs to encourage alliances. In Singapore, for example, the Local Industry Upgrade Program (LIUP), administered by the Economic Development Board (EDB), seeks to promote greater productivity in small and medium-sized firms through strengthened supplier/buyer relationships. Multinational firms participating in the program must agree to second one employee to the EDB to serve as the firm's LIUP project manager. The foreign firm works with an agreed-upon group of four or five vendors on a range of activities encompassing improved operational efficiency, product and process diversification, and joint R&D projects. Both sides benefit from each other's comparative advantages – present and potential. Participants in the LIUP include Apple Computer, AT&T, Cipher Data Products, Data General, ESE Thomson, Hewlett-Packard, Matsushita, National Semiconductor, Olivetti, Philips, and Unisys.

Conclusion

Strategic alliances between NIC and OECD firms will become a significant element in the global strategies in high-tech industries over the next decade. Increasingly, OECD firms are recognizing the NICs' new generation of technical manpower, R&D infrastructure, and access to significant Asian markets as opportunities they cannot afford to pass up. NIC firms, meanwhile, want longer-term commitments from potential partners. As their negotiating chips become more valuable, these firms will be in a position to insist on such commitments.

Although forming alliances at this time might require consideration of potential rather than immediate benefits, waiting for this potential to materialize before forming alliances would certainly mean missing out on critical opportunities.

¹New York Times, *May 21, 1989*

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