Inside-Out Teamnets: Crossing Enterprise Boundaries Fortune 500—Style

Future survival for the Fortune 500 depends upon cooperating with competitors.

"Big company joint ventures, a business trend for the '90s, are springing up like mushrooms after rain," writes James Flanigan in the *Los Angeles Times.'* In the 1980s, acquisitions and mergers were the business deals of choice for Fortune 500 companies. 'Today, Fortune 500 companies breed boundary crossing teamnets as they announce hundreds of new corporate partnerships every week. Every alliance or joint venture causes people to work together across corporate borders.

Instead of creating jobs, big companies are eliminating them. From 1981 to 1991, Mobil cut 140,000, General Electric eliminated 120,000, ITT cut 122,000, USX and Union Carbide each cut about

100,000.2 By 1991, the Fortune 500 employed just 12 million people, a drop of 3.6 million in ten years.[3] In the same period, the United States' small businesses created two out of three new jobs, employed half the country's workers, accounted for nearly 40 percent of national production, and developed most of the new products and technologies.

It's no surprise then that big companies are finding new ways to do business. Alliances with other firms allow companies to grow without having to bear all the costs. One familiar firm is now a pro at this: IBM.

Big Blue to Baby Blues?

Once the premier go-it-alone, we-do-it-all company, today IBM, beset by a $5 billion loss in 1992, finds it has to work with other companies. It has staggering numbers of strategic alliances. Since 1986, when its president Jack Kuehler first promoted the idea, IBM, for decades the world's computing behemoth—its $65 billion in revenues is still five times that of its closest competitor—has entered into *20,000* alliances. Only 2 percent of these, merely 400, involve equity investments.

Th the astonishment of many, IBM now partners with arch rivals, including:

- ?The company that once advertised IBM as its enemy: Apple Computer—to produce a new computer operating system, code named Pink;
- ?Motorola, Groupe Bull, and, again, Apple to design a family of new micro-processors; and
- ?Siemens and Toshiba to develop new semiconductor technology, a 1992 deal that *Business Week* calls "the alliance of all alliances."

Clearly, this is not IBM'S only change since 1986. In 1991, this bastion of centralized management stunned the business commu-

nity with its reorganization announcement: 13 stand-alone divisions. Chairman John Akers, who resigned suddenly as CEO in 1993, described them as wholly owned but more or less autonomous companies in marketing, service, product development, and manufacturing. Each has its own financial report, Board of Directors, and responsibility for maximizing return on assets.[4]

The divisions in turn are being reorganized into profit centers and subunits. The 450-person Costa Mesa sales and support unit, for example, regrouped into boundary crossing teamnets of no more than 20 people. Each brings a specialty, contributing to rapid customization of products. In the first year, workstation sales soared 70 percent.

By 1992, IBM nearly doubled its revenue per employee from $129,000 to $210,000, while cutting 80,000 employees from its payroll, making *its* contribution to the 2 million lost Fortune 500 jobs. But the computer giant is still in trouble: 1993 will see an additional 25,000 to 40,000 job losses, even once-unimagined layoffs.

"What we're seeing is the beginning of the dismantling of IBM," said one securities analyst at the time. It is too early to tell how IBM will end up: Will the archetype of centralization successfully decentralize? From a teamnet perspective, IBM, a substantial player in the computer industry, is disaggregating into smaller units and reaggregating into flexible alliances.

IBM is not alone in partnering. According to Decision Resources, the Burlington, Massachusetts, research firm, alliances among computer companies *quadrupled* between 1982 and 1992. The computer industry has no franchise on this trend, however. Boeing's new 777 development project, for example, involves 235 "design-build" teams, involving people inside and outside of Boeing. Industries as diverse as transportation, floor covering, textiles, aerospace, consumer electronics, communications, and pharmaceuticals all recognize the competitive value of cooperation. Collectively, they generate thousands of boundary crossing teamnets each year.

Whether inside or outside, teamnets offer competitive advantages that few people thought possible even a few years ago:

the power of scale and diversity in a world of limited resources. Many large companies, some on the brink of extinction just a few years ago, now depend upon boundary crossing teamnets, known by a variety of names. When people work across functions—in intracompany task forces, cross-functional teams, and interdepartmental management groups—they break allegiance to a single internal hierarchy. This presents new challenges to management, just as formidable as when people work with others outside their firms.

A powerful synergy occurs when internal boundary crossing reflects external partnership patterns, and vice versa. Because there is a common core to these teamnets, large and small, lessons learned in one arena can be applied in another. A shared set of values drives both renewal within and alliances without.

From small group and large organization teamnets, we move to enterprise, alliance, and economic megagroups on the Thamnet Organization Scale. One company that knows how to network across the range of levels—from small groups to multi-billion-dollar joint ventures—is based in the small town whose name it bears in upstate New York.

The "Global Network" Company: "A Work in Progress"

"In 1854, my great-great-great grandfather founded a small glass manufacturing business, the Union Glass Company. Today it is a global corporation known as Corning, Inc.. . . what we call a 'global network'. . . an interrelated group of businesses with a wide range of ownership structures. Although diverse, these businesses are closely linked."[5] So begins James ("Jamie") R. Houghton, the seventh, and probably last, Houghton to hold the reins of the now $3 billion specialty glass company, in "The Age of the Hierarchy Is Over," his 1989 *New York Times* article.

Through its global network, Corning produces much more than Corning Ware and Pyrex. It's in:

- ?Fiber optics, after 17 years of research and an investment of $100 million;
- ?Computing components, where "27 scientists in Corning's labs are poring over the glass used in liquid-crystal displays found in laptops";[6]
- ?Environmental technology, with Cormetech, its joint venture with Mitsubishi Heavy Industries, established a decade before the big profits are expected. Corning supplies the ceramic-based technology to filter pollutants, while Mitsubishi Heavy Industries provides smokestack expertise; and, of course,
- ?Housewares, expanding its market considerably in 1991 by partnering with Mexico's giant glass manufacturer, Vitro. In Mexico, the company is Vitro Corning, owned 51 percent by Vitro; in the United States, the company is Corning Vitro, owned 51 percent by Corning.

Until controversy hits one of its partnerships in 1992, the company enjoys excellent press since 1983, when Jamie takes charge from his older brother, Amory, Jr. (who goes on to become a Republican U.S. congressman). *Business Week's* May 13, 1991, cover story is "Corning's Class Act: How Jamie Houghton Reinvented the Company."[7] The "reinvention" prompts not only good press, but also good results. Reversing three years of steady decline and a 70 percent dependence on slow-growth businesses, return on equity climbs from 7.3 percent in 1983 to 16.3 percent in 1990. Stock value of the company (incorporated just before the Civil War) increases 36 percent in the same period. Analysts predict earnings likely to grow 20 percent annually with good market share in strong growth businesses.

Corning's is not just a remarkable story of external adventures. It is also a tale of how a nearly 150-year-old company undertakes a 10-year internal effort to transform itself into a 21st-century corporation. It does so with boundary crossing teamnets.

CORNING'S INTERNAL DRIVE FOR QUALITY

Jamie Houghton recalls walking into a "dreary" Rochester, New York, hotel function room in October 1983, his first year of office. "Corning plans to spend $5 million on a 'total quality program,' "he tells his top managers. No one is interested. "It went over like a bomb. They thought it was the flavor of the month," he says later.[8] Undaunted, he barrels ahead with his vision to turn Corning into a quality enterprise. Houghton appoints Corning's first director of quality. As the new CEO, he goes on the road, carrying his vision to over 50 company and partner sites. Everyone is required to go through a two-day quality seminar.

At Corning, quality means "meeting and exceeding customer requirements." Delivering the keynote address (appropriately titled "Quality: Beyond the Corporate Walls") at the Economic Club of Detroit in October 1990, Houghton says, "Quality is more than a business process; it's an ethical behavior system. . . Quality implies empowerment of all people at all levels in an organization. The old pyramid structure is flattening out with power spreading downward and outward through employee quality teams."

Houghton is not exaggerating:

- ?Corning people participate in quality circles, the small group management process that began on the shop floor in Japan in the early 1960s.
- ?Corning has hundreds of cross-functional teams in its factories and businesses, with people from many parts of the organization working together "spotting trouble and fixing it at the source."
- ?At its "Factory of the Future" in Blacksburg, Virginia, Corning runs 24 hours a day, 7 days a week, self-supervised by "high-performance work teams," with "mentor networks" guiding new hires.

Corning also partners with the labor unions. The company and the union jointly work to increase employee participation in worker

teams. These teams determine job schedules and participate in factory design. When a molten-metal filter production plant moves from an older facility to Erwin, New York, union workers design the new plant with open spaces, sound-dampening ceilings, numerous windows, and a production line that keeps everyone on a team within earshot of one other. They redesign the organization, not only the technology: 47 job classifications fold into one, employees rotate jobs weekly, and salaries rise when people learn new skills. The defect rate dives from 10,000 per million to 3 per million, with virtually no customer returns. At Corning, quality works.

In 1987, Houghton launches a new crusade: he appoints two companywide teams to address workforce diversity. Corning, the tiny upstate New York town, also benefits. The company invests in the community, addressing economic, racial, and quality-of-life issues:
it buys and rehabilitates properties; it builds a hotel, museum, and library; and it arranges for the local cable station to carry black-oriented programming. Corning understands the essence of quality: a focus on people.

CORNING AND ITS PARTNERS

Corning is not new to the joint venture business. It is 1924 when Corning first takes advantage of complementary product development with another company, making cartons for glass products. This practice of Corning and its partner each contributing its expertise will be echoed for the next 75 years in some 60 ventures. These partnerships, says Houghton, contribute about half of Corning's earnings, which he believes to be "unique among Fortune 500 companies." Some are really micro-joint ventures such as Corning's partnerships with Genentech in enzymes and tiny PCO, Inc., in optics.

Corning's partners include some newer ones—Siemens of Germany, Ciba of Switzerland, Samsung of South Korea—and some quite old—like Asahi Glass of Japan. Amazingly, even though the

Japanese partner and Corning did not communicate during World War II, Asahi Glass kept meticulous records and presented Corning with its earnings after the war was over.

During the same war, a handshake between Jamie Houghton's father and Dr. Willard Dow in 1941 established perhaps the most famous of the partnerships: Dow Corning to produce silicones. Dow Corning illustrates both the profits and the peril of partnerships. In 1991, Dow Corning's $2 billion in revenues contributes 25 percent of Corning's $316.8 million earnings.[9] In 1992, Dow Corning, which produces 5,000 specialty chemicals ranging from the sealants used on the 0-rings of the space shuttle to Silly Putty, is on the front page because of silicone breast implants. Potential lawsuits could exceed $1 billion or more in liabilities.

In the long view, a vulnerable partnership will not deter Corning from its network strategy. In networks, the parts do not necessarily conform to the structure of the whole. Nor is Corning likely to alter its basic philosophy that respects the autonomy of both its partners and the joint venture spin-offs. Autonomous partners, for better or worse, comprise networks. Indeed, it is the real autonomy of Dow Corning from its founding parents that provides the break wall against the storm of suits that follows the ban on silicone implants.

Despite mistakes, Corning is extremely successful in its joint ventures. "Corning has the critical ability to treat its partners as true equals, to see their interests and respond to them," writes Jordan Lewis, author of *Partnerships for Profit.*[10]

As above, so below. The treatment of both corporate partners and employees as equals springs from the same culture and philosophy. "We have found that the successful operation of a global management network requires a new mind-set," Houghton writes. "A network is egalitarian.. [with] no parent company. A corporate staff is no more or less important than a line organization group.. [B]eing part of a joint venture is just as important as working at the hub of the network."[11]

Houghton calls Corning "a work in progress." It is a rare long-term experiment in conscious transformation from a traditional

American hierarchy to a more networked form of management at every level. Is the Corning way right for every company? Probably not. Yet, other companies use these and similar ideas in different ways to improve their businesses.

Every business needs to adapt to change. By knowing what some companies have tried, you will get a clearer idea of what might work for you.

At the nexus of business boundaries, internal and external, is the enterprise.

The process of transformation from a traditional organization into a modern teamnet structure takes a number of forms at the enterprise level. Teamnets appear in:

- *Kaizen* corporations. Although there is no such word in English, the Japanese have one for *ongoing improvement involving everyone,* which reaches from the shop floor to the company's external alliances.
- *Internal markets,* self-regulating mechanisms that serve the place of vast numbers of bureaucratic policies and procedures.
- *Service webs,* the classic flat distributed networks delivering everything from pizza to professional services.

?*Core* firms—with one foot on the enterprise level, and one on the alliance level—which use the external market to simplify their relations with a select number of suppliers and distributors.

KAIZEN: "ONGOING IMPROVEMENT INVOLVING EVERYONE"

Japan has built its powerhouse economy not on plentiful resources but on excellence in management. Excellence comes not from this or that technique. Rather, it is a pervading set of values. They give rise to a variety of quality management innovations, captured in the word "kaizen."

All sorts of teamnets arise under kaizen's umbrella:

? Total quality control;
? Customer orientation;
? Suggestion systems;
? Just-in-time inventories;
? Total productive maintenance;
? Zero defects;
? Productivity improvement; and
? New product development; as well as
? Quality circles; and
? Cross-function management.'[2]

When people translate "kaizen" as "improvement," they lose its essence, which, according to Masaaki Imai, author of *Kaizen:*
The Key to Japans Competitive Success, means "ongoing improvement involving everyone." And it's been going on for a long time. As early as 1954, the Japanese were applying Deming's ideas beyond manufacturing to an overall management approach.'[3]

At the enterprise level, kaizen is a process rather than results-oriented management approach. All the companies leading the

quality movement in Japan—including NTT, Matsushita, Toyota,. Nissan, and Komatsu—reflect this overall process orientation throughout their management layers, which other companies emulate and copy.

When the multinational Philips initiates its "company-wide quality improvement" program in October 1983, its then-president Dr. Wisse Dekker begins his statement, "The quality of products and services is of the utmost importance for the continuity of the company."[4] The first two of the 10 points of the Philips quality policy formalize the essence of kaizen:

1. Quality improvement is primarily a task and responsibility of management as a whole.
2. In order to involve everyone in the company in quality improvement, management must enable all employees—and not only employees in the factories—to participate in the preparation, implementation, and evaluation of activities.

INTERNAL **MARKETS REPLACE BUREAUCRACY**

Habitat for Humanity International builds houses for poor people all around the world. In India, one house owner could not make his small monthly mortgage payment. Instead, he brought an emaciated water buffalo as payment to the committee that oversaw loans. The committee, in turn, decided not to sell the water buffalo but instead to feed it, then to sell the milk it produced. This way, the man continued to make his mortgage payments and people had more milk. Instead of the man's losing his house because of regulations, the committee, close to its customers, realized the man had something to sell, if only someone would invest. Thus internal markets are born.

Markets can replace bureaucracy in many creative ways. The fall of Communism may be attributed to the extraordinary drag the bureaucratic apparatchiks put on Soviet economic development,

performing functions that in the West are done by markets, such as the allocation of capital.

Asea Brown Boveri operates as an internal market with its 1,300 companies and 5,000 profit centers. These internal markets work in tandem with external markets, with internal units free to buy and sell outside the enterprise.

> *"The essential condition for free markets within an enterprise is that internal business units be allowed to purchase goods and services from external vendors."*

So says Russell Ackoff, one of the great systems thinkers and a Wharton management guru, to a 1991 conference on internal markets. With speakers from Ford, Eastman Kodak, Armco, MCI, ALCOA, Dow Corning, Esso Petroleum (Canada), and Control Data, Ackoff opens the conference. He contrasts "free market policies" with traditional "monopolistic practices" inside most firms— i.e., manufacturing *has* to buy CAD services from the company's engineering organization.'[5]

ALCOA Separations Technology has let free market forces loose in functions where costs have been getting out of control. While overall results are mixed, in some places, such as R&D, there is noteworthy success. The "old" R&D unit was costly, slow, and always "working on hare-brained ideas rather than getting the things done that would yield revenue sometime in this century." After instituting internal market mechanisms, R&D reorganizes and soon makes up more than 35 percent of its budget from external work. Internal customers also report significantly improved service.

Internal markets at ALCOA also work with manufacturing, pushing the idea to the factory floor. Members of work centers, as

they call them, become excited about their jobs and "begin to see a direct link between their work, customer feedback, and the profitability of the unit . . control was in their hands." In one work center, average lead time drops from 12 to 14 weeks to 2 to 5 days. To be effective, internal markets must be populated with boundary crossing teamnets.

THE SPIDER'S WEB: HOW TEAMNETS DELIVER SERVICE

Whether they come off as sales presentations for Tupperware or "tax returns" for H&R Block, service webs find the smallest possible unit where production can be replicated to derive efficiencies, and combine the units to meet localized or individual customer needs.

Like a sponge for bureaucracy's excesses, the modern service organization naturally flattens the hierarchy. In some service businesses, the search for ever-smaller units of replicability has pushed beyond the sales counter and stockkeeping unit to measures of everything from "freshness" to "cleanliness." Information collection is so sophisticated among some large chains that headquarters instantly can detect problems in a decentralized unit, and often diagnose them.'[6]

> *Organizationally, the basic replicable unit of service webs is the local operation (internal) or franchise (external).*

This model adapts equally well to very simple and very complex services.'[7] Domino's Pizza represents one extreme, a "chain" of 4,500 "highly decentralized outlets" that encourages managers to regard themselves as "individual entrepreneurs." If Domino's were a

"chain ,"it would break immediately. It works because it is a systematically applied network. A virtual science of pizza making eliminates much of the drudgery and ensures quality, while sophisticated information systems facilitate the bane of all managers' existence, paperwork. This frees managers to concentrate on customer service, a company hallmark, and for many people, the "fun stuff." Not incidentally, it provides an extremely effective centralized coordination system for management. Technology can so easily control or empower—here both happen at once.

Arthur Andersen and Company (AA&C) is another example of a service company with widely dispersed service locations or points of customer contact. Instead of pizza, AA&C delivers highly sophisticated customized information services through 40,000 professionals in virtually every country in the world. Like Domino's, Arthur Andersen "operates in a highly decentralized, real-time mode. Each local office is as independent as possible." Equally importantly, AA&C is a lead user of applying technology to professional services, generating a knowledge-based corporate resource that is the paragon of the much-heralded "knowledge company." Consulting is not alone. Investment banks, financial services, engineering, construction, research, health care, accounting, and advertising all use service webs.

Service webs are very information-sensitive. The key competitive advantage comes from a careful fit of management structures with the technology system.

When customers become the focus, companies flatten. According to James Brian Quinn and Penny Paquette, who have studied service webs extensively, the organization inverts to empower the employees closest to the customer. Toronto Dominion Bank's organization chart literally has the CEO at the bottom and customer on top. Federal Express, with 42,000 employees, has five levels of management and a staff complement that is one-fifth the industry average.

Because these replicable service forms tend to become "infinitely flat" organizations, Quinn and Paquette call them a "spider web because of the light but structured quality of its interconnec-

tions." They offer these conditions for "extremely wide reporting spans:"

- ? Localized interactive contact is very important.
- ? Each ultimate contact point or operations unit can operate independently from all others at its level.
- ? The critical relationship between decentralized units and the center is largely quantitative or informational.
- ? The majority of relationships with the information center can be routine or rules-based.

Flat service networks of common units represent one end of the network enterprise range of diversity. Chunky networks of core firms held together by complementary interests represent the other end of this range.

CORE FIRMS, NOT HOLLOW CORPORATIONS

"The Hollow Corporation will ultimately hurt the U.S. economy," thunders *Business Week* in March 1986.18 The industrial sector provides productivity, innovation, and a rising standard of living, but there is a growing weakness, *Business Week* warns: outsourcing. "Outsourcing breaks down manufacturers' traditional vertical structure, in which they make virtually all critical parts, and replaces it with networks of small suppliers. Even such proud giants as IBM and GE are doing it to varying degrees. In the short run, the new system may be amazingly flexible and efficient. In the long run, however, some experts fear that such fragmented manufacturing operations will merely hasten the hollowing process."

In the 1990s, once-proud giants are scrambling to downsize and outsource, focusing on core competencies to survive into the next century. As the next two chapters illustrate, the "hollowing" of companies does not necessarily mean the loss of the manufacturing base. It does reflect an unstoppable trend as information-driven service technologies offer significant economies of scale coupled with flexibility and customer responsiveness.

In industry after industry, manufacturing is a shrinking part of the product cost. Only a fraction of a drug's value lies in manufacturing, while the great bulk of value-added costs derives from service functions such as R&D, legal and regulatory, clinical clearance, marketing, and distribution. Is Merck a manufacturer or is it really a service company?

Value chains that start with suppliers and end with customers segment work in firm-sized bites. For each staff function and for each service in the value chain, companies confront a series of "make or buy" decisions. Each such decision weaves another knot in the boundary crossing tapestry, giving internal (make) and external (buy) hues.

ADP can do your payroll; it can also track your banking, file taxes, and print messages with checks. ServiceMaster is a $3 billion company that can do your maintenance function; it will also jointly invest in new equipment and share productivity gains with you.

Companies the world around are looking closely at what they do best. Cutting-edge management advice in the 1990s is to:

? Compare each function you perform with the best-in-class.
? Dominate those functions that are strategic and where you are or can become the best (core competencies).
? Outsource where you have no strategic advantage.

In 1964, Nike was a U.S. dealer for a Japanese shoe; in 1991, it is a $3 billion corporation. It got there by building an extremely effective core firm—supply network structure. It based its strategy on close relations with—but not dominance of—manufacturers in the resurgent East: Korea, Thailand, Indonesia, Taiwan, China. Nike expects its suppliers to sell to its competitors to remain competitive and not become too dependent on Nike. The core company maintains technical competence in R&D, quality processes, and even manufacturing in one U.S. facility that does leading-edge designs. ‘~

Used strategically, outsourcing does not hollow out the corporation. "Instead, it decreases internal bureaucracies, flattens the or-

ganization, gives it a heightened strategic focus, and improves its competitive responsiveness," Quinn et al. assert, answering *Business Week's* alarm.[20]

When even the most rigid hierarchies organize to get something done together, teamnets naturally form. They use a variety of special-purpose vehicles that nonetheless all leave the participating firms reasonably independent.

So it seems unremarkable to call joint ventures and other inter-corporate relationships "teamnets." Yet, for all the years companies have been forming strategic alliances, many clearly haven't done it very well. According to an oft-cited study of 880 cooperative arrangements among American firms, only 45 percent were deemed successful by all sponsors, only 60 percent have lasted more than four years, and only 14 percent have passed a 10th anniversary.[2'] Mergers, the 1980s predecessor wave to the ally-making 1990s, have an even higher rate of failure—somewhere between half and two-thirds, according to some research.[22]

At the intercorporate level, enterprise boundaries can grow very fuzzy. For all the practice they've had creating them, distinctions are still something of a hodgepodge, as companies struggle to work together in spite of differences. The literature on new interenterprise forms is a lot skimpier than at the intraenterprise levels.

Joint ventures and *strategic alliances* are common to bigger companies. *Flexible business networks* show the power of teamnets now working for smaller businesses.

"TRUST ONE ANOTHER": THE KEY TO JOINT VENTURES

Joint ventures—the establishment by two or more partners of a separate business—is one distinctive form of strategic relationship. Its central lesson is this: The autonomy given to the new enterprise relates directly to the success of a joint venture.[23] According to Charles Raben, who has studied numerous alliances, joint ventures work when the partners:

- ? Trust one another, have compatible business philosophies and styles, and commit time to their relationship;
- ? Agree on venture autonomy, a process to resolve differences, on long-range goals, and on minimal direct involvement; and
- ? Each makes a contribution that the other respects, and each understands the business.

If the partners can't collaborate, then one partner should dominate. Some companies are widely recognized as having learned the secrets of external partnerships, like Corning in the United States and Olivetti in Europe. Olivetti's joint venture partners are worldwide and include Groupe Bull, Canon, Digital Equipment Corporation, and EDS, along with many other arrangements, such as strategic investments with AT&T and Toshiba.

PARTNERING AS A **MATTER OF STRATEGY**

How do you execute your corporate strategy when you lack critical core skills and components? Companies form alliances to meet spe-

cific business needs and to address opportunities that they cannot meet internally. To meet strategic goals, companies work together—in value-adding partnerships, precompetitive R&D contracts, corporate venturing, partial mergers, supply alliances,[24] large-small "winning combinations," and "virtual corporations." Each of these enterprise forms generates teamnets.

By Adding Value

When independent companies work closely together all along the value chain, they are participating in value-adding partnerships. McKesson Corporation, the $7 billion distributor of drugs, consumer, and health care products, is one example. Its network includes manufacturers, distributors, retailers, consumers, and even a third-party insurance supplier. To independent drugstores that retain local autonomy, it offers the benefits of scale, such as access to large computer systems that none could afford independently.[25]

Joint R&D Before *the Competition*

In the United States, Europe, and Japan, many companies collaborate in the early phases of new technologies. By cooperating, they lower the risk for discovery and pioneering. Then, they go their separate ways, competing to refine, produce, and market resulting products. Together, companies:

- Search for basic breakthroughs;
- Slog through the endless combinations required for applied research; and
- Do enough development to test the concept.

Precompetitive R&D has been popular in semiconductors, gene research, plastics, telecommunications—and every other major industry that depends on a stream of innovations.

Sometimes government and academia are involved; sometimes

not. Some research consortia include academic members; some don't. Japanese government-industry collaboration in new technologies is legendary, many led by MITI—from high-performance ceramics to fifth-generation computing to sea water desalinization. In the United States, the Microelectronics and Computer Technology Corporation (MCC) is one somewhat centralized example. Other collaborations set standards for emerging technologies. Among U.S. defense firms, cooperative teaming to produce a multi-billion-dollar prototype is the norm; then the companies split apart to compete for production contracts.

As transnational companies ally to do precompetitive R&D, national boundaries become fuzzy and government sponsorship lines grow murky. International transgovernmental sponsorship of basic research will be a big boundary crossing activity by the end of the 1990s.

Corporate Venturing

It may sound like a bit of an oxymoron, but "corporate venturing" has a specific meaning: it's when large companies take minority equity positions in young companies with good growth prospects. [26] For the big company, the purpose is not a direct return on investment. Rather, it needs to gain access to a new technology or market. Olivetti, Europe's largest "local" information technology company, operates a globally diverse venture capital operation ($40 million in 1987) called Olivetti Partners. Some investments include European Silicon Structures (7 percent), Danish start-up Olicom (40 percent), Torus Systems of Cambridge, England (25 percent), and Yokohama-based Dixi Corporation (9 percent).

One interesting twist to this idea is targeted venture capital funds *that require the companies they invest in to foster cooperation.* Euroventures, founded in 1984 by a group including Asea, Fiat, 3M, Olivetti, Bosch, and Volvo, is goaled to encourage pan-European cooperation. To that end, it operates a "network of satellite funds throughout the European Community."[27]

A Step Short of the Altar

In the gray areas between mergers, ventures, and alliances, partial mergers sometimes appear as an intermediate stage. One Bayer merger took 17 years from start to finish. In 1964, Bayer merged its Agfa subsidiary with the Belgian firm Gevaert to form a photographic group owned 50 percent by each. Bayer raised its stake to 60 percent in 1980, when new capital was needed, and in 1981 completed a buyout. Honeywell-Bull represents the not necessarily successful tangle of relationships that have grown up as major players enter and leave the computer business. A 1960s alliance between the French government Machine Bull and GE—whose computer business was taken over in the 1970s by Honeywell (which at the same time bought up a number of small precision instrument firms)—and a 30-year relationship with Japan's NEC, all continue today in a triadic equity arrangement.

From Supplier to Partner

In 1971, when General Motors made its 34 percent strategic investment, it cemented relationships with Japan's Isuzu Motors, gained access to a needed component, and gained entry to a new market. This type of supplier partnership doesn't produce new enterprises, but it does require companies to work together. They increase strategic interdependence and generate significant boundary crossing activity. Manufacturers and their key component suppliers, companies doing contract R&D, OEM (original equipment manufacturing) customers, and key distributors are typical of vertical supply alliances. [28]

"Winning Combinations"

In the near future, "Goliaths"—large companies unable to muster the speed and take the risks to innovate continuously—will increasingly team with "Davids"—smaller companies quickly able to

produce new products. To Davids, Goliaths bring financial resources and an ability to market and sell worldwide. Imagine the potential of allying the Fortune 500—the biggest of the big—with the Inc. 500—the best of the entrepreneurial small.

In *Winning Combinations,* James Botkin and Jana Matthews argue that "the innovation imperative" of the global market drives these types of alliances, enabling corporations to:

? Respond promptly, develop rapidly, and produce new products and services innovatively; and
? Take quick advantage of international marketing capabilities and distribution channels for new products and services.[29]

The "entrepreneurial partnership" combines the competitiveness of entrepreneurship, which is central to success in business networks, with the cooperation of partnership. "Collaborating to compete is an example of innovative management in action," writes George Kozmetsky in the foreword to their book.

The Virtual Corporation

In February, 1993, *Business Week* updated its 1986 concern about "hollow corporations" with cover text proclaiming: "Big, complex companies usually can't react fast enough. Small, nimble ones may not have the muscle. What's the answer? A new model that uses technology to link people, assets, and ideas in a temporary organization. After the business is done, it disbands. It's called the virtual corporation. Just another management fad—or a vision of the future?"[30]

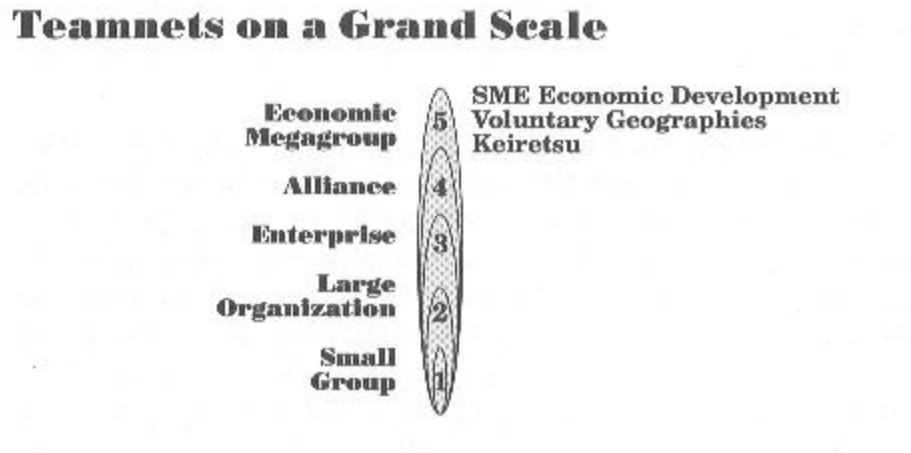
Contrasting with its alarm at hollow corporations, *Business Week* clearly treats the virtual corporation as a wave of the future. Its definition of a virtual corporation is that of a teamnet: "a temporary network of independent companies—suppliers, customers, even erstwhile rivals—linked by information technology to share skills, costs, and access to one another's markets." Among those it lionizes for taking this approach are Jamie Houghton of Corning, John Sculley of Apple, and Andrew Grove of Intel.

Multiple company partnerships are not only a direction big, high-tech companies are taking. They are also the wave of the future in small businesses, even in traditional industries.

ON THE SMALL BUSINESS FRONTIER

In the 1990s, the really big news about interenterprise alliances is in small companies, not large ones. "Flexible manufacturing networks," with beginnings in northern Italy in the 1970s, are still in the early phases of their organizational ramp. This little-known but powerful grass-roots business movement promotes economic development: it creates jobs, improves productivity, and lowers costs. An important major new strategy for small business, it also improves the health of the economy as a whole.

The companies you meet in "Small Giants," chapter 6, are the harbingers of a new category—the Teamnet 500 for the 21st century.



Boundaries are fuzziest beyond the alliance level, when companies create such complex teamnets that they generate new *economic megagroups:*

? Perhaps the best known of these are the Japanese *keiretsu*—"societies of business," which dominate their country's and thus much of the world's economy. Keiretsu are precursors of vast business complexes and long-term alliances arising elsewhere.

? Voluntary geographies refers to large, lively concentrations of hundreds and thousands of companies in the same broad region or industry forming and re-forming business relationships.

? While individual flexible network successes are rewarding to the parties involved, real impact can come only when companies begin interorganizing on a massive scale. Network strategies for diverse multi-industry *small-medium enterprise (SME) economic development* have been demonstrated to work for regional and national economies.

KEIRETSU: NOT **JUST JAPANESE**

Japan's businesses use two general forms of keiretsu:

? Horizontal, bank-centered keiretsu, such as Sumitomo and Mitsubishi; and

? Vertical, supply keiretsu, such as Toyota and its vast penumbra of vendors.

Six bank keiretsu each comprise 20 to 45 major companies, generally one to an industry. NEC, for example, is Sumitomo's electronics company. Supply keiretsu control layers of subcontractors that extend to large numbers of tiny job shops and family firms, common in the auto, electronics, and machinery industries. These forms are mutually supporting: NEC is part of a bank group and is the principal firm in a supply keiretsu of electronics companies.

While the United States has for years been fighting keiretsu in trade negotiations, now many believe keiretsu are a necessity for the United States. Clear calls are coming that it is time to join them. "Unless we move in that direction, we don't stand a chance," says

TRW chairman Joseph Gorman, one of the CEOs who accompanied President George Bush on his ill-fated 1991 trip to Japan. ~' Others echo Gorman's view. "U.S. and European information technology companies face a stark choice: cooperate or become vassals of their Japanese competitors—hang together or hang separately," writes Charles Ferguson, a technology adviser to investment bankers, in "Computers and the Coming of the U.S. Keiretsu." He even goes so far as to propose a massive "Euro-American Keiretsu" anchored by IBM, Siemens, Philips, DEC, Xerox, and Motorola.[32]

In the late-1980s, Ford and Chrysler followed Toyota and other Japanese car makers in forming supply keiretsu by drastically reducing the components made in-house. In 1993, even giant GM is following suit.

Keiretsu create innumerable teamnets who, working together, generate an economic mega-region.

VOLUNTARY GEOGRAPHIES OF PLACES AND IDEAS

Until the 1970s, there was no such place as Silicon Valley. But since then, the Valley of Intel and Apple has been California's economic jewel. Stumbling in the mid-1980s in the face of Japanese competition, the Valley made a strong return in the early 1990s. The reason for the renaissance? "Small and medium-sized enterprises are pioneering a new Silicon Valley—one that fosters collaboration and reciprocal innovation among networks of specialist producers." Coopetition provides the revitalizing dynamic, Anna Lee Saxenian finds. "Paradoxically, both cooperation and competition are intensifying as local firms organize themselves to learn with their customers, suppliers, and competitors about what to make next and how to make it," she writes.

These large-scale network economic conditions do not require physical proximity. The joining together of many smallish firms and professionals in endless combinations of temporary arrangements also characterizes a number of particularly fast-paced industries,

some old, like publishing and the movie business, and some new, like electronics and biotechnology. Biotech, write Quinn, Doorley, and Paquette, "is becoming structured as a number of multiple-level consortia; each enterprise has its own network of contact and information relationships involving a variety of research, clinical, production, and marketing groups around the world."[34]

DEVELOPING ECONOMIES

Saxenian uses Silicon Valley's success to "underscore the importance of regional economies to industrial competitiveness and the need for local industrial policy in the 1990s." Jerry Nagel of the Red River Trade Corridor, Inc., expresses the idea simply, "If I think of myself as living in a rural town of 8,500, I'm pretty small. But if I think of Crookston, Minnesota, as part of a 1.5-million-person region that produces $20 billion a year, I'm pretty big." Nagel is thinking outside the geographic dots, connecting Manitoba, eastern North Dakota, and western Minnesota, running along the Red River. Their biggest trading partner? Brittany, France.

Italy's Emilia-Romagna region and Denmark's economic revitalization through small business networking provide evidence of the value of teamnets on the broadest scale, examples extensively explored in "Instead of Layoffs," chapter 7.

How Fast Is Your Environment?

As we hurtle through the early decades of the Information Age, new forms of organization such as the types described in this chapter and the last no longer just emerge; they erupt. Constant change and continuous globalization challenge all companies in all markets— from hidebound firms in backwater industries to speedster leaders in industries on the innovation bullet train.

Teamnets are emerging as a response to the pace of change, change driven above all by technology.

Turbulent environments once existed only in the province of high-tech companies, research facilities, and special-case industries like entertainment. The classic line about CNN is that they hold their meetings, lasting perhaps 30 seconds, in the hall. Today, fast-paced change is everywhere, pushing companies of all sizes in all industries into more flexible internal and external arrangements. You don't have much time for bureaucracy if you're making decisions every minute.

Can't keep up with the pace of change? Not surprising. While there are still important differences between the pace of change in semiconductors and television from the pace of change in machine shops and lumber mills, nevertheless:

Everyone's pace is accelerating. Human beings have never before had to cope with such an accelerating rate of change as a constant daily diet.

Business, which strives for stability and predictability, is undergoing a major epochal shift. As the fundamentals move into new territory, dynamic balance and insightful anticipation are at a premium.

The speed of change is a powerful reality in our daily working lives. Companies need to adapt swiftly and flexibly. The old commands and controls don't work as the pace picks up. The fast-approaching 21st century appears to be dramatically different from the 20th. In the words of R. Buckminster Fuller, the designer of the geodesic dome, we must learn to "do more with less" in a world of shrinking resources and rising expectations.

PACE OF CHANGE AFFECTS ORGANIZATION

The here today, gone tomorrow, accelerating pace of change is the shorthand measure of many trends in technology, markets, and society. They affect organizations and people in every nook and cranny of commerce. Use the Pace of Change chart to assess how fast your business environment is moving.

Pace of Change

SPEED OF CHANGE	ENVIRONMENT	CONDITIONS
Slow.	Stable.	Predictable demand; unchanging competitors; gradual innovation; government policies set.
Medium.	Changing.	Demand fluctuates but is predictable over a few years; competitors enter and leave without major effects; innovation orderly and public policies changing predictably.
Fast.	Innovative.	Sudden, unpredictable demand and competitor shifts; innovation rapid; government struggling to make policy.

The pace of change has an environmental impact on the nature of organizations. Fifty years of research confirm that the more stable the environment, the more mechanistic and hierarchical the organization tends to be. Conversely, the more rapidly changing the environment, the more organic and networked the organization.[35] "Networks are designed to build the central competitive advantage of the 1990s—superior execution in a volatile environment," writes management consultant Ram Charan.[36]

Departments and other major components internal to an enterprise also organize according to the pace of change.[37] One Fortune 500 company organizes its fast-paced research and engineering

groups as a network spread out over several dozen sites. Its purchasing department, though, where life is less chaotic, concentrates in a few places and functions as a typical bureaucracy. Thus, different parts of the same organization can have distinctly different cultures.

From Hierarchy to Network

HIERARCHY	NETWORK
Imposed control	Self-control
Specialized	Generalized
Dependence	Independence
Formal channels	Voluntary relations
Commands	Consultation
Appointed leaders	Natural leaders
Formal job descriptions	Loosely defined jobs
Vertical interaction	Lateral interaction
Rigid levels	Flexible levels

Professional cultural differences can erect internal boundaries so intense that people in the same company say, "We can't talk to each other." For example, innovators and designers often find it difficult to talk to producers and distributors, writers can't talk to engineers, sales people can't talk with accountants.

NOT ONLY **FATHER** KNOWS BEST

Doing more with less requires thinking differently about how to do business. Just as the old nuclear family of Mom, Dad, and the two kids no longer applies to everyone, the old nuclear work group of boss and bossed is now only one of many arrangements. The approach of "future managers ... has to be less boss-ship and more participative," says Eugene E. Harris, general management and

development manager for USS Fairless Works, a division of USX Corporation.[38]

Less bossy and more participatory teamnets are very scalable. Thamnet principles apply at all levels, from small groups to organizations to enterprises to groups of enterprises.

Empowered teams, study circles, and top teams all reflect different ways for small groups to function more flexibly and responsively. Cross-functional teams, empowered clusters, and sociotechnical systems are teamnet approaches for large organizations. Kaizen, internal markets, service webs, and core firms transform whole enterprises. Joint ventures, strategic alliances, and flexible business networks are boundary crossing teamnets at the alliance level. Keiretsu, voluntary geographies, and economic megagroups are examples of very large-scale teamnets.

Our focus now shifts to small companies in the next two chapters. As the biggest companies continue to retrench, the exciting new frontier for business development in the 1990s is in the multiplying power of small businesses.