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Strategy & Organization

Baruch Lev

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Charles C. Snow

James O'Toole
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Baruch Lev

Information disclosure activities of most companies are largely limited to compliance with legal requirements and to occasional reactions to external events, such as a negative analyst report or a proxy contest. However, the absence of a carefully planned and executed disclosure strategy is shortsighted and detrimental to the company and its managers. Such a strategy of voluntary information disclosures has considerable potential for changing stakeholders' perceptions of the company and thereby its market value, for decreasing the cost of capital and consequently enhancing growth, and for improving the terms of trade with suppliers and customers as well as reducing the likelihood of regulatory intervention in the firm's affairs. This article outlines the development and implementation of a disclosure strategy.

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Homa Bahrami

Many enterprises, public and private alike, are in the midst of fundamental organizational changes. These cover a spectrum of initiatives—ranging from downsizing and delayering to the creation of team-based networks, partnerships, and alliances—and involve a fundamental reassessment of employment security, critical competencies, and career trajectories. Collectively, these trends highlight some of the limitations of our traditional approaches for managing continuous, rather than periodic, transformations. High-technology firms in Silicon Valley are experimenting with flexible organizational building blocks, designed to address novel tasks, “kaleidoscopic” change, and continuous innovation. This article describes the building blocks of flexible organizational designs.

Causes of Failure in Network Organizations

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Raymond E. Miles & Charles C. Snow

This article forecasts the problems that the emerging network form of organization faces as the result of managerial actions which inadvertently damage the operating capabilities of network organization. It examines the managerial mistakes that have plagued and continue to plague earlier functional, divisional, and matrix forms of organization, actions that are most likely to constrain the network structure. By analyzing predictable mistakes as they begin to occur, the authors hope to help managers prevent these problems rather than become victims of them.

Our Federalist Future: The Leadership Imperative

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James O'Toole & Warren Bennis

Is it better to be big or small? Are large organizations inherently superior because they possess greater resources to protect the interests of their constituencies against the vagaries of powerful external forces, or are small-scale organizations superior because they are more sensitive to their constituents' needs and more adaptable to changing conditions? That unresolved issue is at the core of a roiling controversy in both the geopolitical and corporate worlds. Efforts to resolve it in government and business present a rare opportunity for mutual learning from experiences in those two quite distinct domains. In the late 18th century, the American Founders advanced a compromise in government that has proved eminently functional and durable: federalism. Now, variations of American federalism are being tested in new confederations of domestic and international businesses, both large and small. Today's federalism seems to work better than previous forms because of the advent of a new style of leadership, which the authors characterize as that of "leaders of leaders."

Advanced Manufacturing Systems and Organizational Choice: A Sociotechnical System Approach

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A.B. (Rami) Shani, Robert M. Grant, R. Krishnan, & Eric Thompson

A major cause of the slow adoption of advanced manufacturing technologies by U.S. industry, and the disappointing performance gains from such technologies, is the failure to adapt organizations and work practices to the new technologies. This article proposes "sociotechnical systems" as a framework for examining the organizational implications of new manufacturing systems, and as a tool for guiding the change process. The sociotechnical systems approach suggests that different new manufacturing technologies have different implications for work design and organizational structure and systems which are likely to necessitate a realignment of the entire organization. Also different technologies are suited to different external environments.

Managing Risk in Advanced Manufacturing Technology

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Michael P. Hottenstein & James W. Dean, Jr.

Most advanced manufacturing technology (AMT) projects fail to live up to expectations. Lack of success may be due to misunderstanding or mismanagement of the risk underlying AMT projects. After studying two dozen such projects, the authors conclude that

AMT projects have special risk profiles and that risk management strategies should mirror these profiles. A risk profile should reflect four types or sources of risk: market, strategy, technology, and organization. This article explores and illustrates each of these sources of risk and then develops risk management strategies appropriate for each risk profile. While no company included in this study explicitly developed a risk profile of their AMT project, several companies did develop plans that included elements of all four sources of risk. In addition, they employed a variety of strategies and tactics to manage these risks throughout the projects. These AMT projects were, on average, more successful.

**Takeover or Makeover?
Japanese Investment in America**

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Gregory W. Noble

President Bush's trip to Japan in search of "jobs, jobs, jobs," the travails of the American auto industry and its Buy America campaigns, and the renewed expansion of Japan's trade surplus have all revived the debate over Japanese investment in the United States. On balance, Japanese investment can help strengthen the American economy, and the dangers attributed to it are mostly nonexistent or exaggerated. Nevertheless, several real issues remain: the behavior of Japanese corporations is genuinely different from that of other foreign investors, and while it is changing, complete convergence with the Anglo-American corporate model is unlikely. Reciprocal investment in Japan by foreign firms is still difficult. The impact of Japanese investment differs across the sectors, and has been most beneficial in mature, heavy industries. Finally the overall type and effect of Japanese investment is not simply determined in Tokyo or Osaka, but depends on the measures we take to strengthen the American economic base.

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Contributors

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From the Editor

The summer of 1992 marks the beginning of my second decade as the editor of the *California Management Review*. My experience as editor has been an extremely rewarding one. Both the stature and visibility of the *Review* have grown substantially over the last decade. In a number of critical areas, most notably the management of technology and manufacturing, corporate strategy and organization, and the political economy of the Pacific Basin, the *Review* has established a well-deserved reputation as an authoritative source of relevant and timely research. In these and other areas, we have achieved our editorial objective of serving as a “vehicle of communication between those who study management and those who practice it.”

In addition to our growth in circulation, which has tripled during the last decade, we have recently experienced a substantial increase in requests for reprints and permission to reprint articles from *CMR*. These requests—which come not only from colleges and universities, but from corporate and executive education programs—testify to the *Review*’s strong and growing reputation among both practitioners and academics. Approximately 30 percent of our revenues now come from requests for reprints or for permission to reprint articles in books, texts, course readers, or periodicals from around the world. The ten most popular articles are listed in our reprint ad at the back of this issue.

The lead article in this issue of the *Review*, “Information Disclosure Strategy” by Baruch Lev of the Haas School, has already attracted substantial attention. Lev persuasively demonstrates the benefits companies can accrue from a carefully planned and well-executed strategy for disclosing financial information. This pioneering piece is likely to have an important impact on management practice.

This issue also features a thoughtful essay by two of America’s most distinguished students of management: James O’Toole and Warren Bennis, both of whom recently joined the *Review*’s editorial board. “Our Federalist

Future: The Leadership Imperative” links trends in global political and economic institutions to suggest the emergence of a new kind of organizational structure. Their provocative analysis has important implications for the future of management decision making.

Gregory Noble’s article on Japanese investment in America also addresses a highly topical issue. Noble, who teaches political science at the University of California, Berkeley, presents an informed and well-balanced appraisal of an extremely controversial and important subject. His analysis can be read with profit by managers and policymakers on both sides of the Pacific Basin.

We welcome your comments on these and other articles that appear in this issue, as well as your suggestions of topics for future articles.

David Vogel
Berkeley, CA

Information Disclosure Strategy

Baruch Lev

Managers rarely devote to information disclosure the careful attention and thorough planning accorded to other corporate activities, such as production, marketing, and finance. For example, a study on the disclosure activities of 100 of the largest U.S. public companies revealed

that 55 companies made fewer than four voluntary disclosures during the seven years 1981–1987, and only 16 companies made at least one voluntary disclosure a year.¹ Is such modest disclosure activity due to managers' belief that the consequences of information releases are not significant and lasting? Or, is it the result of an ever increasing disclosure-related threat of litigation by disaffected investors? Perhaps managers believe that capital markets are efficient and therefore security prices properly reflect the company's value no matter what is disclosed about it?

Whatever the reasons for the modest disclosure activity, economic theory and empirical evidence demonstrate that such restraint is in general detrimental to the company and its stakeholders. Specifically, evidence indicates that the consequences of most voluntary disclosures are significant and long-lasting; litigation based on omission of material information may be as costly as that triggered by actual disclosures; capital market efficiency does not negate the benefits of information disclosure, rather it enhances them; and despite the existence of extensive disclosure laws and regulations, there

¹ I gratefully acknowledge the comments and suggestions of David Aaker, Yair Aharoni, Fred Balderston, Martin Gerstel (Alza Corporation), Robert Harris, William Hasler, David Irons, Robert Kaplan, Marvin Krasnansky (McKesson Corporation), Rachel Lev, Keith Mabee (Industrial Indemnity), Charles O'Reilly, Richard Rumelt, Barbara Swales, Brett Trueman, and Russell Winer.

is considerable leeway for voluntary communications. Most importantly, disclosure activity does not differ in principle from other corporate activities, such as investment, production, and marketing. Disclosure shares with these activities the fundamental characteristics of providing benefits and incurring costs, and it therefore warrants the careful attention and long-term planning accorded to any major corporate activity. Hence the need for an information disclosure strategy.

The process of developing and implementing a disclosure strategy is outlined below. Disclosure is considered here broadly to include quantitative (e.g., earnings, dividends) as well as qualitative communications (e.g., a strategy statement) of retrospective or prospective (e.g., an earnings forecast) nature. Also considered are the actions (e.g., a stock repurchase) aimed at enhancing the effectiveness of disclosures. While the impact of information disclosure on a broad spectrum of markets and constituents is examined below, special emphasis is placed on capital markets, given the extensive knowledge accumulated about these markets by financial economists.

Signaling activities by individuals and companies have been extensively discussed in the economics, finance, and strategy literature.² However, the systematic formation and implementation of a corporate disclosure *strategy* has received little if any attention. This study presents the need for a disclosure strategy and outlines its development and implementation. It should be appreciated at the outset that a disclosure strategy is not a separate, isolated strategy. Rather, it should be integrated with the overall corporate strategy and culture and linked with the specific investment, production, and marketing policies. Linked this way, an information disclosure strategy will be fully successful in assuring that securities' values and stakeholders' perceptions reflect the overall strategy of the company and the consequences of its activities.

The Impact of Voluntary Disclosure: Empirical Findings

Voluntary corporate disclosures—information releases which are not required by laws and regulations—were found to exert a significant impact on perceptions and market values. Following is a sample of research findings encompassing a broad range of communication activities.

- *Strategy Announcements.* Investors' reaction to a sample of 634 strategy announcements by firms (joint venture formations, new R&D and capital expenditure programs, and product development strategies) was examined and found to be, on average, positive and statistically significant.³ The price reaction to some individual announcements was rather large. For example, J.C. Penney's plan to spend \$1 billion for store modernization (2/1/83) triggered a 7.8% price increase upon announcement, amounting to a total shareholder value gain of \$275 million.⁴
- *Announcement of Acquisition Programs.* The preceding study examined a heterogeneous sample of strategy announcements. A focus on single strategy was achieved by examining a sample of 55 firms that publicly announced and subsequently carried

out aggressive corporate acquisition programs. For a period of 12 months prior to and including the strategy announcement month, the stocks of these companies increased, on average, by 13%.⁵ While it is difficult to separate in this case the impact of the acquisition strategy announcement from that of the firms' operating performance (acquiring firms often do well before acquisition), the researchers concluded that the *announcement* of the acquisition strategy had a significant impact on market value.⁶

- *New Product Announcements.* The market reaction to a sample of 1,100 announcements of new products was examined (e.g., Anheuser-Busch introduction of Bud Light on March 1, 1982; IBM's introduction of the PC-XT on March 9, 1983; and Apple's introduction of the Macintosh computer on January 25, 1984).⁷ The average two-day price reaction to the announcements was positive and statistically significant, and the average value of a single announcement, in terms of total shareholder value increase, was \$85 million in 1991 dollars.
- *Managerial Earnings Forecasts.* From "soft," qualitative disclosures of strategies and plans, I turn to "hard," quantitative predictions of future performance. Examination of 1,500 forecasts of earnings made public by corporate executives indicated a 2% average abnormal stock price increase during the month of the forecast release.⁸ Given that the market value of the median firm in the sample was \$200 million, a typical earnings forecast thus generated a \$4 million shareholder value gain.⁹
- *Warning Investors.* The threat of litigation by disgruntled investors prompts an increasing number of companies to release public warnings prior to the disclosure of earnings declines or negative surprises (i.e., earnings that fall short of analysts' expectations). Investors' reaction to such warnings was found, as expected, to be negative (-2.4%, on average, for a sample of 167 cases), whereas the subsequent reaction at the time of earnings disclosure was close to zero.¹⁰

While the five studies mentioned so far dealt with specific prospective announcements, the following two studies demonstrate the impact of background information.

- *Justifying Dividend Decreases.* Announcements of dividend decreases generally elicit a strong negative market reaction. However, a comparison of investor reaction to dividend decreases announced without explicit reasons to that of dividend decreases explained by strategic imperatives, such as conserving cash for large investments, indicated a significant difference. For a three-day interval around the dividend decrease announcements, the average negative reaction to the "unexplained" cuts exceeded by 3% the reaction to the "reasoned" dividend decreases.¹¹ Over a two-month period during which investors apparently corroborated managements' explanations, the average difference in market-adjusted returns was 10% in favor of the "explaining" firms.
- *Management's Discussion.* The contribution to share value of executives' prospective comments in the financial statements over that of the "hard" earnings and dividend data, was found to be statistically significant. (Retrospective comments, on the other hand, did not have a noticeable effect.)¹² The impact of such voluntary disclosures was not limited to the level of stock prices, they also decreased their *volatility*. Other voluntary disclosures, such as on the firm's order backlog (unfilled orders for the firm's products), were also found to exert a significant impact on market values.¹³
- *Monitoring by Analysts.* Investors do not accept managers' communications at face value; they often closely examine and critically evaluate these disclosures, leading to significant changes in market values. For example, a study of 25 *Barron's* articles written by Professor Briloff, who generally criticizes companies for attempting to portray a better-than-actual performance (higher profitability and growth, better solvency), indicated that on the day *Barron's* hit the stands the stock prices of the subject companies decreased on average by 8% (market adjusted).¹⁴
- *Equity Carve-Outs.* The cases presented thus far pertain to information disclosures describing firm activities (e.g., a product development). Sometimes firms engage in real activities that are intended to achieve an informational effect. Equity carve-outs

provide an example. These are public stock offerings by a parent company for a partial ownership in a subsidiary. An informational motive—to improve the visibility of a subsidiary in order to attract new investors and enhance the firm's market value—often underlies such a stock offering.¹⁵ Examination of a sample of 70 carve-out cases indicated that stock prices increased by 5%, on average, around the offering announcement.¹⁶ Such price increases are particularly noteworthy since the announcements of regular stock offerings generally prompt stock price declines.

- *Entry Deterrence by Disclosure.* Finally, the impact of information disclosure is not restricted to capital markets. Suppliers, customers, and competitors are often the target of communications. For example, an extensive survey of firms' attempts to limit entry into their industries revealed that of the various deterrence strategies surveyed (e.g., excess capacity, limit pricing) only one—"obscure profits"—dealt with information (rather disinformation) disclosure. Obscuring profits refers to attempts by multi-product firms to mask single product profitability by such means as common cost allocations and aggregation of heterogeneous products. The survey further revealed that masking divisions' profitability was the deterrent strategy practiced most often by the respondents.¹⁷

The above sample of empirical findings and other research allow for the following major conclusions concerning the impact of corporate voluntary disclosures:

- Voluntary disclosures and the analyses and criticism they evoke often have significant impact on securities' prices and volumes of trade. While investors obviously react to the *activities* disclosed (e.g., the development of a new product), the announcement itself generally creates value that predates the actual realization of the activity by months and sometimes years, as in the disclosure of a strategy change.
- The impact of disclosure is not limited to share prices and volumes. Information releases were found to be associated with decreased volatility of prices and the narrowing of the bid-ask spreads of stocks, thereby enhancing the liquidity of securities. Information disclosures may also affect the firm's shareholder mix, impact corporate governance (e.g., proxy) contests, bolster the confidence of suppliers and customers, and deter entry into the industry.
- Despite seemingly strict regulation of financial disclosure, numerous choices are available to managers within the legal bounds. They can select from the wide menu of measurement and reporting practices allowed by Generally Accepted Accounting Principles and augment such disclosures by voluntary release of background information, statements of policy and strategy changes, and forecasts of future performance. This will generally ensure that the full value of the company's production, finance, and marketing strategies and activities will be reflected in a *timely* manner in its stock and bond prices. Without an active, well planned and executed disclosure strategy there is no assurance that the intrinsic value of the company and its potential will be fully appreciated by outsiders (investors, suppliers, customers).

- Information disclosure, particularly of a prospective nature, is effective in changing perceptions even in large and active capital markets. In fact, such “efficient markets” assure a quick and proper reaction to communication. On the other hand, the impact of disclosures is more pronounced for relatively small, sparsely followed companies. Such small, new technology companies will therefore benefit most from a disclosure strategy.
- Since investors’ perceptions and the consequent market valuations are strongly affected by financial analysts following company securities, the “management of analysts’ expectations” should be of considerable importance to managers. Such management of expectations, an integral part of a disclosure strategy, includes sharing with analysts the long-term strategy of the company, explaining the role of specific events (e.g., a restructuring) in the long-term strategy, steering analysts’ forecasts within a realistic range, and warning them (as well as the public at large) ahead of time of negative developments (e.g., a sharp earnings decline).

Given the far reaching impact, multiple objectives, and overall complexity of information disclosure, it obviously should not be conducted haphazardly. Hence, the need for a long-term disclosure strategy.

Who Benefits from Disclosure?

The widely documented impact of corporate disclosure on market values and stakeholders’ perceptions does not directly indicate the ultimate beneficiaries of disclosure. Does disclosure primarily benefit financial analysts in reducing their cost of search for information, or competitors who learn about the company and its plans, or just the sophisticated investors with ready access to the new information? While the above might occasionally benefit from disclosure, the major beneficiaries are, in general, the company’s managers and its stakeholders. Two largely unappreciated phenomena lead to this conclusion: disclosure has a significant effect not just on outsiders but also on managers’ decisions and corporate activities; and a substantial and permanent information gap generally exists between company insiders and outsiders.

Disclosure Affects Company Activities—The information disclosed by a company and sometimes the absence of disclosure, affect outsiders’ perceptions of its economic condition and future prospects. These perceptions, in turn, affect key decision variables, such as the company’s cost of capital and input prices. For example, when the performance of a company or its financial health are under-appreciated by investors due to incomplete information, the securities of this company will be undervalued, leading to low prices and high yields (cost of capital) for new stock and bond issues.¹⁸ The detrimental effects of low capital market valuations and negative investor sentiments (e.g., relatively low analysts’ forecasts of earnings) is not

restricted to *new* securities issues. It is well known, for example, that bank loan officers consider the firm's capital market performance in determining the cost of loans. Similarly, large suppliers and customers watch the company's market performance and analysts' reports when considering terms of trade. The high cost of capital resulting from low valuations and negative perceptions will depress earnings and cause managers to forego beneficial investment opportunities, impeding the firm's growth and its ability to compete.¹⁹ These consequences of inadequate disclosure will obviously have detrimental effects on the company's managers and its stakeholders.

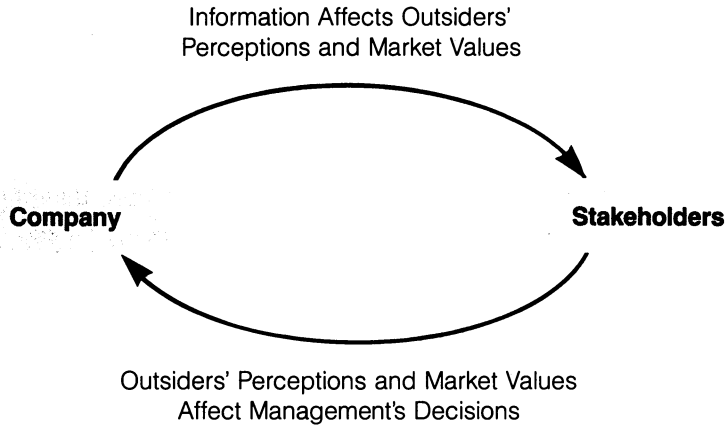
The effects of securities' undervaluation are not restricted to cost of capital and input/output prices. For example, undervaluation may draw the attention of corporate acquirers, causing managers to spend time and resources to avert takeover.

Example: Sea Containers, Ltd., a marine container leasing and shipping company encountered in May 1989 multiple takeover bids by Swedish and British companies offering \$50 per share when these shares traded in the low \$30s. In the 1989 financial report, Sea Container's president stated [p. 3]: "Since the company had a liquidation value estimated to be in excess of \$100 per common share, obviously your board of directors could not entertain such a miserly offer. . . . *Investors had not perceived that the shipping recession of the mid 1980s had passed* and the company was entering a period of excellent earnings growth. As a proof of this we finished 1989 with net earnings of \$7.15 per common share, a record high." [emphasis mine] Indeed Sea Container's stock price more than doubled in the second half of 1989. The undervaluation and the consequent costly fight to deflect the takeover bids could probably have been avoided by an effective and timely communication to investors of the true value of Sea Containers and its favorable prospects.

The circular role of disclosure in first affecting stakeholders' perceptions which in turn impact the company's decisions and performance is depicted in Figure 1.

Permanent Information Gap—The above-outlined benefits of an active disclosure policy might be questioned on the grounds that investors, customers, and suppliers have strong incentives to obtain company-specific information and, therefore, there seems to be no need for an active corporate disclosure policy—sooner or later the "truth" will come out. This is yet another misconception. Economic theory has recognized that without active disclosure the "truth" may never come out—a *permanent* information gap generally exists between insiders and outsiders. This view is clearly espoused in "agency theory" which focuses on conflicts of interest between principals (shareholders, lenders) and agents (managers), and examines the adverse consequences of such conflicts as well as the mechanisms (e.g., management compensation) aimed at mitigating them.²⁰

Agency theory postulates that firms' values are permanently depressed by the cost of the agency relationship (e.g., the consequences of managers' opportunistic, self-serving decisions, the costs of monitoring managers),

Figure 1. The Dual Impact of Information Disclosure

since investors aware of the conflict of interests will not be willing to bear the costs resulting from them. While agency costs are present in all public companies due to the inherent separation of ownership from control, the *magnitude* of these costs and the consequent depression of market values vary considerably across firms, depending, among other things, on the costs and difficulties outsiders encounter in evaluating (monitoring) managers' performance. Accordingly, a disclosure strategy that effectively disseminates timely, relevant, and credible information, allowing outsiders to evaluate the firm and its management in an effective low-cost manner, will not only narrow the information gap but will create shareholder value by decreasing the agency costs which depress values. Such value creation by disclosure is permanent and not just a correction of a temporary undervaluation.

Example: The disclosure of a clear strategy for General Electric by its newly elected CEO Jack Welch in the early 1980s precipitated the following comment by a Kidder, Peabody analyst: "General Electric is in the process of becoming a somewhat simpler company to understand." [Kidder, Peabody Newsletter, December 21, 1983] "Simpler to understand" implies lower monitoring (agency) costs, leading to higher market values. Similarly, the 1988 Motor Carrier committee of the Financial Analysts Federation scored Ryder Corporation high on disclosure because "Ryder provided particularly useful supplementary financial data that helped diligent investors make independent judgments about the company's complex and sometimes controversial activities."

The detrimental effects of agency costs extend beyond capital markets. When managers, for example, are perceived to maximize short-term earnings at the expense of long-term growth, employees' and suppliers'

confidence in the firm's survival will deteriorate.²¹ Credible, well-planned communications can allay such stakeholders' concerns, leading to improved positioning of the firm in the labor, input, and output markets.

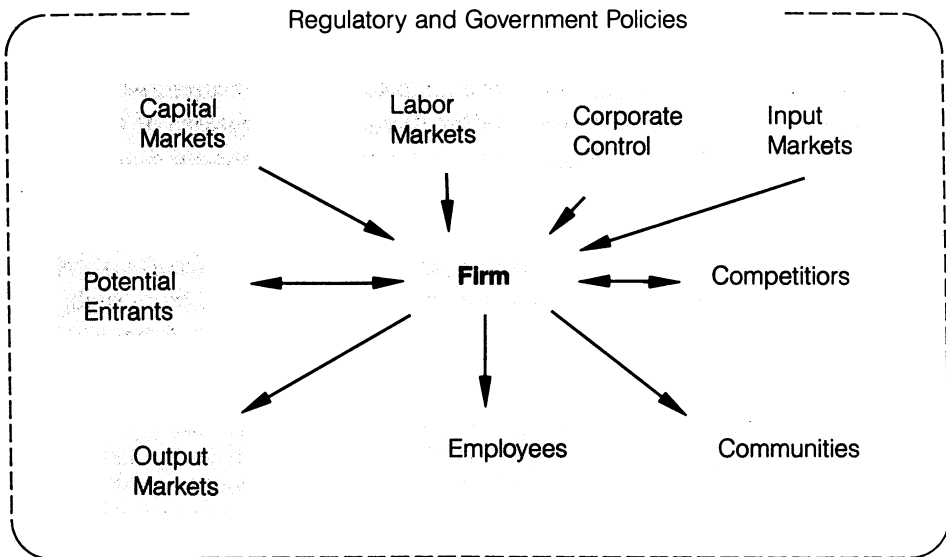
To summarize, information disclosure is not different, in principle, from other major corporate activities. Absent an active, well planned disclosure policy there is no assurance that the full value of the firm's other activities (investment, production, marketing) will be recognized by outsiders. Information disclosure can create value in two ways: directly, by narrowing the information gap (asymmetry) thereby decreasing investors' uncertainty about the firm (agency costs); and indirectly, by enhancing value-creating activities through a reduced cost of capital and improved suppliers' and customers' terms of trade. It is important to note that the detrimental consequences of the information gap and agency costs are particularly pronounced for companies which for certain reasons (small size, unconventional business, restricted analyst following) are not prominent in the public's mind set.²² Consequently, the benefits of a disclosure strategy will be particularly large for such companies.

Strategic Objectives and Costs of Disclosure

In contrast to most other corporate activities for which objectives and costs can be straightforwardly determined, assessing these parameters for information disclosure is more intricate. This is largely due to the fact that information disclosure often exerts simultaneous and contradictory effects on various stakeholder groups and constituents, particularly in the current climate of "freedom of information," where access to information cannot be restricted to particular stakeholders. Thus, for example, an optimistic earnings forecast will generally have a favorable impact on capital markets, yet might adversely affect (from management's viewpoint) labor negotiations and might even bring about regulatory intervention.

Example: Sometimes companies attempt to avoid the conflict by sending different messages to different constituents. Such an attempt was probably made by Transco: "Is Transco Energy in a 'stable' financial position? Or is it on the verge of suffering 'irreparable harm'? The answer depends on which Transco document you read—and investors would do well to make sure they get hold of both [a news release to investors and an appeal to the Federal Energy Regulatory Commission]." [*The Wall Street Journal*, October 4, 1991, p. C2] Such a multi-purpose communication policy can obviously backfire.

Accordingly, the cost-benefit analysis of a disclosure strategy should simultaneously consider the effects of disclosures on *all* the firm's major stakeholders and constituents, including government and regulatory agencies, as depicted in Figure 2.

Figure 2. The Firm's Environment**Disclosure Objectives**

Correcting Misvaluations—A misvaluation exists when the firm's *intrinsic* (true) value differs from its market value. Intrinsic value refers to the value based on the complete information set available to managers; that is, the value that would be established in the capital market were outsiders privy to all of managers' information. In addition to capital markets misvaluations, possible misvaluations occurring in other markets are depicted in Figure 2. Thus, for example, when the firm's growth prospects are not fully appreciated in the labor market, potential employees concerned with slow advance and lack of challenging opportunities will shy away from it.

Since, by definition, the source of misvaluations is information asymmetry (the information gap between insiders and outsiders) they can be mitigated by disclosure. Misvaluations can be temporary or permanent: a temporary misvaluation, for example, is a relatively low share price that will be corrected upon the release of the next quarterly report, while a permanent misvaluation is one caused by the absence of information that will not be forthcoming in the near term, such as on the firm's R&D program. It is important to note that even temporary misvaluations are harmful to shareholders: a week long undervaluation of the firm's shares will cause undue losses to investors selling during that week, unaware of the undervaluation. Similarly, a temporary overvaluation will increase the exercise (strike) price of employee stock options granted during that period, thereby reducing the incentive effects of such options as well as future employee gains. A temporary misvaluation is, therefore, not an excuse for inaction,

since managers have an implicit responsibility to investors to continually maintain market values as close as feasible to intrinsic ones.

Operationally, a rich set of indicators-sensors is available in real-time to identify corporate misvaluations. For example, the Price/Earnings (P/E) and Price/Book-Value (P/B) ratios reflect investors' perceptions of the relative growth potential of the company. Changes in these measures over time and/or persistent differences between a company's P/E and the industry average will suggest to managers the possibility of misvaluation. Similarly, changes over time or differences across firms in analysts' forecasts of earnings and in their buy/sell recommendations (readily available from such outfits as IBES and Zacks) are direct and sensitive indicators of the investment community perceptions.

Example: The indications about investors' perceptions managers can obtain from analysts' forecasts and recommendations are demonstrated by the following statement: "Analysts have lately turned slightly more positive on Sears [Roebuck]. According to Zacks Investment Research . . . a group of 15 analysts who follow Sears is expecting the company to earn \$3.75 a share this year, up from its prediction of \$3.60 a month ago. . . . But while earnings estimates are up, the analysts polled by Zacks still do not rate Sears a "buy." Only one has a "buy" recommendation, seven have "holds" on the stock, and four are recommending the sale of Sears shares." [*The New York Times*, May 28, 1991, p. C8]

Appreciation of outsiders' perceptions can also be obtained from changes in the "short interest" (i.e., the number of the firm's shares shorted by investors, expecting price decreases),²³ changes in the firm's share ownership by institutional investors (presumed to be relatively informed and sophisticated), and changes in the company's stock and bond trade volumes. It is also possible, though more expensive, to construct a stock valuation model based in part on information available to managers (e.g., the planned growth in cash flows from products currently under development) and compare periodically the company valuation derived from such a model with its market value to check for misvaluations. Misperceptions of the firm's potential by non-investor stakeholders (customers, suppliers, employees) can be identified by such indicators as the rate of customer defection, changes in suppliers' terms of trade and variations in the availability of qualified employees, to the extent that these changes are not shared by similar firms. When such changes are believed by managers to be caused by misperceptions (rather than reflecting reality), they should trigger the disclosure strategy to action.

Enhancing Liquidity—The liquidity of securities is generally measured by investors' cost of a "round trip," namely, the transaction costs of buying and selling a security. These costs include the direct, generally small commission paid to brokers and primarily the difference between the "bid" and "asked" prices—the "bid-ask spread"—which is rather large for relatively

small, thinly traded securities.²⁴ Investors trading in relatively illiquid securities will naturally demand higher returns (e.g., purchase shares at relatively low prices) to compensate them for the large transaction costs. The higher returns imply an increased cost of capital to the company which in turn will depress earnings and lead managers to forego investment opportunities that would have been acceptable under a lower cost of capital. It is, therefore, in the company's and its managers' interest to enhance the liquidity of securities.

The existence of significant information asymmetries is a major reason for low liquidity: when some investors are privy to value-relevant information not shared by others (e.g., on the state of a drug certification by the FDA), the "market maker" ("specialist") who sets security prices will increase the bid-ask spread as a protection against losses from trading with such "informed" investors.²⁵ By increasing the spread the specialist offers a lower purchase price and a higher selling price for the security, thereby enhancing his/her gains from trade. Since information asymmetry leads to low liquidity, the decrease of the information gap should enhance liquidity. This can be done by a disclosure strategy that will assure the release of timely, high quality information (of both positive and negative nature) concerning the company's current condition and its prospects. An even flow of credible information, as opposed to infrequent releases of highly surprising news, will decrease the volatility of security prices *over time*, further improving the risk and liquidity characteristics of securities.

Example: Financial analysts are averse to surprises, particularly repeated ones: "Household International Inc., disclosing another round of problems in its far-flung lending operations, said its first-quarter profits will be 40% to 50% below what analysts had been anticipating Some analysts find it irksome that Household's bad news has come in several installments. 'It's bad for them to keep on serving us surprises,' said Ms. Gelman." [*The Wall Street Journal*, March 27, 1992, p. A3]

Indicators-sensors of the liquidity of securities are the bid-ask spread and the security's price volatility, as well as the volume of trade (thin volume = low liquidity). A disclosure strategy aimed at enhancing liquidity will be based on a continuous monitoring of such indicators for significant changes or deviations from typical values of similar firms.

Changing Shareholder Mix—A disclosure strategy may also be aimed at achieving and maintaining a certain shareholder mix. Managers may be interested in a large institutional ownership since it generally provides a ready market for new stock or bond issues. Furthermore, demand for the firm's securities can be more readily enhanced by providing specific, tailor-made information to a few large investors than to many small, geographically scattered, and largely uninformed shareholders.²⁶ Institutional investors are also believed to be effective evaluators of the company and its management's performance, and therefore a large institutional ownership is considered

a “good housekeeping seal” by lenders, suppliers, and customers. The downside of a large institutional ownership from managers’ viewpoint is due to the increased involvement of institutions (particularly the large pension funds) in firms’ governance (e.g., thwarting managerial attempts to erect antitakeover defenses, or pressing for lower executive compensation), as well as to the alleged short-term orientation of some institutions.

The company’s shareholder mix can be changed to some extent by information disclosure. Institutional investors require sophisticated, future-oriented information, suggesting that the provision of such information will increase their demand for the firm’s securities. On the other hand, by targeting disclosure to “sell side” (brokerage) analysts, or by communicating in the mass-media, a company can increase its visibility to and the demand for its securities by individual investors.

Detering Political and Regulatory Intervention—Economists and political scientists suggest a fourth objective of information disclosure—keeping politicians at bay.²⁷ Regulators and policymakers, pressed by various consumer, environmental, and anticorporate activist groups, are often on the lookout for unusual corporate behavior, such as abnormally high profitability and product prices (e.g., for AZT), significant increases in market share, or firms’ restructuring resulting in massive plant closings and layoffs.

Example: From the U.K.: “Big profits mean bad regulation. Or so you would think from the outcry that greeted British Telecom’s announcement that its profits in 1990–91 were \$5.7 billion. . . . The complaints have grown louder as British Gas and some of the water companies have also unveiled fatter profits this week.” [*The Economist*, June 1, 1991, p. 55]

The financial reports of companies are the prime source of information for those looking for abnormally high profitability, market share gains, and other “suspect” corporate activities. This suggests the advisability of following a well-planned disclosure policy, such as the use of “conservative” (income depressing) accounting techniques and the release of special disclosures revealing, for example, the full cost (R&D, investment in production facilities, cost of capital, etc.) of bringing a drug to the market. Such an intervention-deterrent disclosure policy is particularly important for companies in politically-sensitive industries such as pharmaceuticals, oil and gas, and utilities.

Gaining Competitive Advantage—This disclosure aspect has received considerable attention in the strategy literature, where it is often referred to as “market signals.” However, such signals—generally in the form of “direct or indirect indication of its [the company’s] intentions, motives, goals”²⁸—are just a subset of the much broader spectrum of disclosures considered in this study. Rather than just attempting to deter potential competitors, the disclosure strategy presented here endeavors to narrow the information gap

between insiders and outsiders, thereby achieving important objectives, such as a market value increase, a cost of capital decrease, or improved liquidity of securities. Such disclosure activities are, of course, ultimately aimed at enhancing competitiveness, as are the entry-deterrence signals discussed in the strategy literature.

The Costs of Disclosure—The development of a disclosure strategy, as that of any other strategy, involves the evaluation of benefits (discussed above) against costs. Costs of disclosure can be broadly classified into two categories: the *direct* costs of processing and disseminating the information; and the *indirect* costs, including those resulting from the impact of disclosures on company decisions and activities (e.g., the impact of a negative earnings forecast on suppliers' terms of sales and credit), the competitive position costs (e.g., benefiting competitors by disclosing proprietary information), and litigation costs. While the direct information costs are substantial,²⁹ the *incremental* costs of implementing a disclosure strategy are probably of secondary importance, since much of the information required is routinely generated by the firm's accounting system. Infrequently, a disclosure strategy will call for independent certification and validation of information, such as the "due diligence" accompanying a public offering, the rating of the company's bonds or the use of experts (e.g., engineers, actuaries, legal counsels) to provide opinions supporting the firm's disclosures. Such costs are easy to estimate and incorporate in the cost-benefit analysis of disclosure.

The indirect costs resulting from the impact of disclosures on company activities and its competitive position can be substantial, yet no systematic evidence exists about the magnitude of these costs. For example, despite the frequent reference to the potential benefits to competitors from disclosing proprietary information in the economics and strategy literature, I am unaware of studies attempting to document the seriousness of these costs. Not much can, therefore, be said at this stage about the indirect costs of information disclosure.

Of the various disclosure cost categories, the potential cost of litigation probably concerns U.S. executives most. Many executives feel "torn" between the insistent demand of analysts and institutional investors for updated, particularly future-oriented information and their legal counsels' frequent advice to abstain from divulging such information. Between the need to promote products and the concern of litigation when such products fail. While a comprehensive discussion of the legal issues related to corporate disclosure is obviously beyond the scope of this study, some general comments on the "law and economics of disclosure" are called for.³⁰

First, those who seek solace in a "no voluntary disclosure" policy should be aware of a fundamental attribute of information in a competitive environment: *no news will generally be perceived as bad news*. When outsiders

(analysts, customers) have reason to believe that managers possess value-relevant information yet choose not to disclose it, they will suspect the worst and act accordingly: sell the stock or cancel outstanding orders.³¹ For example, when a company releases a sales forecast or any other statement about its operations while a close competitor keeps silent, investors, customers, and suppliers will interpret the silence as bad news, implying that the competitor's performance is weak relative to that of the disclosing company. Similarly, when a significant event affecting a broad segment or industry occurs (e.g., a sharp decline in real estate values affecting many banks), investors and depositors will view with considerable trepidation the companies that choose not to comment on the event's impact on their operations and financial condition. Even a late release of a quarterly or annual financial report is a cause for concern, since it is well known that companies with good news tend to release their reports soon after year- or quarter-end.³²

Example: "Gap Inc.'s monthlong stock slide accelerated into a rout Friday [a one-day 15.4% price decrease], as analysts and institutional holders suddenly soured on the near-term prospects for the formerly high-flying apparel retailer. . . . Analysts say . . . the company encounters increasing price resistance from customers, a sluggish start to the fall buying season and negative reaction to changes in its product mix. . . . The San Bruno, Calif.-based concern on Friday declined repeatedly to comment on the drop in its share price. But yesterday, Gap broke a longstanding company policy against projecting earnings and disclosed that the preliminary data indicated net income could fall as much as 33% for its current third quarter ending Oct. 31. Gap's reticence to divulge information about its current quarter apparently also played a part in the drop Friday." [*The Wall Street Journal*, September 21, 1987, p. 32]

Thus, when a company operates in a competitive environment and is closely monitored, a nondisclosure policy will often result in protracted periods of decline in its securities' values and large price volatility upon disclosure of financial results.

Second, even from a narrow "minimization of litigation cost" point of view, it is highly questionable whether a "no voluntary disclosure" policy is a safeguard against litigation. While corporations are under no general affirmative duty to publicly disclose material new developments, except for those specifically required by laws and regulations (e.g., quarterly reports or when insiders trade on confidential information), they have a duty to *update* or *correct* any previous disclosures that they have made, including information contained in quarterly reports and other mandatory disclosures, if those disclosures become inaccurate, incomplete, or misleading.³³ Since practically every management makes numerous statements about the company's operations in offering materials, annual and quarterly financial reports (particularly the "MD&A" section), and in comments to analysts' inquiries, plaintiffs will usually find it easy to allege that such prior statements became misleading in light of the information at issue (e.g., a large order cancellation) and hence management had a duty to disclose it.³⁴

Example: Recent SEC action questions even the general assumption that corporations are under no affirmative duty to disclose new developments, except for correcting prior statements. “The SEC charged that Caterpillar didn’t inform investors that nearly 25% of its 1989 earnings came from its Brazilian unit, and didn’t properly warn that such strong profit at the unit and whole company probably wouldn’t recur the next year [Caterpillar settled without admitting or denying wrongdoing]. . . . Security lawyers said the case—the first to focus solely on management discussion—would significantly affect the thinking of corporate America. . . . Simply put, he [an SEC enforcement official] added, if the management of a company knows something that could have a material impact on earnings in the future, officials have an obligation to share that information with shareholders.” [*The Wall Street Journal*, April 2, 1992, p. A3]

Thus, a strict no-voluntary-disclosure policy is not a safeguard against litigation. Furthermore, it will in general increase investors’ uncertainty and concern about the company, leading to lower security prices (i.e., higher cost of capital) and low liquidity.³⁵ Such adverse effects of no disclosure are particularly detrimental to small companies which, in general, encounter difficulties attracting analysts’ and institutional attention. The alternative to a strict no-disclosure policy is a carefully planned and executed disclosure strategy.

Strategy Implementation

The objectives of a disclosure strategy as well as the set of sensors-indicators that could be used to monitor the company’s state relative to the desired level of these objectives were outlined above. I now turn to the third major element of the strategy—the *disclosure actions* available to management. These actions are classified into three categories:

- disclosure choices within the legally-mandated set of Generally Accepted Accounting Principles (GAAP);
- voluntary statements and communications by corporate executives; and
- actions or “commitments” aimed at enhancing the impact of disclosures.

Throughout the following discussion the effectiveness of disclosure actions will be evaluated and ranked according to their “information content,” which is defined as the impact the disclosure is expected to have on the receivers’ decisions and actions.³⁶

Within-GAAP Disclosures—These are the choices available to managers within the regulated domain of GAAP. The latitude (choice set) available here is very wide: in computing earnings and asset values managers can choose among various inventory (LIFO, FIFO, average) and depreciation (accelerated, straight line) techniques, select one of two alternative methods of accounting for corporate acquisitions (purchase, pooling), or choose to report income from long-term projects by either the “finished projects” or

the “percentage of completion” method, to name just a few alternatives. In addition to alternative accounting *techniques*, managers have considerable leeway in making the multitude of *forecasts* and *estimates* supporting earnings and asset values. For example, the provision for doubtful receivables (loan loss reserve) can be based on different assumptions about the future state of the economy, the estimation of the useful lives of assets for depreciation depends, in part, on predictions of technological changes, and the expectation of future wage and salary increases required for the pension liability computation depends on assumptions about future inflation rates and employee productivity. These and the many other within-GAAP choices have a significant affect on the information reported to outsiders and presumably on their decisions.³⁷

Example: General Motors Corp. revised in 1987 the estimated service lives of its plant, equipment, and special tools, as well as the rates of depreciation for automobiles on operating leases to retail customers. These changes increased income by \$1,491 million, amounting to 58% of GM’s reported operating income for 1987 (\$2,569 million).

What should guide managers’ within-GAAP disclosure choices? Conformity with the accounting practices used by peer companies is one consideration since it is expected to positively contribute to securities’ value and liquidity. The reason: such conformity reduces analysts’ and institutional investors’ costs of evaluating the company’s performance within its industry. Occasionally, managers wish to make specific “statements” by the use of accounting techniques, such as the massive writedown of asset values (or write-up of reserves) known as the “big bath,” which is generally aimed at providing a new management team with a clean slate unencumbered by past mistakes and asset overvaluations.³⁸ Sometimes, accounting techniques are aimed at portraying a favorable managerial performance intended to affect takeovers or proxy contests.³⁹ But the overriding consideration in choosing among alternative accounting techniques should be to convey management’s message in the most effective and credible manner. An important determinant of such effectiveness and credibility is the conservative-aggressive quality of accounting techniques.

Conservatism in financial reporting refers to the impact of accounting techniques and estimates on reported earnings and asset values: techniques yielding relatively *low* earnings and asset values (e.g., LIFO, accelerated depreciation, short estimates of asset lives, fast amortization of goodwill) are considered conservative, while those leading to relatively *high* reported earnings (e.g., FIFO, straight-line depreciation, the “pooling method” for corporate acquisitions, capitalization of interest) are considered aggressive (or “liberal”). Sometimes managers will attempt to boost sagging earnings and stock prices (as well as their compensation), or otherwise draw investors’ attention by reporting significant earnings increases based on aggressive accounting. This “strategy” often backfires. It is by now widely

known that companies using aggressive accounting tend to underperform their peers,⁴⁰ and that an escalation of aggressiveness, such as an earnings boost resulting from a change in accounting techniques, is often a harbinger of serious operational difficulties.⁴¹ Consequently, conservatively reported earnings, often characterized by analysts as of “high quality,” receive in the market a higher price multiple (valuation) than aggressive earnings.⁴² Particularly aggressive accounting might even lead to a breakdown of credibility of managers’ communications.

Example: Alarmed by sinking credibility among customers and investors because of rampant manipulation and aggressiveness of financial reporting, executives of more than a dozen software makers (e.g., Lotus Development Corp., Ashton-Tate Corp. and Sybase Inc.) announced on October 9, 1990 the formation of an industry self-policing group—the Software Business Practices Council, aimed at “reforming what its members call widespread, misleading and sometimes unethical marketing and accounting practices.” These practices “adversely affect the credibility and health of our industry,” a council statement says. [The quotes are from *The Wall Street Journal*, October 10, 1990, p. B1.]

Given that investors (and perhaps other stakeholders) discern the degree of conservatism underlying firm disclosures and assign a relatively high valuation to conservatively-based information, managers can increase the impact of their disclosures and enhance their reputation as credible communicators by systematically following a conservative disclosure strategy. Such a strategy will be most effective when the credibility of disclosures is a priori suspect, such as in the case of relatively small, young, new technology, or financially distressed companies.⁴³ Conservative disclosures might in some cases be costly if investors misperceive the relatively low levels of reported earnings and asset values to indicate poor operating performance rather than the result of accounting techniques. Accordingly, the optimal level of choice along the conservative-aggressive spectrum should be determined by weighing benefits against costs, rather than necessarily adopting the most conservative accounting techniques available.

Voluntary Communications—This second disclosure dimension refers to the public announcements that may be released by management, such as forecasts of sales and earnings, disclosures of planned capital expenditures and R&D, announcements of strategy changes, and the provision of background information (e.g., the Management Discussion and Analysis section of the financial report). The information content or impact of voluntary disclosures is mainly determined by the *prospective* nature of the message and the degree of its *verifiability* (i.e., outsiders’ ability to evaluate after the fact the accuracy of the disclosure). In general, the more prospective and verifiable the disclosure, the stronger will be its impact. For example, a point estimate of future earnings (e.g., “earnings next quarter will be \$3.75 a share”) will affect investors’ perceptions more strongly than a

qualitative forecast (“the earnings prospects are good”), while both such prospective disclosures will be more effective in changing perceptions than a retrospective communication explaining, for example, the firm’s past performance. The reason is that future-oriented disclosures, if credible, exert a direct and predictable effect on perceptions and valuations, while retrospective communications have, at best, an indirect, largely unpredictable effect.⁴⁴ Furthermore, quantitative (point-estimate or range) future-oriented communications are more effective than qualitative disclosures, since they can be verified by investors after the fact. Managers, aware of such verification and the penalty for erroneous or misleading disclosures, are therefore expected to be more careful and truthful in releasing verifiable information; hence the stronger impact.

The impact of voluntary disclosures will depend, to a large extent, on the *credibility* (reputation) of management. Maintaining credibility requires a commitment to *ongoing* communication with outsiders, rather than haphazard disclosures under duress (e.g., a reaction to a significant drop in stock price). Credibility is predicated on a *long-term*, consistent disclosure strategy, where bad (i.e., below expectations) as well as good news are disclosed. Managers should recognize that the cost to financial analysts and institutional investors of disappointments (e.g., reported earnings falling substantially short of their forecasts) are generally higher than their benefit from positive surprises. This asymmetry calls for considerable care and forthrightness in disclosing events which might negatively affect the company’s operations along with an elaboration of the actions taken to deal with these events. In general, the strategy should be aimed at minimizing investors’ surprises, particularly the negative ones.

Example: One way of maintaining ongoing communication and minimizing surprises is to guide analysts. “Darwin E. Smith, Chairman and CEO [Kimberly-Clark Corp.], cautioned that analysts were overly optimistic about the company’s expected 1992 performance. He confirmed analysts’ 1991 per-share earnings estimates of \$6 to \$6.20. . . . However, he said 1992 earnings will be lower than analysts’ forecasts of \$6.40 to \$7.20 a share. . . . He estimated that 1992 earnings will range from the 1991 level to a “high” of \$6.40.” [The Wall Street Journal, November 18, 1991, p. C20] Or, “Coca-Cola Co. posted a hefty 22% increase in fourth-quarter earnings and said it planned a 2-for-1 stock split. . . . In an interview, Robert C. Goizueta, Coke’s chairman and CEO, said he expects the earnings momentum to continue. He estimated that net income would increase 18% to 20% in 1992.” [The Wall Street Journal, January 31, 1992, p. A3]

Commitments—The third dimension of disclosure actions consists of the “commitments” (signals) managers can provide to enhance the information content (impact) of disclosures. Some such commitments are in the form of financial decisions (such as a dividend increase or a stock repurchase) where the commitment results from the increased burden on future cash outflows, while other commitments (e.g., an increase in insiders’ share

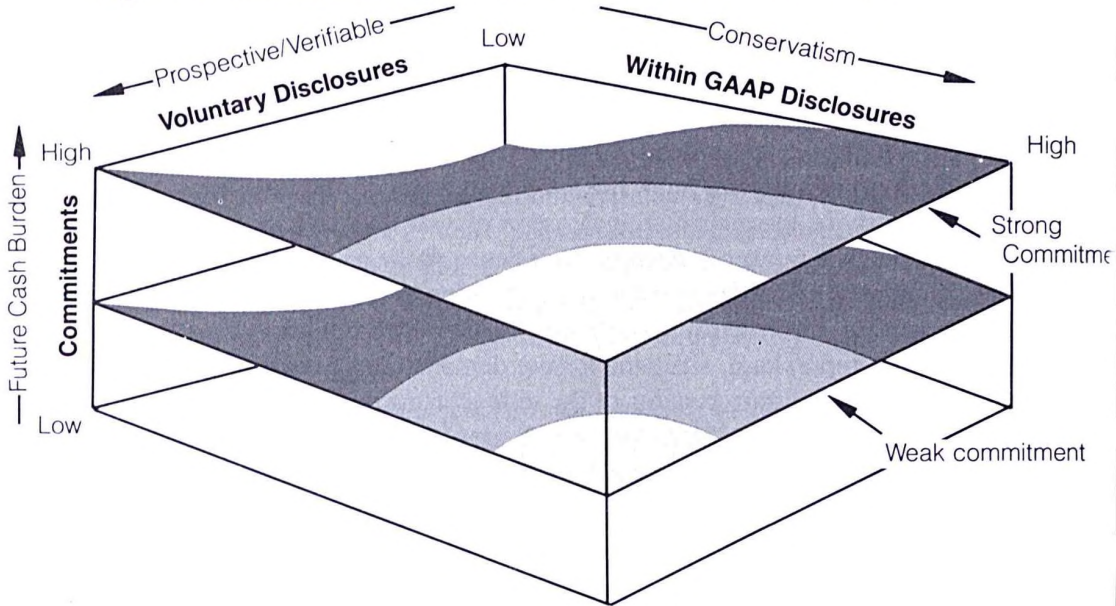
ownership) raise managers' stake in the company's performance. For example, the impact of a reported earnings increase can be enhanced by a simultaneous announcement of a dividend increase, demonstrating management's confidence that the reported earnings increase is not due to temporary circumstances, rather the higher earnings will persist in the future and provide for the larger dividend payments.⁴⁵ When such a commitment is in the form of a special (one time) dividend its credibility and impact will obviously be lower than an increase in regular dividend, since the former reflects a weaker managers' confidence in the persistence of earnings. Similarly, an announcement of an *intention* to repurchase stock accompanying a restructuring program is a weaker commitment than an *actual* stock repurchase, since the former demonstrates a relatively weak confidence in the future benefits of the restructuring program. An actual share repurchase funded by debt that will have to be serviced in the future demonstrates a strong confidence in the restructuring. Thus, the effectiveness of a financial commitment in enhancing the impact of disclosures will be generally determined by the burden it places on future cash flows.

Example: General Dynamics Corp. released on September 25, 1991, an upbeat forecast of third quarter 1991 earnings, saying, "earnings will exceed some analysts' forecasts." Apparently, being aware of investors' skepticism of the prospects of defense contractors given sharp cuts in the defense budget, General Dynamics felt necessary to add a commitment to the voluntary disclosure: it announced that management is considering various options for the excess cash, including increasing dividends and repurchasing stock. This is, of course, a relatively weak commitment, since no firm dividend or repurchase obligation was made. Nevertheless, General Dynamics share price increased on the day of this announcement by 8.5% (the Dow Jones industrials decreased that day by 0.3%).

Additional commitments and devices that may enhance the impact of disclosures are stock splits and stock dividends; increases in the stock ownership of insiders (managers and board members);⁴⁶ increases in the firm's leverage (debt/equity ratio), demonstrating managers' confidence that future earnings will be sufficient to service the higher debt; the expansion of the component of managers' compensation which is based on the firm's performance;⁴⁷ the disclosure of experts' (engineers, economists, tax lawyers) statements attesting to the technical or legal validity of managers' statements; and the use of bond raters and credit experts to attest to the firm's solvency status.

Figure 3 summarizes the three dimensions of disclosure actions available to managers in increasing order of effectiveness, as one moves outward (and upward) from the origin. The two surfaces indicating the impact of disclosures (e.g., in enhancing share prices) increase as: the level of conservatism of the within-GAAP financial information increases; the prospective and verifiable nature of voluntary disclosures increases; and the level of commitments increases (upper surface reflects a stronger commitment,

Figure 3. Information Disclosure Actions and Their Impact



say a dividend increase, than the lower surface). Note that Figure 3 abstracts from the costs of disclosure, suggesting (unrealistically) a monotonic increase in effectiveness as the levels of conservatism/verifiability/commitment increase.

Concluding Remarks

The impact of voluntary information disclosure in the capital as well as other markets in which companies operate is often substantial. Accordingly, information disclosure is not inherently different from other corporate activities such as investment, production, and marketing, and it shares with such activities the fundamental characteristics of promising benefits and incurring costs. Given that without an active, long-term disclosure strategy there is no assurance that the full value of the firm's other activities will be reflected in a timely manner in the various markets in which it operates, the need for a disclosure strategy arises. A disclosure strategy should be of particular interest to top management, since disclosure is among the few corporate activities *practiced directly* by executives, as contrasted with most other activities which are delegated to subordinates. Furthermore, a disclosure strategy should be of particular concern (and benefit) to relatively small, lightly followed, new technology companies, and those operating in "politically sensitive" industries.

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9. This gain reflects the tendency of forecasting firms to be above-average performers and thus to release "good news" forecasts. Note, however, that the positive market reaction *at the time* of the forecast caused firm values to increase well before the financial statements confirming the good performance were publicly released.
10. Skinner, op. cit.
11. R. Woolridge and C. Ghosh, "Dividend Cuts: Do They Always Signal Bad News?" *Midland Corporate Finance Journal* (Summer 1985), pp. 20-32. An example of a "reasoned" cut: On December 6, 1983, Gould Corp. decreased its quarterly dividend from 43 to 17 cents per share, stating that the decision was intended to "conserve cash that can be used to finance the growth of its electronic business." On the day of this 60% dividend cut announcement, Gould stock closed up \$0.50, while the market was virtually unchanged.
12. R. Hoskin, J. Hughes, and W. Ricks, "Evidence on the Incremental Information Content of Additional Firm Disclosures Made Concurrently with Earnings," *Journal of Accounting Research*, supplement 1986, pp. 1-36.
13. Lev and Thiagarajan, op. cit.

14. G. Foster, "Briloff and the Capital Market," *Journal of Accounting Research* (Spring 1979), pp. 262-74. For a recent Briloff commentary, see the article on Waste Management Corp.: "Recycled Accounting," *Barron's*, August 6, 1990. Waste Management's stock price plummeted 7.9% on that day (the Dow Jones industrials decreased 3.3%) for a total shareholder value loss of \$1.5 billion.
15. For example, Perkin-Elmer Corp., in announcing its plan to offer the public up to 19% of its minicomputer business, stated in a *Wall Street Journal* advertisement (February 19, 1986):

"Higher visibility and a sharp, singular focus will . . . lead to increased recognition in the financial community where shareholders will be able to benefit from its [the new subsidiary] full potential."
16. K. Schipper and A. Smith, "Equity Carve-Outs," *Midland Corporate Financial Journal* (Spring 1986), pp. 23-32. In some cases the price increases were very large: for example, Condec Corporation's 1981 offer to sell 20% of the equity in its wholly owned subsidiary Animation resulted in a market-adjusted price increase for Condec of 19%.
17. R. Smiley, "Empirical Evidence on Strategic Entry Deterrence," *International Journal of Industrial Organization* (June 1988), pp. 167-80.
18. For elaboration on the relation between disclosure and cost of capital, see D. Diamond and R. Verrecchia, "Disclosure, Liquidity, and the Cost of Capital," *Journal of Finance* (September 1991), 1325-59.
19. See S. Myers and N. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have," *Journal of Financial Economics* (June 1984), pp. 187-221; where the link between the information gap (asymmetry) and decreased company investment is established.
20. For elaboration, M. Jensen and W. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics* (October 1976), pp. 305-60.
21. See J. Stein, "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior," *Quarterly Journal of Economics* (November 1989), pp. 655-69. A specific example: concerns with suppliers' loyalties are evident in the following comment. "Chrysler, like the others in the Big Three, does not want investors, suppliers or lenders to get the idea that it is paring spending for new models, a perception that would only worsen its problems on the showroom floor." *The New York Times*, May 16, 1991, p. C1.
22. This is the concept of "neglected firms" in the finance literature. See A. Arbel and P. Strebel, "Pay Attention to Neglected Firms," *Journal of Portfolio Management* (Winter 1983), pp. 37-42. Also, D. Dubofsky and J. Grott, "Relative Information Accessibility for OTC Stocks and Security Returns," *The Financial Review* (February 1986), pp. 85-102.
23. For example, the *Wall Street Journal*, reviewing the monthly (7/15/1991 to 8/15/1991) changes in the "short interest" of Nasdaq stocks, noted [August 27, 1991] that the short interest was up in both Xoma Corp. (60%) and Centocor Inc. (46%), as the two biotechnology companies were locked in a patent battle. The average short interest in all OTC stocks increased only 5.6% over that 30-day period.
24. For example, Amihud and Mendelson ["Liquidity and Cost of Capital: Implications for Corporate Management," *Journal of Applied Corporate Finance* (Fall 1989), pp. 65-73] report that in their sample the spreads ranged between 0.5% of the stock price for the low-spread stocks to an average of 3.2% of the stock price for the group of large-spread stocks. When a stock is traded several times a year, a 3.2% cost for each trade will quickly add up to a very substantial expense.
25. For elaboration on the relation between information asymmetry and liquidity, see L. Glosten and P. Milgrom, "Bid, Ask and Transaction Prices in a Specialist Market with

- Heterogeneously Informed Traders," *Journal of Financial Economics* (March 1985), pp. 71-100, and Amihud and Mendelson, op. cit.
26. "The key, I think, to having good communication with the investment community is to have large shareholders . . . their presence would close this communication gap [between management and shareholders] that otherwise reduces the value of large public companies with a broadly dispersed shareholder base. . . . In recent research, John Pound and I have found that across a broad sampling of industries, the presence of a large shareholder boosts price/earnings multiples by roughly 10 percent." R. Zechhauser, in "Lead Steer Round Table," *Journal of Applied Corporate Finance* (Fall 1989), pp. 43-44.
 27. For example, S. Pelzman, *Regulation of Pharmaceutical Innovation: The 1962 Amendments* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1974).
 28. M. Porter, *Competitive Strategy* (New York, NY: The Free Press, 1980), p. 75.
 29. For example, a survey revealed that the average cost of producing an annual financial report is \$3.37 per copy [survey conducted in 1990 by Padilla, Speer, Beardsley, Inc.].
 30. For discussion of the legal issues in disclosure, see, for example, H. Bloomenthal, *Securities Law Handbook* (New York, NY: Clark Boardman Company, Ltd., 1990); T. Hazen, *The Law of Securities Regulation*, 2nd edition (St. Paul, MN: West Publishers, 1989), Section 13.10; and W. Walton and C. Brissman, *Corporate Communications Handbook* (New York, NY: Clark Boardman Company, Ltd., 1991), Chapter 2.
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 32. For empirical evidence indicating that firms tend to disclose good news early and postpone the release of bad news, see D. Givoly and D. Palmon, "Timeliness of Annual Earnings Announcements: Some Empirical Evidence," *The Accounting Review* (July 1982), pp. 486-508. Also, A. Chambers and S. Penman, "Timeliness of Reporting and the Stock Price Reaction to Earnings Announcements," *Journal of Accounting Research* (Spring 1984), pp. 21-47.
 33. See L. Loss and J. Seligman, *Securities Regulation*, 3rd edition (Boston, MA: Little, Brown, 1991), p. 3517.
 34. See J. Alexander, "Do the Merits Matter? A Study of Settlements in Securities Class Actions," *Stanford Law Review* (February 1991), pp. 497-598.
 35. In fact some legal scholars argue that it is easier for plaintiffs to prove management's intent to defraud (i.e., "scienter") in the case of a failure to disclose information than in the case of an actual disclosure, see J. Bauman, "Rule 10b-5 and the Corporations Affirmative Duty to Disclose," *The Georgetown Law Journal* (April 1979), p. 943.
 36. This definition of information content of disclosures is consistent with that of Information (Communication) Theory [e.g., C. Shannon and W. Weaver, *The Mathematical Theory of Communication* (Urbana, IL: The University of Illinois Press, 1964)], in which the information content of a message is measured by the extent of change it causes in the receiver's prior expectations with respect to an event. A change in expectations will generally lead to an action (e.g., buying the shares of the communicating company), hence the link between information content of disclosures and impact on the receivers' decisions and the consequent outcomes (e.g., a share price increase).
 37. The effect of using alternative accounting techniques and estimates on stakeholders' (investors, suppliers, customers, regulators, employees, etc.) decisions is still to a large extent an open issue. Particularly intriguing is the question whether sophisticated investors can be "fooled" by accounting techniques, or whether they are able to "see through

- the numbers." Accounting techniques may also affect managers compensation and loan covenants. For a discussion of these issues, see R. Watts and J. Zimmerman, *Positive Accounting Theory* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1986).
38. On the "big bath" see J. Elliott and W. Shaw, "Write-Offs as Accounting Procedures to Manage Perceptions," *Journal of Accounting Research* (supplement 1988), pp. 91-119.
 39. Evidence consistent with this use of accounting techniques is reported in L. DeAngelo, "Managerial Competition, Information Costs, and Corporate Governance," *Journal of Accounting and Economics* (January 1988), pp. 3-36.
 40. S. Lilien, M. Hellman, and V. Pastena, "Accounting Changes: Successful Versus Unsuccessful Firms," *The Accounting Review* (October 1988), pp. 642-56.
 41. Dharan and Lev ["The Valuation Consequences of Accounting Changes: A Multi-Year Examination," working paper, Rice University, May 1991] provide evidence that companies engaged in aggressive (income increasing) accounting changes suffer, on average, significant market value declines during the five years after the change.
 42. For evidence, Lev and Thiagarajan, *op. cit.*; E. Imhoff and J. Thomas, "Accounting Quality," working paper, University of Michigan, 1989.
 43. These company attributes were pointed out by the Treadway Commission [*Report of the National Commission on Fraudulent Financial Reporting*, October 1987] as characterizing companies which are frequently involved in fraudulent financial reporting.
 44. For evidence, see R. Hoskin, J. Hughes, and W. Ricks, *op. cit.*
 45. Indeed, Dharan ["Accounting Changes and Information about Earnings: An Examination with Dividend Signals," working paper, Rice University, 1989] provides evidence that the price reaction to earnings increases accompanied by dividend increases is, on average, larger than the reaction to similar-size earnings increases announced without the dividend increase.
 46. Conversely, decreases in insiders' holding adversely affects investors' perceptions. For example, in a report on The Limited, *The Wall Street Journal* [August 12, 1991, p. C2] notes: "Another possible concern [to security analysts] is that 19 company insiders have sold Limited stock this year. None have disclosed open-market purchases . . . The median insider sold 16% of holding."
 47. Evidence on investors' positive response to an increase in the performance-based component of managers' compensation is provided by J. Brickley, S. Bhagat, and R. Lease, "The Impact of Long-Range Managerial Compensation Plans on Shareholder Wealth," *Journal of Accounting and Economics* (April 1985), pp. 115-29.

The Emerging Flexible Organization: Perspectives from Silicon Valley

Homa Bahrami

M*any enterprises are in the midst of fundamental changes in organizational designs and management practices. Pioneering and traditional companies alike are experimenting with novel organizational structures and management processes in order to accommodate the fast pace of technological change, global competition, and the emergence of a knowledge-based economy. These developments are collectively precipitating a move away from monolithic and rigid organizational designs which were geared for repetitive transactions and routine activities. The resulting impetus is toward flexible and agile organizational forms which can accommodate novelty, innovation, and change.¹*

This article describes some of the organizational features of the emerging flexible enterprise and is based on field studies of 37 high-technology firms in California's Silicon Valley.² These firms are experimenting with new organizational arrangements and are at the forefront of experiencing the challenges of the information era. Their business foundations are anchored in knowledge-based industries. Many compete in global markets and face global competition. They employ educated, young, and mobile professionals with high expectations. Some enter, or even, create pioneering markets and develop as yet untested products without the benefit of existing role models and blueprints for success. Moreover, they must manage novelty

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and continuous changes in products designs, competitive positions, and market dynamics. As Bill Joy, a co-founder of Sun Microsystems, observes:

“High-technology obeys the iron law of revolution . . . the more you change, the more you have to change . . . you have to be willing to accept the fact that in this game the rules keep changing.”³

The Changing Organizational Landscape

An extensive array of organizational experiments have been under way in many firms during the past decade. Some of these developments have turned out to be transient fads, whereas others point to fundamental shifts in organizational design and management practice. Some of the more prevalent developments include delayering, team-based networks, alliances and partnerships, and a new employer-employee covenant.

The delayering and down-sizing trend was initially triggered by the need to reduce costs. However, it also reflects the administrative impact of information and communication technologies. Increased use of technologies, such as electronic mail, voice mail, and shared databases, has, over time, reduced the need for traditional middle management, whose role was to supervise others and to collect, analyze, evaluate, and transmit information up, down, and across the organizational hierarchy. The potential consequences of delayering are intended to be, in part, faster response to competitive and market changes, larger spans of control, increased workloads, and a broader range of assignments and roles for individuals and groups. One of the expected benefits of flatter hierarchies is the organization's ability to become flexible and responsive by reducing the time lag between decision and action—enabling faster response to market and competitive dynamics.⁴

In an attempt to manage cross-unit projects and to reduce time-to-market, many firms are increasingly relying on multi-functional, multi-unit teams. Indeed, during the last decade “teams” and “groups” have become part of our managerial vocabulary and are now viewed as a central organizational building block.⁵ A key advantage of teams is their intrinsic flexibility. They can be formed, re-formed, and disbanded with relative ease; they can bypass the traditional hierarchy; and their composition can evolve over time in order to blend different skills and address changing priorities.

Reliance on sub-contracting has been prevalent in a number of industries for some time.⁶ Recently, however, there has been a substantial increase in alliances which affect core business activities—such as product development, distribution, and financing. This trend is giving rise to complex organizational forms and business relationships. A number of reasons have been put forward to explain the rapid diffusion of such “hybrid” organizational forms. These include “changing environmental conditions, the limits of large-scale organization, and the importance of speed and

information.⁷ As Evans suggests, collaborative partnerships are a flexible mode of blending capabilities, sharing risks, and generating options.⁸

Recently, we have also witnessed a major re-assessment of the implicit lifetime contract between employers and employees. Many firms have re-examined their employment policies—initiating early retirement programs and other incentives to reduce the size of their workforce. As pointed out in other studies, the critical tradeoff in this context is between “corporate flexibility and individual security.”⁹ Many corporations rely on temporary workers, specialized vendors, and consultants in order to flexibly deal with unique contingencies. Additionally, this trend points to a fundamental shift in the foundation of employer-employee relationship, away from the traditional patriarchal orientation toward what may be characterized as a peer-to-peer relationship. This sentiment is echoed in the following comment which encapsulates the implicit relationship between Apple Computer and its employees: “You own your own careers; we provide you with the opportunities.”¹⁰

Collectively, these and other changes point to a somewhat radical re-shaping of the traditional organizational landscape.¹¹ As current trends indicate, contemporary firms need flexible and agile organizations that can effectively function in environments of continuous and kaleidoscopic, rather than periodic and paradigmatic, change.

Flexibility: The Emerging Imperative

Historically, the term “flexibility” has been used rather loosely—referring to a blend of capabilities and attributes that facilitate adjustments to change. However, as suggested in previous studies, flexibility is a polymorphous concept whose meaning varies according to the situational context.¹² For example, flexibility means “being agile”—fast on one’s feet, able to move rapidly, change course to take advantage of an opportunity or to side-step a threat. This capability is critical for enabling “time-based” competition, facilitating rapid response, and reducing product development cycles. It also refers to the ability to quickly redefine a position and re-focus in the midst of a dynamic engagement—such as an acquisition, new product introduction, or legal proceedings.

Flexibility, however, is not just synonymous with agility. It also implies the ability to be “versatile”—able to do different things and apply different capabilities depending on the needs of a particular situation. For example, employees with diverse capabilities are versatile in that they can readily switch between different assignments.

On the “defensive” side of the spectrum, flexibility also refers to qualities which enable an enterprise to endure when negatively affected by change. This attribute is reflected in concepts such as “robustness” or “resilience.” The former characterizes the capability to absorb shocks and withstand

perturbations—for example, by having excess slack or liquid assets. The latter refers to the ability to come back from the brink of disaster without bearing permanent scars or disabilities.¹³ Sometimes the events which trigger the need to change can be anticipated ahead of time. More often than not, however, firms need to respond to changes which are typically unexpected.

The point is that all these different attributes—spanning both offensive and defensive qualities—are needed in a truly flexible enterprise. The concept of flexibility, in an organizational context, refers to the ability to precipitate intentional changes, to continuously respond to unanticipated changes, and to adjust to the unexpected consequences of predictable changes. Put simply, strategic flexibility “is the ability to do things differently or do something else should the need arise.”¹⁴

All the different senses of flexibility are critical for the survival and success of high-technology companies. Indeed many of these firms are at the forefront of both, inflicting and responding to continuous change. Such environments exhibit a high propensity for what the economist Shackle termed “kaleidoscopic” change, where a small, apparently insignificant, change can dramatically alter the entire context.¹⁵

Due to short product life-cycles, technology firms have to quickly capitalize on narrow windows of market opportunity, introduce new products in rapid succession, and respond, in real time, to competitive and market dynamics. Organizational problems are further exacerbated by rapid and volatile growth patterns. Early success is no guarantee of long-term survival. An incumbent pioneer can be quickly eclipsed by a technological breakthrough, an unexpected spin-off, or a sudden shift in market conditions. Managing kaleidoscopic change is an everyday fact of life and a criteria for survival; it is not a one-time, periodic adjustment, or simply a corrective move following a crisis.

In view of these challenges, a number of innovative organizational experiments have been under way in many high-technology firms in Silicon Valley and elsewhere. Some pioneering moves have also been initiated by established corporations in the process of metamorphosis and transformation.¹⁶

Building Blocks of Flexible Organizational Designs

High-technology firms face significant organizational tensions in spite of their relative youth. Irrespective of their size or stage of development, they need to remain disciplined, lean, and focused, requiring minimal duplication of effort, stringent accountability, and effective control and coordination. However, a loose, hands-off management style is needed to manage expectant professionals, maintain a conducive environment for creative thinking, and provide the capability for rapid response to competitive and market developments. As depicted in Table 1, they need flexible organizational systems which can balance dialectical forces—facilitating creativity,

Table 1. Organizational Dilemmas

Control	Autonomy
Focus	Innovation
Global Products	Local Recipes
Less Duplication	Rapid Response
Time-to-Market	Future Products
Today's Performance	Long Term Vision

Managing Opposing Tensions

innovation, and speed, while instilling co-ordination, focus and control, and the staying power to withstand periods of adversity.

The following comments capture the essence of some of the dialectical tensions facing these firms: “We want an environment that enhances individual creativity, but we do not want chaos . . . we want people involved in decisions that affect their work and we want teamwork, yet we want our employees to have a bias toward action . . . we want small groups of dedicated workers (decentralization) but such groups may feel aimless or may be charging in the wrong direction with hidden agendas . . . we want people to stretch to reach tough goals, so our real emphasis is on easily-measured short-term growth and profits—but we should also have time to develop our employees for the longer haul, to promote from within, to monitor the atmosphere for creativity.”¹⁷

Similar tensions also seem to confront many established entities. Percy Barnevik, the CEO of ABB, describes his firm’s critical organizational challenge as dealing with three internal contradictions: “We want to be global and local, big and small, decentralized with centralized reporting.”¹⁸ The challenge facing British Petroleum is depicted in terms of a critical paradox: “How to reinforce its strengths as a corporation while allowing its constituent businesses much greater flexibility and speed of response.”¹⁹ Similarly, the modern “transnational” must simultaneously address the need for scale efficiency, local responsiveness, and continuous learning.²⁰

A Multi-Polar Organization—The traditional model of the industrial enterprise has been one of an all-powerful center with various subsidiaries. The center has historically formulated the strategic direction, consolidated and integrated divisional plans, allocated resources, and monitored performance. For example, in the classic multi-divisional structure, senior corporate management—assisted by their staff—have set the long term direction while the divisions have implemented the plans.²¹

This model of the omnipotent center which functions as the enterprise's brain has been subjected to much pressure as business enterprises have had to think and act quickly, re-calibrating their strategies continuously in fast-moving conditions. Under these circumstances, the traditional approach has several drawbacks:

- Rapid change demands quick reactions and continuous re-calibration. Separating the brain (the center—which plans a response) from the muscles (the line units—which enact the response) can lead to slow response and result in information distortion through hierarchical filtering processes.
- The executives with the most up-to-date understanding of evolving market realities are typically in the trenches. They are thus best-positioned to strategize *and* execute the necessary actions in real time as new imperatives unfold.
- Line managers in knowledge-based companies have the professional expertise and the educational background to undertake much of the strategizing and analytical work; assisted by new technologies, they can minimize their reliance on corporate support groups.²²

The emerging organizational system of high-technology firms is more akin to a “federation” or a “constellation” of business units that are typically interdependent, relying on one another for critical expertise and know-how. Moreover, they have a peer-to-peer relationship with the center. The center's role is to orchestrate the broad strategic vision, develop the shared organizational and administrative infrastructure, and create the cultural glue which can create synergies, and ensure unity of mission and purpose. However, these tasks are undertaken together *with* the line units, rather than for them. This sentiment is reflected in the following: “[The center's] mission is to support our business units in fulfilling their business goals, and perform the truly corporate services in an effective and cost efficient manner.”²³

Apple Computer is a case in point. Its main line units—although varying in size, scope, and style—have a peer-to-peer relationship with one another and with the center. The heads of the line units—Apple Products, Apple USA, Apple Europe, and Apple Pacific—are represented on its top management team together with the leaders of the corporate functions—finance, human resources, and legal and administrative services. Members of the different units collectively participate in setting and implementing the corporate direction; worldwide meetings (held twice a year) of the top 400 or so executives provide focused opportunities for discussing critical challenges; and the extensive movement of people between the units ensures that personal relationships are forged to enhance inter-unit cooperation.

Dualistic Systems—Many observers may have the impression that the organizational systems of high-technology companies are in a continuous

state of flux; that formal structures—in the sense of clear reporting relationships, grouping of skills, and concise assignment of responsibility, authority, and accountability—do not exist in their organic setting. Such an impression, however, only reflects one dimension of the organizational reality. Many firms we observed were both *structured and yet chaotic*; they had evolved dualistic organizational systems, designed to strike a dynamic balance between stability on the one hand, and flexibility on the other.

The first component is a substrate of the formal structure which only periodically undergoes major transformation. This provides a formal mechanism for grouping skills, clustering activities, and assigning reporting relationships, as well as a base unit which gives many employees an anchor of stability.²⁴ However, due to inertial forces, these bedrock structures can not be changed as frequently as may be warranted by internal and external changes. Many firms compensate for the relative inflexibility of the bedrock structure by using overlays of temporary project teams and multi-functional groups whose members are drawn from various operating units. These enable a firm to focus on critical assignments without causing major disruptions.

A good case in point is the structural evolution of ROLM Corporation, a pioneering telecommunications company which was acquired by IBM in 1984. During its 15 years as an independent company, ROLM went through 4 major re-organizations of its bedrock structure, although it formed and disbanded many temporary groups and project teams. As depicted in Table 2, the first major structural change was initiated in 1973 (four years after its founding) when it entered the telecommunications business. This involved a fine-tuning of its functional structure to embrace the new venture. The second re-organization occurred in 1977 when 3 autonomous divisions were set up to focus on different businesses: mil-spec computers (its original business), telecommunications products, and a new venture (later discontinued) in the energy management field. The third re-organization (which was largely confined to the telecommunications business) was initiated in 1981 when a hybrid structure was created to consolidate its end-user sales and service organization and to focus on the new initiative in office systems. A further re-organization was completed in February 1984, prior to the IBM acquisition. It resulted in a partly functional superstructure and divisional substructures devised to ensure effective co-ordination of its telecommunications and office products.

In many of the observed firms, such fundamental re-organizations of the bedrock structure were typically undertaken in response to, or in anticipation of, metamorphic events—such as changes in the composition of top management teams, strategic re-orientations, shifting priorities, performance setbacks, and resource constraints. Temporary teams, on the other hand, were used for a wide range of activities—including new product development, strategic assessments, and the formation of

Table 2. Organizational Evolution of ROLM Corporation: 1973–83

Year	Revenue (m\$)	Business	Organization
1973	3.6 Million	Mil-Spec Computers New Venture: PBX	Functional
1977	30.0 Million	Mil-Spec Computers; Digital PBX; New Venture: Energy Management	3 Stand-Alone Divisions
1981	294.5 Million	Mil-Spec Computers PBX Systems; New Venture: Office Systems	Hybrid: Partly Func- tional/Partly Divisional
1983	502.6 Million	Mil-Spec Computers PBX Office System	Functional Super- structure; Divisional Sub-structure

management processes. For example, in early 1984 ROLM formed a five-person team in the System Development Group (the product development arm of its telecommunications business) to set up a company-wide business planning process. Team members were drawn from various product divisions, they made their recommendations within 6 months, and the teams were subsequently disbanded.

Such dualistic systems enable high-technology firms to deal with a widely felt tension: how to create a relatively stable organizational setting within whose boundaries people and resources can be flexibly deployed. Bedrock structures are the relatively stable base units. Temporary teams are the flexible, rapid deployment overlay. They enable the organization to pool together different individuals at short notice, put them to work on diverse projects, and disband them once their task has been accomplished.

Front-Line Orientation—Historically, organizational roles and departmental activities have been divided into staff and line positions. The first category comprise functions whose power and influence are based on advisory or monitoring roles, with “the right to advise, rather than the power to decide.”²⁵ Typically, these groups have limited direct control over line operations, and hence over revenues and profits. Functions such as personnel, planning, and MIS, among others, have historically belonged to this category. By contrast, line functions, such as sales, manufacturing, or product development, have the “power to decide” with direct control over, and accountability for, revenues and profits. Critics have long argued that as a result, staff functions have been cushioned from the harsh realities of the “market.”

This instrumental distinction between staff and line functions is becoming increasingly blurred, not just in high-tech companies, but also in many traditional organizations.²⁶ The impetus for change has largely come from competitive pressures to reduce costs. Many staff functions are becoming directly exposed to the “front-line” realities of their internal customers—funding their operations by selling their services to the line units.²⁷

In many high-technology companies, support groups are also typically responsible for undertaking what would have traditionally been viewed as advisory assignments and are held directly accountable for the results. For example, an employee relations expert may deal with a disgruntled employee, and the training staff may actually design and deliver many courses. Other staff functions, such as strategic planning and business development, are more support-oriented, rather than control-oriented. These groups typically view their role as facilitators, consultants, and process managers, rather than as formulators of strategies and overseers of line activities.²⁸

This front-line orientation has re-assigned power and influence to those in direct contact with the market and competitive realities. This trend is further reflected in the fact that CEOs of a number of technology firms have dual roles and are directly accountable for specific line operations. For example, John Sculley, Apple’s Chairman and CEO, has also been partially responsible for the company’s product development group. In a recent interview, he made the following observation:

“As I look back over the last eight and a half years and say, what things would I have done differently, the one that really stands out is that I should’ve gotten involved in product development a lot sooner than I did. To lead a high-technology company, you really have to lead it through the technology and through the products.”²⁹

This orientation fuses the strategic and operational roles of senior executives—enabling them to re-calibrate strategies based on real-time information and realistic action plans.³⁰

Cosmopolitan Mindset—Many technology firms become global very early in their development. For example, it is not unusual to find young companies—less than 10 years old—with manufacturing, research, and distribution facilities in the U.S., Europe, Japan, and the Pacific Rim. Moreover, many generate more than a half of their sales outside the U.S., and have a large population of non-American employees.

Such a rapid process of globalization makes it necessary to develop a cosmopolitan mindset that incorporates different cultural assumptions and premises. This is a significant challenge since it requires balancing strong corporate values (which typically reflect the “home” culture) with a broad perspective (which accommodates the diverse viewpoints of global customers, employees, and competitors). Despite the inherent challenges, however, a pluralistic culture can provide considerable versatility by drawing on diverse perspectives, approaches, and solutions.

Apple Computer is a good case in point. Its executives have attempted to manage Apple not as an American entity, but as a global company: “we want to look and feel like a local company to our customers while successfully competing with worldwide corporations that rapidly leverage expertise and resources wherever they are located.”³¹ Apple strives to create a cosmopolitan organization—not with one heart rooted in U.S. culture, but with “multiple hearts which beat as one” reflecting the diversity of its markets and employees.³² It has attempted to create a pluralistic organization and a cosmopolitan culture in a number of ways:

- Its top management team is composed of different nationalities. Until 1990, a French-born executive was in charge of worldwide product development, manufacturing and R&D. A German-born national is its current President and an Australian has been in charge of the Asia-Pacific group. The composition of this team sends a strong symbolic message to its employees, partners and customers, reinforcing the value of cultural diversity.
- Workforce diversity is an important part of Apple’s human resource strategy. It is a key component of its recruiting plans, promotion policies, and management training and development programs.
- Apple is also focusing on other initiatives to further strengthen its global orientation. These include “dispersed expertise to leverage unique local talent, global dissemination of knowledge and skills partly through communication forums which bring together groups with similar interests, consistent treatment of global accounts with local look and feel, global account management information systems, integrated databases and networks, and global telecommunications facilities.”³³
- Simultaneous product launch in key global markets is another goal. For example, Claris Corporation, Apple’s software subsidiary, has set out to develop the U.S. and international versions of its products at the same time, so they can be distributed in its global markets soon after their U.S. introduction.³⁴

In summary, Apple’s strong corporate culture provides a few bedrock values, which provide “sameness” and give cohesion to its global operations. However, each region can exercise discretion in evolving its structure and style to accommodate different market conditions and cultural values. Apple’s genetic code permeates every unit, yet each has its own distinctive identity. In striking an effective balance, a key challenge is “figuring out what has to be the same so that everything else can be different.”³⁵

Capability-Based Organizations and Multi-Talented Employees—

Andrew Grove, the President and CEO of Intel Corporation coined the expression: “Our assets have legs; they walk home every day.”³⁶ Indeed, the core capability of high-technology companies is their know-how, which resides in people. The organization can thus be characterized as a montage

of individual capabilities and informal networks and relationships, rather than a series of pre-determined roles and positions and formal hierarchical relationships.

The pivotal importance of informal networks in high-technology companies is due to the fact that the productivity of knowledge-based entities depend on employees' capabilities, commitments, motivations, and relationships. They can not be programmed around pre-determined roles and positions in a machine-like hierarchy. Moreover, continuous change typically renders institutionalized roles and positions somewhat obsolete. An individual's effectiveness in getting things done is based on results and credibility, perceived reputation, and network of relationships, rather than on formal authority, job descriptions, and position in the hierarchy. In this context, titles, seniority, spans of control, formal power, and hierarchical position are not necessarily significant determinants of individual success and organizational power.

Moreover, in contrast to the specialized orientation of traditional entities, many high-technology companies build versatility into their organizations by leveraging their employees in different capacities, depending on their situational needs. This is reflected in the following comments which were made by the founder of a medical electronics firm: "I want to recruit people who are absolute experts in a given area but who can also apply their talents to other areas; "A" class players in their field, but also "B" and "C" class players in other fields."³⁷ Effective employees have the flexibility and the confidence to leverage their knowledge and capabilities across different areas as and when conditions change and new needs arise.

Despite the inherent difficulties, many firms try to make their employees more versatile by putting them through different experiences and rotating them through various assignments. For example, the chief financial officer of one company took over the responsibility for building and managing its direct sales and service organization, despite the fact that he had no prior sales experience. The assignment made sense because he was both negotiating with and acquiring a number of its existing distributors—requiring an understanding of the company's strategy, coupled with financial acumen, and personal trust relationships forged over a number of years. The chief administrative officer of a network-server company was given the additional responsibility for co-ordinating its major accounts programs in Japan, despite the fact that he had no previous sales experience or familiarity with the Japanese market; in this case the critical requirement was the coordination of the different functional groups in addressing the client's needs. The executive in question was ideally positioned to do this because he continuously interacted with the various groups as part of his on-going administrative responsibilities.

Developing versatile employees by exposing them to different experiences is not new or unique to the high-tech sector. As early as the 1970s, Royal Dutch Shell used its corporate planning group as a vehicle for

broadening its line managers' perspective and giving them a bird's eye or "helicopter" view of Shell's global operations.³⁸ Similarly, job rotation programs at companies such as IBM, Hewlett Packard, and many Japanese corporations have been a key component of their career planning systems for some time. What is different in the emerging high-tech sector is that employees need to possess a flexible mindset and the ability to adjust unexpectedly and quickly to the demands of a new assignment, without going through extensive training or being assigned the responsibility as part of a systematically planned career management program.³⁹

Semi-Permeable Boundaries—Much has been written in recent years about the rise of strategic alliances and collaborative partnerships. The consensus seems to suggest that such alliances are a novel form of "hybrid" organizational arrangement, provide a mechanism for pooling complementary capabilities, addressing rapid product development cycles, reducing risks, and providing strategic flexibility.⁴⁰ Moreover, in recent years they have proliferated into various forms, and are continuously evolving.

High-technology companies have been at the forefront of initiating and managing many types of strategic partnerships. These vary in form, scope, and longevity. Many companies have forged their fundamental business proposition and organizational infrastructure around partnerships. Apple, for example, collaborates with third-party software developers, dealers, distributors and resellers, and sub-system and component suppliers.

While such "leverage" models of business partnership are at the extreme end of the alliance spectrum, others may have a more limited objective. They may be used for financing purposes—as is the case with many Japanese investments in new start-ups.⁴¹ They may give the parties reciprocal access to geographic markets, or they may provide an effective way of pooling know-how and sharing risks in developing technologically advanced products. In many instances, they are an extension of the traditional supplier-customer relationships. Irrespective of their purpose, scope, or form, their continuous formation has broken down the solid walls which have historically separated the firm from its external stakeholders.

The emergence of these semi-permeable boundaries in the high-technology sector is organizationally apparent in a number of ways. Many firms have access to their partners' internal information systems through electronic mail networks. For example, Apple gives its partners—including software developers, consultants, dealers and resellers, and sub-system suppliers—access to its internal electronic mail system. This facilitates communication between the different groups and gives them timely information on new product releases, press announcements, and re-organizations, among other items.⁴² Additionally, it is a common practice for engineers working on joint development projects to be assigned to a strategic partner. The employee in question becomes a temporary employee of the partner for

a limited period of time—forging crucial relationships and gaining access to vital information about the partner’s culture and *modus operandi*.⁴³

In summary, the key organizational challenge facing many high-technology firms is balancing several opposing tensions: selling and servicing existing products while developing and bringing new ones on stream; remaining, disciplined, focused, and frugal, while continuously learning, experimenting, and re-calibrating; generating consensus, yet ensuring timely decisions; balancing individual contribution and teamwork; ensuring short-term profitability in the context of a long-term vision. The modern high-technology enterprise needs diverse capabilities and multi-faceted organizational arrangements to flexibly deal with these complex tensions. As depicted in Table 3, their organizational building blocks have evolved in order to address these tensions, and to provide different forms of flexibility.

The Emergence of a Bi-Modal Organization

Many firms appear to have walked a tightrope between these tensions without having allowed any one imperative to dominate the strategic and organizational context. These attempts cannot be described in monolithic, unidimensional terms, as simple recipes and “either/or” solutions. Their organizational systems were by no means chaotic, but neither were they in total control. They were not frugal although a cost-conscious mentality pervaded their style. The management teams were not mavericks, yet an entrepreneurial zeal and anti-bureaucratic sentiments were frequently observed. They focused on generating short-term results but did not lose sight of their long-term mission. The resulting organizational systems can be best depicted as “bi-modal”—in that they could accommodate opposing tendencies and yet function as coherent and cohesive concerns. Signs of bi-modality were commonly observed in broaching three types of tension: Centralization versus decentralization, stability versus change, and uniformity versus diversity.

Centralization and Decentralization—The organizational system of many high-technology firms clearly transcends the centralization-decentralization spectrum.⁴⁴ On the one hand, it needs to remain loose, decentralized, and differentiated in order to provide the capability for creative initiatives and rapid responsiveness. On the other hand, tight centralized direction is needed to maintain strategic cohesion, manage interdependencies, and reduce the time lag between decision and action. This imperative is reflected in the following: “we like the idea of small, decentralized units . . . with focused accountability . . . but our products have to play together . . . our customers buy an integrated system . . . there is a major element of success that depends on co-ordination and close co-operation between the units.”⁴⁵

Table 3. Organizational Attributes: A Comparison

Traditional Model	Emerging Model
Single Center	Multiple Centers
Self Contained	Steeple of Expertise
Independent Activities	Interdependent Units
Vertically Integrated	Multiple Alliances
Uniform Structure	Diverse Structures
Parochial Mindset	Cosmopolitan Mindset
Emphasis on Efficiency	Emphasis on Flexibility

Centralizing tendencies can be observed in visible and involved leaders whose passion, vision, and charisma are critical in charting the direction, generating cohesion, defining the boundaries, and motivating the troops.⁴⁶ Moreover, top management teams are typically involved in new, risky projects during the formative stages and participate side-by-side with the troops in the development process. For example, a co-founder of ROLM was directly involved in the development of its office systems products during the early 1980s, even though he was an executive vice president and a member of ROLM's top management team.⁴⁷

However, strong leadership and directed moves do not imply that leaders are the sole source of the corporate vision, or that strategies and decisions are imposed from the top. The scenario portrayed by individual contributors is one of a "great deal of autonomy," a "lot of room for initiatives," and "doing whatever it takes to get the job done." Indeed, those who are promoted and rewarded are typically champions of major initiatives and doers who have made things happen. Such levels of autonomy have historically been associated with decentralized structures.

The resulting organization can be best characterized as both centralized *and* decentralized. It is centralized in that top management teams are a critical force behind charting the strategic direction and defining the boundaries for individual and team initiatives. It is decentralized in that front-line personnel can exercise discretion in dealing with new imperatives as they arise—within broad, yet well-defined, strategic and cultural parameters.⁴⁸ The critical catalyst in creating this alignment is reliance on formal and informal bridging mechanisms which establish direct communication channels between the leaders and the doers. These include electronic-based communication, planning sessions and review meetings, informal opportunities for interaction, educational forums, and open access protocols.⁴⁹ Regular communication ensures that impending changes in market realities and strategic priorities can be quickly discussed, evaluated, and implemented.

Stability and Dynamism—Bi-modality is also manifest in the tradeoffs made between stability and change as reflected in the following remark: "we

want to be flexible and respond to market changes without *creating chaos and confusion amongst our people.*"⁵⁰ Indeed, the priorities facing many high-technology firms are in a state of flux, resulting in continuous change and frequent re-calibrations. For example, one month the focus may be on launching a new product; another month it may shift over to volume manufacturing and procurement; and in the third month, product re-design, based on lead-users' feedback, may be on top of the business agenda.

Dynamism and change are accommodated through extensive reliance on project teams, micro re-organizations, and re-deployment of core employees in various capacities. Moreover, many high-technology firms seek to improve their flexibility by relying on temporary workers, specialist vendors, and consultants and contractors. Reliance on such a variable talent pool enables them to undertake different assignments without incurring the fixed cost and the long-term commitment expected by core employees.

However, constant change can also be threatening and de-motivating for individuals, and disruptive and unproductive for the organization. It is not surprising to find that many firms strive to create anchors of stability around which everything else can change. Some attempt to clarify and articulate a clear sense of purpose and a few overarching values which define the broad boundaries within which changes take shape.⁵¹ For example, the mission of Conner Peripherals, a disk drive manufacturer and one of the fastest growing companies in U.S. corporate history, is described as follows: "Identify customers' needs sooner and fill them faster than the competition."⁵² Moreover, their recruiting practices and orientation programs help set the employees' expectations and thereby ensure an effective fit between personal and organizational goals.

Uniformity and Diversity—There is a clear sense of corporate purpose and cultural identity associated with pioneering high-technology companies, yet their style professes to value diversity. Inculcating diversity enables these firms to become versatile, pool together different capabilities, and nurture the ability to address different contingencies.

Many high-technology companies attempt to become "diverse" by blending various management styles and cultural perspectives. For example, they may recruit inexperienced college graduates as well as experienced professionals with extensive track record. They also recruit people from different cultures and ethnic backgrounds to blend together different cognitive orientations. A young company in the network server business, for example, consciously sought to recruit a woman chief financial officer from a different cultural background in order to provide a role model for its women professionals and develop the capability base to deal with clients and partners from other cultures. In this case, after a period of extensive search, they recruited an Asian woman as their chief financial officer.

Composition of top management teams can also send an important symbolic message and further reinforce the importance of diversity. A

well-known case is the complementarity between David Packard's business style and Bill Hewlett's technical orientation. Other famous examples include the late Noyce-Moore-Grove troika at Intel, and Oshman, Maxfield, and Chamberlain at ROLM. These teams represent unity through their shared values and overarching sense of purpose. Diversity is promoted in that they have complementary skills and management styles.

Recently, a number of high-technology firms have also set out to sensitize their employees to cultural diversity through in-house training and educational programs. A few companies have made strong commitments to internal training programs that prepare executives for global assignments and strive to build cultural awareness in all employees. The crucial value of diversity further highlights the importance of distinctive corporate values. These spell out a few boundary conditions within which everything else is free to operate. They define the limits and set the constraints for individual and team initiatives.

Summary and Conclusion

Developing flexible organizations is critical for business enterprises in the 1990s. Flexibility is a multi-dimensional concept—demanding agility and versatility; associated with change, innovation, and novelty; coupled with robustness and resilience, implying stability, sustainable advantage, and capabilities that may evolve over time.

A critical challenge facing many business entities is how to transform their traditional organizational systems and management practices in order to become more flexible. This task requires identifying and implementing those approaches, processes, and tools that can be used to manage a bi-modal—rather than a monolithic—organization. This poses a major challenge because our existing organizational systems and managerial mindsets have evolved to address uni-dimensional imperatives, rather than the new, rampant multi-dimensional tensions.

Moreover, our expectations, norms of behavior, vocabularies, and frames of reference have evolved around the traditional themes of stability rather than change, uniformity rather than diversity, and optimality rather than flexibility. We need to forge new attitudes and behavior patterns by deploying educational programs, incentive systems, and communication protocols, among others, to support and reinforce the importance of flexibility, diversity, and dynamism. If the experience of the high-technology sector is indicative of broader trends, the 1990s is likely to be a decade of organizational experimentation and managerial innovation, and one likely to bring forth novel organizational systems and management approaches. This challenge requires focused attention, a readiness to experiment, and the willingness to share ideas and learn from different corporate experiences.

References

1. The need for flexibility is discussed in a number of recent books. For example, see C. Handy, *The Age of Unreason* (Boston, MA: Harvard Business School Press, 1989); R.M. Kanter, *When Giants Learn to Dance* (New York, NY: Simon and Schuster, 1989); T. Peters, *Thriving on Chaos* (New York, NY: Harper and Row, 1987); R. Pascale, *Managing on the Edge* (New York, NY: Simon and Schuster, 1990).
2. These findings are derived, in part, from a study of 37 firms in the electronics sector, conducted during 1982-91. The firms varied in size, ranging from start-ups to multi-billion dollar corporations. Their businesses spanned several high technology industries—including computer hardware and software, networking and telecommunications, computer peripherals, semiconductors, and scientific instruments. Sources of data included structured and semi-structured interviews with a cross-section of senior executives and rank and file employees, analysis of internal documents, attendance at company meetings, and use of published data.
3. Speech given by Bill Joy, a co-founder of Sun Microsystems, at the Churchill Club, Palo Alto, California, 1990.
4. In an earlier article, it was argued that alignment between the apex and the core, or the generals and the troops, is critical in this context. See H. Bahrami and S. Evans "Stratocracy in High Technology Firms," *California Management Review* (Fall 1987).
5. Self-managing, multi-functional teams are considered to be the backbone of "fast cycle" companies. See J.L. Bower and T. Hout, "Fast Cycle Capability for Competitive Power," *Harvard Business Review* (November/December 1988). A "project orientation" enacted through "co-located, joint function teams" is viewed as the hallmark of innovative companies. See T. Peters, "Get Innovative or Get Dead," *California Management Review* (Fall 1990), p. 23. A recent British study concludes that in today's business environment career success often hinges on project management (and hence team management) skills. The business section in London's *Sunday Times*, March 11, 1990. Additionally, since the Hawthorne studies we have known that groups are a critical source of individual commitment, loyalty, and identity—essential ingredients for managing professional and expectant knowledge-workers. For an insightful perspective on the Hawthorne Studies, see F.J. Roethlisberger, *The Elusive Phenomena* (Boston, MA: Harvard University Press, 1977).
6. For example, general contractors in the construction industry have relied on their long-standing relationships with specialist sub-contractors. The textile sector has historically evolved around an intricate web of relationships between different specialists; and the automobile industry has traditionally benefited from the diverse capabilities of its sub-contractors—each possessing a unique skill in a distinctive area. For further discussion see W. Powell, "Hybrid Organizational Arrangements," *California Management Review* (Fall 1987).
7. Ibid.
8. J.S. Evans, "Strategic Flexibility in Business," SRI Business Intelligence Program, Report #678, Menlo Park, California, December 1982.
9. As Kanter points out the broad implication is that "people's careers are more dependent on their own resources and less dependent on the fate of a particular company . . . no longer counting on the corporation to provide security and stature requires people to build those resources in themselves." See Kanter, op. cit., p.357.
10. Speech given by K. Sullivan, Senior Vice President, Apple Computer, to the author's MBA class on Organizational Behavior at U.C. Berkeley, April 1991.
11. Miles and Snow characterize the firm of the future as a "network" in which "brokers" play significant roles as intermediaries. See R. Miles and C. Snow, "Organizations: New Concepts for New Forms," *California Management Review* (Spring 1986). Hedlund

- describes the emergence of "heterarchy" based on observations of Swedish multinationals. By way of contrast from their hierarchical predecessors, these firms are characterized by "diffusion of strategic roles, a wide range of governance modes, and holographic attributes." G. Hedlund, "The Hypermodern MNC—A Heterarchy?" *Human Resource Management Journal* (Spring 1986). Child discusses how information and communication technologies have enabled many firms to "externalize" internal activities to contractors, and yet retain a certain measure of operational control—giving rise to novel organizational arrangements. See J. Child, "Information Technology and Response to Strategic Challenges," *California Management Review* (Fall 1987). Handy describes the firm of the future as resembling a "shamrock"—comprising partners, consultants and part-time workers, as well as full-time employees. See Handy, *op.cit.*
12. J.S. Evans, "Strategic Flexibility and High Technology Maneuvers: A Conceptual Framework," *Journal of Management Studies* (January 1991).
 13. *Ibid.*
 14. A.G. Hart, "Anticipations, Business Planning, and the Cycle," *Quarterly Journal of Economics* (February 1937), p. 272
 15. G.L.S. Shackle, *Expectations, Investment, and Income* (Oxford University Press, 1938).
 16. Bell Atlantic and ABB are cases in point. See R. M. Kanter's interview with R. Smith of Bell Atlantic entitled "Championing Change," *Harvard Business Review* (January/February 1991), p. 26; and W. Taylor interview with P. Barnevik of ABB in "The Logic of a Global Business," *Harvard Business Review* (March/April 1991), p. 95.
 17. Internal memorandum from the Executive Vice President of a \$700 million high-technology firm on its business philosophy, May 26, 1981.
 18. See Taylor, *op. cit.*, p. 95.
 19. On changes at B.P., see C. Lorenz, "A drama behind closed doors that paved the way for a corporate metamorphosis," *Financial Times*, March 13, 1990, p.13.
 20. See C. Bartlett and S. Ghoshal, "Organizing for Worldwide Effectiveness," *California Management Review* (Fall 1988).
 21. See A.D. Chandler, *Strategy and Structure* (Cambridge, MA: MIT Press, 1962) on the historical evolution of the multi-divisional structure.
 22. J. Child, "New Technology and Developments in Management Organization," *Omega*, 12/3 (1984).
 23. Source: Internal board presentation at a software company. The firm employs about 100 professionals in roles which are classified as "corporate." These include "finance and administration" (corporate reporting, taxes, treasury, planning, investor relations, and internal audit), infrastructure support (facilities and safety, information systems, corporate purchasing, and risk management), legal services, human resources, and corporate communications.
 24. See H. Bahrami and S. Evans "Emerging Organizational Regimes in High Technology Firms," *Human Resource Management Journal* (Spring 1989) for an account of the evolution of the formal structure in high technology firms.
 25. H. Mintzberg, *Structure in Fives: Designing Effective Organizations* (Englewood Cliffs, NJ: Prentice Hall, 1983).
 26. A good case in point is Bell Atlantic's "client-service" groups. During a recent reorientation process, many of its support functions have had to operate as line groups—enlisting the support of other units in order to continue their operations. In this case, the line units can either buy their required services from the support groups or from outside vendors; the only constraint is that they can not develop their own support functions. Reciprocally, the support units can also offer their services to outside clients, within certain competitive guidelines. In this way, the old staff entities have been transformed into line operations—with their own clients, revenues, profits, and direct accountability to the user. If the activity can not be supported, it is disbanded, in direct

- response to market feedback. See Kanter, *op.cit.* The point was also discussed by Ray Smith, Bell Atlantic's Chairman and CEO, in a keynote speech given at a U.C. Berkeley Executive Program, Sturbridge, MA, October 1990.
27. For a detailed study of how the human resource function is being transformed along some of these dimensions, see The Conference Board, "The Changing Human Resource Function," Report number 950, New York, 1990.
 28. This was the finding of a study conducted by the author; H. Bahrami, "Strategic Planning in Emerging and Established Firms: A Comparison," paper presented at the fifth Strategic Management Society Conference, Barcelona, Spain, 1985.
 29. See R. Karlgaard, "Sculley Looks Ahead," *Upside* (October 1991), p. 101.
 30. For more detail on how strategic decisions in high technology companies entail continuous re-calibration see H. Bahrami and S. Evans "Strategy Making in High-Technology Firms," *California Management Review* (Winter 1989); for a study on how effective executives in the microcomputer industry relied on real-time information to make decision, see K. Eisenhardt, "Speed and Strategic Choice," *California Management Review* (Spring 1990).
 31. Internal presentation, Apple Computer, September 23, 1988.
 32. Spindler, M. Speech given to Apple's worldwide sales force, March 1987.
 33. Internal document on Apple's New Enterprise Project, 1988.
 34. *San Jose Business Journal*, Special Report (March 1992), p. 14.
 35. Personal Communication with executives at Apple Computer, 1990.
 36. Indeed the phrase "people are our key asset" is often used not just in high-tech companies, but increasingly in traditional corporations. This is partly reflected in the recent focus on "human resources" as a critical function. See London's *Financial Times*, January 28, 1991, p. 14. Extensive reference to the importance of "networking" is another manifestation of this trend. In a recent article, Lorenz discusses the confusion surrounding the concept of the "networked" organization, especially concerning "official" and "unofficial" networking: "Official networks are certainly a praiseworthy advance over the bureaucracies they replace. But they are often little more than streamlined, well-run, and physically-dispersed committees . . . the real breakthrough is official blessing for all sorts of unofficial, informal networks . . . it is they, much more than the official variety, which will really help create the open and flexible learning organizations which most forward looking companies aspire to become." "Network Organizations," *Financial Times*, Management Page, April 3, 1991.
 37. Personal Communication, W. New, M.D., August 1989.
 38. Evans, *op. cit.*
 39. It is commonplace to find employees assigned to new roles or seconded to other groups on a frequent and, at times, unplanned basis. For example, a key member of the engineering staff in a surveyed company was unexpectedly seconded for nine months to the manufacturing group because he was very knowledgeable about an outsourcing issue—a critical priority for the manufacturing group at the time.
 40. See Powell, *op. cit.*; Evans, *op. cit.*; Kanter, *op. cit.*; B. Borys and D.B. Jemison, "Hybrid Organizations as Strategic Alliances," Working Paper 951r, Graduate School of Business, Stanford University, 1987; D. Mowery, *International Collaborative Ventures in Manufacturing* (Cambridge, MA: Ballinger, 1988); W. Ouchi and M. Bolton, "The Logic of Joint Research and Development," *California Management Review* (Fall 1988); Y.L. Doz, "Technology Partnerships between Larger and Smaller Firms," *International Studies of Management and Organization*, 17/4 (1987).
 41. See A. Beshar, "Asian Investor Feast," *Upside*, (November/December 1989).
 42. In order to differentiate between the information given to "outsiders" versus "employees," Apple has its "Hotlinks" electronic bulletin board which is only accessible by company employees.

43. See N. Rutter, "Kubota-San," *Upside*, (January/February 1990).
44. See Bahrami and Evans (1989), op. cit.
45. Interview with R. Maxfield, Executive Vice President and co-founder, ROLM Corporation, April 1985.
46. Well-known examples include ROLM and Ken Oshman, Digital Equipment and Ken Olson, Intel and Andrew Grove, Sun Microsystem and Scott McNeilly, Cypress Semiconductor and T.J. Rogers, Microsoft and Bill Gates, Software Publishing and Fred Gibbons, NeXT and Steve Jobs, ASK and Sandra Kurtzig, Electronic Arts and Trip Hawkins, Oracle and Larry Ellison, among others.
47. This contrasts with the practices observed in many traditional firms. As recent studies have shown, new activities in established entities are, by and large, initiated at the periphery of the firm [see Beer et al., "Why Change Programs Don't Produce Change," *Harvard Business Review* (November/December 1990) or by lower level champions in an autonomous manner [see R.A. Burgelman and L.R. Sayles, *Inside Corporate Innovation* (New York, NY: Free Press, 1986). This makes sense since in established firms those on the periphery have much to gain and little to lose by embarking on presumably risky, new initiatives. By contrast, their senior colleagues would have typically advanced in the organization by playing according to the prevalent rules, without disturbing the status quo. In the absence of a major crisis, many are thus likely to support a major change either under crisis conditions, or when it has proved to be feasible and entails minimal risk to the organization.
48. New technologies have provided the means to transcend the centralization/decentralization spectrum, see J. Child, "New Technology and Developments in Management Organization," *Omega*, 12/3 (1984); and J. Child, "Information Technology and Response to Strategic Challenges," *California Management Review* (Fall 1987); G. Huber, "The Nature and Design of Post Industrial Organization," *Management Science*, 30 (1984); M.L. Markus and D. Robey, "Information Technology and Organizational Change," *Management Science*, 34 (1988); S. Zuboff, *In the Age of the Smart Machine* (New York, NY: Basic Books, 1988).
49. For further discussion, see Bahrami and Evans (1989), op.cit.
50. Personal Communication, Executive Vice President of a software company, prior to a major re-organization, March 1989.
51. For an assessment of the critical role of corporate culture in business organizations, see C. O'Reilly, "Corporations, Culture, and Commitment," *California Management Review* (Summer 1989).
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Causes of Failure in Network Organizations

Raymond E. Miles Charles C. Snow

It is widely recognized that we are in the midst of an organizational revolution. Throughout the 1980s, organizations around the world responded to an increasingly competitive global business environment by moving away from centrally coordinated, multi-level hierarchies and toward a variety of

more flexible structures that closely resembled networks rather than traditional pyramids. These networks—clusters of firms or specialist units coordinated by market mechanisms instead of chains of commands—are viewed by both their members and management scholars as better suited than other forms to many of today's demanding environments.¹

However, despite the current success of network organizations, the most likely forecast is that their effectiveness will decline rather than improve over time. In fact, there is already evidence of deterioration in some network organizations—failures caused not by the inappropriateness of the network form but because of managerial mistakes in designing or operating it.

Indeed, the evolution of the network form of organization appears to be following a familiar pattern. Historically, new organizational forms arise to correct the principal deficiencies of the form(s) currently in use. As environmental changes accumulate, existing organizational forms become less and less capable of meeting the demands placed on them. Managers begin to experiment with new approaches and eventually arrive at a more effective way of arranging and coordinating resources. The managers who pioneer the new organizational form understand its logic and are well aware of its particular strengths and weaknesses. However, as the use of the new form increases, so too does the potential for its misuse. When design and operating flaws multiply, the form loses its vitality and begins to fail.

The Evolution of the Network Form

Over the course of American business history, four broad forms of organization have emerged. First, the *functional organization* appeared in the late nineteenth century and flourished in the early part of the twentieth. This new organizational form allowed many firms to achieve the necessary size and efficiency to provide products and services to a growing domestic market. An early vertically integrated functional organization was designed by Andrew Carnegie who applied ideas about functional specialization from the railroads to steel production. By controlling both raw materials supplies and distribution, he was able to keep his mills running efficiently on a tightly planned schedule. A current example of the functional organization is Wal-Mart, Inc., one of the nation's largest retailers. Across the country, Wal-Mart focuses on a well-defined and socio-economically homogeneous target market as it locates its stores in small towns and suburbs of medium-sized cities. For these highly similar markets, Wal-Mart makes maximum use of on-line computerized sales data from over 1,200 stores to feed what is recognized as one of the most efficient inventory and distribution systems in the country. Like its functional predecessors, Wal-Mart performs a limited set of functions extremely well, using the specialized talents of planners, logistics specialists, and store personnel. However, while Wal-Mart is tightly integrated from its warehouses through its store shelves, the company does not attempt to actually produce the goods it sells. Nevertheless, because of its buying power, Wal-Mart can centrally coordinate an army of suppliers eager to respond to its forecasts and schedules.

Next, the *divisionalized organization* appeared shortly after the end of World War I and spread rapidly in the late 1940s and into the 1950s. Among the earliest divisionalized structures was that designed by Alfred Sloan at General Motors, where specific automobile brands and models were aimed at distinct markets differentiated primarily by price. Product divisions (Chevrolet, Pontiac, Cadillac, etc.) operated as nearly autonomous companies, producing and marketing products to their respective targeted customers while corporate management served as an investment banker for growth and redirection. A modern divisionalized firm is Rubbermaid, whose ten operating divisions account for over 200 new products a year. Each division has its own target market and its own R&D team focused exclusively on that market, allowing maximum responsiveness in a diversified product arena.²

The third organizational form was the *matrix*, which evolved in the 1960s and the 1970s, and combined elements of both the functional and divisional forms. An early matrix structure was created at TRW, which sought to make both efficient use of specialized engineers and scientists while adapting to a wide range of new product and project demands. Technical and professional personnel moved back and forth from functional departments

to product or project teams, and from one team to another, as their skills were needed. Many modern matrix organizations are even more complex, such as the one used by Matsushita, which combines global product divisions with geographically based marketing groups.

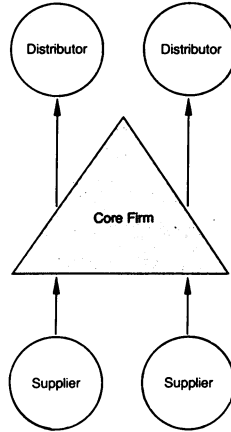
Movement toward the *network* form became apparent in the 1980s, when international competition and rapid technological change forced massive restructuring across U.S. industries and companies. Established firms downsized to their core competence, de-layering management hierarchies and outsourcing a wide range of activities. New firms eschewed growth through vertical integration and instead sought alliances with independent suppliers and/or distributors.

Within this general trend toward disaggregation and looser coupling, managers experimented with various organizational arrangements. Instead of using plans, schedules, and transfer prices to coordinate internal units, they turned to contracts and other exchange agreements to link together external components into various types of network structures.³ As illustrated in Figure 1, some networks brought suppliers, producers, and distributors together in long-term stable relationships. Other networks were much more dynamic, with components along the value chain coupled contractually for perhaps a single project or product and then decoupled to be part of a new value chain for the next business venture. Finally, inside some large firms, internal networks appeared as managers sought to achieve market benefits by having divisions buy and sell outside the firm as well as within.⁴

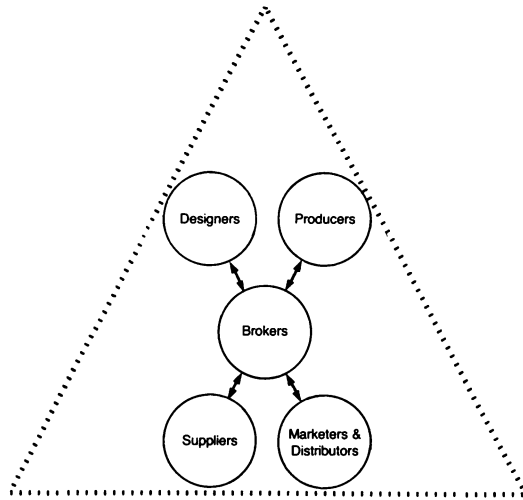
Network organizations are different from previous organizations in several respects. First, over the past several decades, firms using older structures preferred to hold in-house (or under exclusive contract) all the assets required to produce a given product or service. In contrast, many networks use the collective assets of several firms located at various points along the value chain.⁵ Second, networks rely more on market mechanisms than administrative processes to manage resource flows. However, these mechanisms are not the simple "arm's length" relationships usually associated with independently owned economic entities. Rather, the various components of the network recognize their interdependence and are willing to share information, cooperate with each other, and customize their product or service—all to maintain their position within the network. Third, while networks of subcontractors have been commonplace in the construction industry, many recently designed networks expect a more proactive role among participants—voluntary behavior that improves the final product or service rather than simply fulfills a contractual obligation. Finally, in an increasing number of industries, including computers, semiconductors, autos, farm implements, and motorcycles, networks are evolving that possess characteristics similar in part to the Japanese *keiretsu*—an organizational collective based on cooperation and mutual shareholding among a group of manufacturers, suppliers, and trading and finance companies.⁶

Figure 1. Common Network Types

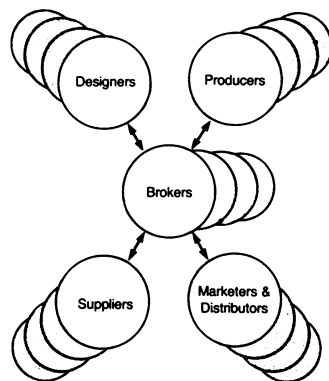
Stable Network



Internal Network



Dynamic Network



Although the network organization exhibits characteristics that are different from previous forms, the stable, dynamic, and internal networks shown in Figure 1 nevertheless incorporate elements of the prior organizational forms as their main building blocks. For example, a functionally organized firm may realize that it needs to outsource the manufacture of certain components, or ally with specific distributors, in order to focus its attention only on those operating activities for which it is best equipped. The result of such changes is a stable network organization: a core firm linked forward and backward to a limited number of carefully selected partners. Upstream stable networks linking suppliers to a core firm are common in the automobile industry. Downstream networks often link computer hardware manufacturers and value-added retailers.

Alternatively, a large multinational matrix organization made up of various design, manufacturing, and distribution units, may decide to replace centrally determined transfer prices with genuine buying and selling relationships among these units. The result is an internal network.⁷

Lastly, in some industries, rapid technological and market changes may encourage a divisionalized firm to disassemble into a multi-player dynamic network of designers, suppliers, producers, and distributors instead of holding all of these assets internally. This is what has occurred over the past twenty years in most publishing firms.

In sum, the network organization in its several variations has sought to incorporate the specialized efficiency of the functional organization, the autonomous operating effectiveness of the divisional form, and the asset-transferring capabilities of the matrix organization—all with considerable success. However, the network form itself has inherent limitations and is vulnerable to misapplication and misuse. To understand the real and potential weaknesses of the network, we need to examine the problems that have plagued (and continue to befall) its predecessor forms.

Causes of Failure in Earlier Organizational Forms

As noted above, a similar evolutionary pattern can be seen in each of the earlier organizational forms. Widespread initial success occurred as the new form provided an innovative arrangement of a firm's resources and a new operating logic responsive to the emerging environment. However, a growing list of failures eventually followed. Some of the causes of failure were obvious—for example, the new form was increasingly, perhaps fadishly, applied in settings for which it was never intended or suited.

The more intriguing failures are those that arise from two types of subtle managerial "mistakes": individually logical *extensions* of the form which in the aggregate push the form beyond the limits of its capability; and *modifications* of the form which, while reasonable on the surface, nevertheless violate the form's operating logic. To fully understand these causes of

failure, it is necessary to first restate the logic of the functional, divisional, and matrix forms and then examine major types of preventable failures against that logic. (See Table 1.)

The Functional Form—The functional form of organization can be thought of as a special-purpose machine designed to produce a limited line of goods or services in large volume and at low cost. The logic of the functional form is *centrally coordinated specialization*. Departments, each staffed with specialized experts in numbers established by a central budget, repeatedly make their contribution to the firm's overall effort in accordance with a common schedule. To be successful, the functional form's specialized skills and equipment must be fully and predictably operated. Firms in the late nineteenth and early twentieth century frequently integrated forward, creating new wholesaling and retailing channels to assure that their output could be efficiently distributed and sold. Similarly, these firms often integrated backward to assure themselves the steady flow of materials and components essential to efficient operation. Today's functional paragons, such as Wal-Mart, are masters at obtaining these kinds of efficiencies, but typically they are not as vertically integrated.

Although vertical integration assures functionally structured firms input and output predictability, it does not come without costs. The further backward and forward a firm integrates, the greater the costs of coordination and the larger the number of specialized assets demanding full utilization. Ultimately, it becomes difficult to determine whether any particular asset along the value chain is making a positive contribution to overall profitability. In fact, the recent trend toward disaggregation (e.g., buying rather than making components, outsourcing sales or distribution) reflects the recognition by many firms that coordination costs and asset underutilization are offsetting the benefits of predictability and hierarchical control.

An example that illustrates these tradeoffs involves the turnaround efforts made at Harley-Davidson in the early 1980s. The motorcycle manufacturer discovered that much of its production inflexibility, along with excessive costs, was caused by attempting to produce virtually all of its own parts and components. A move to a just-in-time inventory system allowed Harley-Davidson to outsource many parts and supplies, reducing its total cycle time and bringing new products to the market quicker while lowering overall costs. What is interesting about organizational "failures" such as that at Harley-Davidson is that managers need not do anything wrong—at Harley, the company's functional structure encouraged internal production of parts and components to assure control. Rather, such systems often fail because managers do too many things right!⁸

Alternatively, the functional organization form will also fail if it is modified inappropriately. The functional organization's logic of centrally controlled, specialized assets does not easily adapt to product or service

Table 1. Causes of Failure in Traditional Organizational Forms

Organizational Form	Functional	Divisional	Matrix
Primary Application	Efficient production of standardized goods and services	Related diversification by product or region	Shared assets between standardized products and prototype contracts (e.g., many aerospace firms) Shared assets between worldwide product divisions and country-based marketing divisions (e.g., some global firms)
Extension Failure	Vertical integration beyond capacity to keep specialized assets fully loaded and/or to evaluate contributions	Diversification (or acquisitions) outside area of technical and evaluative expertise	Expanding number of temporary contracts beyond ability of allocation mechanisms Search for global synergy limits local adaptability
Modification Failure	Product or service diversification that overloads central planning mechanisms	Corporate interventions to force coordination or obtain efficiencies across divisions	Modifications that distort the dual focus (i.e., favor one type of market or product over another)

diversity. A functionally structured manufacturing firm can efficiently produce a limited array of products if demand for the various products can be forecast and productions runs strictly scheduled. However, if the number of products offered becomes too large, or if demand variations interfere with efficient scheduling, the functional form begins to prove inflexible and costly to operate.

For example, after World War II, the Chrysler Corporation rapidly expanded its product line in an attempt to match General Motors' strategy of a "product for every pocketbook." However, while its models proliferated (actually exceeding the number of GM models at one point), Chrysler did not adopt the divisional structure then used by its competitors. Chrysler's mostly functional structure ultimately suffered from losses in efficiency and from added coordination costs as the company attempted to accommodate increasing product variability and complexity. Here, managers

modified key aspects of Chrysler's functional structure for apparently logical reasons, moves that probably were initially successful. However, an eventual array of over seventy different models demanded not just continued structural modification but total restructure—the adoption of a new (the divisional) form.

The Divisional Form—The divisional form of organization can be thought of as a collection of similar special-purpose machines, each independently operated to serve a particular market and all evaluated centrally on the basis of economic performance for possible expansion, contraction, or redirection. The operating logic of the divisional form is thus *the coupling of divisional autonomy with centrally controlled performance evaluation and resource allocation*. The divisional form achieves both flexibility and economies of scope by its ability to rapidly focus clusters of assets on new or expanding markets. It develops a unique competence for evaluating divisional performance in a given set of related markets and for investing pooled returns to promote growth in existing divisions and to create or acquire new divisions. The divisional form also may develop mechanisms for transferring new technology and managerial knowhow across divisions as well as to newly created or acquired operations. Overall, the divisional form's ability to reallocate management knowhow and emerging technology, along with resources generated from existing operations, gives it an advantage in responding to new opportunities and in the cost of startup.

Markets for differentiated goods and services grew rapidly in the 1920s and again after World War II. As described above, the early divisionalized organization at General Motors focused different automobile models on distinct markets, differentiated primarily by price. Similarly, Du Pont identified different types of markets in which its several divisions could use their technical and managerial knowhow in applied chemistry, and Sears Roebuck challenged managers across the country to independently operate "hometown stores with nationwide buying power."

Although divisionalized firms are adept at moving incrementally into related areas, they are also vulnerable to overextension. Most divisionalized firms have had the experience of moving into markets that initially appeared to be appropriate but ultimately turned out to fall outside their area of expertise. Entry into unrelated markets weakens the divisionalized firm's ability to appraise performance and make investment decisions. As the firm moves further away from its unique informational base, its decisions become no more efficient, perhaps even less so, than those the market might make. For example, General Mills, a highly successful divisionalized firm, at least twice extended itself into areas that proved to be beyond its zone of technical and investment expertise, first into electrical appliances and later into toys and fashion goods. In both cases, the firm recognized its own shortcomings and either divested the divisions or moved back from direct operation.⁹

Divisionalized firms are also vulnerable to modifications that begin with good reason but subsequently undermine the form's operating logic. For example, the creation of cross-division committees to share technology, or the creation of a corporate staff group to help coordinate process improvements, may genuinely prove valuable. However, excessive coordination requirements across divisions eventually constrain the divisions' flexibility to meet the demands of their respective markets. Similarly, corporate staff enforcement of interdivisional planning gradually undermines corporate management's ability to accurately assess the individual effectiveness of each division. Both types of modifications, though successful when carefully applied, may expand until they violate the logic of divisional independence and corporate appraisal. Just such extensive coordination requirements constrained, in fact destroyed, the operating autonomy of the separate automobile divisions of General Motors. Initially, in a period of weak competition, the firm enjoyed cross-divisional scale economies without major losses from decreased flexibility and responsiveness. However, under growing competition, GM's complex, interdivisional planning process delayed new product development, and its intrusive coordination mechanisms contributed to unit costs above those of its competition. Most recently, in order to produce a "truly new" car (Saturn), GM had to circumvent its own convoluted structure by creating an entirely new division.

Clearly, in a divisionalized firm, broad operating freedom creates the opportunity for divisions to suboptimize—to take actions that improve their own profitability at the expense of possible overall corporate gains. However, such possibilities are simply part of the normal costs of using the divisional form, offset in the longer run by the benefits gained from well-made local decisions. Unfortunately, fewer and fewer firms today appear to be willing to leave the logic of the divisional form intact. Indeed, many firms that refer to themselves as divisionalized in fact have extensive corporate staff coordination and minimal divisional autonomy. Such operations actually produce all the costs and rigidity of the functional form while adding the cost of divisional duplication of resources. Again, individually sound decisions may add up to overall operating inefficiencies and ineffectiveness.

The Matrix Form—The matrix organizational form can be thought of as a complex machine simultaneously generating two or more outputs for a set of both stable and changing markets. The operating logic of the stable portion of the matrix form is similar to that of the functional form, centrally coordinated specialization. Not surprisingly, the portion responding to unique or changeable markets emphasizes local operating autonomy as is the case in the divisional form. To these dual aspects of its operating logic, the matrix form adds the requirement for *balance among the components to produce mutually beneficial allocations of resources*.

For example, in one type of matrix, an aerospace firm may fulfill a number of long-term contracts to produce a line of standard products in the

functionally structured, stable portion of the organization. Simultaneously, the firm may group a series of project teams around contracts for customized products or prototypes. In this type of matrix, the key contribution of the form is its ability to supply the members of the various project teams through temporary assignment of personnel from the stable departments of the firm. Then, when a project is completed, personnel return to their home departments to work on standard product needs and perhaps await reassignment to another project team. The matrix form gives a firm the capacity to expand and contract and to constantly address new market opportunities while holding key human assets.

In another matrix application, a multi-product, multinational firm may combine worldwide product divisions with national or regionally based marketing groups. Again, the key in a global matrix is to gain the benefits of local operating flexibility while employing resources “owned” by the product divisions.

As with the functional and divisional forms, the matrix form can be overloaded by simply extending a firm’s operations beyond the capability of its structure. For example, in the aerospace matrix, each additional project places new demands on the resource-allocation capacity of the firm. Ultimately, resources are held but are not kept fully employed, and the firm achieves something akin to negative synergy—each new logical addition brings with it coordination costs which exceed its benefits.

Equally troublesome are failures of the matrix form resulting from modifications that violate its operating logic. Recall that the purpose of the matrix form is to let two different types of market forces help shape the operation of the firm. However, many firms are unwilling or unable to maintain balance between or among their market foci and functional components. For example, if worldwide product divisions have no means of influencing the marketing priorities of national or regional marketing groups, operating efficiency may be totally subordinated to local responsiveness. Alternatively, if managers of functional departments have full say over assignments to project teams, the needs of the stable portion of the organization will dominate those of the flexible side, making it difficult for project team managers to meet customer needs for both technical sophistication and timeliness.

In sum, there is considerable historical evidence to suggest that an organizational form performs optimally only within certain limits. When a particular form’s operating logic is violated, even by apparently reasonable extensions or modifications of the form, failure may result.

Potential Causes of Failure in Network Organizations

Like its predecessor forms, the network organization can fail because of alterations made by well-intentioned managers. The network form has an operating logic associated with each of its variations, and violations of this

logic are likely to limit the form's effectiveness and, in the extreme, cause it to fail.

The Stable Network—The stable network has its roots in the structure and operating logic of the functional organization. It is designed to serve a mostly predictable market by linking together independently owned specialized assets along a given product or service value chain. However, instead of a single vertically integrated firm, the stable network substitutes a set of component firms, each tied closely to a core firm by contractual arrangements, but each maintaining its competitive fitness by serving firms outside the network.

Given its logic, the most common threat to the effectiveness of the stable network is an extension that demands the complete utilization of the supplier's or distributor's assets for the benefit of the core firm. If the several suppliers and distributors in the stable network focus their assets solely on the needs of a single core firm, the benefits of broader participation in the marketplace are lost. Unless suppliers sell to other firms, the price and quality of their output is not subject to market test. Similarly, unless multiple outlets are used, the value actually added by distributors must be set by judgment rather than by market-driven margins. The process of asset overspecialization and overdedication by network partners is frequently incremental and can therefore go unnoticed. Continued, step-by-step customization of a supplier's processes, either voluntarily or at the core firm's insistence, can ultimately result in the inability of the supplier to compete in other markets and an obligation on the part of the core firm to use all of the supplier's output. (See Table 2.)

Another reason for network members to participate in the market outside their relationship with the core firm is to force these components to maintain their technological expertise and flexibility. Suppliers come into contact with innovations in product or service designs and develop their adaptive skills by serving various clients. Overspecialization and limited learning can easily occur if both the core firm and its components are not alert. In fact, for maximum effectiveness, both the core firm and its stable partners must explicitly consider the limits of allowable dedication—forcing themselves to set restrictions on the proportion of component assets that can be utilized.

An enormously effective stable network has been put together by Nike, the athletic shoe and apparel giant. Founded in 1964, as a U.S. dealer for a Japanese shoe firm, Nike began developing its own product line in 1972 and has built a \$3 billion business on a clear strategy of working closely with, but not dominating, a wide range of suppliers in Korea, Taiwan, Thailand, and the Peoples Republic of China. Nike wants its suppliers to service other designers so that they can enhance their technical competence and so that they will be available when needed but not dependent on Nike's ability to forecast and schedule their services. A major factor in Nike's

Table 2. Causes of Failure in Network Organizations

Type of Network	Stable	Internal	Dynamic
Operating Logic	A large core firm creates market-based linkages to a limited set of upstream and/or downstream partners	Commonly owned business elements allocate resources along the value chain using market mechanisms	Independent business elements along the value chain form temporary alliances from among a large pool of potential partners
Primary Application	Mature industries requiring large capital investments. Varied ownership limits risk and encourages full loading of all assets.	Mature industries requiring large capital investments. Market-priced exchanges allow performance appraisal of internal units.	Low tech industries with short product design cycles and evolving high tech industries (e.g. electronics, biotech, etc.)
Extension Failure	Overutilization of a given supplier or distributor leading to unhealthy dependence on core firm	Extending asset ownership beyond the capacity of the internal market and performance appraisal mechanisms	Expertise may become too narrow and role in value chain is assumed by another firm
Modification Failure	High expectations for cooperation can limit the creativity of partners	Corporate executives use "commands" instead of influence or incentives to intervene in local operations	Excessive mechanisms to prevent partners' opportunism or exclusive relationships with a limited number of upstream or downstream partners

continuing market leadership is its ability to introduce new models quickly to meet (or create) market trends. Perhaps most importantly, Nike has maintained its technical competence and leads the industry in R&D investment.¹⁰ Nike personnel work directly with suppliers to build and maintain their capability, verifying product quality in-process as well as after the fact. To assure their own expertise in manufacturing (and to prevent costly design mistakes), Nike has continued a small domestic manufacturing operation focused on leading-edge designs.

The stable network can also be damaged by unthoughtful or even inadvertent modifications. In the search for assurance that suppliers can meet quality standards and delivery dates, some core firms attempt to specify the

processes that the network member must use. Deep involvement in a supplier's or distributor's processes can occur through innocent zeal on the part of the core firm's staff and may be enthusiastically endorsed by the component's staff. Within limits, close cooperation to assure effective linkage is valuable. However, the core firm can ultimately find itself "managing" the assets of its partners and accepting responsibility for their output. Moreover, when the operating independence of the network member is severely constrained, any creativity that might flow from its managers or staff is curtailed—and the core firm is not getting the full benefit of the component's assets. In effect, the core firm is converting the network into a vertically integrated functional organization.

The Internal Network—The logic of the internal network requires the creation of a market inside a firm. Here organizational units buy and sell goods and services among themselves at prices established in the open market. Obviously, if internal transactions are to reflect market prices, the various components must have regular opportunity to verify the price and quality of their wares by buying and selling outside the firm. The purpose of the internal network, like its predecessor, the matrix form, is to gain competitive advantage through shared utilization of scarce assets and the continuing development and exchange of managerial and technological knowhow. But, also like the matrix, the internal network can be damaged by extensions that overload its internal market mechanisms and by modifications that unbalance the relationships between buyers and sellers.

For example, the giant multinational firm ABB Asea Brown Boveri has grown quickly to over \$25 billion in revenues and nearly a quarter of a million employees through a concerted program of mergers and acquisitions which has given it unmatched local and global synergy in the electrical systems and equipment market. To this point, the firm has increased shareholder value by thoughtfully specifying the market domain of each of its components and creating the internal mechanisms by which they can exchange goods and services in mutually beneficial ways under overall market discipline. However, it would be easy for such a firm to be seduced by its current success into an attempt to move further and further afield. At the moment, the CEO and key managers of ABB have a well-articulated concept of how the firm's global internal market operates.¹¹ However, each new business line, and each new geographic area addressed, must be carefully interconnected throughout the global grid, a task whose difficulty increases not arithmetically but geometrically.

Internal networks thus can fail from overextension, but they can fail perhaps even faster because of misguided modification. The most common managerial misstep in internal networks is corporate intervention in resource flows or in the determination of transaction prices. Not every

interaction in the internal network can and should flow from locally determined supply and demand decisions. Corporate managers may well see a benefit in having internal units buy from a newly built or acquired component, even though its actual prices are above those of competitors in the marketplace. Such prices may be needed to sort out the operation and develop full efficiency. However, the manner in which corporate management handles such “forced” transactions is a crucial factor in the continuing health of the network. Ideally, corporate executives will manage the internal economy rather than simply dictate the transfer price and process. This can be accomplished by providing a “subsidy” to the startup component to allow it to sell at market prices while still showing a profit, or by providing buyers with incentives that keep their profits at rates which would occur if they were free to buy from lower priced competitors. Obviously, such subsidies or incentives should be time bound and carefully monitored to prevent abuses. Although this process is demanding, it serves to protect the logic of market-based internal transactions rather than reverting to centrally determined transfers. Unfortunately, as indicated, instead of influencing the internal market and preserving the ability to evaluate components on actual performance, many corporate managers “command” component behaviors and risk destroying agreement on the criteria for performance evaluation.

Despite potential problems, the shift from complex, centrally planned hierarchies to internal market structures is a growing movement, and IBM’s recent announcements provide one more large, highly visible example. IBM’s plan is to turn each of its major units into self-managed businesses, free to buy and sell goods and services with one another and ultimately with outside buyers and sellers as well. A 1991 conference reported experiments in building internal networks in organizations ranging from services (Blue Cross-Blue Shield), to materials (Alcoa), to low (Clark Equipment) and high tech (Control Data) manufacturers. Not surprisingly, these applications tend to demonstrate both the benefits and the types of resistance anticipated here. However, it is too early to tell whether these and other internal network structures will avoid major managerial mistakes.¹²

The Dynamic Network—The operating logic of the dynamic network is linked to that of the divisional form of organization. Recall that the divisionalized organization emphasized adaptability by focusing independently operated divisions on distinct but related markets. The combination of central evaluation and local operating autonomy is reflected in the dynamic network where independent firms are linked together for the one-time (or short-term) production of a particular good or service. For the dynamic network to achieve its full potential, there must be numerous firms (or units of firms) operating at each of the points along the value chain,

ready to be pulled together for a given run and then disassembled to become part of another temporary alignment.

The availability of numerous potential partners eager to apply their skills and assets to the upstream or downstream needs of a given firm is not only the key to success of the dynamic network, it is also a possible source of trouble. For example, if a particular firm in the value chain over-specializes—refines but also over time restricts its expertise—it runs the risk of becoming a “hollow” corporation, a firm without a clearly defined, essential contribution to make to its product or service value chain.¹³ Firms need to occupy a wide enough segment of the value chain to be able to test and protect the value of their contribution. A designer needs to retain its ability to build prototypes, a producer may need to experiment with new process technologies, and so on. Firms with a contribution base that is either too narrow or weakly defined are easily overrun by their upstream and/or downstream neighbors. Indeed, examples of firms (and industries) pushed into decline and ultimate failure by excessive outsourcing abound. From radios to television sets to video recorders, outsourcing decisions by U.S. corporations allowed foreign suppliers to acquire the technical competence to design and sell their own products, eventually capturing the bulk of U.S. domestic markets.¹⁴

Conversely, firms with a clear competence-based position on the value chain, a base maintained by continuing investment in technology and skill development, can afford to interact confidently with upstream and downstream partners. Nevertheless, there is a constant temptation for firms to go beyond the development of their own competence as the means of insuring their viability. They may seek to add protection through an excessive concern for secrecy, heavy emphasis on legalism in contractual relations, a search for preferential relationships with particular partners, and so on. In fact, potentially dysfunctional network behaviors are currently multiplying across the personal and business computer industry as firms, including industry giants IBM and Apple, build an almost undecipherable maze of interconnected agreements and alliances to protect market share, enter new arenas, search for technical innovations, and promote the adoption of technical and/or system standards. Each of these efforts is designed to give the newly formed partners a competitive advantage over those players not included (who are instead building their own web of alliances).¹⁵ Such protective modifications can constrain the primary strength of the dynamic network—its ability to efficiently allocate member firms, uncoupling and recoupling them with minimum cost and minimum loss of operating time.

In sum, the dynamic network places demands on its component firms to continually reappraise their technical competence and the scope of their activities, not only to maintain their own well-being but that of the broader network as well. No one component can know everything that is happening

or everything that is needed in the broader network. However, each component can preserve its own competence and refrain from behaviors which are a threat to network performance.¹⁶

Avoiding Failure: Developing the Competence for Self-Renewal

In the preceding sections, we have outlined how organizational forms may lose their vitality over time as managers make what appear to be logical extensions or modifications. However, rather than improving performance, these actions may gradually obscure and subvert the operating logic of the form. Few organizations appear to have the capacity for self-renewal—the ability to adapt without losing effectiveness. What is needed is the competence to not only make adjustments to environmental shifts, but to do so either: within the constraints of the operating logic of the existing organizational form; or by adopting a new form to fit a new market strategy. Obviously, the ability of an organization to self-renew is easier to describe than achieve. However, such competence may be enhanced as a firm increasingly adopts characteristics of one of the three network types (stable, internal, or dynamic).

The possibility that firms adopting network structures will improve their self-renewal competence flows from two unique characteristics of the network form: the essential relationships among components are *external* (and thus highly *visible* to all parties) and these relationships are *voluntary* (and thus must reflect *explicit* commitments).

Dynamics of External Relationships—Even when a network's components are commonly owned, the essential structure of the organization is external—an exoskeleton of clearly specified, objectively structured contracts and buy-and-sell agreements that guide interactions rather than internal schedules, procedures, and routines. Conversely, in purely internal communication and reporting channels, every interaction is colored by the hidden threat of hierarchical politics, the likelihood that power and influence rather than performance are guiding behavior. In older organizational forms, for example, cost data and/or performance measures may be manipulated by simply changing accounting conventions—such as the way in which overhead expenses are accumulated and assigned. With external linkages, attempts at personal gain may be made, but the behavior will be much more transparent.

Of course, the fact that network linkages are external does not guarantee that they will always be efficacious to each of the parties, but it does push the parties toward performance-based equity. A number of years ago, we predicted that network organizations would create “full-disclosure information systems” to assure that all decisions were made objectively and fairly.¹⁷ Such practices are now quite common. As the CEO of Excel Industries, a major supplier of Ford, states: “They know every cost we incur.”¹⁸

In sum, visible, external linkages among network components have perceptual as well as substantive benefits. A faulty external coupling must be dealt with, while purely internal mechanisms can be eroding or even broken for some time before the damage demands the affected parties' attention.

Dynamics of Voluntary Relationships—External, visible relationships, as suggested, tend to be explicit. They specify the performance that is expected from each partner and how that performance will be measured and compensated. Explicitness, however, does not require complex, legalistic, or highly formal contracts. A contract can be as simple as a due date and a price based on disclosed costs. In the construction industry, “partnering” sessions are held among network members at the beginning of major projects to clarify responsibilities and relationships and to agree on methods of resolving disputes. Similarly, General Electric’s Workout Program is designed to bring GE’s managers, customers, and vendors together to create effective working relationships.¹⁹

Most importantly, the fact that network relationships are explicit does not mean that they are dictated by one party or another. In fact, underlying all of the positive characteristics of network structures is the dynamic of voluntarism. If voluntarism is not present—if partners are not free to withdraw from relationships they believe are unfairly structured—then the value of openness and explicitness is compromised. Of course, such compromises can and do occur, as noted earlier. For example, in stable networks, components may become overly dependent on one another, and in internal networks corporate interventions may force components into relationships that are neither fair nor appropriately subsidized.

Nevertheless, U.S. firms are gaining experience at creating and maintaining fair and voluntary relationships. For example, Harley-Davidson claims it is no longer “waging war” with its suppliers. Harley’s managers reportedly “threw the lawyers out” and produced a simple contract that clarified goals for suppliers and outlined how disputes could be resolved.²⁰

In sum, the unique, positive characteristics of the network organization discussed here can assist managers in making adaptations by enabling them to test their proposed modifications and extensions against the operating logic of the form. Because changes are visible and clear to all parties in the network, there are likely to be multiple players tracing the impact of any change. Moreover, the key characteristic of the network form, voluntarism, is in itself a litmus test of logic violation—*any* change that reduces voluntarism is a potential threat to the overall efficiency of the network.

Conclusion

Research over the past decade has increasingly confirmed what managers and organizational theorists have long understood—organizations, particularly large, complex firms, have a difficult time responding to changes in

their competitive environment. Instead of adapting incrementally as market and/or technological changes occur, managers tend to wait until environmental demands accumulate to crisis proportions before attempting a response, and then they often fail. When managers do behave incrementally, they frequently make patchwork alterations to the existing organization as each new market or technological shift occurs but without considering the ultimate systemic impact. Such adjustments gradually move the organization away from its core structural logic, creating an idiosyncratic system highly dependent on a few key individuals or units to function. These organizations are not only unstable and costly to operate, they often are so convoluted that it is difficult even to determine where major change might begin—to get to the center of a complex organizational knot.

Our premise here has been that organizational forms, particularly the network form, need not be so prone to failure. If managers understand the logic of the form their organization employs, and if they keep that logic visible to themselves and others associated with the organization, the benefits of proposed changes can be weighed against the strains they impose on the total system. In fact, we believe that it is possible to anticipate how and why each organizational form is likely to fail. Moreover, if managers understand the operating logic of alternative forms, they can explore the possibility that environmental changes have pushed their organization outside the boundaries of one form and into those of another.

Finally, we have tried to illustrate how the network form should help make the manager's task of successful adaptation easier. By its very nature, the network organization is always in the process of renewal—its important elements are in a constant state of adjustment to market, technological, and other forces in the environment. This continual process of adaptation, coupled with the fact that network components are typically smaller and more focused than those of integrated firms, should help managers deepen their understanding of the form's operating logic and develop their renewal skills.

Whether the network form of organization is less prone to internally generated failures than its predecessors is ultimately determinable only over time. Nevertheless, its evolution provides managers the opportunity to explore and test their understanding of organizations from a new vantage point, and the continued study of networks should contribute to a better understanding of the causes of success and failure in all organizational forms.

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2. For a brief description of both Rubbermaid and Wal-Mart, see the Special Report, *Business Month* (December 1988), pp. 38 and 42.
3. For an early discussion of how large firms have disaggregated their operations and spread them across multiple, smaller elements along the value chain, see Michael J. Piore and Charles E. Sabel, *The Second Industrial Divide* (New York, NY: Basic Books, 1984). See also Johnson and Lawrence, *op.cit.*
4. A more detailed description of these three types of networks, and the forces shaping them, is provided in Charles C. Snow, Raymond E. Miles, and Henry J. Coleman, Jr., "Managing 21st Century Network Organizations," *Organizational Dynamics* (Winter 1992), pp. 5-20.
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8. Thomas Gelb, "Overhauling Corporate Engine Drives Winning Strategy," *The Journal of Business Strategy* (November/December 1989), pp. 91-105.
9. See General Mills, Annual Report, 1985.
10. See Nike, Annual Report, 1991.
11. See William Taylor, "The Logic of Global Business: An Interview with ABB's Percy Barnevik," *Harvard Business Review* (March/April 1991), pp. 91-105.

12. See, Jason Magidson and Andrew Polcha, "Creating Market Economies Within Organizations: A Conference on Internal 'Markets'," *Planning Review*, 20 (January/February 1992): 37-40.
13. *Business Week* used the term "hollow corporation" pejoratively in its March 3, 1986 cover story, *op. cit.* However, recognizing that thoughtful outsourcing does not cause an organization to lose its critical expertise, Quinn, Doorley, and Paquette discuss how firms are "learning to love the hollow corporation." See James Brian Quinn, Thomas L. Doorley, and Penny C. Paquette, "Technology in Services: Rethinking Strategic Focus," *Sloan Management Review*, 31 (Winter 1990), p. 83.
14. These and other examples are discussed in companion articles in the February 1992 issue of *The Academy of Management Executive* [Richard A. Bettis, Stephen P. Bradley, and Gary Hamel, "Outsourcing and Industrial Decline," pp. 7-22; and James A. Welch and P. Ranganath Nayak, "Strategic Sourcing: A Progressive Approach to the Make-or-Buy Decision," pp. 23-31]. However, while both pieces bemoan the negative impact of faulty outsourcing decisions on U.S. competitiveness, each recognizes that outsourcing, if properly handled, can be an important management tool, and Welch and Nayak propose models to assist with strategic outsourcing decisions.
15. See James Daly and Michael Sullivan-Trainor, "Swing Your Partner, Do-Si-Dough," *Computerworld*, December 23, 1991/January 2, 1992, pp. 21-25.
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17. Miles and Snow (1986), *op. cit.*, p. 65.
18. "Learning From Japan," *Business Week*, *op. cit.*, p. 59. Similar relationships based on full cost and profit information sharing among Silicon Valley chip designers and manufacturers are described in John Case, *op. cit.*
19. Snow, Miles, and Coleman, *op. cit.*
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Our Federalist Future: The Leadership Imperative

James O'Toole Warren Bennis

"The structure of the organization can then be symbolized by a man holding a large number of balloons in his hand. Each of the balloons has its own buoyancy and lift, and the man himself does not lord it over the balloons, but stands beneath them, yet holding all the strings firmly in his hand. Every balloon is not only an administrative but also an entrepreneurial unit."

—E.F. Schumacher

In these turbulent times, prudent mapmakers work on Etch-a-Sketch pads. Political boundaries change almost weekly as new nations emerge with varying degrees of anguish from the disintegrating empires of yesterday. No part of the world is exempt. From the Balkans to the British Isles, from the banks of the St. Lawrence to Guangdong Province on China's muddy Pearl River, ethnic and linguistic groups are wrestling—often at the cost of their lives—with a fundamental challenge of our era: We'll call it The Iceland Dilemma. The horns of that dilemma are represented by the choice between the advantages of small country autonomy, on one side, and the benefits of big country economies-of-scale, on the other. In the words of Daniel Bell, "the nation state is becoming too small for the big problems of life, and too big for the small problems of life." Because this big/small "mismatch of scale" to which Bell refers bedevils business organizations as well as nation states, in the pages that follow, The Icelandic Dilemma will be used as a metaphor for the most critical organizational challenge facing contemporary corporations both big and small.

But first let us consider Iceland's dilemma: This bleakly beautiful island nation is being pulled and shaped by two powerful and opposing forces. On one side is the Icelanders fierce pride in their nation's Viking heritage. This

pride has led the population of Iceland (in total, some 250,000 shivering souls) to form a committee to give Viking names to concepts that even their visionary national hero, Lief Erickson, never could have imagined. Hence, in Icelandic a computer screen is called a *skjar* (the ancient word for a “window” on a traditional turf house).

But that passion for what is uniquely theirs is only one side of modern Icelandic values. Even as Icelanders quote traditional sagas and support laws to require citizens to choose names for their children from an approved list of “pure” Icelandic origin, those same citizens are eager to enter into active participation in the global economy, to become a part of the highly competitive modern world of international technology, commerce, and finance.

Icelandic society is thus a vivid example of what philosophers once called the tension between the tribal and the universal. How to balance tradition and the desire for economic progress, how to be true to oneself while being a partner, and how to sing solo but be in the chorus at the same time—that is the essence of The Iceland Dilemma. Indeed, the entire world today is grappling with the need to strike a balance between nationalism and globalism. And that need is likely to grow more pressing as the new millennium unfolds, considering the fact that there are over 5,000 restless “nationalities” in the world, but only 166 nation states . . . so far. Clearly, the number of nations should be viewed as just pencilled in, and can be expected to increase dramatically as countries divide and subdivide even further in coming years, all the while seeking simultaneously to be a part of the New Globalism.

Fortunately, there is a generic solution to The Iceland Dilemma: *federation*. For example, Icelanders currently are debating whether or not to seek escape from their own particular version of the dilemma through an exogamous marriage with the European Community—joining their fortunes to those of peoples who have little interest in the purity of the Icelandic tongue or in the preservation of Icelandic culture, but who can provide the political and economic clout Iceland needs to be a player in world markets. Indeed, the European Community is the surpassing model of the federalist future. With twelve member states (and counting), the EC is now seen by some three score ethnic groups living in the twenty-five nations situated between Reykjavik and Riga as the best means for them to unify for overarching political and economic purposes, while at the same time maintaining their cultural integrity.

As we shall see, not only is such confederation a practical resolution of The Iceland Dilemma for nation states, it can be equally as beneficial as a strategy for business corporations, as well. Furthermore, the thorny governance problems inherent in political federalism can provide instructive guidance to corporate managers who are open to learning from geopolitical experience.

Government (and Corporate) Federalism

Unlike monolithic forms of government, political federations are alliances of more or less independent states, often with little in common but their desire to share in the benefits of swimming in a larger pond. The most durable example of confederation is Switzerland, where a workable union of divergent cultures has survived for more than 700 years. In modern Switzerland, there are 26 semi-autonomous cantons (and half-cantons), which together comprise four major cultural groups, each with their own language and customs. Perhaps the most convincing argument in favor of federalism is that the *Confederaziun Helvetica* endures despite this remarkable diversity (tolerating even the reactionary values of one half-canton that is the last political body in the Western world to deny women the vote in local elections). In general, federations allow member units to pursue their unique—even quirky—interests, to realize their distinctive possibilities, and to address their special needs, as long as they do not compromise the rights of other members or the needs of the alliance as a whole.

In that most successful of federations—our own resilient alliance of states—the whole is greater than the sum of Alabama, Alaska, Arizona, and the other disparate but essential components of the union. In these rapidly changing times, such federations as the United States work better than monolithic nations (like the former, misnamed, Union of Soviet Socialist Republics) because they offer flexibility as well as strength. By their nature, federal systems recognize the legitimacy of alternatives, of more than one possible response to a given challenge. If a federation were a poem, it would not be the epic saga of a single national hero, but something like Wallace Steven's "Thirteen Ways of Looking at a Blackbird."

Committed to a single vision and course of action, a unitary government is often too slow to respond to changing conditions. In contrast to the singular stance of the monolithic state, federations are more nimble and accustomed to considering a full repertoire of responses. While the unitary nation goes for all or nothing, federations multiply the options and reduce the risk. In theory, at least, federations are also less prone to the ethnic animosities that are the ugliest aspects of hyper-patriotism. The very existence of a federation is implicit recognition that there is strength in diversity. In homogeneous groups, outsiders are too often seen as monsters, devils, or obstacles on the road to "racial purity." But it is much harder to dehumanize outsiders in a heterogeneous alliance in which others are viewed as peers and partners (albeit, ethnic vilification is not impossible in federations, as the former Yugoslav republics sadly demonstrate).

It is not that federalism solves the problems of diversity; rather, it is a process for harnessing the positive potential of what otherwise might be counterproductive forces. As John Gardner writes, the on-going challenge for America is to create "a pluralistic but coherent society."¹ In fact,

pluralism and federalism are complementary concepts. James Madison argued that the virtue of a system predicated on those mutually reinforcing ideas lies in its built-in mechanism to counter the natural tendency toward the pursuit of self-interest, thus protecting the rights of minorities from “the tyranny of the majority.”²

Because federalism allows constituent units to maintain their integrity while unifying for common purposes, it is not surprising that the form is now a major trend in business as well as in government. For if “Centralization is the death-blow of public freedom,” as Disraeli said, it is equally the death-blow of corporate innovation. For that reason, many of the world’s most influential business leaders are creating new kinds of corporate confederations with numerous semi-autonomous units, often in far-flung countries, joined together only to allow them all to succeed better in an increasingly competitive global economy. Examples include: Benetton, Coca-Cola, and the newly formed ABB (Asea Brown and Boveri). These companies have become models for international orchestration, influencing such traditionally structured companies as IBM and General Electric. Just yesterday, Big Blue was structured monistically—critics would say monolithically. Now, the company boasts of some “20,000 business alliance relationships worldwide, including almost 400 equity investments and joint ventures.”³ It is subdividing into 13 divisions, and even creating semi-autonomous business units—some in joint ventures with competitors—which will do battle with their traditional lines for dominance of the same markets. Similarly, GE’s CEO Jack Welch is attempting to implement the new corporate federalism when he describes the characteristics of the “boundaryless” GE he intends to create. (Why federalism nonetheless remains an elusive goal for the likes of GE and IBM is an issue to which we return below.)

Significantly, the characteristics of successful national and corporate confederations are nearly identical. Moreover, the following characteristics of federalism have remained constant since they were first described by Madison in the late Eighteenth century, and thus they appear to possess almost universal validity.

- *Non-Centralization*. In federations, power resides in many semi-autonomous constituent centers, deliberately diffused for the purpose of safeguarding the freedom and vitality of those units. This *non-centralization* should not be confused with commonplace *de-centralization* (typically characterized by an all-commanding central authority which unilaterally delegates specific, limited powers to its subordinate units). In sharp contrast, a true federal system is contractual and power cannot be rescinded unilaterally or arbitrarily by the central government (or central headquarters). For example, the corporate staff at one of America’s most truly federalized corporations—Dayton-Hudson—cannot change the rules of the game that affect its Mervyn’s and Target divisions. As with

the Swiss confederation, such changes may occur only as the result of mutually respectful negotiations, a process that is prescribed in Dayton-Hudson's "constitution."

- *Negotiationism*. In federations, decisions are made in an ongoing process of bargaining between the units and the central authority—and, often, between the units themselves. Thus there is shared decision making, and the units have a guaranteed voice in defining their financial, administrative, and other obligations to the central body. This doesn't mean that Coca-Cola's distributors and bottlers dictate terms to CEO Robert Goizueta; nor, as we shall see, does Goizueta dictate to them, either. Rather, it means that terms and conditions are negotiated and contractual.
- *Constitutionalism*. In federations, there is a written (occasionally, unwritten) covenant that binds the allegiance of the units to the basic purpose, mission, philosophy, and principles of the overarching institution. Often, this constitution spells out the mutual rights and responsibilities of all parties. Constituent units, in turn, may be free to have their own constitutions as long as these do not violate the basic principles of the articles of federation. Much like the U.S. Constitution, ABB has a 21-page "bible" which lays out the principles by which the company operates, and Dayton-Hudson's 118-page "Management Perspectives" serves much the same purpose.
- *Territoriality*. In federations, there are distinct boundaries between the constituent units. In the case of nations, these geographic boundaries may be based on ethnicity or tradition. In corporations, the boundaries can be based on business or product line. (With franchisors like Coca-Cola and Benetton, the boundaries are often geographic). The key point is that there is "dual citizenship" in both the unit and the umbrella organization. This is much more logical than the dual reporting relationship found in matrix organizations in which the concept of territoriality is often ambiguous or blurred.
- *Balance of Power*. Federations seek balance not only between the central authority and the units, but between the units as well. (The nineteenth century confederation of German states failed, in no small measure, because Prussia over-dominated its weaker partners.) Part of the negotiations that led to the 1980s merger of Dayton-Hudson and Mervyn's concerned the relative role the California chain would play in the established, mid-west oriented, pecking order of DH's other retail units.
- *Autonomy*. In a federation, the units are free to experiment and be self-governing to the extent they do not violate the fundamental principles necessary for the maintenance of the union. Of all the characteristics of federation, this is the most difficult to achieve and maintain. As students of the Civil War are aware, the American union was nearly dissolved because of conflicting interpretations of this principle. Over far less

morally significant matters, Benetton recently found itself sued by an angry franchisee who claimed that the corporation was imperiously dictating policies that ran counter to the spirit of the alliance. (We return to this important issue below).

The Necessity—and Fragility—of Federalism

Madison argued that these traits of federalism become necessities when an organization reaches a certain size. While the Founders could imagine successful unitary republics on the scale of the Athenian city state (or Renaissance Venice), they argued that even the original thirteen United States were too big to function monistically. Their insight seems apposite to corporations, as well. Small, well-managed companies like Ben and Jerry's, Herman Miller, and Chaparral Steel operate effectively within a unitary structure and culture and demonstrate little need for federalism. While Madison recognized that size alone is not the only relevant criterion for choosing federalism—diversity is another—it is clearly the single most important reason. Is it coincidental that almost all large social and economic institutions which find themselves in trouble today are unitary in form? From the nation of China, to IBM, to the Los Angeles Unified School System, almost all such monolithic organizations could benefit from a heavy dose of federalism (as the leaders of IBM and the L.A. schools admit).

In this regard, it is significant that many of history's most successful giant institutions—the Catholic Church, the Roman Empire, the General Motors corporation, to cite three rather large examples—enjoyed their finest hours during periods when they were structured along roughly federal lines. For instance, G.M. reached its pinnacle in the late 1920s when it briefly approached Alfred Sloan's original concept of six confederated divisions; and G.M. was never as *unsuccessful* as it was in the late 1980s when it had all but abandoned the last remnants of true divisionalization (even producing Buicks on Chevrolet assemblylines).

The G.M. example also illustrates the essential fragility of federalism, an inherent instability that stems from the above-mentioned tension between the needs of central authority to exert power versus the rights of the units to autonomy. The art of leadership in a federation is to preserve the balance between those ever-shifting forces. History shows how difficult that art is in practice. Like G.M., most federations have a tendency—fatal in the long term—to overcentralize and homogenize. The old U.S.S.R. is a classic political example of this pattern. And the root of the Soviet problem wasn't simply communist dogma. Under Margaret Thatcher, capitalist Great Britain also did not go far enough in the devolution of authority to the constituent parts of the United Kingdom (and the new democratic Russian "Federation" seems to be regressing toward Soviet-style centralization).

The former Union of South Africa was once a relatively effective (but undemocratic) federal state. Then, in the 1950s, power was centralized in order to impose apartheid on the reluctant English-speaking provinces. The result was the erosion of autonomy and the creation of a unitary (and even more undemocratic) republic.

At the other extreme, the United Arab Republic (a short-lived marriage of convenience between Syria and Egypt) had nearly none of the characteristics of successful federations listed above, and consequently crumbled as if constructed of Arabian sand. And conglomerate corporations—like Dart Enterprises in the 1970s—typically disintegrate (or degenerate into mere holding companies) when there is no unifying vision, constitution or federal structure. As with so many conglomerates of the 1960-70 era, the parts of Justin Dart's once-mighty empire are now scattered across the *Fortune 500*.

The fundamental, and continuing, question facing all federations is this: What powers rightly belong with the central authority, and what powers should be reserved for the constituent units? Madison believed he had solved the question with the U.S. Constitution and Bill of Rights, which basically limited the power of Washington to matters of defense, foreign affairs, and regulation of interstate and international commerce. In theory, he may have been on target, but in practice he failed to anticipate a slew of complex problems that could not be relegated simply to one box (federal responsibility) or the other (states' rights). The problem came to a head over a moral issue—slavery—and has recurred time and again, particularly in relation to other issues of human rights and, more recently, to environmental questions (for example, we are now agreed that no state has the right to pollute air that blows over neighboring territory).

In fact, there has been a steady erosion of the power of the states, particularly in areas of fundamental moral principle. Until recently, Americans had cherished the belief that setting educational policy was a state's right. Yet, today, George Bush—an unapologetic opponent of centralization—argues that the education of the nation's youth is of such overarching importance that it cannot be left solely to the discretion of the states. His solution to the problem is a classic example of federalist thinking: The national government will set performance standards, and the states and localities will be free to find the most effective ways and means of achieving those standards. This is a specific illustration of federalism's most basic playing rule: The central authority establishes the why and the what; the units are responsible for the how.

It is this principle that has been violated, until recently, by almost every business corporation that has attempted to become a confederation. It was this "principle of co-ordination without losing the advantages of decentralization" that Alfred Sloan attempted, and failed, to define for G.M. in his classic 1921 "concept of the organization" study. In trying to simultaneously achieve co-ordination and specialization, Sloan later admitted (in 1963)

that forty years earlier he had been “amused to see that [my] language was contradictory.”⁴ While Sloan never abandoned his wish to resolve his corporate version of The Iceland Dilemma, in practice there was a steady erosion of “states’ rights” at General Motors almost from the day he unveiled his federalist structure for the corporation.

In fact, Sloan, his colleagues, and their many generations of successors, were never comfortable with the leadership style required for federalism to work. The system requires several things of those in central authority: faith in the power of people to solve their problems locally; willingness to forgo the satisfaction of exercising command and control; and understanding that, in complex systems and turbulent times, no one individual or group possesses enough knowledge to manage the jobs of everyone else in the organization. Sloan—and tens of thousands of managers around the world who were to become his disciples by way of the business school gospel of “specialization/differentiation” cases—were never comfortable with such basic assumptions about organizations and leadership. Indeed, the most famous practitioner of going-through-the-motions federalism was Harold Geneen, who had the form of confederation down pat at IT&T, but who lacked the essential “feel” for the technology of collaboration to make the system function entrepreneurially. Thus far, the acquisition of the “feel” has eluded the leaders of such companies as IBM and other industrial behemoths despite their apparent commitment to the principles of federation.

Therefore, in spite of the rhetoric of de-centralization, neither G.M. nor IT&T (nor the countless giant corporations modeled after them) has ever been a true confederation. At least not until the unprecedented turbulence of the late 1980s began to force a few corporate executives to re-invent Mr. Madison’s (and Mr. Sloan’s) marvelous notion . . . this time with feeling.

Resolving the Big Company vs. Small Company Dilemma

Here’s the circuitous path by which corporate America has finally arrived at federalism: Historically, America has been the land of the entrepreneur. In no other country have entrepreneurs been revered in legend the way they have been in the United States. Until mid-century, the mythical Horatio Alger and the historical Henry Ford were genuine heroes (almost like Napoleon in France). But, by the end of World War II, the entrepreneur was an endangered species in this country. In the years immediately following the war, so-called “organization men”—the risk-averse children of the Depression—had little interest in chancy careers in the corporations they dominated. Surveying the structure of industry two decades after the war, the renowned Harvard economist J.K. Galbraith declared entrepreneurialism to be an anachronism, and hailed the apotheosis of professional managerialism and giantism. “The planning system” (as he called the industrial form emerging in the 1960s) was to be dominated by a few monolithic

corporations working in close concert with government ministries.⁵ No longer would dozens of small firms compete within a given industry or for a given market. In Galbraith's brave new world, it would be USA, Inc. vs. Japan, Inc. vs. Germany, Inc. (or, more specifically, General Motors vs. Toyota vs. Volkswagen).

In fact, Galbraith was almost proved right: In the 1960s and 1970s, the big did get bigger and the number of competitors was reduced. For example, in the jet engine industry there were just three giants: G.E., Pratt and Whitney, and Rolls Royce—the first two of which built the largest factories in the Western World in pursuit of the holy grail of economies-of-scale. Similarly, by 1970, most major U.S. industries were dominated by one or two mammoth firms: G.M. (autos); U.S. Steel (metals); IBM (computers); Exxon (oil); Bank of America (finance); Sears (retailing). In Europe, the pattern was even more pronounced: The Italian government gobbled up scores of small companies and conglomerated them into giant, state-owned groups; in Britain, nearly the entire auto industry was amalgamated into one giant firm. This “New Industrial State” was the right way to go according to Galbraith—and most Europeans believed him: witness Jean-Jacques Servan Schreiber's *Le Defi Americain*.⁶

Everyone knows what happened next: Within a decade, G.M. had been badly embarrassed not only by smaller Ford and Chrysler, but by a passel of even smaller Japanese and German firms, as well; U.S. Steel was being chopped up by mini-mills; IBM had, literally, hundreds of smaller competitors; Exxon's megalomania had led it to acquire a bushel of small, successful, high-tech companies—and then to micromanage them into failures; Bank of America was being niched to death by financial boutiques and, likewise, Sears by its numerous small competitors in the retailing industry. Thus, by the mid-1990s, the entrepreneur was not only back from the brink of extinction, he (and, now, she) was said to be in ascendancy. In the Reagan era, the giant corporation seemed destined to the fate of the Brontosaurus, and George Gilder was crowing (while J.K. Galbraith was eating crow).⁷

While there can be no doubt that the 1980s belonged to the entrepreneur, Mark Twain's oft-quoted line—“News of my death has been greatly exaggerated”—may be finding a parallel in the life cycle of large corporations. Today, it seems wildly premature to join Gilder in assigning big business to the ash heap of history. This is not to defend the past behavior of the many complacent industrial giants who squandered America's precious assets in the 1960s and 1970s—their self-defeating human resources policies, suicidal customer relations, misguided planning, and faulty financial assumptions are beyond rational defense. Yet, there is no evidence to suggest that the current denizens of the *Fortune 500* are collectively about to go out of business—not next week, not next year, not in the next decade (and, not even in the next century). There are several reasons why large corporations

—witness GE—continue to succeed, and it behooves the enthusiasts of small business to keep these in mind.

Some Inherent Advantages of Large Corporations:

- They possess economies-of-scale in finance, purchasing, distribution, advertising, service, R&D (and, arguably, in manufacturing).
- They are able to undertake *global* marketing.
- They have resources to protect themselves against cross-subsidization (dumping).
- They are able to maintain a large, diverse bank of skilled people (which allows them to invest in lengthy training for future assignments, and to survive the loss of key individuals).
- They possess the organizational wherewithal and managerial know-how to bring more than one project at a time from the idea stage into full development.
- They provide key employees with a relatively high level of security and financial benefits.
- They are able to undertake the long-term planning and commitment of resources needed for giant, capital-intensive products (e.g., a jet airplane).
- They have clout with suppliers, governments, and unions.
- They can afford basic research, and to undertake slow, costly, incremental improvements in process technology.
- They have stability because they can afford to be integrated backwards (to suppliers) and forwards (to dealers).
- They tend to be diversified and, hence, less susceptible to vagaries of the economic cycle (and less vulnerable if one or two key products fail).

While all this stability, security, predictability, synergy, and discipline are, at best, theoretical advantages of large business, sufficient examples can be supplied to support most of these claims. After all, what small firm would not want to have the financial, service, marketing, distribution, purchasing, and R&D punch of an IBM? Especially—and this is the key point—if those benefits of size could come without the *dis*benefits of bureaucracy.

Which brings us conveniently to the advantages of small- and medium-sized businesses. Because there are so many static “mom ’n pop” firms which cannot serve as models of eminence, we have in mind here the characteristics of *Inc.* magazine’s list of the fastest-growing entrepreneurial businesses.

Some Inherent Advantages of Small Firms:

- They tend to be lean, agile, dynamic, and flexible (non-bureaucratic).
- They are close to their customers and, thus, sensitive to (and fast to react to) shifts in market demand.

- They are run by managers who often are owners and, thus, highly motivated by their equity positions.
- From top to bottom, nearly everyone in the company has direct, ongoing personal knowledge of most aspects of the business.
- Their employees are motivated by the human scale of the organization, by peer pressure, and by knowing how their parts contribute to overall company performance.
- They have excellent upward, downward, and lateral communications.
- They attract the most creative, energetic, and risk-taking individuals (indeed, there is a “brain drain” from large to small companies).
- They have a focused orientation on a single product or related line of products.
- They have short production runs and, thus, can customize products and keep a constant watch on quality.

The Big Mimic the Small

These impressive advantages are, in fact, the very characteristics of small firms that almost all large corporations today are attempting to capture through frantic attempts to alter their “corporate cultures.” In order to “get close to customers,” to “become people-oriented,” and to “focus on quality,” giant corporations around the world are experimenting with intrapreneuring, gainsharing, team approaches, spin-offs, product-line focusing, specializing, downsizing, dis-integrating, subcontracting, and decentralizing—in effect, emulating what small companies do naturally.

Hence, in this paradoxical world, we are faced with yet another fine irony: While entrepreneurs are trying to capture the advantages of large firms, managers of large corporations are, at the same time, attempting to behave like entrepreneurs! Therefore, it would seem as misguided today to speak of the decline of large organizations as it proved inaccurate twenty years earlier to speak of the fall of entrepreneurs. While smallness is *usually* more beautiful, bigness is simply a fact of life in a world where three billion people are increasingly linked by common technologies and markets.

It may be useful to think about this issue by way of analogy: Is the mega University of California going to give way to competition from hundreds of small colleges? Is the unitary government of France going to devolve all its power to the country’s myriad *départements*? Is Boeing soon to give way to small-scale manufacturers of jumbo jets? While a reasonable answer to each of these questions is negative, the most likely scenario is that the structures of giant universities, central governments, and colossal corporations will change to forms beyond our current ability to envision. Although we can’t imagine exactly what these new structures will look like, it nonetheless seems reasonable to expect that almost all organizations which survive and thrive in the future will possess the best characteristics of both

today's big *and* small successes. That is why in so many well-led large organizations efforts are being made to overcome *diseconomies-of-scale* by creating dozens of small, independent, manageable units.

The Small Mimic the Big

While the giants attempt to avoid extinction by imitating the behavior of fast-moving small companies, the parallel challenge for entrepreneurs in coming years is to build global markets by capturing the advantages of gargantuan firms. Fortunately, meeting this challenge will be facilitated by emerging, computer-based technologies of production and distribution. Newly developed manufacturing tools give small companies the advantages of mass production while, at the same time, allow them to customize products economically. New telecommunications technologies provide access to distant and specialized markets that were formerly out-of-reach for all but giant firms with global distribution networks. Sophisticated data bases provide even the smallest companies with marketing information that just yesterday was affordable only to the largest. And all this technology is currently available. At present, American fabric and apparel manufacturers are linked by computer to hundreds of retailers, thus giving increased purchasing power to the small firms, and faster inventory information to the manufacturers, all of which permit U.S. companies to use technology to help overcome Asia's competitive wage advantage.

By fine-tuning the federal strategy by which the small, semi-autonomous American states combined and cooperated in order to gain the advantages of a large nation, small businesses around the world are creating networks, partnerships, consortia, and federations—all designed to give them the functional equivalent of bigness. The best-known company pursuing a federal strategy is Benetton, where finance, R&D, design, purchasing, and planning are centralized, while the activities of manufacturing and retailing are dispersed. The company is a unique confederation of hundreds of small, manager-owned manufacturers and franchised retailers all linked together by computer to form the United States of Benetton. Like Benetton, such companies as Nike and The Limited also have learned that it is better to achieve the benefits of forward and backward integration through confederation rather than through acquisition.

Importantly, there is no single model of confederation. Such writers as Tom Peters, Peter Drucker, William Davidson, and Stan Davis have recently observed that companies around the world are engaging in creative forms of linkages, alliances, and consortia across corporate and national boundaries. Small companies, in particular, are inventing all manner of joint ventures, subcontracting, franchising, R&D consortia, and strategic partnerships.

These are taking the form of cooperation between customers and suppliers, between domestic and foreign entities, between large and small organizations—and even among competitors: after all, entrepreneurs are willing to do whatever it takes in order to combine the advantages of big and small. Some examples: small record and book publishers (and film producers) use the services of large distributors to gain economies-of-scale in marketing; small airlines form consortia to buy jet aircraft from brokers in order to gain economies-of-scale in purchasing; small corporations design furniture, contract to have it made in Third World countries, and then wholesale it to large department stores in Europe and America (or market their products themselves in stores-within-stores). As our colleague Jay Galbraith explains, the common thread in each of these examples is that small companies “buy the power of bigness”—that is, they have someone else provide the scale in marketing, purchasing, financing, or manufacturing that is uneconomical for the small company to attempt itself.

Some of these are companies that Raymond Miles calls “dynamic networks” which remind him more of “a switchboard instead of a corporation.”⁸ At the extreme, these low overhead “hollow corporations” may merely represent the abandonment of manufacturing. While subcontracting across corporate and national boundaries to avoid the headaches of in-house and domestic manufacturing represents one variety of federalism, it strikes us as neither the most socially desirable nor most organizationally effective end to which the structure can be put. Exporting jobs and losing the ability to manufacture are questionable justifications for federalism. In sharp contrast are the “flexible manufacturing networks” that have sprung up in such places as East Brooklyn, New York, Erie, Pennsylvania, and Italy’s Emilia-Romagna region.⁹ In these federal systems, numerous small manufacturing companies—frequently, competitors—form linkages designed to improve economies of scale and the ability to specialize. Another manufacturing-based variant of federalism is found at Cypress semiconductors, which encourages innovation by creating separate, semi-autonomous start-up businesses in which employee-owners of these units function co-operatively under a corporate umbrella.

The federal form has applications not only for manufacturing and retailing, but for service industries, as well. American Airlines’ SABRE system uses high technology to link the worldwide fortunes of numerous large and small competitors in the airline industry. In the U.S., nearly every service from real estate to plumbing has been successfully franchised, and international professional services firms like Arthur Anderson are, in fact, prime examples of the federal system. And Coca-Cola, with its global network of franchised bottlers and distributors, is the longest-standing—and most successful—example of the advantages of confederation.

Federalism as a Revitalization Strategy

Of more recent origin—and less-conventional structure—is the confederation ABB which employs more people around the world than live in the entire country of Iceland. Although some components of the company are over a hundred years old, ABB's CEO, Percy Barnevik, has demonstrated the validity of federalism as a strategy to revitalize old-line manufacturing firms for competition in today's world markets. Barnevik explains that ABB "is a company with no geographic center, no national ax to grind. We are a federation of national companies with a global communications center."¹⁰ Barnevik is not worried by the contradictions that led Sloan to abandon federalism: "ABB is an organization with three internal contradictions. We want to be global and local, big and small, radically decentralized with centralized reporting and control."

The managerial secret that allows ABB to turn these contradictions into what Barnevik calls "real organizational advantage" is federalism with a vengeance. ABB's operations are divided "into nearly 1,200 companies, with an average of 200 employees. These companies are divided into 4,500 profit centers with an average of 50 employees." With only 100 professionals in their Zurich headquarters, the company is not unified by the efforts of an all-powerful central staff *à la* General Motors. Rather, this *non*-centralized confederation of semi-autonomous units is held together by a common vision of globalism, excellence, and clearly enunciated responsibilities for performance. What is the role of central headquarters? "To operate as lean as is humanly possible," says Barnevik. And the role of leadership? To give managers "well-defined sets of responsibilities, clear accountability, and maximum degrees of freedom to execute."

Problems, Problems

While we have stressed the advantages of federalism, the managerial difficulties inherent in the system are legion. According to a *Fortune* reporter, federalism is so demanding that "Barnevik assumes that his highfliers will spend up to 30 hours a week *in addition* to their regular work" managing the complex ABB confederation.¹¹ The sources of the extra work are clear: powersharing is not a natural act, learning to disseminate information effectively is not as simple as it sounds, and balancing the conflicting interests of numerous parties is harder than juggling a half-dozen indian clubs. The truth of the matter is that the longevity record for joint ventures, strategic alliances, and other forms of consortia is mediocre, at best, and there are precious few examples beyond ABB and Coca-Cola of successful true federations. Such structurally endemic problems as "free-riding," high transaction costs, absence of accountability, and a dozen other centrifugal forces cause most confederations to fly apart.

And the score sheet in the political arena is only marginally more encouraging. Even our lead example—the European Community—suffered a series of shocks to its cohesiveness during 1992. Beginning with a negative vote by the Danes on ratification of the Treaty of Maastricht, one EC member country after another reasserted its sovereignty in a fashion that skeptics interpreted as making a mockery of the notion of a United States of Europe. Hence, in both the corporate and political arenas there are grounds to question the viability of federalism on the grounds that it is devilishly hard to manage such a system. To some, this may justify rejecting the structure. But we would argue that both corporate and political federalism are relatively new phenomena and, hence, knowledge about how to manage such alliances is just being garnered. Since we are just beginning to analyze the experience of corporate federations, in particular, it seems premature to write this new idea off before we have had sufficient time to test it. At this early stage, we can only say that a new style of leadership appears to be a *sine qua non* of success in any federal system.

The Leadership Imperative

The sharpest image of the new federal leader that comes to mind is that of Coca-Cola's Robert Goizueta who, at a recent meeting of the company's bottlers and distributors, was observed to implore those fiercely independent folks *at least three times in one speech* to "please paint your trucks red." How's that? In the year in which he earned some \$80 million, the CEO of Coca-Cola had to plead with "his troops" to adhere to standards of corporate conformity? Clearly something new is going on here. And that something is that leaders of federations don't think of their associates as troops—and the associates don't think of their leaders as generals.

Like ABB, Coca-Cola's federalism is effective in a way that Sloan never could have imagined because of a factor that emerged nearly three decades after the G.M. chief's death: A new concept of leadership. Sloan was a brilliant leader of G.M., but therein lay the fatal flaw in his attempts to install federalism: Sloan was also the *only* leader at G.M. In sharp contrast, the new leaders of the emerging federal corporations are *leaders of leaders* who, like Percy Barnevik and Robert Goizueta, are willingly followed by other leaders who have subscribed to their "vision."

It became commonplace in the 1980s that the new leader is one who has the ability to generate a compelling, moving, and unifying vision. This means the ability to establish a climate and structure that gives all members of the organization a clear sense of what they are doing and why. What has not been fully appreciated about "the vision thing" is that the purpose of a clearly communicated vision is to give meaning and alignment to the organization and, thus, to enhance the ability of *all* employees to make decisions and to create change. The new leader does not make all decisions herself;

rather, she removes the obstacles that prevent her followers from making effective decisions *themselves*. Thus, not only is the standard military leadership metaphor of generals and troops wrong, so is the classical peacetime metaphor of shepherds and sheep. The new leaders are no more shepherds than their followers are sheep. A more fitting metaphor is Schumacher's balloon man—now a woman—who holds a fist-full of strings attached to countless units, each tugging away because it is filled with the helium of entrepreneurial spirit.

Indeed, when we describe the emerging leadership relationship in today's federal organizations we come closest when we speak of *leaders of leaders*. In these organizations, senior leaders are followed willingly by other leaders by virtue of the formers' vision, integrity, and courage (and not just by the organizational equivalent of a yank of the crook or the nipping of a sheepdog at the heels). Importantly, because people at *all* levels are leaders in their own right, there is little of the resistance to change that characterizes the middle ranks of most hierarchical organizations headed by a single commander-in-chief and staffed by layers of resentful sheep. In the emerging leadership relationship, it is far from easy for the outsider to identify *the* leader. As the Chairman of Herman Miller, Inc., Max De Pree, explains, "The signs of outstanding leadership appear primarily among the followers. Are the followers reaching their potential? Are they learning? Serving? Do they achieve the desired results? Do they change with grace? Manage conflict?"¹² If so, the organization is blessed with an outstanding leader of leaders.

In the successful federal organization, a central—perhaps *the* central—task of the leader of leaders thus becomes the development of other leaders. At Dayton Hudson, Kenneth Macke spends about half of his time on the career development of the firm's top one hundred managers. With 4,500 employees in potential leadership positions, Percy Barnevik's job becomes one of creating the conditions in which all those people can succeed in their jobs. In effect, federalism provides a structural skeleton for the rhetorical goal of "empowerment." Thus, Federalism does not obviate the need for leadership; instead, it focuses and redefines the task of the leader. The success of the current president of the European Commission of the EC, Jacques Delors, illustrates the necessity of federal leadership characterized by the provision of inspiring vision—coupled with the identification, nurturing, and development of future leaders empowered to carry out that vision.

Indeed, federalism may be a necessity for achieving true empowerment in large, complex systems. Because it stresses interdependence over independence and autonomy over dependence, it substitutes healthy self-control for the command and control of a hierarchy. And, if anything has been learned about human behavior in organizations and society, it is that interdependence leads to healthy cooperation, and that dependency is neither healthy nor effective.

Ultimately, federalism also may pave the path toward more democratic organizations. When we ask “Is democracy inevitable?” the answer is a more resounding and immediate “yes” in federal systems.¹³ For as Madison recognized, democracy is more natural in smaller units, and less-wieldy in large, unitary states. Lest this federalism sound like soft-headed, “touchy-feely” management, it is worth noting that George Will has called for a marked return to federalism in the American system of government: “That is the future—congressional ascendancy and vigorous federalism. We can live with that. The Founders said we should.”

“A Pretty Good Alliance.”

In essence, federalism allows nations and corporations to have their organizational cake and eat it, too. Given proper leadership, the new federalism—whether in the guise of ABB or the EC—illustrates that it is possible to pursue innovation, self-governance, and autonomy, while at the same time enjoying the advantages of effective coordination, economies-of-scale, and the protection of cherished freedoms that only pluralism can provide. From a business perspective, federalism erases the false “big versus small” dichotomy that has for too long preoccupied those engaged in debate about the essential traits needed for international competitiveness, much as it points the way towards variations on the theme of confederation that could lead to truly effective performance in the global economy. Even granting that federalism is a difficult structural form to manage—perhaps the most difficult—it might still recommend itself on the grounds that, like democracy, it is simply better than the alternatives.

Finally, we can imagine a time when corporations such as ABB—which are simultaneously global and deeply rooted in local cultures—serve as models for nations that aspire both to national self-expression and to survival in the world economy. The “dual citizenship” that characterizes these new confederations could resolve The Iceland Dilemma, and the only cost would be the loss of the jingoistic rhetoric of which national mottoes and state anthems traditionally have been composed. The slogans of the federations of the future probably won’t be as stirring as the national slogans of the past. It is true that “My federation, a pretty good alliance” doesn’t have the ring of “My country, right or wrong.” But a world of overlapping and interwoven corporate and national federations would be a far better place in which to work and live.

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Advanced Manufacturing Systems and Organizational Choice: Sociotechnical System Approach

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I*nternational comparisons show that in terms of employing robots and installing computer-integrated manufacturing (CIM), the U.S. lags behind Japan and several Western European countries (including West Germany, Switzerland, and Sweden).¹ Research also suggests that, even when U.S. firms have* advanced manufacturing technologies installed, they are less effective in their utilization of the technologies than their overseas competitors.² Part of the problem may be the lower level of technical competence of senior corporate executives in the U.S. compared to Japan and Germany and a general bewilderment caused by the alphabet soup of manufacturing technologies and techniques available.³ These include CIM, MRPII, FMS (flexible manufacturing systems), CAE (computer-aided engineering), CAD (computer-aided design), CAM (computer-aided manufacturing), CAPP (computer-aided process planning), JIT (just-in-time), TQM (total quality management)—not to mention robotics, concurrent engineering, and automated storage and retrieval.⁴ However, a growing body of research suggests that the critical problems that U.S. companies face are not technical but managerial. Observations of companies' experiences in implementing advanced manufacturing systems point to the problems arising from the incompatibility of new technologies with organizational structures, decision techniques, management systems, and employee attitudes.⁵

New manufacturing technologies fundamentally change the nature of the firm. Hayes and Jaikumar compare the transition from traditional to new manufacturing systems with a family replacing their old car with a

helicopter as their primary means of transport.⁶ In order to benefit from the changeover, it is essential that the family not use the helicopter in the same way that it used the family car. Bela Gold makes a similar point. The key feature of computerized manufacturing, he observes, is that it offers “systemic” rather than “point” capability. As a result, it is a “*contagious technology* . . . it offers progressively greater benefits as it integrates more sectors of a plant’s operations.”⁷

Hence, for companies to capitalize on the full potential of advanced manufacturing technologies to enhance competitive performance, they must move away from a technologically inspired view of the future. The popular vision of the factory of the future, the “robotized factories . . . whirring away in the dark throughout the night with only ghost crews to oversee them,”⁸ is not a myth, but the route towards it involves much more than capital investment in state-of-the-art facilities. The real impediment to putting new manufacturing technologies to work, observe Hayes and Jaikumar, “lies not in the inherent demands of the hardware but in the managerial infrastructure that has become embedded in most U.S. companies over the past 50 years.”⁹

The management problems associated with new manufacturing technologies arise from their dependence on integration—not just within the manufacturing process, but across the enterprise as a whole, and even extending beyond the enterprise to include suppliers and customers. Critical elements of this integration include the interfaces between design and manufacturing;¹⁰ between design, engineering, and plant control;¹¹ between manufacturing strategy and organization strategy;¹² between manufacturing processes and firm’s systems of cost management and investment appraisal;¹³ between marketing, design, and quality control;¹⁴ and between manufacturing and human resource management.¹⁵

If implementing new manufacturing technology requires adjustment by every function of the firm, the implication is that the successful introduction of new manufacturing technology requires nothing short of a complete transformation of the firm. It has been recognized that the comprehensive organizational transformations required by new manufacturing technology can only be achieved with the leadership and commitment of top management. As Gold¹⁶ and Hayes and Jaikumar¹⁷ recognize, bottom-up processes simply do not work in the adoption of advanced manufacturing systems. But even with the necessary commitment, where is the CEO to begin? For organizational transformation to take place, some unifying framework is needed to guide the process. Sociotechnical systems are such a framework.

The Sociotechnical Systems Approach

Over the last three decades the sociotechnical systems (STS) approach has become an increasingly popular organization design tool for examining and changing the workplace environment.¹⁸ Although STS theory lags behind

practice,¹⁹ studies of STS redesign efforts show that such changes have increased productivity through better utilization of human resources and capital equipment, and have enhanced the quality of working life.²⁰

The sociotechnical systems perspective considers every organization to be made up of a *social subsystem* (the people) using tools, techniques and knowledge (the *technical subsystem*) to produce a product or a service valued by the *environmental subsystem* (of which customers form a part). The success of an enterprise depends upon the compatibility between its three subsystems. Thus, while every organization is perceived as a socio-technical system, not every organization is designed using STS design principles, methods, processes and philosophy.²¹

The STS perspective appears straightforward, even tautological, at first glance. Yet, the theory, the design principles, and the change process focus our attention on complex processes within organizations and between organizations and their environments. A fundamental axiom of STS is that whatever decisions are made about or within any one of the organizational subsystems, those decisions should meet the demands of the other subsystems. The traditional focus of STS analysis is work design: decisions concerning the interaction of people and technologies must meet the requirements of the external environmental subsystem. The scope of STS analysis also extends beyond work design to broader dimensions of organizational structure and strategy. STS provides a particularly useful framework for assessing the system-wide implications of new manufacturing technologies. Ensuring compatibility between the technical and environmental subsystems requires that new manufacturing technologies are effective in meeting the needs of customers and are capable of enhancing the competitive position of the firm.²² Hence, introducing new manufacturing technologies inevitably requires a redefinition of the relationship between the technical and environmental subsystems through adjustment to overall business strategy. At the same time, compatibility between technical and social subsystems implies that a delicate balance must be struck between selecting the new technologies which are most compatible with the existing social subsystem, and changing the social subsystem to accommodate the requirements of the new technology.

The most common application of STS analysis to organizational redesign has involved firms employing continuous process technologies. Within this context, STS analysis emphasized the merits of multi-skill requirements, autonomous work groups, group-based reward systems, minimal critical specifications, increased interactions with customers, self-inspection of quality, information-sharing mechanisms, performance feedback loops, pay for knowledge, flexible responses, and parallel learning structures.²³ The new manufacturing technologies, many of which involve integrated batch manufacturing, share a number of properties with continuous process technologies.²⁴

New Manufacturing Technologies from a Sociotechnical Perspective

Classifying New Manufacturing Technologies—Most studies of organizational aspects of production technology have been based upon typologies of “traditional” technologies.²⁵ Advanced manufacturing technologies may be distinguished from traditional technologies (including nonprogrammable automation) in terms of their capacity to store, process, and relay information; the capacity to improve quality by self-monitoring, self-regulation, and self-correction; the capacity to be easily modified during process or product production; and the capacity to be integrated with other production equipment and systems.²⁶ Advanced manufacturing systems may be regarded as embodying three types of innovations categorized in terms of their area of applications:

- *engineering technologies*—such as computer-aided design (CAD), computer-aided engineering (CAE), computer-aided process planning (CAPP), computer-aided manufacturing (CAM);
- *manufacturing techniques*—such as robots, group technology, cellular manufacturing, flexible manufacturing system (FMS), automated storage/retrieval system; and
- *business techniques*—such as manufacturing requirements planning (MRP II), just-in-time (JIT), kanban techniques, and total quality management.²⁷

For our purposes, the critical characteristic for classifying advanced manufacturing technologies is the level of integration they imply. Meredith and Hill distinguish four levels:²⁸

- Level 1—*stand-alone* (or unitary) equipment such as robots or numeric-controlled machine tools.
- Level 2—*cells* consisting of groups of equipment and materials for the production of parts, typically utilizing group technology and computer-aided manufacturing. At their highest level of integration, a cell might form a flexible manufacturing systems.
- Level 3—*linked islands* involving cells from level 2 being linked together into larger production systems which typically utilize CAD/CAM, automated storage and retrieval systems, JIT, and MRPII;
- Level 4—*full integration* providing linkage of the entire manufacturing function and all its interfaces through an extensive information network. This level of integration is commonly known as computer-integrated manufacturing (CIM).

On the basis of STS principles and our observations of different production systems, we can specify some of the key linkages between the new technologies and the technical, social, and environmental subsystems of the organization. Table 1 provides a summary of our predictions.

Table 1. A Sociotechnical–System-Based Comparative Examination of Four Levels of Advanced Manufacturing Systems

Key Organizational Elements	Level 1 Stand Alone (e.g., new machine tools, robots)	Level 2 Cells (e.g., FMS)	Level 3 Linked Islands (e.g., MRP II, CAD/CAM)	Level 4 Full Integration (e.g., CIM)
Technical System				
Level of Complexity	Low	Moderate/High	High	High
Innovation	Process innovation	Mostly process with limited product innovation	Moderate innovation in both product and process	High innovation in both product and process
Environmental System				
Complexity and Stability	Stable, simple, with low to moderate uncertainty	Limited turbulence, complex, with moderate to high uncertainty	Turbulent complex, with high uncertainty	Turbulent, complex, with high uncertainty
Technical/Environmental Interface				
Strategic goals	To replace an existing machine, group of machines and/or workers	To facilitate some required changes in the firm's product mix; capacity, lead time process	To provide competitive advantage by developing synergy in the production	To become a true competitive force in the marketplace
Risk	Low	Moderate/High	High	High
Relationship with vendors	Bureaucratic control of vendors and suppliers	Semi-bureaucratic control of vendors and suppliers	Vendors and suppliers are linked to the organization	Vendors and suppliers are an integral part of the organization

The Technical Subsystem—The technical system of an organization consists of the tools, techniques, devices, artifacts, methods, configurations, procedures and knowledge used by organizational members to acquire inputs, and transform inputs into outputs.²⁹ An important difference between the four categories of new manufacturing technology is in the magnitude of their impact on the firm's technical subsystem. The introduction of stand-alone items of capital equipment has a local impact: it leaves the technical subsystem largely intact. Fully integrated systems involve a complete transformation of the technical subsystem. In terms of qualitative impact, there are two characteristics of new manufacturing technologies: level of

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Social System				
Skill Requirements	High specialization, with routine and repetitive tasks	Limited multiple skill requirements	Multiple skill requirements	Low specialization, with multiple skill requirements
Employment Requirements	Relatively stable	Semi-flexible	Flexible	Flexible
Work Design				
Individual or Group Task Design	Mostly individual task design	Semi-autonomous work group design	Semi-autonomous work group design	Autonomous work groups design
Structure	Rigid/mechanistic	Semi-organic	Organic	Organic/networked
Integration	Limited local integration	Local integration	Semi-integrated total system	Total system integration
Information Flow	Manual exchange of information	Restricted exchange of information	Semi-automatic transfer of information	Automatic transfer of information
Control	Bureaucratic	Semi-bureaucratic	Semi-self-regulated	Self-regulated
Rewards	Individual-based	Individual- or group-based	Group-based	System-based

complexity and effect on innovation. The level of technological complexity of the four advanced manufacturing systems varies significantly. In moving from Level 1 through to Level 4, the extent of integration increases, the size of capital investment rises, the capability and sophistication of software and hardware increase, and a greater variety of skills are required.³⁰

The movement through Levels 1 to 4 is also associated with increasing capacity for innovation. “Stand-alone” items represent localized, closely targeted process innovation. A fully integrated system, on the other hand, focuses attention on both the manufacturing process and the marketplace, fostering both process and product innovations.

The Environmental Subsystem—The key exogenous players in the environment are customers (whose demands the organization must seek to satisfy) and competitors (who are also vying to serve the same demands). As competition intensifies and customers become more sophisticated and fickle, the external environment becomes less stable and more complex. To the extent that traditional manufacturing systems were orientated towards a less complex, more stable environment, stand-alone items are more suited to settings that have remained comparatively stable (with relatively few external elements in the environment upon which the organization is dependent) and where each of these items operates independently. For example, a CNC machine or a point-welding robot is introduced to provide clearly defined performance enhancement to a specific task. Such localized technological enhancement is conducive to an environment where the performance requirements are simple and well-defined, and where the requirements are relatively stable over time. At the other end of the scale, fully integrated systems are likely to fit best a turbulent business environment in which the organization must satisfy a broad range of performance requirements. This is because fully integrated systems have the capability of total-system adjustment in response to external change—including the introduction of new products.

At the interface between the technical subsystem of the firm and its environment is the strategy of the organization. In terms of selecting new manufacturing technology, the key elements of business strategy are the strategic goals and the values and assumptions concerning risk. Stand-alone machines have narrow goals relating to cost reduction and to specific improvements in technical performance. The goals of fully integrated systems, on the other hand, are more likely to be closely identified with broader strategic goals which may include product innovation, multidimensional aspects of quality, and the reduction of new product lead times. At the intermediate level, cells and linked islands are likely to be associated with strategic goals such as the increasing product differentiation potential, broadening product mix, and increasing fast-response capability.

An integral part of the strategic positioning of the firm in relation to its environment concerns its choices with regard to risk. While risks have their sources in the environmental subsystem, their impact upon firm performance depends upon how these risks are mediated by the firm's strategic stance. The impact of new manufacturing technologies on risk depends upon interactions between the technical and environmental subsystems. For example, as the levels of integration increase across the four categories in Table 1, risk increases via two mechanisms. First, the size of capital investments and associated fixed costs increase, making the firm more vulnerable to cyclical movements in demand. Second, the increased need for integration increases the risk that the necessary system-wide adjustments will not be successfully managed. A final aspect of the technical/

environmental interface concerns relationships with suppliers. As the integration associated with advanced manufacturing technologies increases, supplier relationships become closer and more intense.

The Social Subsystem—The social system of an organization comprises the individuals who work in the organization and the total of their individual and social attributes. The social system encompasses individuals' aptitudes, skills, their attitudes and beliefs, and their relationships within groups and between groups. These relationships include lateral relationships and vertical relationships between supervisors and subordinates; they include formal relationships and the informal relations determined by implicit psychological "contracts" between the individual and the employer, political relationships based upon the distribution and exercise of power, and the influence of cultures and tradition. From an STS perspective, social systems are the only part of the organization that can conceive and implement improvements in organizational processes.

The different technical characteristics of the four categories of new manufacturing technology have important implications for the social system of the enterprise. Table 1 identifies two specific relationships: skill requirements and employment arrangements. The skill requirements of the various technologies differ substantially. Stand-alone systems typically involve routine and repetitive tasks requiring specialized skills. Machine cells and linked islands of automation involve less specialization and increased flexibility and versatility requiring the application of multiple skills. The higher levels of integration required by "fully integrated" manufacturing systems involve the application of a yet more complex mix of skills. As integration increases, human control is directed less towards specific technical requirements and more towards integration. At the full-integration stage, tasks are primarily non-routine and non-repetitive and require the flexible application of a range of specialist engineering and programming skills.

Employment arrangements are also influenced by the task, skill, and integration requirements of the different technological categories. In the case of stand-alone systems, an operator typically undertakes a narrowly defined task and continues to do that task unless promoted to "higher" position. In linked islands and fully integrated manufacturing systems, employment arrangements are more flexible—high levels of integration are conducive to broader, less specific job assignments. The interaction between the technical and social subsystems is critical to the successful introduction of new manufacturing technology and provides a particularly complex and delicate management challenge.

Total System Integration: Work Design—The role of management is to weld the technical system with the social system with the aim of achieving an optimum fit between the organization and its environment. Bringing the

three systems (technical, social, and environmental) together occurs at the work design level. Work design encompasses many organizational elements such as task designs, structure, control and reward systems, information flow, decision-making processes, and human resource practices. Table 1 summarizes the implications of the four advanced manufacturing systems for six work design dimensions.

Changes along each of these dimensions are closely related to the degree of integration. At the stand-alone level, work design is similarly individually based. In fully integrated systems, work design is similarly determined by the need for integration.

In terms of structure, stand-alone systems are typically specialized. They fit a mechanistic structure involving specialized individual work tasks with hierarchical control. Rewards tend to be individual, based upon quantitatively assessed performance, and information transfer is manual, primarily in a vertical direction.

Localized integration offers implies islands within which specialization and bureaucratic controls are relaxed, while linked islands of automation, involving a closer integration of tasks and individuals, are likely to be best suited to the greater flexibility offered by an organic structure with even less specialization and hierarchy. Linked-island systems favor self-regulated work groups, but within the context of constraints on group autonomy set by the need for linkage between the groups. Such linkage can be achieved by automatic transfer of information, or by semi-automatic transfer (e.g., kanban systems).

Under full-integration, high levels of self regulation are feasible so long as coordination is maintained through automated, fully networked transfer of information. An interesting feature of fully integrated systems is that they seem to promote an organizational structure that features a level of flexibility, integration and lack of specialization that extends beyond that usually associated with organic structures. A key consequence of computer-integrated manufacturing is the extension of computer integration from manufacturing to other functions of the firm and beyond the firm to encompass suppliers and customers. The result is the "computer-integrated enterprise." We refer to this "ultra-organic" structure as the "networked organization."

Implementing New Manufacturing Technology: Managing the Transformation Process at Northern Telecom

How does a firm move from a sociotechnical system based upon one category of technology to one based upon another? This question is important in light of the increased environmental complexity and instability of the 1980s and 1990s which put greater demands upon firm's technical and social systems for efficiency, flexibility, output quality, and product innovation.

The result has been a convergence of the strategic goals for manufacturing systems, which points towards the advantages of fully integrated advanced manufacturing systems for an increasing number of manufacturing companies. The problem for most firms, however, is the transition from traditional systems (where new technology was introduced on a piecemeal basis) to fully integrated systems. This transition necessitates a transformation of the firm's social systems, otherwise organizational performance will deteriorate rather than improve.

In order to better understand the process by which firms can manage the transition from one effective sociotechnical system to another, we studied the transformation process in Northern Telecom's manufacturing plant at Santa Clara, California.

Northern Telecom and Its PBX Operations—Northern Telecom Inc. (NTI) is the U.S. subsidiary of the Canadian company Northern Telecom Limited (NT), the world's fourth largest supplier of telecommunications equipment and the second largest supplier in North America. Its Business Communications division is concerned primarily with supplying private branch exchanges (PBXs). Santa Clara, California, is the site of the NTI's U.S. plant for the manufacture of PBXs, although the divisional headquarters together with several divisional functions are at Richardson, Texas.

NT's rise to preeminence in telecommunication equipment is associated with two main factors. First, NT's leadership advantage in being first to market with a digital switch in the late 1970s. Second, the breakup of the Bell system in the U.S. which gave NT the opportunity to supply the Bell operating companies (which had previously been under strong pressure to purchase internally).

The Environmental System—During the 1980s the telecommunications equipment industry emerged as one of the most dynamic and complex of any industrial sector. The replacement of electromagnetic switching by digital switching helped fuel strong growth, with worldwide spending on telecommunications products and services projected to reach one trillion dollars by the end of 2001.³¹ Digital technology permitted the joint transmission of voice, data, and visual images; the replacement of electrical by fiber-optic transmission; and, more generally, the merging of telecommunication and computer technology. Acceleration of technological change coincided with deregulation of telecommunications services: the breakup of the Bell system in the U.S. was followed by privatization of national telephone companies in several overseas countries. Among business customers, increasing complexity of their communications needs resulted in growing demands for private switching equipment and local area networks. International competition also increased sharply. By the mid-1980s, NT's continuing erosion of AT&T's share of the North American PBX market, was

running up against AT&T's major restructuring for lower costs manufacturing, Siemens' incursion into the U.S. markets, and IBM's move into telecommunications following its acquisition of Rolm. Internationally, both NEC and Ericsson were building strong global positions.

These combined external pressures placed increased strains upon NT's technical system. During the late 1970s and early 1980s NT was able to exploit its leadership in digital switching technology. By the mid-1980s, however, competitors had largely eroded its initial advantages, equipment prices were declining in real terms, and concerns over quality, flexibility and speed to market were growing.

The result was pressure on NT-SC for a strategic adjustment which would realign its technical system with the demands of the environmental system for lower manufacturing costs, increased product quality, increased responsiveness to customer requirements, and faster new product introduction. These pressures were directed through two channels. At the divisional level, operational objectives were established in the following areas: annual reductions of operating costs, reduction in manufacturing cycle times, reduction in new product introduction intervals, improvements in incoming material quality, improvements in process and outgoing product quality, inventory reductions, customer service improvements, and increased market share. At the corporate level, the formation early in 1985 of an "Operations Council" (composed of senior operations managers throughout the company) provided the impetus for the development of a company-wide manufacturing strategy and for a program of continuous improvement of manufacturing performance. The program had three basic corporate-wide objectives—to reduce inventory by 50%, to halve manufacturing overhead as a percent of sales, and to increase customer satisfaction by 20%—and there were specific recommendations on how to accomplish these objectives.³²

These developments were accompanied by a number of senior level changes in personnel at Northern Telecom-Santa Clara (NT-SC) including a new plant General Manager and a new Director of Manufacturing Operations.

NT-SC's Technical System—In 1985, NT-SC embarked upon a period of organizational transformation that has continued up to the present. The focus of the environmental pressures for change was initially on the technical system. In 1985, NT-SC's manufacturing facility could be described as batch production organized on a job-shop basis, with new manufacturing technology existing primarily as stand-alone systems. For example, automation existed at several stages in the manufacture of printed circuit boards (PCBs), including automatic insertion of components and wave soldering of components onto boards.

The initial strategy was to move quickly from a Level 1 situation (Table 1) to Level 3 and Level 4 technologies. The aim was to establish linked islands of automation that would then form the basis for comprehensive

computer integration—which would include not only manufacturing, but would extend to new product design, sales, marketing, field support, and other divisional and corporate functions.

The 1986-1988 divisional operating plan outlined the intent:

The key manufacturing strategy is to implement, during the plan years, an automated flexible manufacturing process supported by a consolidated automated warehousing operation, to support business change and reduce manufacturing interval, to achieve excellence in customer service and to become the low cost manufacturer. The plan consists of implementing strategic islands of automation, each controlled by computer linking first by material handling automation, then linking by software to a host computer (factory controller) that will synchronize the total manufacturing process.

Initial steps on the road towards computer integration occurred in several areas. At the manufacturing level, the starting point was to be a work cell consisting of three or four robots inserting some 20 components that previously had been manually inserted. Automation of the Santa Clara warehouse and parts handling procedures also commenced. Coordination was a primary responsibility of the Business Systems Department which began to integrate the different computer systems and databases used within NT-SC within the context of the company-wide Network Environment for Information Transfer (or “T-Net”) initiative established by the Operations Council.

However, despite initial enthusiasm and divisional and corporate support, a combination of experience and further analysis soon stimulated reconsideration of the plans for technological upgrading. To appreciate the issues involved, we need to consider the social system of NT-SC and its relationship to the technical system.

NT-SC’s Social System—In 1985/1986, the social system of NT-SC corresponded closely to that of Level 1. In manufacturing operations, job specialization was high, most jobs were repetitive, and skill requirements were low. The workforce not only lacked the training to meet the multiskilled, flexibility requirements of integrated manufacturing, but also lacked the communication skills necessary for group-based working. Seventy percent of shop-floor employees were immigrants from either Mexico or Vietnam, mostly with poor English-language skills. Cultural, ethnic, and religious differences added further barriers to communication and cooperation.

Organization structure, both within the plant and at the divisional level, was functionally based. At NT-SC functional departments included: manufacturing operations, marketing operations, business systems, quality assurance, finance, and human resources. Each was headed by a director who reported to the plant’s General Manager. Other divisional functions were located at Richardson, Texas, while both hardware and software design and development were located within an organizationally separate division, Bell Northern Research, which was located six miles from NT-SC (in Mountain View, California). The barriers that this functionally specialized

structure posed for integrated manufacture were reinforced by functionally differentiated departmental cultures and the presence of long-established hierarchical traditions within NT as a whole.

The Emergence of a New Operations Strategy—Given the constraints of the social system, doubts mounted over the feasibility of introducing automation and computer integration into NT-SC. If new manufacturing technology was to be introduced, it would have to be accommodated by an upgrading of individual skills, redesign of individual tasks, and restructuring of controls, rewards, and information flows. Simultaneously, increasing competition in the external environment resulted in pressure on margins and constraints on capital spending.

As a result, it was decided to maintain the goal of moving towards full computer integration, but to extend the time horizon and change the transition process. Rather than make radical advances in the technical system, in the hope that the social system would somehow adjust, a number of transitional steps were proposed, each of which would involve simultaneous, coordinated changes in both technical and social systems. The principal changes in manufacturing technology included the following:

- *The Reorganization of Circuit Board Manufacture around Five “Flowlines.”* In place of the former activity-based positioning of people and machines, sequential processes for similar products were linked together to permit a continuous flow of product through consecutive stages of processing. This linking reduced travel distance, permitted the reduction of work-in-progress, but, most importantly, enabled the close coordination of workers engaged in consecutive processes, thus providing the basis of improved quality and increased flexibility.
- *Introduction of Just-In-Time.* The closer integration of production permitted by flowlines assisted the introduction of just-in-time scheduling based upon a “kanban” system. The result was the near-elimination of inventory between processes and a substantial reduction in the inventories of incoming components and materials.
- *Closer Supplier Coordination.* Reduction in inventories of bought-in products and materials and higher incoming quality standards encouraged closer coordination with suppliers. Between 1986 and 1989, the number of vendors was reduced from over 300 to under 200, of which 60 supplied 80 percent of the volume of parts. Longer-term relationships were forged with vendors to assist them in pursuing cost/quality improvement programs and to contribute to NT’s value analysis/value engineering programs. By mid-1989, 36 vendors had successfully completed NT’s vendor certification program.
- *Warehouse Automation.* Automating Santa Clara’s incoming components warehouse contributed substantially to JIT scheduling. The improved

efficiency of warehouse operations permitted a reduction in outside warehousing from 75,000 to 30,000 square feet between 1987 and 1989.

- *Increased Integration between Manufacturing and Design.* The traditional approach at NT had been for the designers at BNR to throw their designs “over the wall” to the manufacturing engineers. The pressure for faster new product introduction and less costly engineering changes, encouraged corporate to systematize product introduction into four clearly defined stages (termed “gateways”). Technical and organizational changes were made to permit sharing of data between design, manufacture, testing, suppliers, and marketing, and to facilitate coordination of each department’s decisions. Progress was slow. However, by 1988 Santa Clara was able to demonstrate a substantial cut in the time required for introducing engineering change orders. Having received customer information on a design fault in a PBX product, NT was capable of: getting design and manufacturing engineers to agree on a solution, amending the design data, transferring the data to the manufacturing floor, updating test procedures and test equipment, and shipping the improved product to customers—all within the space of seven days.

Changes in the Social System—The establishment of flowlines and the adoption of JIT scheduling necessitated far-reaching changes in work design. Flowlines, supported by computer-aided manufacturing and coordinated by JIT, corresponded to the “linked islands of automation” system outlined in Table 1. Such arrangements had implications for individual skills, the need for group-based rather than individual-based tasks, for control, and for incentives.

- *Skills, Training, and Attitudes.* As predicted by our STS analysis, preparation for the introduction of the flowlines involved substantial investment in training in which each worker acquired multiple skills. This training extended beyond the acquisition of work skills. Cultural and ethnic diversity of the majority of the shop floor workers presented a unique challenge to integration and group working. Of the four and a half hours a week spent by employees in class, a portion was devoted to learning English. In addition, training in leadership skills was provided for the team leaders.

Training and education efforts appeared to be effective in building support for technological change. An attitude survey showed that employees supported manufacturing changes, viewed technological change as necessary for the survival of the business, and believed that technology would permit them to undertake higher skilled work—thus increasing their own marketability and improving their position in the organization.³³ A second independent study examined flowline employees’ attitudes nine months later. It found that 75% of the employees

were satisfied with their jobs, committed to the organization, and satisfied with the degree to which their social needs and needs for growth were met. Nearly all employees indicated that they worked very hard on their job, 80% saw their group performing effectively, 75% viewed their supervisors as encouraging participation, aiding problem solving, showing consideration to employees, and behaving fairly.³⁴

- **Task Design.** A central feature of the introduction of flowlines was the move from individual to group task design in manufacturing operations. Each flowline was operated by a work group (one group for each shift) coached by a team leader. The group was responsible for allocating individuals to jobs, meeting productivity and quality goals, and solving internal problems.
- **Control.** In moving from individual to group operation of manufacturing tasks, supervisors were replaced by team leaders. As one of the Printed Circuit Board Assembly managers observed:

All of a sudden we went from a dictatorship, an "I think, you work" type of atmosphere, to one of real participation . . . We had to have leaders who could communicate their mission and their vision, not just to *know* what is about, but to *explain* it to the team. We had to have coaches that build an atmosphere of trust, team participation, and "ownership". We motivate employees to own the parts they build, to have a lot of pride in what they do, and to really implement an "I trust you" atmosphere. The other thing is that the coach is responsible for the team becoming self-directing . . . That's a different type of management.

The shift from bureaucratic control towards self-regulation based upon consensus in meeting common goals also affected other areas of operations management levels. As another manager noted:

We did away with the offices. We put the managers and supervisors right out there on the line—in the middle of manufacturing. We put our process engineers on the floor—they used to be on the second floor, tucked away in their own little offices. The engineer went from a fix-it person to a consultant. There was some resentment because he was no longer the hero on a white horse who rode in and saved the day . . . No longer do we want heros.

This shift from bureaucracy towards self-regulation was localized. While the flowline-based PCB assembly led the way, other areas of manufacturing operations lagged some way behind. Meanwhile, outside manufacturing operations changes were even less apparent. Throughout the division as a whole, control could be characterized as semi-bureaucratic.

- **Rewards.** The pay incentives system at NT-SC continued to be based upon individual incentives, however, the introduction of flowlines was accompanied by the introduction of a "pay for skill" program. To support the training initiatives, eleven set of skills were identified and workers received pay increase for each new set of skills that they mastered.
- **Structure and Integration.** Increased integration occurred mainly within manufacturing operations, primarily in response to changes in the

technical system—notably the introduction of flowlines and JIT, and the closer integration of manufacturing engineering and test engineering with manufacturing processes. However, moving towards the fuller integration envisioned in both divisional and corporate plans proved difficult. The rigidity of the functionally specialized divisional structure provided a particularly resilient barrier to the integration of manufacturing with other functions. Most significant was the organizational and geographical separation of design from manufacture. The inclusion of the BNR Mountain View facility within the PBX division did much to eliminate this organizational separation. Manufacturing also lacked close integration with marketing and sales. Even within NT-SC, parts of the organizational structure began to look outmoded—for example, quality assurance continued as a separate department from manufacturing operations.

- *Information Flows.* Creating a common information system with automatic data transfer was critical to integration both within the manufacturing process and between manufacturing and other functions. Integrating different information systems into a common data base was a complex and gradual process. Three years after the beginning of the flowlines implementation, the division still lacked a common data base linking customer orders, purchasing, design, and manufacturing. Within manufacturing, information transfer involved both manual systems (notably kanban) and computerized data transfer. Between manufacturing and other functions, data transfer was limited by the lack of a common system. In particular, design data needed to be re-inputted into the Product Administration System which identified component requirements and programmed the production machines. However, inclusion of BNR's Mountain View facility within the PBX division facilitated data transfer between design and manufacturing permitting the inclusion of manufacturing rules and constraints into CAD systems and the testing of new designs by simulation.

The Managerial Challenge

The strength of STS analysis as a framework for examining the organizational implications of new manufacturing technology is that it provides a uniquely broad theoretical perspective for examining the relationships between process technology and a wide range of environmental, human, and organizational variables. The framework is also highly practical framework for managing the implementation of new manufacturing technology. While STS theory can be used as a managerial diagnostic tool, it can also yield dynamic implications in terms of guiding the movement from one socio-technical system to another. Some of the main conclusions arising from our case study are the insights which STS analysis offers into the constraints on the adoption of advanced new manufacturing technology and the organizational transformation required to accommodate new technology.

A Framework for Analysis—Although a number of studies have addressed both the performance potential and the management problems associated with new manufacturing technologies, little progress has been made in developing general frameworks that distinguish between the management issues associated with different technologies.³⁵

A key feature of the classification of manufacturing technologies is that it focusses attention on the linkages of technology both with the other internal aspects of the firm and with the external environment. From a management perspective, the critical feature of the progression from the dedicated automation of stand-alone systems, through FMS cells, and towards full computer integration, is not so much the more complex manufacturing hardware involved, but is the higher levels of integration required. Thus, the holistic nature of STS theory guides the implementation of advanced manufacturing system in two respects: first, in recognizing that introducing advanced technology into the manufacturing subsystem necessitates realignment of the entire organization; and second, in identifying the individual organizational and managerial variables where adjustment is likely to be required, and specifying the direction of such adjustments.

Managing Transformation—It is well known that mature companies experience difficulty in fostering radical changes in their manufacturing operations. STS analysis suggests that the problems are not just in the technical subsystem, but in achieving coordinated changes in all three subsystems. The key factor is that these changes cannot be made on a sequential basis: companies that have attempted to introduce advanced manufacturing technologies—and then have made changes in their social system to accommodate these technical changes—have typically failed to exploit the performance potential of their technology. (General Motors has been quoted as an example of this phenomenon.)

If simultaneous changes throughout the entire organization are needed, how then can radical improvements in manufacturing technology be achieved? The experience of NT-SC suggests that objectives for technological change must take into account the organizational adjustments that must accompany technical change. Such adjustments are likely to be highly management intensive. Thus, although NT's objective was to move from a traditional batch system with stand-alone items of automated equipment (i.e., Level 1) to a fully computer-integrated manufacturing system (Level 4), it initially established a system of linked islands (Level 3) as a necessary intermediary stage for the medium term.

Moreover, even in moving to the linked islands stage of integration, an incremental approach was found necessary. NT's transition to linked islands began with PCB assembly and was introduced one line at a time. This stage required 18 months: 12 months of planning and training followed by 6 months in the phased introduction of the five lines. The advantage of an extended period of transition was in the spreading of training demands,

lessening of the disruption caused by changeover, and the ability to transfer the learning gained. The philosophy of incrementalism was explained by NT-SC's plant manager:

There are basically two approaches, you can have an evolution or a revolution. A revolution can achieve more startling performance gains, the problem is that you have to bet the ranch. The other problem is that the managerial and organizational problems of changing the whole system are so great that enormous amounts of preparation, analysis, and training are required. The result can be paralysis by analysis.

More generally, incremental joint-optimization of sociotechnical systems appears to be an attractive strategy for mature, complex companies seeking to upgrade their manufacturing technologies. At NT-SC this approach was a product of intuition and circumstances.

One result that is abundantly clear is that critical management problems arise not in the adjustment of the technical system, but in the adjustment of the social system. Not only are the time frames required for adjustment much longer (for example, in employee training and in gaining the commitment of managers at different levels and in different functions), but the problems of interpersonal relations and organizational structure are far less transparent and much less easy to define than those of technology.

These time frames for achieving the adjustments to a firm's social system have implications for the sequencing of the transformation process. The causal sequence flows as follows:

- Changing customer requirements and increased competition in the environmental subsystem create demands on the technical subsystem for innovation and increased productivity and quality.
- Changes in the technical subsystem require adjustments to the social subsystem.

However, if changes in the social subsystem take longer to implement than changes in the other two subsystems, the implications for transformation management are the following:

- If firms are to respond quickly to the changing requirements of their markets, then reacting to observed changes in the external environment is unsatisfactory, and firms must instead embark upon organizational adjustments *in anticipation* of changes in the external environment. This implies close monitoring of the strategies and new product developments of leading competitors and close monitoring of the emerging requirements of leading edge customers.
- In managing transformation, if changes to technical and social subsystems are to occur simultaneously, then the groundwork for the adjustments to the social subsystem must be undertaken some time in advance of technological changes. For example, in implementing computer-integrated manufacturing it is desirable that social integration—in the

form of creating work groups, removing bureaucratic controls, and establishing close interfunctional communication and cooperation—needs to be implemented in advance of computer-networked, programmable production equipment.

A further advantage of an incremental approach to change is the creation of an organization where change is the norm. The problem of change for mature companies is its relative infrequency. A long-established structure with a low rate of employee mobility and a stable technical system builds considerable inertia, partly through the accumulation of entrenched positions of individual power. By implementing incremental changes, so that the social subsystem “loosens up,” the stage can be set for faster and more radical changes. Ultimately, the experience of initiating and adjusting to change results in the creation of an organization where change is accepted as the norm. This would then replace the conventional wisdom that says that a trade-off exists between flexibility and efficiency. Firms can then move towards achieving “dynamic efficiency”—a reconciliation between flexibility and efficiency that arises from the organizational adjustment to constant change.

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Managing Risk in Advanced Manufacturing Technology

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Most advanced manufacturing technology (AMT) projects fail to live up to expectations. As a result, scholarly and managerial publications are increasingly addressing the factors that determine success or failure in AMT implementation.¹ Managers reading this literature may be overwhelmed and confused by conflicting recommendations and, thus, become reluctant to pursue advanced technology due to a fear of failure.

One general set of recommendations is *not* appropriate for all AMT projects because all projects do not experience the same risks. Our basic hypothesis is that a specific set of recommendations applicable to a particular project will depend on its risk profile. Our goal is to develop a typology of projects based on risk profiles of AMT projects. This typology will enable managers to choose which recommendations in the literature apply to their AMT projects in order to be more successful in future implementation attempts.

Our study involved 22 AMT projects in 19 firms in 7 industries. Table 1 lists the industries and a representative sample of types of firms and projects. We visited these companies, toured their facilities, and conducted extensive interviews with participants in AMT projects. We conducted approximately 100 interviews, or an average of 5 interviews per project. The interview questions were open-ended and focused on project characteristics, management approaches, and project successes. As the interviews progressed, we developed and refined the risk profile typology as presented in this article.

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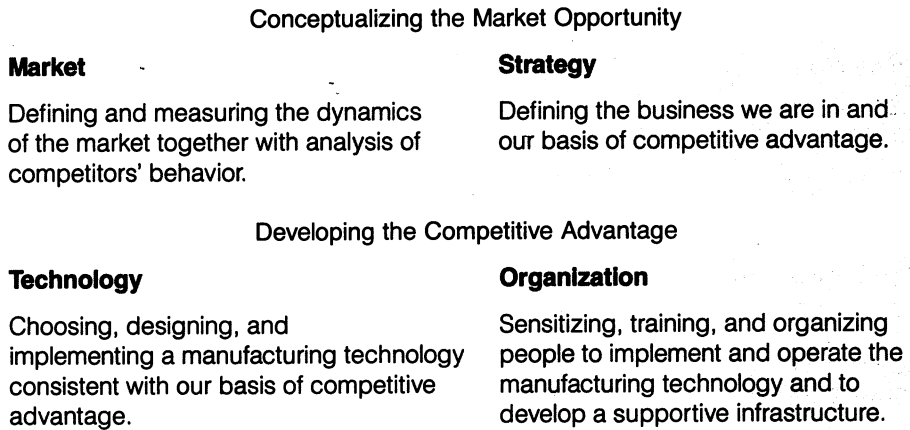
Table 1. Industries, Companies, and AMT Projects

Industry	Type of Company	Type of Project
Aerospace	Large Defense Contractor	1. MRP II System 2. Flexible Manufacturing System
	Midwest High Tech	Robotic Assembly
	Large Commercial Aircraft	CAD/CAM System
Building Materials	Diversified Glass Manufacturing	"Greenfield" Plant with New Process Technology
Computers and Office Equipment	Large Diversified Computer Company	CIM System
	Large Global	Flexible Automated Flow System
	Manufacturer of Computer Connectors	Automated Data Collection System
Electronics	Department of Defense Contractor	Flexible Manufacturing System
	Large Diversified Company	1. Shop-Floor Control System 2. MRP II System
Industrial and Farm Equipment	Machine Tool Manufacturing	Flexible Manufacturing System
	Large, Diversified Farm Equipment	JIT System
Motor Vehicles and Parts	Integrated Assembler	Multi-Model Assembly Line
	First-Tier Supplier	MRP II System
Scientific and Photo Equipment	Large, Diversified Company	Process Automation

AMT Risk Profile

A risk profile of an AMT project reflects four possible sources of risk: market, strategy, technology, and organization. Well-conceived AMT projects must be based on these four elements as shown in Figure 1. Managers must conceptualize the market opportunity by carefully relating knowledge and assumptions about the market with a strategy that defines the business and the basis of competitive advantage. Technology and organization are the means by which companies develop their competitive advantage.

Figure 1. Elements of AMT Project



However, for a given project, all of these elements will not contribute equally to the project's risk. We define project risk as the likelihood that a project will fail to achieve its objectives. Management's task is to determine the project's risk profile by assessing sources and the amount of risk. Based on the risk profile, the manager can appropriately select the strategies for managing these risks.

Market Risk—Market risk is a function of the uncertainty of the market for the product to be produced by AMT. Projects in competitive industries, where market dynamics change rapidly and windows of opportunity are short, have high market risk. Market risk will also be high for innovative products for which technical success and demand are unproven. Additionally, the economy contributes to market risk. A firm developing an AMT system for a proven product in a mature industry in good economic times will experience low market risk. However, the company could experience high market risk if a large percentage of the company's profits are expected to be generated by the product and the economy turns weak. The dimensions of market risk are depicted in Figure 2.

The market risks associated with AMT implementation are demonstrated by the case of a major electronics manufacturer. The firm had invested heavily in automated process technology. The market in which the company had competed for a major product line was undergoing major changes. Previously, the company offered a highly standardized, off-the-shelf product to a mature domestic market. It decided to enter the international market with a completely redesigned product which needed to be offered in numerous configurations. The global market was growing much faster than the domestic market and competition was fierce with some competitors

Figure 2. Market Risk

Dimensions	Low Risk	←→	High Risk
Newness of Product	Mature		Novel
Newness of Market	Proven		Emerging
Window of Opportunity	Long		Short
Velocity of Market Dynamics	Slow		Fast
Technology of Life Cycle	Long		Short
Competitive Actions	Passive and/or Predictable		Aggressive and/or Unpredictable
General Economy	Stable and/or Predictable		Correcting and/or Unpredictable
Stake	Product Sales \$ Low Relative to Total SBU Sales \$		Product Sales \$ High Relative to Total SBU Sales \$

subsidized by their governments. The technology life cycle was thought to be relatively long. However, the company felt that their window of opportunity to enter this new, international market was two years or less given present and anticipated competitive actions. While the product was one of a wide product line, it was potentially a 50 to 100 million dollar business on a company base of just short of a billion dollars in annual sales.

Strategy Risk—Strategy is the link between the market and the organization. Without a proper strategy, technological and organizational capabilities become unfocused and often misdirected. A good business strategy should answer two questions: “What business are we in?” and “What is our basis of competitive advantage?” Strategy risk arises if a company cannot properly answer these two questions. If the first question can be answered but the second question cannot, the answer to the first must be reconsidered. The market opportunity must be redefined until there is a sufficient basis for competitive advantage. If a basis of competitive advantage cannot be found, the market may have to be abandoned. In Figure 3, we use a biblical metaphor to illustrate companies experiencing various levels of strategic risk.

The term “Promised Land” depicts a company in the right business at the right time with a consistent basis of competitive advantage. This company is

Figure 3. Strategy Contingencies

	"Right" Basis of Competitive Advantage	"Wrong" Basis of Competitive Advantage
"Right" Business	"The Promised Land"	"Broken Promises"
"Wrong" Business	"Changing Wine into Water"	"Wandering in the Wilderness"

concerned about sufficiently communicating its strategy to all the functional areas of the business so that they can develop competitive capabilities.

"Broken Promises" represents companies that are clever or lucky enough to be in the right businesses but haven't discovered how to compete successfully in those businesses. Because they don't have the right competitive capabilities, they are always breaking promises to their customers in the form of cost overruns and missed delivery dates. These companies may be compounding risk in AMT projects by signaling the development of the wrong capabilities. For example, one company in our study automated its process for producing lap-top computers in order to be cost competitive. However, it was unable to add features and capabilities in response to competitors' innovations. Eventually, it had to withdraw from that business.

"Changing Wine Into Water" companies spend a lot of time and money developing capabilities but end up wasting them because they never get a handle on the market. A company in this category may have a good technology base, but the business strategy does not take advantage of this base. For example, one company developed a flexible manufacturing system (FMS) that could economically produce machined parts in very small lot sizes. Unfortunately, the marketing department never took advantage of this capability by positioning the company as a "just-in-time" supplier to its customers.

Finally, "Wandering in the Wilderness" companies don't have it together at all. These companies don't have a sound strategy. Their AMT projects are adrift with very little connection to the development of a strategic advantage for the company. Consequently, they experienced strategy risk. While no company in our study fell in this category, one company came close. Management purchased a robot for each of the plants with the hope that they would productively use them. One plant did; it used the robot to hand out trays in the worker's lunch room!

Each of these types of firms implies a different level of strategic risk for AMT projects. Strategic risk will be lowest for "promised land" companies, highest for companies "wandering in the wilderness," and intermediate for the other two types.

Figure 4. Strategy Risk

Dimensions	Low Risk	↔	High Risk
Product Positioning	Broadly Based		Narrowly Based
Market Focus	Broad		Narrow (Niche)
Competitive Advantage	Presently Available		Must be Developed
Technology Base	Build on Present Base		Must Build New Base
Newness of Strategy	No Significant Change		Novel; Significant Difference

Strategy risk is also associated with the dimensions of the strategy itself. Some strategies are riskier than others. Our research has identified a number of dimensions that lead to strategic risk. First, strategies are risky in which the basis of competitive advantage does not currently exist. Second, strategies that depend on the success of a technological breakthrough are also inherently risky. Third, strategies intended to exploit a specific market niche are riskier than those with a broader strategic target. For example, a firm attempting to develop a new competitive advantage using breakthrough technology to serve a niche market would experience extreme strategic risk. The dimensions of strategy risk are summarized in Figure 4.

Technology Risk—Technology risk arises from the failure to choose, design, and implement a manufacturing technology consistent with a company’s basis of competitive advantage. Assuming a company has been able to arrive at an appropriate strategy, translating that strategy into effective technological capabilities can be risky. There are many perils at this stage. We believe common mistakes can be divided into two general categories: failure to translate desired strategic capabilities into technological specifications and failure to implement the new technology properly.

There are numerous sources of technology risk. Technology risk is high when current manufacturing processes are complex and not under control. Risk is also high when the new technology represents a major departure from existing conditions and is not well-understood. New technology is also risky if it affects several processes and/or functions because it then requires integration. Likewise, if system developers are operating under time constraints and start-up and debugging will be done directly on the shop floor, there is increased risk. Lastly, if the AMT project represents a significant investment relative to the total asset base of the strategic business unit (SBU), the technology risk is high. These dimensions are summarized in Figure 5.

Figure 5. Technology Risk

Dimensions	Low Risk	←→	High Risk
State of Current Process Capabilities	Understood, Simple, Controlled		Confusing, Complex and Out-of-Control
Expectations Relative to Current Capabilities	Consistent and Incremental		Inconsistent and Quantum Leap
Commitments from Manufacturing	Reasonable		Too Much, Too Soon
Technology	Proven; In-House Knowledge-Based		Untried; Knowledge to be Acquired or Developed
Functions and Processes Involved	Single		Multiple
Start-up	Laboratory		Shop-Floor
Stake	Small Relative to Asset Base		Very Large Relative to Asset Base

We found many of these sources of technological risk in a shop floor control system that had been implemented in the electronics division of a large firm. The system was originally intended to track inventory, however, it was expanded to track labor hours for each product by each operator. It was implemented (and simultaneously debugged) on the shop floor in the most complex manufacturing process in the plant. The implementation team worked under severe time constraints. Eventually, the system had an influence on the operations of much of the plant, even though it was technically implemented in one area. This very high degree of technology risk almost scuttled the project. The system ultimately had to be shut down and reconfigured before being reimplemented.²

Organization Risk—Organization risk is a function of the organization's ability to undertake and cope with an AMT project. It is well known that

the handling of organizational issues can make or break such projects.³ Our research indicates, however, that organizational risk is not equally distributed. Rather, some types of projects and some types of organizations are more at risk than others.

Certain firms are characterized by adversarial relations among functional departments, between line and staff, and between management and labor. These organizations rely on formalized procedures and Tayloristic job designs, and are highly resistant to change. They have very little slack, and are not technologically well-informed. Such firms will experience substantial organization risk regardless of the specific project they are pursuing.

The type of project being pursued also influences organization risk. For example, projects that require collaboration across functional or departmental boundaries are risky. Similarly, AMT projects that require major changes in organizational procedures (e.g., accounting systems, decision-making processes, or work scheduling) involve greater organizational risk. Figure 6 portrays the dimensions of organization risk.

A major division of an aerospace company had its engineering function design and install an MRPII system for manufacturing. This division was functionally organized with a history of poor relations among some of its functions. While the engineering staff was young and highly educated, the manufacturing staff was older and had less formal education. Manufacturing managers spent much time on the manufacturing floor troubleshooting and expediting materials. The division recently had received a large military contract and was under a lot of pressure to manage cost, quality, and schedule. The new MRPII system required major changes in order scheduling, shop floor control, costing, and inventory practices. Most significantly, it demanded precision, discipline, and attention to details. It allowed, and also required, a new and different way to manage. It became apparent that the manufacturing managers were rarely using the system and, consequently, it quickly lost its data integrity. The chief engineer lamented “those manufacturing SOB’s could only manage by the ‘seat-of-their-pants’ and they always had to go down on the shop floor and ‘kick-the-tires’.”

Risk Management Strategies

Risk management strategies are not necessarily oriented toward the reduction of risk. Rather, they are oriented toward giving the AMT manager tools for successfully managing a project given its risk profile. If a risk profile is not acceptable, ways might be found to reduce risk at its sources. For example, one could use a proven rather than an untried technology, or, if this is not possible, abandon the project.

While there are millions of different AMT project risk profiles, we focus here on four profiles that are dominated by a single source of risk: market, strategy, technology, or organization.

Figure 6. Organization Risk

Dimensions	Low Risk	← →	High Risk
Horizontal Organizational Relationships	Interface, History of Cooperation and Mutual Support		Adversarial, History of "Turf Battles"
People Relationships	Consensus and Development; Cooperation		Command and Control; Adversarial
Organizational Slack	Some		None, Everyone Overcommitted
Tradition of Training and Development	High Priority		Low Priority
Existing Job Structures	Multi-tasks and Decision Making Involvement		Narrow, De-skilled, No Decision Input
Line/Staff Relations	Blurred Distinctions; History of Cooperation		Hostility, Mutual Distrust
Organizational Levels and Degree of Bureaucracy	Flat and Informal		Tall and Formal
Reaction to Change	Welcome Change		Resist Change
Organizational, Technological Competency	High		Low

Strategies for Managing Market Risk—In the face of high market risk, the focus of AMT should be on the development of flexibility to cope with volume, product mix, and design changes. Such flexibility capabilities would allow a company to adjust output volumes to reflect changes in market demand. In addition, the company could switch the product mix to meet the dynamics of the market and introduce product enhancements in a timely fashion.

The electronics company mentioned in our first example in this article employed a deliberate strategy to manage its market risk. First, it completely redesigned its product line using modular-design concepts. With a handful of basic configurations, it was able to create nearly a thousand different end-products. A single automated assembly system was designed to produce any of the 1,000 end-products in economic production quantities of one. The system was designed to run at a rate of 500, 600, or 700 units per hour from one to 24 hours per day. Finally, the automation was software

driven and was robust enough to permit modest product design changes. Thus, the AMT project was developed for flexibility to cope with volume, product mix, and design changes.

Strategies for Managing Strategy Risk—The higher the strategy risk, the more critical the alignment is between the technology capability and the desired basis of competitive advantage. The key here is whether the choice of technology, the business unit strategy, and the manufacturing strategy are aligned. These strategies must be aligned and intrinsically sound. As Flores and Whybark point out, implementation of new technology assumes that the business unit strategy makes sense because this strategy is to drive technology justification.⁴ Alternatively, one could ask whether the manufacturing and business unit strategy is taking full advantage of the potential distinctive competencies provided by technology.⁵ The consequences of AMT *not* being aligned with strategy is that the investment will not make much contribution to competitive advantage. In addition, it may be a waste of money. (In the extreme case, the investment could work against the grain of the strategy and hamper the rest of the organization). How is an organization assured that AMT efforts are aligned with strategy? A few examples from our study provide the answer:

A divisionalized, high-tech electronics company has worked hard to assure that each division's top manufacturing manager is recognized as a full partner on the business team. The business team is responsible for developing business strategy. Furthermore, they must make sure that each functional area has or can develop the capabilities needed to support the strategy.

An aerospace company requires that all AMT project teams have representation on those teams from managers two levels above the level of the champion. The goal is to assure there is alignment between the technology and the business strategy.

A chemical and instruments company uses several independent approaches to identify opportunities for investments in manufacturing technology and to justify such investments. Opportunities are identified by articulating goals and objectives that are consistent with the company's strategic plans.

Voss concluded that AMT often has not yielded potential benefits because implementation has not been carried out in relation to strategic objectives.⁶ While AMT is cited as strategic in nature, it is rare to see this exploited. His study found that technical considerations such as cost reductions have predominated.

Strategies for Managing Technology Risk—When faced with high technology risk, AMT management should first attack risk at its sources. Second, it should focus all efforts on making the new technology work. Managing an AMT project under conditions of high technology risk is a recipe for disaster. However, rather than considering the risk profile as given, the AMT management should attack technology risk at its sources.

For example, if there has been poor communication about the desired strategic capabilities, AMT management should seek clarification until desired capabilities are fully understood. Likewise, if manufacturing has promised more than can be reasonably delivered, they should renegotiate goals, timetables, and budgets. Finally, if current processes are confusing, complex, and out-of-control, they should simplify and control these processes. The most frequent message heard in our study is "never automate complexity."

The companies in our study employed a variety of strategies and tactics to help get the technology up and running. First, many of the companies had central units devoted to developing in-house expertise in many advanced manufacturing technologies. These corporate or division-level staff units had a wide variety of names. Most played both reactive and proactive roles with the line organizations attempting to implement AMT. Managers of AMT projects that deal with untried, emerging technologies should seek help from internal AMT staff units.

Second, simulation has been a popular tool for designing and testing out new manufacturing process technology before going to shop-floor hardware. Simulation can help answer the question "Will it work?" Along the same lines, some organizations hold design reviews for the new system. They invite operators and outside experts to review designs and identify problems that may have been overlooked.

Third, many organizations use in-house or outside manufacturing R&D laboratories to build, test, and debug new process systems before moving them to the shop-floor. Sometimes individuals who will be responsible for operating the new processes are brought to the laboratory to help debug the processes and to learn how to run them.

Fourth, in situations where the new technology represents a significant departure from conventional technology, the old process is operated in parallel for a period of time as problems are worked out. One company in the study indicated that they would have had a catastrophe without a back-up system in place.

Fifth, in situations where a large-scale project involves several processes or departments, many companies use a modular or staged implementation approach. Rather than bringing up the entire system at once, a modular approach divides the system into modules or subsystems that can be started one at a time. Once all of the modules are up, the process of integration can begin. Kimmerly suggests dividing the CIM implementation program into manageable partitions and then implementing logical clusters of partitions in a time-based approach.⁷ If properly done, each cluster will produce benefits from integration and, when later integrated with other clusters, a new class of benefits should be realized.

Sixth, proactive companies should set standards for compatibility and ability to integrate. Failure to do so leads to frustration when separately

designed systems can't be later integrated or when equipment purchased from different vendors are not compatible with one another.

Finally, companies who are most successful in dealing with technology risk are ones who have an overall theme, conceptual framework, or vision. They don't look for opportunities for improvement in a piecemeal, one-at-a-time fashion. Their overall theme might be a just-in-time philosophy, computer-integrated-manufacturing, or a vision of "the factory of the future." Mize et al. described factory modernization at the Garrett Turbine Engine company.⁸ They said that without a general framework there was no way to objectively assess the relative worth of individual modernization projects or of the total set of projects. Their framework later emerged as a vision of the factory of the future.

Strategies for Managing Organization Risk—The higher the organization risk, the more important but difficult it is to develop support for the AMT project among individuals and groups that will affect or be affected by the technology. This suggests that high organization risk is synonymous with a hostile environment for the implementation of AMT. Several writers have suggested the need to change both human resource practices⁹ and organization design.¹⁰ Our study had similar findings. However, how does the AMT management develop support from a hostile environment when they may not be able to make radical changes in human resource management practices or to the organization design? Based on our study, we suggest a set of strategies or tactics to develop support in a high organization risk environment.

First, perform an audit of likely "organizational impacts" (like environmental impact statements) that will result from the advanced technology.¹¹ This audit can be used to select one type of technology over another; or it can be used as a tool to identify key issues to deal with early during implementation.

Second, include on the selection and implementation teams individuals from groups that will affect or will be affected by the technology. Bringing all constituencies together at the outset will reveal the various constraints and conflicting goals as well as build commitment for the technology.

Third, if the technology is to be later applied at other locations, include representatives from these locations on the AMT team. This strategy might reduce the "not invented here" syndrome when attempts are made to transfer the technology to other locations. Refer to Wolff for interesting suggestions on what to do about the "not invented here" syndrome.¹²

Fourth, those who are directly involved in developing the technology need to understand the context and culture in which the technology will be used.

Fifth, training cannot be overdone. In order for supervisors and users to

accept ownership of the technology, they must understand the technology and how to operate and service it properly. This degree of confidence can only come from training on the new technology.

Sixth, develop a supportive infrastructure. This cannot be overemphasized. One company used a transition plan involving numerous meetings with groups who were instrumental to the support of the AMT system. Each group—including production planning, materials, quality control, design, and manufacturing—had to sign off on each step of the plan. This point supports Meredith's belief that significant AMT implementation difficulties can arise without concurrently making required changes to the infrastructure.¹³ What is required, according to Meredith, is no less than an infrastructure strategy. This would consist of a study of current procedures, rationalization of existing process and information flows, and a plan for all the system modifications that will be required to support the new technology.

Seventh, it is important for AMT managers to interface with other functional areas or with plants or processes in the chain. As the AMT management reaches out to other related organizational units, more strategic benefits will be realized.

None of these above strategies require making radical changes to the organization or how it's managed. All of the strategies are well within the scope of authority and influence of most AMT managers.

Conclusions

Many advanced manufacturing technology projects fail to deliver on their promises and expectations. Lack of success may be due to misunderstandings or mismanagement of the risk underlying AMT projects. After studying two dozen AMT projects, we conclude:

- AMT projects have special risk profiles, thus risk management strategies should mirror these risk profiles.
- A risk profile for an AMT project reflects four types or sources of risk: market, strategy, technology, and organization risks.
- Market risk arises out of the uncertainty and dynamics of the marketplace. Therefore, in the face of high market risk, the focus of AMT should be the development of flexibility to cope with volume, product mix, and design changes.
- Strategy risk can result from a poorly conceived strategy or from the riskiness of a well conceived strategy. The higher the strategy risk, the more critical it is for the technology capability to be aligned with the desired basis of competitive advantage.
- Technology risk arises from the failure to choose, design, and implement a manufacturing technology consistent with a company's basis of

competitive advantage. When faced with high technology risk, AMT management should first attack risk at its source and secondly focus all efforts on making the technology work.

- Organization risk is a function of the organization's ability to undertake and cope with an AMT project. The higher the organization risk, the more important and difficult it is to develop support for the AMT project among all individuals and groups that will affect or be affected by the technology.

No company in our study explicitly developed a risk profile for their AMT project(s). However, several companies did develop plans that included elements of all four sources of risk. In addition, they employed a variety of strategies and tactics to manage these risks throughout the projects. These AMT projects were, on average, more successful than others.

If AMT managers develop a risk profile of their project, they can target the company's resources on managing those areas most likely to cause problems in the project. By developing a risk profile, all areas of risk are considered and firms are not "blind-sided" by some area of risk not considered or experienced in the past.

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Takeover or Makeover?

Japanese Investment in America

Gregory W. Noble

F*ew summit meetings have provided as much symbolism as President Bush's trip to Japan in January 1992. After criticism from the Democrats that he was more interested in going on world tours than addressing America's pressing economic and social problems, the President canceled his planned* November visit to discuss alliance politics. He then invited along 21 high-level American executives, including the heads of all three American auto manufacturers, and turned the January trip to Australia and Asia into a search for "jobs, jobs, jobs." When a bout of flu caused Mr. Bush to vomit and collapse at the summit banquet, a shocked Prime Minister Miyazawa cradled his head. "It's so symbolic," said Amaya Naohiro, noted commentator and a key strategist of Japan's industrial policy when he was a MITI official in the 1960s, "the superpower America is tired and everyone around it has to take care of it."¹

In the wake of the trip, Japanese trade and investment policy dominated the news again. The President's trip produced some new and unexpected twists. Not all of them were critical of Japan. An upsurge of public anger at the extraordinary salaries of American executives served to put the Japanese in a positive light: why did blustering Lee Iacocca, whose firm teetered on the brink of bankruptcy, earn so much more than Toyoda Eiji?² When the Bush trip set off a flurry of Buy America activity, the American mass media suddenly discovered what business people and academics had long known: determining which products are "American" is surprisingly difficult. Finally, some even began expressing concern about a possible *shortage* of Japanese investment, given the weakness in the Japanese land and stock markets, and reports of a sharp decline in direct investment from Japan.³

Most of the reaction to the summit meeting, however, followed traditional

lines, such as criticism of Japan's large trade surpluses and the impact of Japanese investment, particularly in real estate and high technology. It became clear that "transplant" production by Japanese-owned auto plants in the United States rendered Japan's "voluntary" quota on auto exports to the U.S. increasingly irrelevant. At the same time, the U.S. Customs Service ruled that cars assembled in Honda's Canadian plant did not embody sufficient American content to receive duty-free treatment.⁴ Similarly, Los Angeles county, reeling from a massive loss of manufacturing jobs following the end of the Cold War, overturned an agreement to procure mass transit cars from Sumitomo on the grounds that the vehicles should be produced in the county itself.⁵ The issue of Japanese political influence in the United States reappeared in fictional form, as *Rising Sun*, Michael Crichton's murder mystery about a Japanese take-over of a critical high-tech firm, hit the best seller lists. In the wake of the Cold War Japan is seen by many as the chief threat to America's world leadership, political sovereignty, and cultural autonomy. The Japanese, many fear, are using direct foreign investment to take over America.

Most economists, in contrast, insist that investment by Japan and other foreign countries is natural, and far more likely a boon than a burden or threat.⁶ Foreign investment provides employment opportunities and upgrades the capital stock. It can be a vehicle for "making over" an economy lacking in competitive firepower. As one financial analyst summarizes the case, "the more investment that takes place here—whether from foreign or domestic sources—the more American jobs will be created, the better those jobs will pay, and the stronger our nation will be."⁷

If the experts are convinced that foreign investment is such a good thing, though, why has Japanese investment in the United States aroused such suspicion? Is the public simply ignorant? Would a mandatory national evening with the economics textbooks relieve all the irrational anxieties?

We need to reexamine the merits and dangers of Japanese investment. On balance, the economists are probably right: foreign investment is a natural and normal phenomenon, and it has the potential to strengthen the host country's economy. Most of the concerns are misplaced or exaggerated. However, it is difficult to say in the abstract whether Japanese investment will lead to "takeover" or "makeover," for realizing the potential benefits of foreign direct investment is not automatic. If we depend on foreign capital, direct and portfolio, to service our budget deficit and make up for weaknesses in investment and management, we should not be surprised if foreigners have more capital with which to expand, and to buy American assets of all types. If Americans are badly trained and managed, and work with an inadequate infrastructure, the jobs created by foreign investment will not be the skilled, high-paying ones we want. Foreign investment may not be a disease, but it is a symptom to which we should pay attention. Moreover, Japan is somewhat different, both in the way its multinational companies

operate, and in its resistance to foreign investment at home. Closing the American market is neither necessary nor desirable, but we should continue to exert pressure to improve the operations of Japanese firms overseas, and to make Japan more hospitable to foreign investment. In the end, though, only American firms can take advantage of new opportunities to expand market share in Japan and to pressure their Japanese competitors around the world.

Anxiety about Japanese Investment

The concern over Japanese investment has been touched off by the highly publicized takeovers of American companies, technology and golf courses by Japanese multinationals. At a time when America seems to be losing an economic and technological competition in every industry from textiles to supercomputers, Japanese firms have been buying out their American competitors and, it seems to many Americans, vacuuming up economic, technological, military, and cultural assets. While U.S. Steel used the protection from imports granted by the American government to buy Marathon Oil and is busy trying to get out of the steel business altogether, Japanese steel companies have taken over effective control of much of the industry by buying shares in American companies and establishing joint ventures in which the Japanese supply the capital and technology. Similarly, while the Big Three American automakers shutter plants and lay off workers to cope with declining sales, virtually all the Japanese auto companies are erecting "transplant" auto factories throughout the Midwest.

In high technology, many Silicon Valley startups in computers, semiconductors, and biotechnology have turned to giant Japanese firms to get the capital to bring their products to market. In return, of course, they have to give up some of their most precious asset: innovative technologies.⁸ Recently, Japanese companies have begun offering astronomical salaries to "buy up" the key competitive resource in computers: individual computer scientists. Many of these American experts are now based in universities. They teach the next generation of American computer scientists, and the fruits of their research are quickly reported and widely disseminated. Once they begin working for private Japanese corporations, though, their work will be largely proprietary. Their research will be reported eventually, but only after their employers have incorporated the new advances and patented whatever they can. And of course corporate employers will tend to push their employees to work on projects with relatively quick payoffs, thus diminishing the supply of basic research.⁹

In other cases, Japanese corporations have established exclusive research and licensing agreements with American universities. In 1990, for example, Hitachi Chemical and U.C. Irvine reached a \$16.5 million dollar agreement on a new biotechnology research building:

The Hitachi Chemical Research Center, called the "Plumwood House" on campus, was constructed and equipped entirely with Hitachi funds on a plot of land given to Hitachi free of charge by UCI. The top two floors of the building are occupied by Hitachi Chemical; the first floor is used by university researchers . . . no university personnel are permitted access to Hitachi's portion, although Hitachi personnel have unrestricted access to UCI's research facilities downstairs.¹⁰

In the same year, the Japanese cosmetics firm Shiseido pledged \$85 million over 10 years to develop a research center at Massachusetts General Hospital, an affiliate of Harvard Medical School, in return for licensing rights to all technology developed at the center.¹¹

Nor is the influx of Japanese capital limited to manufacturing and high-tech industries. Four of the top ten banks in California are now controlled by Japanese parents.¹² Recent purchases by Japanese real estate developers have been widely publicized: Rockefeller Center, Pebble Beach, Heavenly Valley, a good chunk of downtown Los Angeles. The old line about how the fiftieth state has become the "Prefecture of Hawaii" no longer seems so amusing.

Finally, Japan has come to Hollywood. SONY's purchase of Columbia Pictures in the fall of 1989 prompted *Newsweek* to run a cover depicting the Statue of Liberty as a Japanese woman clothed in a kimono.¹³ Despite urgings from the Ministry of International Trade and Industry to avoid high-profile takeovers, the SONY move set off a wave of takeovers and investments in the American entertainment industry by other Japanese electronics and publishing firms, including JVC, Fuji-Sankei, and Pioneer, as well as SONY's arch-rival Matsushita. If Japanese companies have long been better at "hardware" such as stereo systems, TVs, and video equipment, while American companies have excelled at entertainment "software," it would appear that the VCR has just bought the video tape.

While SONY's chairman Morita Akio insisted that Columbia would remain completely independent and free of censorship, Matsushita was initially reluctant to give such blanket guarantees about Universal Studios. Given Matsushita's observance of the Arab boycott of Israel, and right-wing pressure in Japan not to allow coverage of such issues as the possible war guilt of the late Emperor Hirohito, some Americans are concerned about a trend that puts so much of the American film industry in foreign, and especially Japanese, hands. Already, studios have made significant changes in movies about Japan, or dropped projects in the face of Japanese opposition.¹⁴

Rebutting the Doom-Sayers

In the eyes of both American economists and Japanese government officials and business people, this picture of Japan invading the United States is warped, exaggerated, and wrong-headed. Japanese investment is nowhere near "taking over" America and is actually helping to strengthen the

American economy. First of all, they argue, the scope of Japanese investment has been blown out of proportion. Foreigners do not control much of the American economy, and Japan is not even the largest foreign investor: through 1990 the net value of Japanese holdings in the United States still trailed that of Great Britain, 84 billion dollars to 108 billion dollars. Japan did not surpass the tiny Netherlands until 1988—and no one screamed about the British or Dutch taking over (see Table 1).

In some cases, prominent firms sold to the Japanese were actually owned by other foreign firms to begin with. When Fujitsu tried to take over Fairchild Semiconductors, for example, a storm of protest blocked the move—even though Fairchild was already controlled by the French firm Schlumberger. Moreover, popular impressions to the contrary, total foreign investment in the United States is still quite low—certainly lower than in most European countries. In 1989, affiliates of foreign firms accounted for less than 15% of total sales of U.S. manufacturing industries, and less than 5% of employment in all industries. Moreover, no one country controls a large share of that investment.¹⁵ As for foreign ownership of news and entertainment media,

Nowhere do [the critics of foreign investment] argue that Rupert Murdoch and Robert Maxwell operate their publications in a way that consistently serves any foreign private or public power, nor do they suggest how this could be done. Control in any sphere implies single-entity dominance or else collusion, and [the critics] find none. If a more subtle “orientation” bothers [them], they might consider the virtually global dominance of U.S. perspectives in news services and popular entertainment.¹⁶

Even more important, to most economists foreign investment is actually *good* for the host country. Indirect or portfolio foreign investment (passive investment in securities or bonds) helps finance the government budget deficit, thereby keeping interest rates from going through the roof. Direct or controlling foreign investment, the kind that concerns so many Americans, creates more new jobs than it displaces, and strengthens the tax base—even when some domestic firms are forced to close their doors or layoff workers because of the new competition.¹⁷ Japanese firms often infuse new technology, particularly in manufacturing processes: “many of the transplant facilities that are remaking the nation’s industrial landscape pay high wages and employ union workers, yet they boast much higher productivity than native U.S. operations.”¹⁸ In the steel industry, joint ventures with Japan have led to rapid installation of basic oxygen furnaces and continuous casting equipment, critical tools in the race to regain competitive strength. Even without new capital investments, Japanese companies often boost productivity through better management. In autos, Toyota is teaching GM how to build compact cars at their joint venture plant in Fremont, California. Once shuttered by GM, it became the major inspiration for GM’s innovative new Saturn line. Similarly, Mazda, in which Ford has a 25% stake, is teaching its “parent” how to design and build small and sporty cars such as the Probe and the new Escort.

Table One. Foreign Direct Investment Position in the United States (on historical-cost basis; billions of U.S. dollars)

	1982	1983	1984	1985	1986	1987	1988	1989	1990
U.K.	28.4	32.1	38.1	43.6	35.0	75.5	95.7	105.5	108.1
Japan	9.7	11.3	14.8	19.3	23.4	34.4	51.1	67.3	83.5
Netherlands	26.2	29.2	32.6	37.1	42.8	46.6	48.1	56.3	64.3
Germany	9.7	10.8	12.0	14.8	17.4	21.9	25.2	29.0	27.8
Canada	11.7	11.4	14.0	17.1	18.3	26.7	26.6	28.7	27.7
Total	124.7	137.1	159.6	184.6	209.3	263.4	314.7	373.8	403.7

Source: U.S. Department of Commerce, *Survey of Current Business* (August 1991), pp. 75-76; (June 1987), p. 45; (August 1985), pp. 51-52.

In virtually every industry in which they have invested, Japanese firms have helped teach their American workers and partners how to improve quality and speed up the design process. They may even be creating new competition. Already SONY and Honda ship large models from their American operations back to Japan. According to some analysts, Japan's overseas investments, particularly in the United States, have already begun to erode its competitive advantage.¹⁹

Besides, aren't Americans being hypocritical when they complain about Japanese investment? The foreign holdings of American corporations are still twice those of Japan.²⁰ They would dwarf Japan's if older holdings were valued at current rates. For years, when U.S. multinationals ruled the waves, Americans insisted that foreign investment was good for host countries, and that Europeans worried about the "American Challenge" and Latin Americans suspicious of dependence on American "imperialism" misunderstood the virtues of international capitalism. And in the late 1970s and early 1980s, when deficits with Japan began to mount, American government, business, and union leaders insisted that Japan invest here, rather than exporting unemployment to us. Lee Iacocca and the American auto industry, sure that Toyota and Nissan could never make a profit if they had to employ American workers and pay American taxes, challenged the Japanese to come over and try producing here. Well, they're here. What are we blaming them for—excessive competence?

Nor are the Japanese coming here in the dead of night to snatch up our companies. Many, perhaps most, acquisitions of American companies have been initiated by American owners begging Japanese investors to prop them up or buy them out.²¹ Those owners of American assets (and their investment bankers) have been handsomely paid, and they can use the proceeds from the sale to invest in, and strengthen, more vigorous parts of the American economy. Indeed, given the high prices paid for many of those assets it

is not clear who is getting the better end of the deal. Kubota, the Japanese tractor corporation, invested \$55 million in two Silicon Valley computer startups as a way of moving into high technology, but legal, business, and technological problems soon led to the collapse and dissolution of the merged company.²² Many Japanese banks, insurance companies, and real estate firms paid astronomical prices for American properties only to watch the commercial real estate market collapse.²³ In the most famous case, Japanese real estate magnate Isutani Minoru was forced to sell the Pebble Beach golf resort after little more than a year, at a reported loss of over \$340 million.²⁴

So great is the apparent hypocrisy that some Japanese, notably but not only Ishihara Shintaro, prominent politician and co-author of the notorious book *The Japan that Can Say "No"*, claim that American opposition to Japanese investment is simply a covert form of racism: Americans say that U.S. investments abroad are good for everybody, and do not complain about investments here by white Europeans, but when Asians want in, suddenly there is a wave of panic about the new "yellow peril."²⁵

Japanese Investment Really Is Different

While this rejoinder convinces many policymakers that the threat posed by Japanese investment is greatly exaggerated, the debate does not end there. For those concerned about takeover, opposition to Japanese investment is not hypocritical or racist, but rather reflects the fact that Japanese investment really *is* different from American and European investment.²⁶ First, if we look not at the usual measure of "investment position," but at the more tangible measures of assets and sales, Japanese investment is actually substantially larger than that of any other country (see Tables 2 and 3).²⁷ Second, by any measure, Japanese investment has increased much more rapidly in the last five years than investment from any other large country. And Japan is not like Canada, the Netherlands, or even the United Kingdom. It has a much larger population and economy than those of the other major foreign investors, and it alone is capable of challenging the United States in all areas: manufacturing, technology, finance, and potentially military power. Given this power and rapidly increasing presence, the argument goes, American concern is only justified.

When Japanese corporations invest in the United States, their behavior is also significantly different from that of other foreign-owned firms. Compared to other foreign investors, Japanese firms have been much more likely to put their money in warehousing and wholesaling, which promote Japanese exports to the United States, than into manufacturing (see Table 4).²⁸

The overseas operations of Japanese companies are much more likely to import parts, especially high value-added parts, from their parent firms or other home country firms than are the overseas subsidiaries of American

Table Two. Total Assets of Non-Bank U.S. Affiliates of Foreign Firms (by country of ultimate beneficial owner; billions of U.S. dollars)

	1980	1986	1987	1988	1989
Japan	27.6	98.1	195.8	289.2	328.1
U.K.	56.6	137.4	156.2	207.9	254.1
Canada	47.9	130.1	140.8	178.4	201.0
Germany	31.2	50.2	58.5	70.8	87.3
Netherlands	36.1	67.7	70.0	75.7	86.7
Total	292.0	838.0	926.0	1200.8	1402.2

Source: U.S. Department of Commerce, *Survey of Current Business* (July 1991), p. 85; (July 1989), p. 121; (October 1983), p. 30.

Table Three. Sales of Non-Bank U.S. Affiliates of Foreign Firms (by country of ultimate beneficial owner; billions of U.S. dollars)

	1980	1986	1987	1988	1989
Japan	84.2	165.7	186.8	231.9	267.0
U.K.	97.4	113.5	131.2	143.0	169.7
Canada	35.4	82.6	89.4	109.1	117.5
Germany	45.6	62.0	74.3	82.3	92.8
Netherlands	38.6	46.4	52.4	59.3	68.1
Total	412.7	667.2	744.6	886.4	1040.9

Source: U.S. Department of Commerce, *Survey of Current Business* (July 1991), pp. 84-85; (July 1990), p. 136; (May 1988), p. 68; (October 1983), p. 30.

and European corporations.²⁹ That is, Japan keeps the good jobs for itself. No wonder so many Europeans complain about Japanese "screwdriver" assembly plants. Japanese subsidiaries tend to deal overwhelmingly with other Japanese-owned companies, from the bank that lends the money for the new factory, to the construction firm that erects it, to the machinery companies who supply the capital equipment and the components. Many Americans now complain about the re-creation on American soil of Japan's "keiretsu" system of interlocked business groups.³⁰

Many Japanese corporations have been accused, and in some cases convicted, of breaking American laws governing taxes and personnel practices. Japanese subsidiaries in the United States have paid very little income tax, and are under investigation for possibly using improper transfer pricing to evade payment of American taxes.³¹ Many Japanese management practices also discriminate against American employees, especially women and

Table Four. Total Assets of Non-Bank U.S. Affiliates, by Country of Ultimate Beneficial Owner and Industry (Historical Cost Basis, 1989; billions of U.S. dollars)

	Japan	U.K.	Canada	Germ.	Neth.	Total
Manufacturing	43.5	94.8	64.4	36.9	20.6	367.4
Chemicals	5.1	14.5	D	18.7	12.2	106.0
Metals	8.0	7.3	4.2	2.6	0.3	46.4
Machinery	11.5	16.7	6.0	7.3	D	64.4
Non-electrical	8.2	12.5	0.9	2.2	0.1	34.0
Electrical	3.3	4.2	5.1	5.1	D	30.4
Transport	4.2	2.0	0.6	0.6	D	10.5
Wholesale Trade	65.2	13.5	4.9	14.2	2.4	131.2
Finance and Insurance (except banking)	179.7	73.0	63.1	21.4	20.6	551.8
Real Estate	22.6	10.8	25.2	3.0	5.5	90.0
Services	9.1	15.8	2.8	3.5	2.4	58.0
All Industries	328.1	254.1	201.0	87.3	86.7	1,402.2

D = repressed to avoid identification of individual firms

Source: U.S. Department of Commerce *Survey of Current Business* (July 1991), p. 89.

members of minority groups. According to a top executive of a Japanese auto transplant, his company selected its site to be "union-free" and to "avoid blacks."³² According to a statistical study by Cole and Deskins, this result is typical of Japanese auto transplants.³³ Honda, Sumitomo Corporation and other Japanese companies have made large payments to settle court cases and have promised to revise the way they hire, fire and promote their American employees, particularly but not only African-Americans and women.³⁴ White collar employees in the subsidiaries of Nomura Securities, Mazda Motors and other Japanese companies have complained that, effusive promises to the contrary, real power is still firmly in the hands of expatriate managers from Japan.³⁵

Finally, critics say, it is not the Americans but the Japanese who are being hypocritical: if foreign investment is so good, why don't the Japanese allow foreigners to buy *their* companies? American investment in Japan is less than one fourth that of Japanese investment in the United States. Investments by European and Korean firms are minimal.³⁶ While the dollar value of foreign investment in Japan increased in the mid-1980s with the revaluation of the yen, it then stagnated in the latter half of the 1980s (see Table 5). Net employment in American-affiliated firms in Japan was actually lower in 1989 than in 1977.³⁷ In many crucial areas, including finance, foreign

**Table Five. Japan's Outward and Inward Foreign Investment
(billions of U.S. dollars)**

Year	Japan's Outstanding Investment Abroad	Outstanding Foreign Investment in Japan
1975	\$8.32	\$1.64
1980	\$19.61	\$3.27
1985	\$43.97	\$4.74
1986	\$58.07	\$6.51
1987	\$77.02	\$9.02
1988	\$110.78	\$10.42
1989	\$154.37	\$9.16
1990	\$201.44	\$9.85

Source: Bank of Japan, *Keizai Tokei Nenpo* (Economic Statistics Annual), various years.

investment has been minimal (see Table 6). Due to a legacy of government and private pressure to accept joint ventures, the proportion of foreign affiliates in which American multinationals are able to exert majority control is dramatically lower in Japan than elsewhere: 33.8% versus an average of 85.2% in Europe.³⁸

Nor are American multinationals "taking over" existing Japanese firms. Unlike the case virtually everywhere else in the world, foreign investment in Japan is largely composed of "greenfield" investment, since cross-holding of shares by Japanese firms (deliberately increased in the 1960s as a defense against foreign investment) and government regulations make acquisition of existing Japanese firms extremely difficult.³⁹ In 1990, Japanese firms acquired 440 firms abroad, including some large and important ones; foreign firms acquired 18 Japanese firms.⁴⁰ No large and competitive Japanese firm has ever fallen into foreign hands.⁴¹ Acquiring existing firms would provide much faster entry into the domestic market, and Japanese firms have taken liberal advantage of that freedom in the United States. Even greenfield investments, however, are difficult in Japan, since the permanent employment system makes it difficult to recruit good middle-level employees. These limitations on the volume and type of investment by foreign firms may be important contributors to Japan's perennial trade surplus with the United States.⁴²

A Final Defense

Even if Japanese investment and management practices really are different today, however, they may not stay that way. Supporters argue that Japanese investment will not keep increasing rapidly, even after recovery from the

Table Six. Foreign Direct Investment in Japan by Industry*
(in billions of U.S. dollars)

	FY 1990		Cumulative, March 31, 1991	
	Value	Share	Value	Share
Manufacturing	1.57	56.5%	11.77	63.9%
Chemicals	0.44	15.8%	3.16	17.1%
Petroleum	0.03	1.1%	0.72	3.9%
Metals	0.15	5.4%	0.65	3.5%
Machinery	0.81	29.0%	6.18	33.5%
Non-manufacturing	1.21	43.5%	6.66	36.1%
Real Estate	0.02	0.9%	0.82	4.4%
Commerce	0.73	26.3%	2.94	16.0%
Services	0.26	9.5%	1.06	5.8%
Banking and Insurance	0.11	3.9%	0.68	3.7%
Total	2.78	100.0%	18.43	100.0%

*Approval basis. Data exclude disinvestments, which sometimes have been substantial.

Source: Ministry of Finance, reported in Japan Economic Institute, *JEI Report*, September 20, 1991, p. 3.

recent recessions in Japan and the United States. Of course, overseas investment will not cease altogether: Japan is a late-comer to foreign investment, and its firms will still want to diversify their holdings and support their global operations. Still, the big increases in investment are likely over. Moreover, while regulatory and economic barriers in Japan remain, in recent years American investment in Japan has expanded considerably. Japan is difficult to enter, but it is by no means uniquely closed to American investment.⁴³

More generally, many of the special characteristics of Japanese investment are reflections of Japan's status as a latecomer, and are likely to converge somewhat, though probably not completely, with those of earlier investor nations. For example, the extraordinary concentration of investment in warehousing and wholesaling has been overtaken by a wave of investments in manufacturing, particularly those related to auto production. The reluctance of many Japanese transplants to procure from American suppliers results at least in part from lack of knowledge about their capabilities and compatibility. Many firms that invested somewhat earlier have made significant strides in incorporating American parts and design skills, and in educating American firms about their procurement requirements. Honda, earliest of the Japanese auto firms to invest in the United States, has increased its use of American parts, is beginning production of engines

at its Ohio plant, and talks of completing a fully integrated research, design, and development capacity in the U.S. within the next few years.⁴⁴ Similarly, since the majority of Japanese operations in the United States are relatively new, it is possible that many of them are still losing money. Thus, failure to report taxable profits is not necessarily proof of tax evasion.

Even when it comes to management practices, supporters of Japanese investment argue, many of the problems may be ameliorated by the passage of time. Japanese firms are less familiar with Americans, and not used to dealing with career women and a racially and ethnically diverse work force. As they become accustomed to doing business in the U.S., and as they increase their cadre of American managers, the worst tensions should ease. SONY, one of the earlier investors, has already installed an American as President of one of its U.S. subsidiaries, and has even installed him on its board of directors, a rare occurrence for a Japanese firm. Given the linguistic, social, and cultural gaps between the United States and Japan, it would be unrealistic to expect friction-free personnel practices anytime soon. Still, it is plausible that the problems which have surfaced in the last few years will at least partly ease.

Conclusion

There is more than a touch of hysteria and xenophobia in the current worries that Japanese corporations are "taking over America." There is also more than a touch of validity to the argument that Japanese investment can help revitalize American competitiveness. Still, let us not fool ourselves. Concerns about Japanese investment are not groundless. Japanese corporations are not philanthropies: ultimately, they are here to make money, not contribute to the economic development of the United States. That is even more true of the Japanese government, which, current rhetoric about international cooperation notwithstanding, ultimately has an interest in keeping Japanese firms profitable, and the best paying jobs in Japan. Moreover, the strongest evidence of "makeover" has come in older, heavier industries, mostly related to autos. While there have been few signs that Japanese investment has led to "takeover" in rapidly growing high-tech industries, there is some evidence, albeit limited, of targeted skimming of American technological strengths in such areas as software.⁴⁵

Popular opposition to Japanese investment would ease considerably if we were able to achieve greater reciprocity of investment, so that Japanese corporations do not have a safe haven from which to compete with the U.S., and so that American citizens will not feel that Japanese investment here is unfair. American financial and manufacturing firms with overseas investments have long been among the staunchest supporters of free international trade and open investments. Assuring that they have opportunities to make and expand investments in Japan will go a long way toward undermining

the rising tide of protectionism in this country. Under American pressure, the Japanese government undertook a significant liberalization of foreign investment in 1980, and minor improvements over the 1980s. The Structural Impediments Initiative talks led to further changes in 1991, including elimination of prior notification requirements and most of the provisions allowing Japanese firms to block potential foreign competitors. Under the foreign goad, the Japanese government is undertaking further measures to promote foreign investment in Japan.⁴⁶

The market access provisions of the 1986 agreement on semiconductors provides a good example of progress in a specific industry.⁴⁷ In that agreement, renewed in modified form in 1991, the U.S. pushed Japan to help American firms win 20% of the Japanese market, a figure seen as roughly representative of the share American semiconductor firms win in similar product markets outside Japan. The accord was roundly criticized on both sides: the Japanese government and firms argued that there were no formal barriers to American firms; if they could not sell more in Japan, it was their own fault, and short of the very kind of intrusive industrial policy that Americans have complained so bitterly about in the past, there was little the Japanese government could do. On the American side, critics of Japan argued that “market opening” plans had never worked in the past, and rather than upbraid the Japanese we should concentrate on protecting our own market and strengthening the American semiconductor industry.⁴⁸

To be sure, the optimistic 20% target has not been met, and the slow pace of progress has frustrated the American semiconductor industry. It is important, however, not to overlook the real progress that has been made. Between pressure on individual Japanese firms from MITI and the Electronic Industries Association of Japan, and greater commitment to the Japanese market on the part of American firms, who finally think they may have a fair chance, the American share of the market has significantly increased, rising from 8.7% in 1986 to 14.3% in 1991.⁴⁹ Japanese electronics and automobile firms are beginning to design new products around American chips. The process has been especially beneficial for producers of value-added chips. For the first time, dynamic smaller American semiconductor firms are beginning to commit themselves to long-term investments in Japan.⁵⁰ These results, while still inadequate, confound both those Japanese who claimed that there were no barriers to American products and investments in the past, and those Americans who argued that pressure for reciprocity would never work. If American firms are assured of a reasonable crack at the Japanese market—eventually including the right to buy Japanese companies—resistance to Japanese investment here will certainly soften. Once the opportunities are open, though, it is up to American firms to make the efforts to invest, attract capable Japanese personnel, and crack local markets.

A second step toward reducing public concern about Japanese investment is to monitor the source and nature of foreign investment in the U.S. more

carefully. The Bush Administration has claimed that stricter reporting requirements inhibit foreign investment, but that is hard to believe. Most countries in the world—including Japan—have significant reporting requirements for foreign companies, and that has not stopped foreign investment yet. If real problems showed up, we would have the data to spot them and do something about them, and in the meantime, we could reassure the American people that their country is not slipping under pernicious foreign control. Some efforts have recently been undertaken in this area, and more could be done, especially in coordinating the considerable information already available.⁵¹

Many Americans feel particularly threatened by Japanese investments because Japan poses a fundamental challenge to traditional American ways of conducting business. International economic competition has proven that in many industries the Japanese way of organizing companies is simply more effective. In the case of automobiles, for example, a major new study has proclaimed the “Toyota Production System”—now renamed “Lean Production”—the model for world manufacturing in all industries.⁵² For Americans, learning the Japanese approach is crucial to regaining international competitiveness, but it will be an uncomfortable and threatening experience. During this extended period of adaptation, monitoring is needed to reassure Americans that foreign investment will not compromise their sovereignty and cultural identity. For all that Ishihara and other Japanese complain of “racism” and “Western superiority complexes,” the real reason the American public is so resistant to Japanese investment is a profound sense not of superiority but of vulnerability. As the public opinion expert Samuel Popkin has shown, the deregulation of the Reagan Era left the public concerned that the government is no longer looking after the national interest.⁵³

A similar logic argues for stringent enforcement of tax codes, antitrust legislation, and statutes covering equality of employment as they apply to Japanese and other foreign companies operating in the United States. Similarly, when regulation of cross-investment in banking or broadcasting prevents American firms from competing with foreign investors, it is time to rethink the regulations. Whether or not we should actively discriminate in favor of “domestic” American firms is a subject of considerable debate, but we certainly should not inadvertently discriminate against American firms by imposing greater regulatory burdens upon them.

Informal pressure will also be helpful. It seems likely, as the proponents of foreign investment argue, that the unusually strong propensity of Japanese companies to procure products and exert managerial control from Japan will naturally decline over time as overseas operations establish themselves.⁵⁴ Here again, however, given the cultural and linguistic distinctiveness of Japanese firms and their heritage of strong control from Tokyo and Osaka, it would be a mistake to assume complete convergence with the

more global approach of American and European firms.⁵⁵ Japan's commercially led system of technological innovation is still fundamentally different from that of the United States.⁵⁶ Japanese multinationals have a long history of cooperation with the Japanese government and each other, they offer "permanent employment" to their core employees in Japan (but not foreign employees), and most are connected to other Japanese corporations by personnel links and cross-holdings of stock. To be sure, Japanese companies are changing, and in some ways becoming more similar to American and European multinationals: they are reducing their dependence on banks, pressure is building to pay out greater dividends, and of course they are increasing their overseas production. Nevertheless, it is highly unlikely that they will converge completely with an "Anglo-American" model of international business. Indeed, as Ronald Dore pointed out almost 20 years ago in the case of manufacturing practices, if convergence comes about, it will more likely result from Westerners adopting Japanese practices than from Japanese firms imitating the West.⁵⁷ These differences in private sector organization should make us wary of glib claims that multinational corporations have become completely disarticulated from their home countries.

It thus makes sense to exert informal pressure on Japanese corporations to incorporate more domestic inputs, to promote local managers to positions of real authority, to carry on research and design activities in the United States, and to deal with existing American firms. Japanese firms generally understand and accept this logic of localization in principle, but will tend to move slowly absent pressure from host countries. In general we should not mandate specific levels of local content, for it can often be counterproductive. If, however, in cases such as autos we are already committed to protection and promotion, calculations of local content provisions should be based on design and production of parts, and not on worker uniforms and depreciation.

As we have seen, some concerns about Japanese investment focus not simply on production and marketing, but on the political activities of Japanese investors.⁵⁸ Clearly, the Japanese government and Japanese firms are trying to influence the climate of opinion in the United States, though they can do that without investing here. There is little evidence, though, that they have fundamentally changed or distorted that climate. The real strength of the coalition for free trade and investment rests not on the well-heeled Japanese lobby or the pervasive influence of academic economists, but on the many American industrial and financial firms with global interests.⁵⁹ Compared to this free trade establishment, the influence of Japan and its agents is minor. Ironically, while Dutch journalist Karel van Wolferen⁶⁰ and other vociferous critics of Japan insist that Japanese influence has made it extremely difficult for research and policy advocacy critical of Japan to appear, criticism of Japan has made them famous.

This is not to say that problems of improper influence or unnecessarily

sweet deals for Japanese companies do not exist. However, in virtually every case these problems reflect not so much the wielding of nefarious influence by Japan but broader questions about how business and government should interact in the United States. Many former American trade officials have gone to work for Japanese interests soon after leaving government, it is true, but many of them represent European multinationals and domestic companies as well. The real question is not whether Japan is buying the American government but what sort of employment restrictions we should place on American officials after they leave office, and more broadly the extent to which we want to continue to depend on short-term political appointees to make our economic policy. Similarly, American companies, particularly in biotechnology, garnered criticism for extracting excessively favorable terms in research alliances with American universities long before the Japanese came along.⁶¹ If the agreement between Hitachi Chemical and U.C. Irvine on biotechnology was inappropriate, for example, it should be restructured not as a way of containing Japan, but in accordance with more general principles covering business-university relations. And if the problem is simply that Japanese corporations such as Shiseido are willing to outbid their American rivals, we need to ask what factors discourage American corporations from making such long-term investments in research.⁶²

Finally, we need to change the way our economy works if American firms are to compete successfully on foreign markets, and if the kinds of jobs Japanese and other foreign investors are willing to create in the United States are to provide a secure future for our children. Virtually all participants in the investment debate, whatever their views on other points, agree that we need to encourage savings and discourage consumption. If we keep consuming so much and running huge budget surpluses, we will be forced to sell off more and more of our assets to foreigners, which eventually will compromise both our standard of living and our independence. We also need to strengthen our physical infrastructure, encourage more research and development, fundamentally reorganize defense R&D so that it is integrated with the civilian economy, and encourage research consortia on generic technologies.

Perhaps most important we need to improve the "human capital" of America. Japan's greatest competitive asset is its work force. We need more and better schooling from nursery school through high school, and the network of social support necessary to enable children to learn. We should consider learning from the German system of apprenticeship, which does so much to transmit not only specific job skills but also good habits and a strong work ethic. In the meantime, we can build on one institution the Japanese do not have—effective and employment-oriented local junior colleges—and on training within firms. As Koike Kazuo and others have shown, much of Japan's advantage in "human capital" lies not just in a

stock of literate and numerate school graduates, but in massive and unrelenting training and retraining on the job.⁶³ If American workers remain ill-educated and poorly trained, even the most independent and cosmopolitan Japanese investors (and there are not many) would leave the most complex, interesting, and well-paying jobs in Japan if only to protect their competitive position in the market. The example of Britain is sobering. It encouraged Japanese investment as salvation for British industry, particularly in autos, and received many turnkey plants; but the Japanese are now moving the most sophisticated jobs to Germany because of its superior training and infrastructure.⁶⁴

The debate on economic issues in this country must move beyond simplistic dichotomies. Japanese investment does not spell either “takeover” or “makeover”; much depends on accompanying policies in the U.S. Part of the solution lies with crafting new approaches that mix competition with cooperation. A recent MIT study has documented the ways in which American industries suffer from inadequate cooperation at every level: between government and business, within industries, and within firms.⁶⁵ The genius of Japanese industrial organization and industrial policy is not that it reduces competition, or replaces capitalist competition with state direction—indeed, many of Japan’s most competitive industries have more firms and more head-to-head competition than in the United States—but that it manages to sustain cooperative arrangements on standards, training, and a host of other issues in the midst of white-hot competition among firms to increase quality and develop new products.

If we indulge in xenophobic rejection of Japan, or on the other hand simply depend on Japanese money to solve our problems, the Japanese *will* end up controlling our economy, and narrowing our scope of political choice. On the other hand, if we take the recent influx of investment as a challenge to break through old stalemates and implement needed changes, Japanese investment can help us revitalize and remake ourselves.

References

1. *New York Times*, January 9, 1992, p. A6. Interestingly, while the Japanese press was captivated by Mrs. Bush’s poise and charm, in their haste to play up the symbolic weakness of America no one mentioned the President’s Japanese-like fortitude in carrying on with the banquet despite his illness, nor the remarkable speed and good humor with which he recovered.
2. Cf. Graef S. Crystal, *In Search of Excess* (New York, NY: W.W. Norton, 1991).
3. According to initial figures, Japanese direct investment in the United States plummeted 93% in the first half of 1991. Total foreign investment fell a little over 70%. *Japan Times Weekly International Edition*, December 2-8, 1991, p. 18.
4. *New York Times*, March 4, 1992, p. C2; *Business Week*, November 18, 1991, December 16, 1991, p. 7.
5. *Los Angeles Times*, January 23, 1992, p. A1.
6. For a good recent example, see Edward M. Graham and Paul R. Krugman, *Foreign Direct Investment in the United States* (Washington, D.C.: Institute for International Economics, 1989).

7. Jim Powell, *The Gnomes of Tokyo*, rev. ed. (New York, NY: American Management Association, 1989), p. ix.
8. *Business Week*, June 26, 1989, pp. 117-119.
9. *New York Times*, November 11, 1990, p. 1.
10. Stephanie Epstein, "Buying the American Mind: Japan's Quest for U.S. Ideas in Science, Economic Policy and the Schools," The Center for Public Integrity, 1991, pp. 10-11.
11. Epstein, op. cit., p. 9.
12. *American Banker*, January 4, 1990, p. 1.
13. *Newsweek* cover, October 9, 1989.
14. *New York Times*, November 27, 1990, p. C1; November 20, 1991, p. 1; February 5, 1992, p. B1.
15. U.S. Department of Commerce, *Survey of Current Business* (July 1991). Note that petroleum and coal products is included in "manufacturing" in this table in order to be consistent with the all-U.S.-business data.
16. Robert T. Kudrle, "Good for the Gander? Foreign Direct Investment in the United States," *International Organization*, 45/3 (Summer 1991): 403. The critics in question are Martin Tolchin and Susan Tolchin, *Buying into America: How Foreign Money is Changing the Face of Our Nation* (New York, NY: Times Books, 1988).
17. Kar-Yiu Wong, "The Japanese Challenge: Japanese Direct Investment in the United States," in Kozo Yamamura, ed., *Japanese Investment in the United States: Should we be Concerned?* (Seattle, WA: Society for Japanese Studies, 1989). Working from micro-level data, Glickman and Woodward conclude that foreign investors eliminate more jobs than they create. Norman J. Glickman and Douglas P. Woodward, *The New Competitors*, paperback edition (New York, NY: Basic Books, 1990), chapter 5. However, their results are probably too short-sighted, failing to account for increased productivity and re-employment. See Kudrle, op. cit., p. 414.
18. Martin Kenney and Richard Florida, "How Japanese Industry is Rebuilding the Rust Belt," *Technology Review* (February/March 1991), p. 25.
19. Young-Kwan Yoon, "The Political Economy of Transition: Japanese Foreign Investment in the 1980s," *World Politics*, 43/1 (October 1990): 1-27.
20. U.S. Department of Commerce, *Survey of Current Business* (August 1991), p. 104; and Bank of Japan, *Keizai Tokei Nenpo [Economic Statistics Annual] 1990*, p. 250. Totals are as of year-end 1989.
21. Examples include Rockefeller Center [*Wall Street Journal*, September 11, 1989, p. A3; November 29, 1989, p. B1], the Seattle Mariners [*Los Angeles Times*, January 25, 1992, p. A1], and many small high-tech firms [*Business Week*, June 26, 1989, pp. 117-118; *Christian Science Monitor*, November 30, 1989, p. 9; *PC Week*, November 19, 1990, p. 191]. Nor are the Americans alone: Vickers recently asked Toyota to put in a bid for Rolls Royce [*New York Times*, April 23, 1992].
22. *Wall Street Journal*, November 5, 1991, p. A3.
23. *Wall Street Journal*, February 21, 1992, p. A1.
24. *New York Times*, February 20, 1992, p. D2.
25. Akio Morita and Shintaro Ishihara, *The Japan that Can Say "No"* (unpublished translation, ND), pp. 15-16; Clay Chandler, "Tokyo's Dr. No," *The New Republic*, May 7, 1990, p. 15.
26. Nor, contrary to the popular press, is American xenophobia restricted to non-white investors. When Britain's BTR tried to acquire the Norton Company of Massachusetts, some of Norton's workers burned the British flag and paraded around with signs proclaiming "Brits Go Home." Glickman and Woodward, op. cit., p. xv.
27. Even the "investment position" figures may understate the share of investment coming from Japan. Despite the assiduous efforts of the Commerce Department's Bureau of Economic Analysis to determine the country of "ultimate beneficial owner," it is likely

- that some of the investment listed as coming from the United Kingdom and the Netherlands is actually controlled by Japanese corporations. The United Kingdom was an early home to Japanese subsidiaries seeking to avoid stringent capital controls at home, while the Netherlands Antilles is a major tax haven. Reverse cases are far less likely. See Glickman and Woodward, *op. cit.*, Appendix A, esp. pp. 305-306. For a recent overview of the Commerce Department's foreign investment data, see *Survey of Current Business* (February 1990), pp. 29-37.
28. Dennis J. Encarnation, "Cross-Investment: A Second Front of Economic Rivalry," in Thomas K. McCraw, ed., *America versus Japan* (Boston, MA: Harvard Business School, 1986), p. 146. Note that as with many other aspects of foreign investment, these statistics are problematic. For example, the manufacturing plants of companies which begin importing products and then add local assembly are still listed under "wholesaling" until local production becomes significant enough to change the industry classification of the entire American subsidiary—a point not yet reached by most Japanese auto manufacturers, for instance. See Glickman and Woodward, *op. cit.*, pp. 54, 307.
 29. For the classic study on Australia, see Mordechai E. Kreinin, "How Closed is Japan's Market?" *World Economy*, 11/4 (December 1988): 529-542; for citations to studies covering South Korea and the United Kingdom, as well as Australia, see David W. Edgington, "Japanese Manufacturing in Australia: Corporations, Governments and Bargaining," *Pacific Affairs*, 64/1 (Spring 1991): 70. A MITI survey published in 1991 confirms these results more broadly, as does other work. Japan Economic Institute, *JEI Report*, March 6, 1992, pp. 8-9.
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 32. Kenney and Florida, *op. cit.*, p. 32.
 33. Robert E. Cole and Donald R. Deskins, Jr., "Racial Factors in Site Location and Employment Patterns of Japanese Auto Firms in America," *California Management Review*, 31/1 (Fall 1988): 9-22.
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 35. Powell, *op. cit.*, p. 53; Joseph J. Fucini and Susan Fucini, *Working for the Japanese: Inside Mazda's American Auto Plant* (New York, NY: Free Press, 1990), Chapter 8.
 36. U.S. Department of Commerce, *Survey of Current Business* (August 1991), pp. 76, 104; Ministry of Finance data in Japan Economic Institute, *JEI Report*, September 20, 1991. The U.S. accounted for 46.5% of cumulative investment through 1991; the Netherlands was the largest European investor at 7.9%.
 37. U.S. Department of Commerce, *Survey of Current Business* (October 1991), p. 34. This stagnation in employment is true of overseas affiliates of American firms more generally, but most other countries were much more open to American investment than Japan in the 1970s.
 38. As measured by employment. Even developing areas such as Latin America and the Middle East are much higher. U.S. Department of Commerce, *Survey of Current Business* (October 1991), p. 30.
 39. Dan F. Henderson, "Access to the Japanese Market: Some Aspects of the Foreign Exchange Controls and Banking Law," in Gary R. Saxonhouse and Kozo Yamamura, eds., *Law and Trade Issues of the Japanese Economy* (Seattle, WA: University of Washington Press, 1986), p. 131-156. Ken-Ichi Imai, "Japanese Business Groups and the Structural Impediments Initiative," in Kozo Yamamura, ed., *Japan's Economic Structure: Should it Change* (Seattle, WA: Society for Japanese Studies, 1990), p. 172.
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41. The much-touted "exception" that proved the rule was the farcical, and temporary, acquisition of floundering audio maker Sansui Electric by Britain's Polly Peck International. *Los Angeles Times*, October 28, 1989, p. D1; *Wall Street Journal*, September 30, 1991, p. A6. Foreign firms have managed to acquire significant shares of a few second-tier firms, though usually not enough to gain management control. Examples include auto companies such as Mazda and Isuzu, as well as the pharmaceutical firm Banyu. For a thorough recent study, see W. Carl Kester, *Japanese Takeovers* (Boston, MA: Harvard Business School Press, 1991).
42. Dennis J. Encarnation, *Rivals Beyond Trade* (Ithaca, NY: Cornell University Press, 1992).
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