

preparation. One company that learned its lesson early was Corning Inc. In 1983, when it set out to improve quality through the use of teamwork, its management established two areas of training emphasis: statistical process control and problem-solving. A year later, after a fitful start, the company realized it also had to add a course called "Group Dynamics and Communication."⁶⁷

Working as a team is natural human behavior, but dealing with the nuances of targeted teamwork involving several diverse personalities and skills is a tricky business, one for which most employees (and many managers) are unprepared. "Upper management has to be prepared to spend some bucks," says Russ Preston, first-line supervisor at Fisher Controls, "It has to put forth the money if it wants work teams to succeed."⁶⁸

Unfortunately, with polls showing a near-majority of business executives predicting that half or more of their workforce will be organized as self-directed teams, this willingness to pay the cost in money and loss of control seems to be lacking. For example, an estimated one-third of teams aren't even allowed to select their team leaders. In 55 percent of the teams, management retains all rights to prepare and manage the team's budget -- and only 7 percent let teams make their own compensation decisions, while 59 percent still cling to individual merit pay programs.⁶⁹

Managers themselves recognize the problem. When asked, 54 percent admitted that the greatest barrier to successful work teams was insufficient training, followed by supervisory resistance, incompatible computer systems, lack of planning, and lack of management support.⁷⁰

It is this kind of result that underscores Peter Drucker's famous observation that management spends much of its time getting in the way.

The Virtual Corporation is a learning organization. At a given moment it is a collection of skills, talents, and experiences that reside in the minds of its managers and workers, and a body of information relating to its products, its internal structure, and its business relationships. Those skills, talents, and experiences bear upon the information -- analyzing it, packaging it, and using it to improve the firm. To do this requires basic skill levels and career-long training and re-training of *all* employees. For a company to survive in a virtualized business environment, all of its employees must learn together.

Wrote the LeHigh researchers, ". . .the quality of all [virtual] manufacturing jobs, including those in production, will be enhanced by the premium placed on initiative, knowledge, and active involvement in all levels of the manufacturing organization in setting and executing production agendas."⁷¹

The beginning of this chapter spoke of a New Social Contract, one built on a spirit of cooperation and trust. Training is part of management's contribution to this contract, along with greater employee power and a just reward system that reflects this added responsibility. Labor's contribution is increased productivity, a willingness to contribute the time needed for added training, and the assumption of much of the role of the now-missing layers of middle management.

There are secondary implications of this New Social Contract as well. One of the most important is the rise of a different sort of interdependence between worker and employer. The employee becomes increasingly indispensable. Not only will a considerable sum have been spent upon that person's training, but, thanks to the added responsibility, the employee (or team) will know more about how to, say, sell company A's products to customer B, than anyone alive. The time and money required to replace such an employee will be large. Thus, a de facto guaranteed long-term employment will be a common characteristic of the virtual corporation.

Some companies have already discovered this change. At LSI Logic, sitting in the Silicon Valley with that region's history of a migratory professional workforce, CEO Wilf Corrigan admits having adopted a policy of doing everything reasonable to retain employees, "Trained people are just too hard to replace."⁷²

But this employee leverage over the employer is matched by a countering force. Many of these new skills will be so specialized as to be untransferable. The same skill at selling A's products to customer B that makes the employee all but irreplaceable to company A, also makes that employee of less interest to company C, its competitor -- and even less so if C doesn't sell products to B. Thus, a new balance of power, one that forces the employer to shift ever-greater authority to the employee, and in return makes that employee vitally involved in the long-term survival of the firm. Conversely, the employee loses a lot of his or her flexibility in the job market.

Combine worker irreplaceability with changing demographics and it becomes apparent why many forward thinking firms are already adopting

employment practices, such as maternity leave, on-site child care, cultural support groups, job sharing, and new kinds of benefit packages in order to keep the emerging non-traditional work force happy and loyal.

Armed Camps

One might well ask where organized labor belongs in this new scheme.

Certainly 'cooperation' and 'trust', the watchwords of the virtual corporation, are hardly terms that would be used to characterize the history of labor/management relations -- at least not since the Civil War and the rise of the railroad, postal, and telegraph industries.

These enterprises, as they grew in scope and size, began to devise the power alignments that still define the modern corporation. The most notable of these was the rise of middle management, and its assumption of duties that previously had taken place on the factory floor. Says Chandler:

"With the coming of the modern factory, the plant manager and his staff took over from the foreman the decisions concerning hiring, firing, and promotion, as well as those on wages, hours and conditions of work. As the enterprise grew, such decisions were placed in the hands of middle management. Policy matters were determined by executives in new personnel departments housed in the central office.⁷³"

Part of this change was due to necessity. By the end of the 19th century, many corporations were growing simply too large to be managed by locally improvised rules. The Pennsylvania Railroad, for example, in 1891 had more than 110,000 workers -- twice the size the U.S. Armed Services at the time -- and had revenues almost a third as great as the federal government.⁷⁴

A second reason was philosophical. The myth of the capitalist plutocrat aside, even by the turn of the century most large U.S. enterprises were not family or financier owned, but public corporations with a professional management. It was this management, oriented toward efficiency and margins rather than empire, that were the prime forces in the adoption of the Taylor American Plan and other 'scientific' methods of production and organization.

Whatever the improvements in coordination and profitability, one inevitable by-product of the bureaucratic corporation was worker alienation. A schism between labor and management had always been intrinsic to the nature of business hierarchies, but in the modern corporation, that split became institutionalized.

The worker was the net loser in this power shift. Having already lost most of the control over the product of his labors in the transition from craftsmanship to mass production a few decades before, the worker now saw the erosion of his control over the organizational issues of daily work life.

The opening decades of the twentieth century saw the struggle of large segments of the labor force to retain, or regain, power in the workplace. The most common means was through unionization. Even there, despite the legends of early labor battles, most of the organizing successes came in industries where modern corporate life had yet to take hold.

"Except on the railroads, the influence of the working force on the decisions made by managers of modern business enterprises did not begin until the 1930s. Before then craft unions had some success in organizing the workers in such labor-intensive skilled trades as cigar, garment, hat, and stove making, shipbuilding, and coal mining -- trades in which modern business enterprise rarely flourished. . . The craft unions, however, made little effort to unionize those industries where administrative coordination paid off. . . until the 1930s, [middle managers] were rarely forced to consider seriously the demands of labor unions to represent the workers. . ."75

The change came in the 1930s when, through organizations such as the CIO, unions began to organize along industrial rather than geographic lines. Now it could answer the specific needs of unskilled or semi-skilled workers according to the nature of the work itself and use the leverage of cross-country, industry-wide strikes. For the next three decades, U.S. industrial unions made impressive gains.

But these near-term successes came with serious long-term costs, costs that are now being paid by unions experiencing dwindling rolls and influence. In particular, unions and management codified the nature of their relationship: mutual distrust, an on-going strategy of most companies to drive out their unions, a reactionary resistance to technological and structural change by the rank-and-file, and most deadly, a willful ignorance by union leaders about the larger issues facing the corporations where their members worked. "Management proposes and union disposes", as the saying went, and in the process most American trade unions abrogated control over the fate of the firm to corporate management.

... union leaders, during the great organizing drives of the late 1930s and immediately after World War II, rarely, if ever sought to have a say in the determination of policies other than those that directly affected the lives of their members. They wanted to take part only in those concerning wages, hours, working rules, hiring, firing and promotion. Even the unsuccessful demand "to look at the company's books" was viewed as a way to assure union members that they were receiving a fair share of the income generated by the company. The union members almost never asked to participate in decisions concerning output, pricing, scheduling, and resource allocation."⁷⁶

By the 1980s, union membership in the United States was experiencing a precipitous drop. From a high of more than 35 percent of the workforce in 1955, it had fallen by 1989 to just 12 percent (and still only 16 percent if one included government employees); the lowest rate since the early 1930s.⁷⁷

There is little indication that this situation is going to improve. One problem is that unions are suffering from their past successes. Calling unions "this century's most successful institution," Drucker goes on to suggest that unions have reached a point of diminishing returns:

"The labor union certainly has much less to offer. Practically everything it stood for has become law in developed countries: short working hours, overtime pay, paid vacations, retirement pensions, and so on. The wage fund, that is, that part of the gross national product that goes to employee, now exceeds 80 or 85 percent in all developed countries. This means that there is no more 'more' for union members. In most years the employee contribution to the employee's pension fund already exceeds by a good margin all the profit available to the shareholder."⁷⁸

Management, forever fearful of union power, has happily helped in its demise. "Management autocracy is on the rise," says Harry Katz of Cornell. Labor negotiator Harold Hoffman adds, "Many managements don't want the unions to be part of the corporation's moving towards the future."⁷⁹

These, and other factors — the declining quality of union leadership, an unsupportive Republican administration in Washington, and the shift of manufacturing to the traditionally non-union South and West — are all partial explanations for the decline of unions in the United States. But the precipitous decline, a decline not shared by other industrialized nations (union membership in the UK and Japan have dropped only slightly, in Germany and Canada remained even, and in Sweden has jumped from 79 percent to 96 percent), suggests that the primary problem with American unions is internal. And it is this internal misorientation that has kept unions from making gains at a time of a declining standard of living,

record unfair labor practice complaints, and widespread worker dislocation . . . historically the most fertile time for worker organization.

The most common explanation is that labor in the U.S. has lost touch with the changing realities of the workplace -- a dangerous position to be in as we approach the radical discontinuity of the virtual revolution. Wrote John Hoerr in the Harvard Business Review:

"As a manager to explain this seeming paradox between worker discontent and union decline and it's likely he or she will say something like the following: the rules of the economic game have changed. Competition is global, technological innovation continuous, the workforce increasingly professional. In such an economic environment, unions are ill-suited to meeting the needs of either workers or companies. At best, they are an irrelevance -- a leftover from a previous industrial era. At worst, they are an obstacle to making companies and countries competitive. Little wonder, then, that unions are on the wane."⁸⁰

A survey of pro-labor articles, books, and speeches is equally dispiriting, leaving one with the impression that organized labor in the United States is still fighting the battles of the Thirties, with little recognition -- even paranoia -- about the changes taking place within its membership. Labor writer Jane Slaughter (Choosing Sides: Unions and the Team Concept) argues that work teams are merely the latest management subterfuge, a new form of worker speed-up, and decries the willingness of some unions to work with the "employer class" in participatory management schemes as a form of co-option.⁸¹ Radical education writer Jonathan Kozol sees business participation in schools in low-income areas as a cynical attempt to increase profitability by filling future low-paying jobs.⁸²

The ineffectiveness of this approach can be measured in the declining rolls of American labor unions. American organized labor has backed itself into a corner by removing itself from corporate decision-making to instead focus upon enforcing -- through job classifications, seniority schemes, etc. -- organizational rigidity. This is the most suicidal strategy imaginable in the virtual corporation. That is why U.S. unions, in the words of Hoerr, "must reinvent themselves much as some companies are trying to do."⁸³

Corporate managers who might welcome the end of unions are making a potentially dangerous mistake. Labor will be represented in one form or another. The void created by the disappearance of unions would probably be filled by government statutes and regulations of far less flexibility than the average union negotiator. There is also a positive reason for bolstering labor unions in some industries as well: if sufficiently enlightened, they would actually enhance the higher levels of training and team work required in the virtual corporation. At places such as Corning Glass, union

participation in work team reorganization and training has proven to be a powerful tool.

A Carnegie-Mellon/MIT study of 1,000 manufacturing plants found union shops with work teams were actually *more* efficient than their non-union counterparts. Wrote the study's authors: "Ironically, it is precisely because unionized workers can say 'no' as a group that they can also collectively say 'yes.'"⁸⁴

One place American labor can look for new models for organizing labor is in other industrialized countries. After all, in Europe and Japan, unions remain a vital presence in the society -- and though some traditional measures of union power have been lost in those countries, others have been gained.

Lowell Turner of Cornell has studied unions around the world. His conclusion is that the varying success of these organizations is dependent upon how well the representation of worker interest has been institutionalized.

"In particular, two critical variables account for relative union success or decline and the stability of industrial relations systems in the contemporary period: (1) the extent to which unions, as a broad national pattern, are integrated into processes of managerial decision making; and (2) the relative cohesiveness of the national labor movement."⁸⁵

How unions have dealt with these challenges has been different for each country. In the most extreme case, Japanese labor is organized into 'enterprise unions', that is, company unions in which the leadership not only works closely with company, but often *become* an integral part of company management after a certain tenure. Needless to say, such a system would be anathema to adversarial American unions.

Far more transferrable, Turner found, was the West German model, which operates through a system of legally empowered works councils that are independent of both union and management and are elected by the workforce, yet have strong union connections. These works councils are participants in personnel, training, and reorganization decisions made by their companies and by law are privy to the introduction of new technology and job design.

This subtle interplay between works council, union, and management can slow decision-making, but it also builds consensus. How it operates is exemplified by the German Metalworkers Union (IG Metal). IG Metal,

recognizing the external challenge to the German auto industry by Japanese competition took an aggressive tack, using its membership strength to wring concessions out of management in exchange for supporting the new work team organization. The result was that the union "held on to its high membership levels and density, expanded protections for its members, retained a stable position of influence within the plants through union-dominated works councils, and began to promote its own vision of work reorganization as part of a general pattern of plant-level productivity coalitions throughout the auto industry."⁸⁶

It is important to recognize that IG Metal *led* the push in its industry for work teams, having preceded management in developing both a vision for this new type of organization, and a strategy for its implementation.

The impact of this approach to union management relations can be found in the success of Volkswagen in the world market. Writes Turner:

"The key elements of the [VW] model are: cooperative or 'social partnership' relations between labor and management; the virtual identity of unions and works council; considerable engagement of the works council in managerial decision-making processes; unity within the works council and union, so that differences regarding such critical issues as policy and candidate selection are hammered out internally and a united front is presented in negotiations with management; a high rate of union membership and strong union shopfloor presence (over 1,000 shop stewards at Wolfsburg alone); virtual lifetime pay and employment security for the workforce; a management (from top to bottom) that is trained to listen to the concerns of workforce representation and to seek consensus prior to the implementation of policy; and last but not least, a firm that is highly successful in world markets, whose management and labor representatives at least in the past have regarded 'cooperative conflict resolution' at VW as a source of competitive advantage in the marketplace."⁸⁷

Elsewhere in the world, Turner found unions, all faced with a changing competitive environment, either adapting or fading. In Italy, labor and management had long operated as adversaries, each taking advantage of shifts in the balance of power. Fiat, as the paradigmatic case, had spent much of the 1970s accommodating to union demands in the face of strikes. Then, in 1980, as the company faced potential bankruptcy, Fiat's management went on the offensive. By the end of the decade, it had broken the union, reducing it to a "marginal" role as it set about implementing new organization and worker participation schemes.⁸⁸

Richard Locke of MIT has also studied unions in Italy. In his opinion, the national unions have failed because they cannot deal with the many diverse reorganizations being attempted by Italian companies. The reaction of the national unions has been one of brute force, that of trying to impose a

monolithic national labor policy. "These vertical structures appear unable to adapt to the variety of corporate structures and strategies emerging within their sectors."⁸⁹

Beyond that, however, Locke has detected the rise of local unions, notably in the northern Biellese Textile District. These unions, small and focused have, despite enormous obstacles -- for example its members are communist, company management is rightist -- worked with many local companies to help them reorganize the transition to specialized production and to implement new technologies.

Says Locke:

"As one local business leader put it, the unions and the managers united in a 'pact for development' in order to save the local industry and preserve jobs . . . Cooperation continues between unions and business leaders. Joint efforts have emerged to promote research and development, technical education and job retraining, and improved infrastructures -- all aimed at enhancing the competitiveness of local industry. The results have been positive. Record sales and profits rates for firms have been matched by high rates of employment."⁹⁰

In Sweden, the most organized of all Western labor forces faced its own challenge in the 1970s. Having historically maintained an arms-length relationship with management, it presciently recognized the new forms of organization as both inevitable and a threat to marginalize its own future role in society. Having strong government support, it turned to legislation and new collective bargaining agreements that emphasized 'co-determination' of company strategy between management and the union. This not only precluded future management challenges, but gave the union a new role in defining workplace organization and employee training. As a result, as noted, Swedish union membership has jumped. In the Swedish automobile industry it now approaches 100 percent.⁹¹

Two lessons for American labor that can be gleaned from Turner's research are that, first, it is possible for unions to play a central role in the corporate world of the future. And second, that the complete solution cannot be found in the labor movements of other nations, but must arise from the unique characteristics of the local environment.

Are there any domestic examples of unions coping well with the virtual revolution? In fact, there are. One is the General Motors NUMMI plant. An important reason for the success of this facility has been the willingness of the United Auto Workers to abandon its traditional divisions between worker skills. For example, at NUMMI, instead of the usual 200 UAW

work classifications; there are just three, thus allowing workers to easily move across disciplines.⁹²

Another example is Corning Inc. Their management, working with the American Flint Glass Workers union, has undertaken a massive shift of its 20,000 workers to self-managing work teams. The union plays a direct role in the retraining program of company employees, assuring that its members will not lose their jobs during the transition. The entire process is taking place under the aegis of a statement of philosophy developed by both sides called "A Partnership the Workplace". This statement includes among its tenets the "recognition of the rights of workers to participate in decisions that affect their working lives" and a "work environment free of arbitrary and authoritarian attitudes."⁹³

A third, and especially compelling, U.S. example of good management-union relations can be found in the growing number of companies owned by their workers.

One of these, as reported by The New York Times, is Republic Engineered Steels, Inc. of Canton, Ohio. Faced with slumping sales and the prospect of having to lay off 625 of the company's 3,980 workers, Republic's CEO Russell W. Maier turned to the union for help, as it could offer the workplace discipline and organization he needed.

The two sides searched for answers, among the most effective of which turned out to be soliciting cost-saving ideas from workers. Workers with good ideas were temporarily teamed with supervisors to turn notions into reality. The result, after more than 1,000 suggestions, were programs that found enough savings in such areas as water conservation to save more than 500 of those jobs.

Commenting on the experience, the words of both Maier and C. William Lynn, president of the United Steelworkers local, have a symmetry. Said Maier, "You've got to build one ingredient without which you fail. . . trust." Said Lynn: "We must build mutual trust between one another so we can all focus on long-range job security."⁹⁴

The very idea of such a cozy partnership between management and union is still alien to many labor leaders. And that is the problem. Again, the virtual corporation is built upon trust and cooperation. Those that cannot accept this new reality face becoming superfluous. Union leaders face the same challenge as their long-time antagonists in management: can they

overcome the reactionary elements in their midst and build a new relationship with the other side based on co-destiny?

The alternative may be oblivion. As Turner concluded in his research: "It seems to be a particular characteristic of current markets and technologies that managers need more cooperation and problem-solving input from employees at all levels of the firm; and managers can only get this cooperation either by completely excluding unions or by integrating unions into firm decision-making in new ways. . . Union leaders in the present period, therefore, must be ready to brave internal political obstacles, in the interest of organizational survival, *to move toward a closer engagement with management.*" 95

To do this may require, as in northern Italy, a new, more decentralized organization in the unions as well, giving locals greater power in negotiating customized agreements with their corporations. In other words, American unions must undergo the same downward shift of power as their corporate management counterparts.

Mere cooperation itself won't be enough. For organized labor to do more than merely survive the virtual revolution, it must move out ahead to demand more training for workers, more worker empowerment, more union participation in improving productivity and quality, more automation, and more flexibility. This is what will constitute true labor advocacy in the virtual corporation.

Lost Souls

The most stunning feature of the new work life will be its *independence*. What has been until now the reward for an exceptional few salespeople, researchers, and specialists, will increasingly become the rule. Job descriptions will be intentionally vague, rewards often linked to the performance of teams, not individuals, with the place where the work is to be done sometimes left undefined. Some employees will find they interact more with suppliers or customers than with their fellow employees, or regularly change bosses, or spend more time with people in far-flung divisions than they do with people in their own building.

All this is going to create some sizable management challenges, more than enough to compensate for the lack of traditional authority.

For example, there will be the task of maintaining employee loyalty. When the corporation is almost edgeless, when a worker may operate out of his or her home, or even from a desk at a customer's factory, how does one instill in that employee a sensing of belonging? Will a paycheck really be enough or will special company-wide morale programs have to be created?

Equally, as companies will become increasingly dependent upon individual employees as the interface to key business partners or customers, what happens when that employee goes on maternity leave or sabbatical or any of the other leave-benefit programs virtual corporations will implement as recruiting tools? Certainly the company can't just shut down the relationship for the interim. So, will the rest of the work team, assuming there is one, fill the void? Or will companies have to keep squads of 'utility employees' specially trained for temporary fill-in?⁹⁶

But the greatest daily challenge to the virtual worker and the management that supports him or her, will be dealing with the unpredictability of life in the virtual corporation. In the virtual corporation, perpetual flux will be the rule. If every revolution brings with it the potential for tragedy, then here is where it is most likely to occur.

From one perspective, such fluidity benefits American companies more than their international competitors. As Brit-turned-American Wilf Corrigan of LSI Logic says, "One of the great advantages of America is that Americans have no memory. The reason I left Europe was because there's such a long memory that you can't initiate change. But Americans have no memory at all. I'm convinced an American workforce can come into work on Monday morning and find the whole production line has changed and by coffee break they're used to the new environment. Americans, unlike, say, the Japanese, are used to change. Most other countries are not. Americans are uniquely adapted to change. Change is the way we can win."⁹⁷

But even in the United States, there is a sizable percentage of people who are change-averse. Many of them migrate to corporations precisely because those institutions have been the most resistant to change. Now a revolution is occurring. What happens to these people, many of them highly successful in the traditional firm?

Corrigan shrugs, "We try to find them a position where there's not much change. There will always be a few of those around. But not many."

Solid and steady, among the most admired attributes of the traditional corporation become negative traits in the virtual corporation. In the process, many individuals who had trouble fitting the old template will suddenly find themselves in the most amenable of work environments; while conversely, those who once thrived may discover themselves disoriented, alienated, and overwhelmed by the new workstyle. It will be one of the sad ironies of the virtual revolution that many of the workers and managers who worked so hard to bring that revolution about will find themselves unable, by personality or sensibility, to cross over the river to the Promised Land.

It will be the task of management and labor, working together in a shared task, to help this new group of disenfranchised workers succeed.

¹Information on GM's Oklahoma City and Orion Township plants come from "Two GM Auto Plants Illustrate Major Role of Workers' Attitudes" by Gregory A. Patterson, *The Wall Street Journal*, August 29, 1991, pp. A1-A2.

²*ibid.*

³*ibid.*

⁴*ibid.*

⁵We again note that the LeHigh researchers independently came up with the same phrase. However, with 'new social contract', as with the 'virtual company', Nagel's and Dove's model deals with temporary multi-corporation link-ups for the design and manufacture of new products -- a development we believe will be rarer in the virtual revolution than do they.

⁶"People: The Only Sustainable Edge," by Michael A. Verespej, *Industry Week*, July 1, 1991, pg. 19.

⁷21st Century Manufacturing Enterprise Strategy, Volume 1, November 1991, by Roger N. Nagel & Rick Dove, Iacocca Institute, LeHigh University, pg. 10.

⁸*ibid.*

⁹*ibid.*

¹⁰"Make it Fast -- And Make it Right," by Robert D. Hof, *Business Week/Quality* 1991, pg. 79.

¹¹"Power to the Workers," by Peter Burrows, *Electronic Business*, October 7, 1991, pg. 98.

¹²Workforce 2000, by William B. Johnston & Arnold H. Packer, Hudson Institute, 1987, pg. xxvii.

¹³"View from top: lousy workers", Associated Press. Quoted from *San Jose Mercury-News*, April 8, 1991, pg. 12A.

¹⁴"Motorola U: When Training Becomes an Education", by William Wiggernhorn, *Harvard Business Review*, July-August 1990. pg. 77.

¹⁵*ibid.* pg. 77.

¹⁶*ibid.*, pg. 78

¹⁷Workforce 2000, data from the executive summary.

¹⁸"Motorola U: When Training Becomes an Education," pg. 77.

¹⁹"How Selectron Finally Got in Touch with its Workers," by Quang Bao and Elizabeth B. Baatz, *Electronic Business*, October 7, 1991, pg. 48

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- 88 ibid. pp. 397-398.

89"The Resurgence of the Local Union: Industrial Restructuring and Industrial Relations in Italy, by Richard M. Locke of MIT, presented at BRIE Conference, Spring 1991. pg. 10.

90ibid, pg. 23.

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93"What Should Unions Do?", pg. 39.

94Republic Engineered Steels story and quotes from "New Paths in Business When Workers Own", by Peter Kilborn, The New York Times, pp. A1 and A10

95"The Politics of Work Reorganization", pp. 45 & 49. Emphasis added.

96We thank Tim Ferguson of the Wall Street Journal for the question.

97author interview with Mr. Corrigan.

Chapter 10: Toward a Virtual Economy

Virtual Corporations cannot long survive unless they operate within a virtualized economy.

How can virtual corporations gather all that information or locate trained workers, suppliers and customers if they are immersed in a sluggish, retrograde business landscape, if the transfer of data and material is across an archaic infrastructure, or if the general population is poorly educated, alienated and intellectually inflexible?

Without a nurturing social, political and commercial environment, virtual corporations will sprout in response to international competition, then wither in a hostile climate. History is replete with examples of countries that eviscerated emerging industrial transformations and in the process fell behind their more adaptive counterparts. The most famous of these was the Industrial Revolution, which, though its core technologies were within the reach of dozens of countries, found fertile ground only in Great Britain and the United States. Much of the rest of the world has spent two centuries recovering from its mistake.

The virtual revolution is likely to present us with the same kind of jarring historical discontinuity. And, like its antecedent, the virtual revolution will not merely be a commercial transformation, but a socio-political one as well. The revised notions of work, employer-employee relations and even knowledge engendered by this revolution ultimately may lead to a different way of looking at the world. If the driving ideas of the Industrial Revolution were energy, specialization and replaceability, in the virtual revolution it will be time, learning and adaptability.

There are hints of what is to come. We stand in awe as a few American and Japanese companies seem to accelerate before our eyes into another dimension of productivity. New products appear and are then improved or replaced at a seemingly impossible pace that yet grows faster by the year.

Slower competitors are soon overwhelmed by this flood, their products quickly appearing anachronistic. And these 'new' corporations seem to do it all better. Sun Microsystems and Dell Computer turn the computer industry upside down. The Lexus sedan in its first year not only comes to market quicker and cheaper than its European luxury counterparts, but also offers greater performance and the highest quality ratings in the history of the automobile industry.

We are amazed because this has never happened before in our memory. For decades, most business change has been incremental, not momentous. But it has happened. Our amazement is that of the Belgian weaver of 1790 visiting a British water-powered loom, or of a Frenchman touring the Remington Arms model plant in 1850 Paris. The ground beneath us has begun to move, and we sense that when the shaking stops, the very topography of our lives will be utterly changed.

Close to Home

Here in the United States, this sense of distortion and confusion, mixed with considerable fear, has become an uncomfortable part of our daily lives. Everywhere there is a disquieting sense of decay -- in government, boardrooms, on shop floors.

The U.S. remains the world's richest and most powerful nation. But the news otherwise is not good. Even our great wealth seems tenuous when the country is also the world's largest debtor, runs huge budget and trade deficits, is losing its manufacturing base, and facing a litany of social ills.

Our schools are in disrepair, many school districts are going bankrupt, the curriculum is being torn apart by factionalism, test scores continue to drop . . . and American schoolchildren are falling ever-further behind their counterparts in other developed (and even some underdeveloped) nations. One by one our industries are losing competitiveness and market share to industries of other nations. Our government seems more concerned with life-long job security for politicians and spending money it doesn't have than in enhancing the economic prosperity of the citizenry. Our manufacturing sector often insults consumers with shoddy products and workers with unearned executive compensation -- and then blames its woes on foreign competition. By the same token, workers are frequently unmotivated and selfish compared to their foreign counterparts; and

consumers have in the past replaced good sense and security with almost pathological acquisitiveness.

Meanwhile, our major cities, once the jewels of our culture, have become violent, ungovernable places perpetually teetering on bankruptcy. In some parts of the country, there is an on-going debate whether there should even be a common *language*. Litigation has become one of our few growth industries, leaving other, more productive institutions and professions cowering in its shadow. Our most talented people now spurn government careers, a dangerous trend in a representative democracy.

Proven techniques for solving these problems suddenly prove ineffectual. Keynesian monetary policy fails in a world of multi-nationals and the instantaneous global transfer of currency. Tax cuts spike purchasing but, unmatched by commensurate spending cuts, also increase the debt. Meanwhile, American competitiveness continues to slip, as does the real income of its citizen. Worse, this democratic society seems to have become a new kind of 'house divided against itself', in which the upper class enjoys prosperity while the middle class struggles not to lose ground, and a recalcitrant underclass drifts off into a multi-generational descent into crime, drug addiction and government dependency.

Writes economist Paul Krugman:

"Although some people became fabulously rich, and a sizable fraction of the population achieved unprecedented affluence, the typical American family and the typical American worker earned little if any more in real terms in 1988 than they did in the late 1970s. Indeed, for the median American worker there has been no increase in take-home pay since the first inauguration of Richard Nixon. And for Americans in the bottom fifth of the income distribution the 1980s [were] little short of nightmarish, with real incomes dropping, the fraction of the population in poverty rising, and homelessness soaring."¹

There are solutions to these problems. They will not be easy, but they exist. What is clear is that they must in part be based on an economy capable of producing manufactured goods competitive in world markets as well as agricultural products and services.

We must produce goods in order to create jobs in both the industrial and service segments. So much of the service segment is both directly and indirectly linked to industry that it cannot prosper without an industrial infrastructure. Evidence of this is all around us. As The New York Times reported at the beginning of 1991:

When mass production was at its apex, the captains of industry were promoted to be generals of the economy. Success having validated their brilliance, they focused more upon serving their own needs than on serving those of their customers or of society. They epitomized forward thinking - and did so long past the day when, in Coriat's words, it had become necessary to 'think in reverse'. Instead of taking guidance from their customers and turning that wisdom into strategy, corporations predictably instead chose to mold the customer base to meet their needs. The task became one of shaping demand to meet the needs of mass production rather than sculpting production to satisfy customer needs and tastes.

Communities and governments were expected to yield to industry in this Grand Scheme. They were expected to support and pay the social costs of the corporation. They were the ones responsible for the blackened skies of Pittsburgh and the polluted waters of the Cuyahoga River. They were to pay the medical costs of injured or health-broken employees. They were to train the interchangeable worker. And most of all, they were to devise laws favorable to the industrial interests.

The logic behind this was elegant in its simplicity. What was good for General Motors was also good for US Steel, duPont, Standard Oil, and all the rest. And what was good for those companies was good for their employees, who, because they were gainfully employed, now had money to feed and clothe their families and serve as the engine for economic growth. The worker would purchase the output of the factories, buy food from the farmer, and provide taxes to support the government. It was to be an economic perpetual motion machine.

Mass production was based on Fredrick Taylor's "one best way" and Henry Ford's one best car -- the black Model T. From this world view it was inevitable that Eli Whitney's interchangeable parts would presage the need for the interchangeable worker. Work was simplified to the point where almost anyone could be trained to perform repetitive tasks effectively. The education system adjusted its training programs to meet the needs of the market.

Management trained the worker to take orders rather than think. The 'one best way' demanded workers who were only allowed to do one single thing. Work became more rote and management more rigid. Labor responded to this rigidity with rigidity of its own. Unions grew in power, and with that came even more stultifying work rules. Now industry found itself with workers who were allowed to operate machines but were not

"In the 1980's, when services added a stunning 21 million jobs and employed almost four out of five workers, Americans debated whether service jobs were good jobs or bad jobs, but basically took the steady growth of services for granted.

No more. Except for health care, the services are in the throes of a pervasive shake-up very much like the one that racked smokestack manufacturers a decade ago. . . . [Economists] expect job growth in the 90's to be the slowest since the 1950's. . . . And they predict that job security—the comfortable expectation of being able to settle down somewhere for life, at least by middle age—may be gone for good."²

We need products to export in order to earn the foreign exchange so we can afford to buy the goods and services we cannot effectively produce in our country. We need manufacturing to fuel the economy in order to provide jobs and the dignity that comes with them for many of our citizens.

Many of the current problems of the United States, especially those in business, arise from a nation struggling and stumbling through the no-man's land between one industrial era and the next. Some of our businesses are already climbing into the 21st century, while many are still trapped in the labor wars of the 1930s or in management theories of the 1950s. The laggards, despite heroic efforts, are losing ground to new domestic and international competitors because they've failed to notice that the game has not only changed, but moved to a different field. Unless they adopt a different approach to their business, they will be lost and will not be able to be a part of the solution to the problem.

The Arrogance of Success

Mass production was probably the single most important factor in making the United States the world's most powerful economy. The processes conceived by Henry Ford and Fredrick Taylor became the dynamos of the world's largest manufacturing corporations. Riding in their wake came the great banks, retail chains, and a host of professional service suppliers, including doctors, lawyers, and accountants.

The spirit of the industrial corporation was perhaps best encapsulated by GM president "Engine" Charlie Wilson in a hearing before Congress in 1953, when he said, "For years I thought that what was good for our country was good for General Motors, and vice versa."³ Those words still echo today through the empty and failed factories that stand as monuments to our industrial-short-sightedness.

allowed to fix them. Or workers who were not allowed to carry materials from one place to another. Or maintenance people who could not perform simple plumbing and electrical jobs because they did not belong to the right union.

Needless to say, the philosophy of one best way, of one best car, led to production facilities that were as rigid as the workers and the managements. These "single" purpose production facilities could only do one best thing. As a result there was one best marketing philosophy as well. The reasoning was inevitable: if the factory could only produce a limited variety of products, why not shape the markets to demand the products the factory could produce?

Products became ever-more standardized and ever-less differentiated. Faced with that companies began to focus on low price as the way of capturing customers. They became rigidly attuned to driving costs down the learning curve. Cost, not quality, became the key to market share. Many company managements came to believe that low cost was in fact *contrary* to high quality. Sacrificed as well was customer responsiveness. Since the rigid systems could not deliver it, it was not important.

The notion of interchangeable workers and parts dovetailed neatly with interchangeable suppliers and replaceable customer. Suppliers existed to serve on the terms most favorable to the industrial customer. And if the supplier balked at those terms there was always another one to turn to. Therefore most attention was focused on price as opposed to quality and relationships. There was little trust on either side of the bargaining table and little interest in attempting to help one another. Secrets were important and information of value to the other side tightly guarded.

As for the marketplace, an attitude of *caveat emptor* was just fine with the corporations. If the consumer was responsible for buying a poor quality product, there was little need to worry about the quality of what was produced. This was especially true after World War II, when customers were numerous and supply was restricted. In a sellers' market, unhappy customers were OK. They had no where else to go.

As myopic as it may seem to contemporary eyes, this business model not only worked, but worked brilliantly. The U.S. industrial engine managed to create the wealthiest society in history while simultaneously overwhelming the two great totalitarian threats of the age, communism and fascism.

But hubris accompanied the acquisition of this power. And when cracks began to appear in the monolith of American manufacturing, the great industrial leaders quickly blamed others for their problems. The villains became indolent and ignorant labor, the high cost of capital, trade restrictions, tax policies, litigation and product liability, predatory foreign competition, onerous environmental regulation, and a poorly educated work force among many others. Certainly all had contributed to the situation. Ignored in all this were the flaws in the internal mechanisms of the corporations themselves.

When it became obvious that America's industrial engine had begun to sputter, many economists and leaders, refusing to admit to a more systemic failure, clutched for the straw of the 'post-industrial economy'. This theory not only provided a convenient explanation for the country's loss of manufacturing prowess, but even made it seem an advantage. After all, what could be cleaner and nicer than a place where brainwork had replaced turbines and smokestacks? Not surprisingly, it was a vision that corresponded perfectly with the personal fantasies of many academicians and corporate staff members. In the new post-industrial society, the problems of grimy manufacturers would mean little if everyone could find cleaner work. Hollow manufacturing corporations could be created which served as marketing organizations for the mass produced products of Asia. Service businesses would flourish and many would find work as doctors, lawyers, accountants, bankers, stewardesses, retail clerks, or flipping hamburgers in fast food restaurants.

Of course, the populace was not spending a lot of time worrying about the situation. It was enjoying the great wealth created by the production machine. Since people could get jobs without finishing school, there was little need to do so. Since government would take care of them in their old age, there was little need to save. Since many could live well enough on welfare, there was less need to work. The government was at work creating a hollow economic structure to match the hollowed out factory.

Through all this, government stood by, paralyzed by indecision. One faction argued that services would propel the country to the next level of prosperity. From the other side came the argument that industry could solve its own problems if left alone or if foreign competitors were held at bay for a few years.

Meanwhile, business did little to help its own cause. Babel-like, some leaders argued for protectionism. Others begged to be freed from the shackles of unfair labor, unfair laws, and unfair litigation. High tech

entrepreneurs announced that all they wanted was for government to create 'a level playing field' and then get out of the way. About the only subject on which all seemed to agree was that the government should not become involved in industrial policy. Unfortunately, for good or bad, this was the one activity in which federal and state governments in the United States had been involved for years.

It had never been billed as such. But nevertheless, the U.S. tax code was the de facto industrial policy of the United States. It determined what type of investments would be most attractive at a given time: real estate sometimes, capital equipment others. By making interest deductible and taxing dividends, it sparked a leveraged buyout spree. By permitting tax free institutions to pay no tax on investments in stocks, it did a great deal to influence the trading mentality in the stock market and managements focus on short term results.

In fact, the tax code was only the most sweeping form of "non-existent" industrial policy. Everywhere in government one could find industrial policy being made. Product liability laws determined the production of everything from pharmaceuticals to small airplanes. Industrial revenue bonds and tax incentives determined the sites of factories. Defense industry expenditures determined how many engineers would be available to work on consumer products. Educational standards determined what future employee talents would be available for industry. Immigration laws determined which job classifications would be filled and which would go begging. Rigid anti-trust laws designed to solve the problems of 1910 determined which threatened industries would be allowed to die before they could form research cooperatives.

What was especially pernicious about this denial of the existence of the industrial policy was that what was created happened in piecemeal fashion, without coordination and with no common goals. If we were to have a national industrial policy, then it should least be a coherent one with focused national initiatives in key areas.

Business executives who did try to remain competitive found themselves perpetually reeling from the latest quixotic decision from Washington. No sooner would an American company show some success in a foreign country than the U.S. government would indulge in some fiscal and monetary policy that would force the dollar sky-high and drive their business venture into the red. That night, the company president would turn on the TV and watch the President of the United States declare the strong dollar to be a policy victory.

Over time this combination of social ills, ineffective government, and business myopia began to degrade the country's commercial institutions. Christopher Hill characterized manufacturing's problem as one of "continuous incremental degradation" or "they don't make them like they used to."⁴ The service industry fared no better, its failures best captured in the poignant question on the cover of Time magazine: "Why is service so bad?"⁵

As it became harder and harder to create wealth in a society having trouble manufacturing competitively and capable of producing quality services, enterprising individuals decided to redistribute wealth through manipulation. Financiers did this with leveraged buyouts, bankers created the house of cards from which the savings and loan crisis grew, and plaintiffs lawyers reshaped the law so that everything became a tort. Government as well focused on wealth redistribution rather than wealth creation. To avoid forcing society to make the tough choices, it ran up large deficits and used inflation as a way to tax the public without being blamed.

Now, in the 1990s, the disturbing truth has become undeniable. For twenty years, the annual growth in per capita income has been at an historic low. Unless something is done soon, for the first time this century, this generation will live less well than its parents did.

What had been obscured and overlooked by all this has been the opportunity to create a new type of added-value production -- one which valued the needs of customers, suppliers, and employees more and the corporate hierarchy less. It would be an industrial model built on cooperation between business, labor, and government; not destructive confrontation. What was needed was a "thinking in reverse."

A Different Story

The Japanese didn't make these mistakes. Having rebuilt a war-decimated economy in the 1950s, they were not encumbered by the burden of past success. Their Golden Age would have to lie in the future -- and the nation, aided by a hermetic and homogeneous culture that could be organized around a common goal, set out to achieve it. Not locked into old patterns and at the same time searching for a way to differentiate themselves from their established American and European counterparts,

the Japanese found quality -- learned, ironically, from Americans such as Deming and Juran. As a result, they were the first to emplace a new industrial paradigm built on constructive cooperation (rather than destructive confrontation) between business, labor and government. They adopted a new theme: "What is good for the customer is good for business".

Japan was heavily rewarded for being the first to make this crucial step towards virtualization, jumping into the ranks of the world's richest nations in just twenty years. But hubris is an international disease, and Japan for its arrogance is now too beginning to feel its sting.

While it is clear the Japanese have done a better job of paying attention to the needs of the customer in many areas (automobiles, consumer electronics, etc.) it is equally clear they have often exhibited reckless disregard for the needs of the economies in which those customers live. Their inability to share their success with other industrialized nations has done much to destroy the markets on which they depend. Now they are becoming victims of restrictive import policies in Europe and similar forms of 'Japanese-bashing' in numerous other countries of the world.

Add to this the fact that the Japanese have been driven from the low added-value commodity markets, and it becomes apparent that the country's future depends on selling advanced entertainment systems, high end color TVs, luxury cars, advanced color copying systems, camcorders, and feature loaded 35mm cameras to prosperous economies -- precisely those economies that, pounded by Japanese indifference, are beginning to suffer economic distress and lash back. This would seem to be as self-destructive a long-term strategy as the United States had in the 1950s, yet it is being assiduously pursued not only by Japan but the hungry developing countries of Asia.

A Domestic Revolution

It must be recognized that there will be no great masterstroke or earth-shattering new invention that will revivify our industry and restore a vibrancy to our economy. To succeed, the virtual revolution will have to take place in almost every office of almost every company in almost every industry in the nation.

Furthermore, it must also be recognized that before wealth can be reinvested, redistributed or spent, *wealth must be created*.

The only way a large, advanced society can do this is to create high-quality, value-added products and services. We cannot maintain, much less improve, our standard of living by building low cost, undifferentiated commodities and pitting our highly paid labor against that of the developing countries of the world. A nation engaged in commodity production will soon find that its wages must on some adjusted basis be equal to those of developing countries. If an American auto worker hopes over the long term to earn five times as much as his Asian counterpart, he or she must be roughly five times as productive.

There are secondary effects as well. If a large segment of the population is paid as if it lived in the Third World, then managers, doctors, lawyers, accountants and others will soon find they are living in a society that cannot afford them unless they work for less. If the people working in the hospitality industry hope to be able to fill rooms in deluxe hotels and tables in restaurants, they must sell at prices which are within the reach of the buying public. This of course links the wages in the hospitality and travel industry to the incomes of other members of society. This is already happening around us, as doctors' incomes have been squeezed by government programs and as members of other service professions find it harder to find clients to pay for their services.

The virtual revolution is crucial because it is currently the best way to add value to an economy. Virtual corporations will have faster and cheaper product development, their products will be more efficient and of higher quality, their grip on market share more secure, and their customers more loyal. An economy built upon virtual corporations will be, despite its continuous internal flux, an extraordinarily stable and enduring structure. Its citizenry will be highly trained, its institutions strengthened by bonds of long-term relationships, its productivity unsurpassed, and its products and services competitive in the world market.

But the question remains: Which of the world's economies will have the courage to lead the way into the virtual revolution? After all, it will come with considerable cost, sometimes to what are now our 'best' workers and managers; its core philosophy is counter-intuitive to many contemporary business leaders; and it will demand a level of trust higher than most people currently consider safe.

It seems unlikely that *no* nation will cross over into the virtual era. That would be unprecedented in the history of both technology and commerce. Some nations, perhaps even some currently uncompetitive ones, will make the leap. And, as these economies accelerate away, the rest will be quickly left behind, victims of their own short-sightedness.

What then would it take to make the United States into a virtual economy? The answer is: whatever it takes to best nurture and grow virtual corporations.

Virtual corporations in turn will do best in a society which is highly educated with a high level of technical and computer related skills. It is most likely to succeed in a country that possesses leading technology in fields related to consumer needs. It will be best able to function in a country with an excellent communications and transportation infrastructure. It will work best in an environment where there is teamwork between the business and government. It will function best in a society that is less confrontational. It has its best chance to survive in an environment dedicated to long term goals and constant improvement. Its interests are best served by a society that saves more and consumes less. It will proliferate most widely in an environment that rewards business contributions which create jobs and wealth rather than merely rearranges them.

Social Kaizen

Until now, this book has dealt with what corporations must do if they wish to remain competitive. But these corporate transformations will be heavily dependent upon the level of support they receive from society. Corporations will not be able to cope with the competitive challenges of the 21st century by themselves. It is therefore important to inquire what government and society should do to support this movement.

The first thing to understand is that the transition to a virtual economy is not going to occur overnight. It will go on for decades. Continuing support will be required from social and government programs during this interval. Yet, at the same time, any abrupt or dramatic change in government and social programs is more likely to hinder than help.

Our society has become so complex, with so many subtle and conflicting forces, that it is almost impossible to predict a positive outcome for *any*

program, no matter how well-meaning. For example, welfare programs aimed at making individuals less dependent have, to a number of observers, only created more dependency. The war on drugs has made little progress despite thousands of arrests and billions of dollars spent. Industrial tax credits did not often lead to more productive long-term output, but, in many cases, created only bookkeeping profits. Protection of the steel industry has not led to the expected increased investment in the steel business by those who cried loudest for it.

In a virtual economy, the best government and social programs will be those that operate under the rules of kaizen -- taking small gradual steps toward a goal and evaluating the progress before going further. If the program isn't working, *stop* -- then either abandon it, or fine-tune it to succeed.

It is not clear that any legislative body could ever restrain itself to the degree required by kaizen. Unfortunately, the consequences of not doing so will be to pre-destine the nation to constant flip-flops in direction, of good ideas becoming expensive mistakes to be dealt with by reforms that start the cycle over again.

For this process to work both major political parties must agree on some broad policy objectives and work towards these goals through successive changes in administration. This implies that the United States must have an industrial policy. The goals of this policy will obviously not remain completely static over the years, but neither can they be allowed to be changed dramatically with every election.

Industrial Policy

Here we tread on dangerous ground. The phrase 'industrial policy' has become so freighted with emotional baggage, so identified with statist solutions to commercial problems, as to be almost impossible to be discuss objectively.

As noted, the United States already has an industrialized policy -- a cobbling of laws, regulations, Commerce Dept. rulings, tax codes, tariffs, subsidies and embargo lists. The problem is that it is bad policy. It is punitive when it should provide incentives, obsessed with minutiae when it

needs to be strategic, and rewards established industries with good lobbyists rather than emerging industries with a vital stake in the future.

If the United States is to have an industrial policy, then it should be *de jure*, not *de facto*; and it should be dedicated to achieving a virtual future, not protecting an anachronistic past.

There is a way to do that, one that divorces itself from the chaos of daily politics, yet is answerable to the long-term needs of the country. Precedent can be found in the way in which the United States deals with monetary policy through the Federal Reserve Bank, its Board of Governors, and its Chairman. With powers independent of both Congress and White House, and with its attenuated terms of office, the FRB has consistently proven that it is not at the mercy of any branch of government, but is dedicated to the long-term needs of the nation.

A similar institution could be erected for the country's industry, chartered to keep the United States a major presence in all key technologies, and charged with sufficient powers to support the emergence of those technologies, but not enough to interfere with them once underway. It must be impossible for such an agency to micro-manage the new technologies, but instead foster competition, entrepreneurship, and the other features of a free market. Otherwise, it will become yet another instrument for preserving the status quo, performing the latter-day equivalent of subsidizing the vacuum tube business long after the transistor has been invented.

In practice, this agency would select the industries important to the future of the country, then make investments and provide incentives to encourage their development. We already know what most of those technologies are; and one of the agency's tasks would be to identify others the instant they appear. We even have a prototype for just such an agency: DARPA (the Defense Advanced Research Purchasing Agency), which, for the last thirty years, has been chartered to identify key emerging military technologies and subsidize them. Despite being chronically underfunded and subject to all the failings of the Defense Department, DARPA has managed over the years to play a key role in the creation of most of America's most successful industries, including commercial aircraft and semiconductors.

The proposed agency would be a commercial DARPA with more teeth. It would fund academic and industrial research and recommend tax and financial incentives for companies making investments in these target areas. It would encourage (through scholarships, endowments, etc.) training in

disciplines that would support these industries so the necessary human resources would be available.

An excellent example of just such government incentive program which is very inexpensive to run but probably has done more to improve the long term competitiveness of our industry than any other government program is the Malcolm Baldrige Award. Here is a case of good industrial policy. This national recognition award, modeled after Japan's Deming Prize and designed to raise the quality of America's industrial output, deserves much of the credit for the quality progress made here in recent years.

In support of such a program, the Federal government must also re-examine its antiquated anti-trust laws, many of which are as outmoded as Fordism, Taylorism, and management hierarchies. In a world with international competition and free trade, it is difficult to envision many monopolies of the type anti-trust laws were designed to stop. Our companies need to pool resources in order to meet the threat of foreign competition.

An example of this type of cooperation is SEMATECH, a \$200 million semiconductor industry consortium funded by the government and private industry aimed at improving the competitiveness of capital equipment suppliers to the semiconductor industry. SEMATECH required Congressional approval -- a convoluted and wasteful process -- that would have been more quickly accomplished by a government agency (or simply a collection of corporations) operating under more realistic anti-trust regulation. By comparison, European nations have created a number of comparable industry consortia with far less difficulty and far more funding, including EUREKA (\$5 billion annually), ESPRIT, JESSI (\$4 billion), and RACE.⁶

Wrote the LeHigh University researchers in 21st Century Manufacturing Enterprise Strategy:

"Creating standard cooperation models, certified in advance as legal, would go a long way toward making cooperation easier and more attractive. . . More broadly, change is required in the prevailing attitude in American society towards anti-trust legislation, as well as in the legislation itself. The historical foundation of anti-trust legislation in the U.S. has been superseded by events."⁷

Tax Policy

The tax code has determined much of the behavior of U.S. industry for the last century. It could be used much more effectively to meet the needs of an emerging virtual economy. In fact, the tax code as it is currently structured does a great deal to undermine the needs of virtual corporations.

The objectives of a good tax code should be to generate revenue for the government to carry out necessary programs, encourage socially desirable activities and discourage others, and to be fair in the manner in which it places a burden on individuals and institutions. Using the tax code as a way to directly re-distribute wealth is *not* a legitimate objective. The only effective wealth re-distribution system is prosperity -- any other workable policy, as Drucker has noted, devolves to the use of inflation to expropriate the middle class; "destroying productivity" in the process.⁸

If one were to redesign the tax code today in light of the needs of the virtual economy, it would encourage long term investment, savings, education and research, and discourage consumption of non-basic and luxury items and precious resources such as oil and water. This could be accomplished so that the tax incentives were not regressive.

One of the primary goals of a new tax policy would be to encourage a long-term view toward investment and discourage investment speculation. A way to do this would be to steeply tax all short-term capital gains and reduce or eliminate the tax on long-term gains for *all* investors. Such a policy would encourage both managers and investors to adopt a more distant business horizon. It would as well discourage speculation by large tax-free institutions, such as pension funds. It seems likely such a tax could be made revenue neutral from the increased taxes on speculative transactions by non-profit institutions, and from raising short-term taxes to offset the reductions elsewhere.

The government could choose as well to tax consumption. It could place luxury taxes on all non-essential items costing more than a few hundred dollars. Those taxes could escalate with price. It could encourage savings by increasing the size of retirement savings exclusions and eliminating or reducing the tax on interest and dividend income. By coupling these programs with some form of income tax reduction for lower and middle income earners these taxes could be made non-regressive.

There are a number of products and technologies which are no longer produced in our country and which are important to the virtualization process. The United States needs domestic access to many of these

consumer electronic technologies, as they will be the basis for many of the critical computation products and mass-customized manufacturing systems of the future. At present there is no domestic manufacture of many of these products. Instead, domestic purchase of imported VCRs, camcorders, low end fax machines, pocket organizers, cameras, and other worthy but inessential consumer products constitute a major component of the nation's trade imbalance.

If the goal is to restore this technology (and the skills that emanate from them) to the United States, then foreign manufacturers must be impelled to move on-shore. In other words, some form of *domestic technology content* regulation. One way to do this would be to levy a sufficiently large excise tax on these items to greatly curtail their sale in the United States. This tax would then be lifted, for *all* competitors, when domestic design and manufacture of these products is established with sufficient local content by any *one* manufacturer. If this suggestion seems radical, keep in mind that is precisely what happened, albeit unconsciously, when Japanese electronics and automobile companies feared the imposition of U.S. tariff barriers and quickly emplaced plants and factories throughout the United States. The result has been beneficial for both nations.

Sweeping tax code revisions are always unpredictable. Motivations change and in the process drive the economy in new, unexpected and sometimes even harmful directions. Individuals and corporations will always find ways to exploit the changes in ways never imagined by government. That is why an attitude of social kaizen is so important. In tax policy as elsewhere, we should pick a direction and move toward it systematically and in small steps, constantly evaluating what works and what does not. In this way, the government can learn as it goes and avoid the haphazard and contradictory patterns that have so often characterized our tax policies in the past.

Education

In 1991, the National Association of Manufacturers, working with consultants Towers Perrin, surveyed 4,000 NAM members about the quality of their workers' job skills. The results, publicized in early 1992 on the same day that the Speaker of the Japanese House of Representatives decried American workers as lazy, selfish and illiterate, were singularly depressing:

"The survey revealed, for example, that the average manufacturer rejects five out of every six candidates for a job, and that two-thirds of companies regularly reject applicants as unfit for the work environment. A third of the companies said they regularly reject applicants because they cannot read or write adequately, and one-fourth reject them because of inabilities with communications and basic mathematics.

"As for those already employed: More than half the companies reported major employee skills deficiencies in basic math, reading and problem-solving . . .

"Thirty percent of companies couldn't reorganize work activities because employees couldn't learn new jobs; 25 percent said they were unable to improve product quality because workers couldn't learn the needed skills."⁹

The virtual corporation will deeply depend upon a skilled and trained work force that is not only literate but capable of decision-making and self-direction. Employees will have to participate in teams, analyze problems, and propose and implement solutions. This will never happen if, as the NAM report concluded, "Sixty percent of new jobs will require more than a high school education. However, 70 percent of new entrants into the workforce will have less than a high school degree."¹⁰

It is therefore crucial that government find ways to improve primary and secondary education in the United States. It is difficult to imagine the country doing this simply by returning to basics, raising teacher salaries, or cutting class room sizes. All would certainly help, but are contingent upon resources that probably will not be found.

Education in the United States needs its own virtualization. Says Robert Reich, "We need to push the responsibility down to the front line, toward teachers and principals."¹¹ And, as in industry, the best hope of attacking the problem lies in applying the computer to education.

We have no illusion that computers are the panacea for poor education, but certainly they can be an invaluable supplement -- especially now that the cost of computation and of multimedia systems is now cheap enough to make wide spread adoption practical. Computerized texts have been developed which have demonstrated effectiveness, especially those that adapt to the diverse needs of students. Some states today even permit textbook budgets to be spent for educational software. Given what are likely to be permanent constraints on education budgets, computers offer the one hope of freeing teachers from the daily burden of teaching basic skills and allow them to dedicate themselves to the more elusive (and rewarding) challenge of creating lifelong learners.

Just creating flexible, curious and competent minds will be enough of a challenge for schools. Companies will need employees with job specific skills. It is their obligation to provide much of this training. This will not happen as often as it is needed if companies view their workforces as transient. Why make a training investment in an employee who will use it to seek a better job elsewhere?

One solution to this is tax credits covering a substantial portion of employee training, say, 90 percent of training costs for the first year of employment and falling 10 percent per year thereafter. This would recognize the overall social benefit of this private training, while at the same time, by not offering complete reimbursement, provide some protection against abuse.

The government should as well actively assure that adequate numbers of trained college graduates are available to our society. All college diplomas are not equal. We currently have too many doctors and lawyers and too few teachers and scientists. One way to shape the composition of graduating classes to more closely meet society's needs is to offer targeted incentives; for example, by making student loans and scholarships more readily available to students pursuing certain degrees. As the needs of society changed, the bias in such a program could be altered.

There is considerable precedent for this. ROTC programs have long been used to produce trained military officers. If indeed the war of the twenty-first century will be for economic survival, then our government should be willing to commit the resources to produce future leaders in that combat.

The higher education system in the United States may be the envy of the world, but it is not doing the job required to train students for the virtual economy. Most colleges and universities in this country reinforce the old notion of 'the two cultures', science and the humanities. Liberal arts programs produce students that technically illiterate, incapable of dealing with the technical content of a modern economy. Meanwhile, science and engineering majors, by being spared a leavening of humanities, are woefully unprepared for the social structures and interpersonal relations that are at the heart of virtual corporations.

Says Reich:

"Technological literacy is fundamental. The emerging global economy requires people at all levels who understand technology, design engineering and manufacturing engineering, energy, production, and so on. . . If you don't have the skills, you are in competition with millions of others worldwide eager to work for less. Blue collar jobs at \$10 and \$20 an

hour are vanishing from these shores. Our unskilled workers are in competition with unskilled workers everywhere.

More and more of the jobs available to unskilled American workers are confined to the local service economy, where it's difficult to make much money. Many Americans still assume that we're living in the 1950s, when a high school graduate could still get a good job in the factory in the next town. That era just doesn't exist any more."¹²

The greatest danger in not properly training our young people to participate in a virtual economy is that of creating an permanent army of disaffected unemployed, perpetually frozen out of the progress occurring around them. Not only would such a group be unhealthy to the society as a whole (as we can already see with our current underclass), but, if a sufficiently large percentage of the population, would ultimately negate whatever gains would be made by the virtual revolution.

A literate person in the year 2000 will have to be both technically and socially competent. That means engineers must have an understanding of cultural anthropology and an appreciation of literature; and that English majors need to be skilled with the personal computer and understand science and technology. This is a tall order, but in some respects it harkens back to the college education of a century ago, when generalism was more valued than specialization. In the virtual corporation to have just one specialty is to be a burden on the rest of the organization.

Infrastructure

One of the biggest tasks facing the United States in the years to come will be the reconstruction of its deteriorating infrastructure. From the end of the Second World War through the 1960s the United States spend 4 percent of its GNP on infrastructure. Since then it has spent just 1 percent, and a reckoning is approaching.¹³

The intuitive answer to this problem is to spend the huge sums needed to rebuild the nation's roads and highways. This, however, is not necessarily the solution demanded by a virtual economy. If traditional corporations were fueled by oil -- for trucking, power and employee commutes -- virtual corporations will be driven by massive amounts of increasingly sophisticated information. Thanks to government research, corporate investment and private initiative (such as Internet), the United States is the world's leader in high-speed computer networking. It is a lead we dare not lose.¹⁴

In a twist of history, it has been estimated that the cost of either rebuilding the nation's highways or installing a national fiber optics network will be about \$200 billion. Thus, we stand at a crossroads. It would be a dangerous mistake, we believe, when the nation is faced with either rebuilding its roads or installing a high-speed communications grid, to give priority the former. That, once again, would be merely improving the past, not embracing the future.

Here again is a place where intelligent industrial policy can be useful. As late as 1987, AT&T predicted it would take until 2010 to convert its entire long-distance network to digital switching. Thanks to competition from the likes of U.S. Sprint, the job was done by 1990. Private competition, spurred by government incentives and investment, might put the data grid in place in a fraction of the expected time with much less burden on the taxpayer.

Perhaps also making such a choice more palatable is the possibility, as George Gilder has suggested, that the advent of high-quality multi-media data communications may obviate the need for a sizable fraction of current commuting and business travel time. The government might also provide incentives for the privatization and expansion of mass transit programs. All of these efforts could buy the nation some time, enabling it to gather the funds needed for bridge and highway improvement. Nevertheless, good roads or bad, whenever the communications grid needs upgrading (such as to the Broadband Integrated Service Digital Network early in the next century) it must take precedent. That will be the choice our best competitors will make. Already NTT has announced it will wire Japan for fiber optics by 2015.¹⁵

Legal Reform

The current legal system is no longer protecting the rights of consumers, but draining their blood. It is estimated that the current tort system costs the country \$300 billion dollars a year in direct and indirect costs. This amount is equivalent to the total defense budget.

Anecdotal evidence is even more alarming. For example, malpractice insurance adds \$300 to the cost of a birth in New York City.¹⁶ It has been estimated by the Rand Corporation that two dollars are spent on the legal system for every dollar delivered to an injured party. And, thanks to legal

judgements, the U.S. small plane industry has essentially disappeared -- ironically leaving enthusiasts to fly older, less-safe planes.

Three hundred billion dollars is 6 percent of the nation's gross national product -- enough to make Forbes complain: "Roll over, Wall Street. Meet the real champions of the great American greed game: plaintiff attorneys -- lawyers who specialize in suing."¹⁷ These plaintiff attorneys alone have an estimated annual income from contingency fees of more than \$10 billion.¹⁸ Certainly most of that money would be better spent on education, research, or improving the infrastructure.

These costs could be dramatically reduced by forcing losers in tort cases to pay some type of fine for the inconvenience they have caused. One notion has been to have the losing party assume all of the other side's costs. But there is a validity to the argument that this would have a chilling effect upon individual litigants bringing suit against giant corporations. A more practical example can be found in the medical insurance industry, where the new practice of having company employees pay a small fraction of their medical costs has sizably reduced benefits filings. By the same token, requiring the loser in a tort case to pay, say 10 percent, of his or her attorney's costs, might well knock off a majority of nuisance suits and settlement fishing expeditions, while still preserving meaningful litigation undertaken by serious plaintiffs.

Many proposals have been made for alternate forms of dispute resolution which would cut the cost of delivering compensation to the injured party. Punitive damages should be limited to some reasonable multiple of actual damages. Courts are meant to render fair judgements, not serve as instruments of personal vengeance. This becomes even more the case in a society that is built upon interdependence and mutual trust.

Labor

Labor organizations based on the assumption that management and labor are blood-adversaries are as obsolete as managements that believe they can continue to exploit workers. Both will disappear because the institutions in which they operate will be the business failures of the 21st century.

The role of unions and worker organizations of the future is to improve job skills, to help management improve efficiency and to assure workers are treated fairly and share in the success of their employers. The issue is

not whether unions are strong or weak, but whether labor and management are capable of teamwork. If they are not, both will fail.

From management's point of view, it should either strive to form a team with labor or it should attempt to rid itself of unions. There can be no middle ground. While this position may appear to be anti-organized labor, we hasten to add that the converse is also true: if the union is operating in good faith and its efforts are impeded by management, the company's board of directors should fire the executives.

As was seen in the Virtual Worker chapter, there is some evidence that the most powerful combination for creating a virtual corporation is one featuring both an enlightened management and union. This suggests that in most cases where unions already exist, the optimum approach is to find ways to cooperate, such as through shared worker training.

Unfortunately, in the rapidly paced world of the virtual revolution, a recalcitrant and reactionary union cannot be suffered for very long. Ridding a company of a union is a divisive and destructive process. But living with one that is anti-company is even more disastrous. Such a union will soon kill the company and itself -- leaving the poor workers as the ultimate victims.

Trust and Teamwork

One of the recurring themes throughout the book is the need for trust and teamwork between government, business and the worker. There is, of course, no law that can be passed that will force this happen. But it is possible to create an environment in which such relationships are likely to occur.

The move toward a more coherent industrial policy will begin the process of bringing government and industry together. Diminishing the pernicious distortions of the legal system will force individuals to solve their problems in non-litigious ways. Helping managements to rid themselves of uncooperative labor groups, and vice versa, will mean those that remain will work as teams. Providing tax incentives that orient management towards the long-term planning will improve relationships with customers, employees, and suppliers. Encouraging business to invest heavily in

training its workers will make it more dependent on them and more interested in developing employee trust.

In the future, treating customers, suppliers, and employees fairly will be vital to the success of a business. Companies such as General Motors are today paying the price for years of abuse of these relationships. In a virtualized economy, competition will be so fierce and the need for trust and teamwork within the virtual corporation so vital that the market will exact its retribution with shocking speed. In this environment, under the threat of annihilation, we will have to cling to one another for safety.

Ben Franklin's words at the birth of this country seem to have a special currency. "We must all hang together or assuredly we shall all hang separately."

The Next Industrial Era

For the United States there is no other choice but to lead the way into the virtual era. Our nation could not long stand the diminishment and the economic colonialism that would come from being an also-ran in the world's economy.

On the positive side, the virtual revolution represents a clean slate, a way to break with mistakes of the past and begin anew. Says the LeHigh University report, "The fact that all of the world's leading manufacturers have to build a new infrastructure to make the transition from mass production to agile manufacturing provides a unique opportunity for U.S. industry to regain the leadership it lost in the 1970s and '80s."¹⁹

Happily, despite our many problems, the U.S. is in many ways the best suited for virtualization. Our technological innovation remains the best on the globe. Our productivity is also the world's highest, though no longer the fastest growing. Finally, we remain the world's greatest economic, military and political power.

There are other, more subtle, advantages as well. We are a multi-ethnic society that has embraced the most adventurous and creative men and women of the world. Our university system, especially its graduate programs, are the envy of other nations. And, certainly, the history of this nation has proven the extraordinary resilience and strength of our political system.

Ultimately, however, America's greatest advantage in the race to virtualization is its storied individualism, and the entrepreneurship that arises from it. It was this entrepreneurship that put the United States at the forefront of other industrial transformations of the past two centuries, and, if properly supported, promises to do so again.

By comparison, the Japanese have few of these prerequisites for virtualization. Says the LeHigh report:

"The new system will depend on spontaneous work force initiative and on innovative creativity at the operational level of an enterprise. Neither of these have been noteworthy characteristics of Japanese industrialization, or society. The system will depend on distributed authority and globally decentralized manufacturing facilities, but the Japanese have had difficulty treating other nationals as peers. Both at home and abroad, Japanese managers will have to deal with women who will merit, and expect, promotion to positions of authority, yet another problem of Japanese culture. Finally, the successful implementation of the new technologies will be critically dependent on the software linking human workers at all levels with a national information network capable of controlling manufacturing operations. Software development has not been a strength of the Japanese computer industry to date."²⁰

As for the United States, our greatest handicap may be the legacy of past success. We have been so wealthy for so long that we have not had to make the tough choices. For four decades now, we have believed we could fight wars and live comfortable lives at home. Social programs have promised our citizens incomes whether or not they made an effort to contribute to society. We guaranteed comfortable retirements to our citizens whether they saved or not. We promoted and graduated students rather than dealing with the truth of their failure.

It is now clear that to capture the future we will have to work as hard as we have at any time in our history. We are competing for our existence against others who want to live better than they do today and who are willing to work very hard to reach that goal.

Because of the diffusion of technology around the world, these people can now build the many of the same products that we can build. This is no longer the world of the 1950s where only a few advanced nations could make steel, cars, electronics, airplanes, computers, copying machines, and machine tools. If we wish to prosper we have to find ways to build products which offer more value. The virtual corporation offers us that opportunity.

In the midst of turmoil, it is easy to become overwhelmed by our problems. They are very large, but they are not unsolvable. Imagine how the world must have looked to a Japanese or German citizen in 1945. Their economies had been devastated by bombs as well as arrogance. Ours is only a victim of complacency.

What is now required is that we commit ourselves to winning the virtual race. This is a race in which there are no leaders today and in which two economies are best positioned to enter the race: ours and Japan's. And, as if preordained for a classic conflict, each of us enjoys vital abilities the other lacks.

The United States has the opportunity to race ahead and lead the world into the virtual future. But for an opportunity to become an advantage requires *will*. It remains to be seen if we Americans are willing to overcome the divisive forces in our society, including race, ethnicity, and class, for the sake of our nation's future. Do we still have our historic courage to embrace change?

The Last Requirement

A final question must be asked. In the end, will the virtual economy result in a better society? Ultimately, after all the losses and gains, will it be for the good? *Is the virtual corporation virtuous?*

This is not an idle question. The monetary expenditure and human energy required of a society to achieve a virtual economy will be so great that a morally ambiguous goal will not be worth the effort.

There is as well the issue of who will work. Virtual factories will be so efficient that not as many individuals will be needed to produce the goods our society needs. Just as there are no longer many people required to work on the farm so to will the need for numerous factory workers vanish. The idea of sharing the work by moving to shorter work weeks is not a practical one either. The virtual worker will require so much skill and training that it will not be realistic to educate numerous people to fill the same job.

Therefore, it is likely that in the future perhaps 95 percent percent of us will work in service jobs, many of them within manufacturing companies. But there will be a difference between the virtual economy of tomorrow

and the service economy of today. It will have be an economy with a strong agricultural and manufacturing base which is capable of sustaining a service infrastructure. It will no longer be a hollowed out economy but a complex, rich one.

Certainly it can be argued that all business and social revolutions ultimately are an improvement over what came before. That's why they occur. Too often books about business assume this answer and go on with their celebrations of the halcyon days to come. The real truth is that all change comes with great cost, for the guilty and sometimes for the innocent. The virtual revolution will be no different.

But any system of human organization that values both the freedom and the power of workers to control their lives; that demands an educated population; that answers the unique needs of individuals; that is built on trust and cooperation rather than distrust and confrontation; and that rewards long-term dedication rather than short-term manipulation, surely must be considered an improvement to the common good.

Furthermore, the evolution from virtual product to virtual corporation to virtual economy certainly; by the evidence to date, represents a virtuous cycle; that is, a positive upward spiral. As virtuality becomes more pervasive it will erase many of the current transitional problems and distortions that currently affect our society.

But none of these salutary results are automatic. For the virtual corporation to appear here, now, will require all of its employees to revise the way they deal with one another and with the outside world. To live in a virtual world, all of us must make the same changes in our lives.

In 1848, Karl Marx predicted that the business and social revolution occurring around him would lead to a revolt by the workers against their capitalist masters. That revolt never occurred. Marx was wrong because he failed to predict that the mass production revolution would also raise the quality of life for the workers as well. He was also wrong because the societies themselves in time recognized the inequities of the new system and set about rectifying them through charitable institutions, vocational schools, public health and welfare.

Like the industrial age before it, the emerging virtual era has the potential to raise the quality of life for everyone to unprecedented levels. Like earlier social transformations, it will likely reward a whole new class of individuals. But, also like economic transformations before it,

virtualization will also leave some behind -- people who cannot cope with the new responsibilities, the rapid pace of change, and the demands for mental adaptability. In the frantic pace of life in a virtual business, in the full-time job of maintaining established relationships, it will be easy forget these others.

A just society, a virtuous society, will tend to the needs of the disenfranchised. Thus, the last requirement of the virtual revolution is that it also exhibit the quality of mercy.

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³"How Mighty General Motors Fell," by Stefan Fatsis (AP), *San Francisco Examiner*, December 22, 1991. pg. E-7. See also "Can GM Remodel Itself?" by Alex Taylor III, *Fortune*, January 13, 1991, pg. 27.

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⁶21st Century Manufacturing Enterprise Strategy, Vol. 1, November 1991, by Roger N. Nagel and Rick Dove, Iacocca Institute, LeHigh University. pg. 4.

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⁸Peter F. Drucker, *The New Realities*, Harper & Row, 1989. pg. 72.

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¹¹"A Conversation with Bob Reich," *Directions* (Thayer School of Engineering/Dartmouth College), Fall 1991, pg. 16.

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¹⁶Peter W. Huber, *Liability, The Legal Revolution and Its Consequences*, Basic Books Inc., New York, 1988, pg. 4

¹⁷"The Plaintiff Attorney's Great Honey Rush," by Peter Brimelow & Leslie Spencer, *Forbes*, October 16, 1989. pg. 197.

¹⁸ibid.

¹⁹21st Century Manufacturing Enterprise Strategy, Vol. 1. From the foreward.

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