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Fashions come and go in everything from the length of women's skirts to management techniques. In business we have moved from the concept of centralized control to decentralization, and in some cases back again; we have pursued excellence, studied theory Z, constructed sell, grow and harvest matrices, and even learned to be a one-minute manager. Whatever the popular theory of the moment may be, by and large the common thread that runs through them all is serving the customer better by getting close to the marketplace. This dictum applies both to heavy manufacturing and to the service industries. If this perception of how to succeed in business is true, it follows that a real understanding of the market is essential for ~~the~~ success.

Today the nature of the market for just about everything is changing at an accelerating speed. Old benchmarks are shifting and new strategies are

required. Competition has moved from next door to anywhere in the world. Suddenly we are finding that world class competition can, and does come from areas that posed no threat only a few years ago. It has now become almost a cliché to say we live in a global marketplace, and although innumerable speeches are made giving lip service to the idea, many people still truly fail to grasp this new reality and continue to operate in the same old way.

The first step in any policy process is to attempt to understand the nature of the problem. The basic reality of the last years of the 20th century is that the world is now so interconnected that the world economy cannot be understood if we continue to believe it to be a collection of national economies. The electronic infrastructure that ties the globe together assures that no

national economy can be managed in isolation from the rest of the world.

The convergence of computers with telecommunications has created an information revolution that in journalist Mike O'Neil's words is "hurrying the collapse of old orders, accelerating the velocity of social and political change, creating informed and politically active publics, and inflicting conflict by publicizing the differences between people and nations."

While this communications revolution is central to all these tides that are washing over our world, much more is in the offing.

The impact of information technology has a profound effect on the rate of advance of all science, since calculations that used to take years can now be done in minutes. Scientific knowledge is currently doubling about every 13 to 15 years. The old industrial age is fading and

being slowly replaced by a new information society. This transition does not mean that manufacturing does not matter, or that it is not important, or that it will disappear, any more than the advent of the industrial age meant that agriculture disappeared. What it does mean is that like agriculture today, manufacturing will produce more goods for more people with less labor. It also means that the relative importance of intellectual capital invested in software and systems will increase in relation to capital invested in physical plant and equipment. Traditional accounting systems designed for another age no longer reflect what is really happening either in business or national economies.

All this taken together is changing our global economy, transforming national political and business institutions, and altering national

foreign policy objectives and the methods of achieving them.

Changes of this magnitude have always been profoundly disturbing to the power structure, and with good reason. The mismatch between the fruits of new technology and the operation of the political process, whether in government, business, or the family, has often produced unrest, changing value systems and, indeed, sometimes revolution. Just as the spread of rudimentary medical knowledge took away the power of the tribal witch doctor, the spread of information about alternate life styles in other countries threatens the validity of some official doctrines and thus the government's power base.

Since knowledge has always conferred power on those who know how to use it, the proliferation and dissemination of information to huge numbers of people can be, and more often than not is, a

precursor to a **shift in the power structure.** But the side effects of the information revolution go even deeper than that.

We are seeing a phenomenon of **eroding government control** over how citizens live and work, and how one's institutions are managed.

This condition is not limited to closed societies, but is becoming more and more evident in the West. National sovereignty and political saliency have traditionally entailed the government's power to regulate major sectors of society, ranging from health care to heavy industries. The increasing difficulty of exercising this power in the information age, as opposed to the industrial age, was summed up by George Gilder this way: "...A steel mill, the exemplary industry of the material age..." lends itself to control by governments: "Its massive output is easily measured and regulated at every



point by government. By contrast, the typical means of production of the new epoch is a man at a computer work-station, with access to data bases around the world, designing microchips comparable in complexity to the entire steel facility, to be manufactured from software programs comprising a coded sequence of electronic pulses that can elude every export control and run a production line anywhere on the globe." The advent of the silicone compiler, which is an analogue of desktop publishing for chip design opens up, in Gilder's words, "a great economic cleavage between the interests of entrepreneurs and the authority of national governments." Since the technology will continue to progress, the cleavage will deepen over time.

It can be argued whether or not we have to be able to find the right words to describe things accurately in order to truly understand what is

going on, but most people would at least admit it is a great help. Many of the words we use today to describe our business and our markets flow from business, accounting, and political systems which have grown up over the years. While these words and systems have served us reasonably well in the past, it can be argued that the numbers produced by our current accounting methodology no longer reflect what is happening in the real world. Everyone knows, for example, that all the lights would go out, that all the airplanes would stop flying, and that all financial institutions would shut down if the software that runs their systems suddenly disappeared. And yet these crucial assets, which are essential for the operation of our societies, do not appear in any substantial way on the balance sheets of the world. Balance sheets are full of what in the Industrial Age were called "tangible" assets -- buildings and

machinery -- and our mindset suggests that to capitalize anything we can't feel and touch would constitute cooking the books. Nevertheless, as the Industrial Age blends into the new information society, it may be time to rethink what constitutes an asset. In the last years of the 20th century, the velocity of change in the world is now so great that there is literally no precedent to guide us. Policymakers are discovering that many of the changes which are altering the world come not in response to their actions, but are driven by technology which they may only dimly understand.

Since about 85% of all the scientists who have ever lived on this earth are alive today, and these men and women have better tools and more creative opportunities, it is not surprising that the velocity of change is now more rapid than at any time in human history. "The entire Industrial

Revolution," says Carver Mead, "enhanced productivity by a factor of about 100," but "the micro electronic revolution has already enhanced productivity in information based technology by a factor of more than a million - and the end isn't in sight yet." The consequences of this revolution are immense, but have not always been immediately grasped by policymakers.

It is not an accident that this revolution in global markets is contemporaneous with the explosion in the use of information technology. Those who used to be thought of as data center managers have now moved into the main stream of management. The person who truly understands the impact of technology has become a vital part of the whole strategic business process. In successful companies we see electronic customer demand management as the new way of life. Paperless order systems and inventory control have

become routine. In addition to the way business is done, we see new corporate structures developing to manage new manufacturing methods, new products and delivery systems. Management structures are already changing dramatically. The old military mode of hierarchical organization charts is giving way to flatter structures designed for faster response times to serve dynamic global markets. Layers of managements, which used to do nothing but relay information from one level to another, are beginning to disappear. Business is learning that these positions are no longer needed when information technology allows the rapid transmission of vital information to all levels of management without human intervention.

Jobs that were once, and still are, important are being performed in very different ways. This phenomenon is not limited to business.

It was not so long ago that the list of Presidential appointments included lighthouse keepers whose importance to commerce was thus recognized at the highest level in Washington. Commerce is still vital to America, but in July last year, the Coast Guard announced that the remaining 18 manned lighthouses would be phased out and replaced by electronic equipment. Those hardy lighthouse keepers have a lot of company. Some 600,000 people left the employ of the Fortune 500 companies between 1985 and 1986, and this trend is far from having run its course.

No one who has sat in, or even visited a modern trading room can fail to understand the revolution in the handling of information.

While much of the technology is highly visible, shifting patterns of trade and commerce, which are vital to our business, are often

obscured by national and international accounting systems devised for simpler times.

It was not so long ago that companies used to export products, and the balance of trade figures aggregating these transactions were regarded as a kind of a zero-sum game. Today this is no longer the rule. A product may have value added in several different countries. For example, the dress a customer purchases at a smart store in New York may have arrived on the rack after a long journey. The cloth may have been woven in Korea, it may be finished in Taiwan, cut and sewed in India, sent to Milan for the attachment of a "Made in Italy" label and shipped to New York. This same kind of phenomenon is occurring in hundreds of manufacturing products. This was dramatized by Secretary of State George Shultz in a speech last December in which he said: "I recently saw a snapshot of a shipping label for some integrated

circuits produced by an American firm. It said, 'Made in one or more of the following countries: Korea, Hong Kong, Malaysia, Singapore, Taiwan, Mauritius, Thailand, Indonesia, Mexico, Philippines. The exact country of origin is unknown.' That label says a lot about where current trends are taking us." These trends are being driven by the growing realization that the concept of a global market has moved from rhetoric to reality almost before we knew it. The old political boundaries of nation states are being made obsolete not only by technology, but also by events that businessmen throughout the world initiate. Political borders, which have been the cause of wars, are now becoming porous. Information moves over and through political subdivisions at the speed of light. The mismatch between the pace of technological advances utilized by business and the adjustment of the



political process has created tension throughout history. Today, because the pace of change is so swift, this phenomenon is assuming even greater significance. In a certain sense, commerce has not waited for the political process to adjust to the new reality, but has tended to drive it. This is especially noticeable in Europe where the new generation of business managers is bound and determined that the integration of the Common Market in 1992 will arrive on schedule, even though political leaders often seem reluctant to see their power attenuate.

On the global business front, the new word is "alliances." Almost every day one reads of an American and Japanese company forming an "alliance," or a Swedish and a German company -- the list of combinations is endless. How all of these associations will work out over time is unknown. Many of them appear to be a kind of

multi-country **horizontal** integration of manufacturing, marketing and research. Since these arrangements transcend national boundaries, if they endure for any sustained length of time, it will become harder and harder for politicians to **unscramble** the new **emerging global economic** system.

For a business to survive and prosper in the global marketplace, the new information technology must be used not just to run the back office in a more cost-effective way, but as a **strategic tool** in the **front office**. As technology permits the wide distribution of information at all levels of an organization, the effectiveness and functional efficiency of the old hierarchal organization chart comes **into question**. In the words of Shoshana Zuboff: "The informing process sets knowledge and authority on a collision course." This means that organizations which make maximum

use of information technology are redesigning their organization charts around the flows of information, rather than the old military pyramid.

As information becomes available to more and more people, it can be used to build new products customers need. The air frame business is a clear illustration of this concept. Ian Sharp has built a data base in Toronto containing information about every commercial airplane that took off in the last 15 years in the United States. There are 70 pieces of data about each flight, ranging from time of takeoff and landing, to number of passengers carried, yield per passenger, fuel consumed and time and distance of flight. Other than as an historical record, what good is it to the management of business? In the tough, competitive world of designing, building and selling commercial airplanes, the information on this data base can make a difference. For

example, when an airplane manufacturer starts to design a new airplane, it is necessary to target specific routes and build to satisfy an airline's requirements for a cost effective plane. One has to know how many passenger seats will be filled and, thus, how large a plane to build. What fuel economies will be required to let the airline turn a profit? This data can make the difference between selling many planes or none, since knowing one's market and building to suit is what it is all about. The difference in this approach and just building a new airplane that one hopes to sell, may very well be the difference between success and failure.

Sometimes, however, information technology can have a profound effect on the nature of business itself. In order to capitalize on new business opportunities, it is important that senior management see information in a strategic

context -- something that may well determine the future of their corporation -- rather than as an operating process to be contained within some technical department. The difference is **critical**.

Information technology can and does change not only the way we do things, but perhaps, more importantly, **what we do**. Automating yesterday does not produce tomorrow's products, although sometimes it will suggest what they might be.

J.C. Penney has achieved one of the truly remarkable uses of information technology to let the company do more business in a better way in more places. Everyone who ever tried to sell anything knows that the closer one gets to the customer, the better one's information is about the consumer's likes and dislikes. In the ideal world of management text books, store managers who know the community in which their stores are located should pick out the merchandise

assortments most pleasing to local tastes. If their judgements are correct, sales increase, markdown decreases, and profits rise. The problem has been to maintain the leverage of the huge buying power of a central office, while at the same time letting store managers make merchandise selections. Penney built a direct broadcast telecommunication system that links all their stores. The system can be, and is used for inventory control, reorders, accounting and all the standard business purposes. But that is only the beginning. Currently store managers gather in centers fairly close to their stores to view a television screen on which appears the latest merchandise picked out by the buyers in New York. Standing in a Penny TV studio on Sixth Avenue, the buyer displays a dress, or sweater or other items, describes the material, the price and delivery times and, in effect, asks for orders. The

enthusiasm, or lack thereof, for an item reflects each store manager's assessment of his or her marketplace. Heavy sweaters may be hot items in Minneapolis but of little interest in Houston. The order system itself is basically paperless and a vast simplification of the old many layered process. From a management point of view, the store manager can no longer excuse substandard store results by complaining that some buyer sent out a poor merchandise assortment that had little appeal in his or her particular marketplace. Today managers can be held accountable, while at the same time each store benefits from the mass buying power of the central office. Technology has permitted a widely dispersed organization with about 1,400 stores to follow customer-driven business practice, and gain a very real business advantage.

These are but two examples of how the use of this new technology has impacted business. While productivity soars, and the very nature of doing business in a new environment is changing rapidly, this rapid change poses new challenges to business. If middle managers are being replaced -- and they are -- where will tomorrow's senior managers come from? In the insurance business, sophisticated software is replacing the human underwriter in some lines of business and credit scoring is displacing some credit officers in banks. If these traditional sources of senior management talent dry up, top executives will have to be drawn from other pools of talent. Lifetime employment is giving way to both a new mobility and to a sense that people are becoming more responsible for their own jobs and careers. To manage this transition, which cannot fail to create anxiety, will call for our best talents.



Since the technology that is driving this change will neither slow down or go away, managers will have to learn new human skills. If properly handled by top management, the new order of things can produce more interesting, more responsible, and more creative jobs throughout the company. It is a challenge that is worth our best efforts.

