

## A COMPUTER ON EVERY LAP

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Computers the size of a notebook are changing Japan's economy and the way its citizens work and live. These amazing little notebook computers soon will revolutionize the entire world's computer industry and the way all of us think about and use computers. They will impact the way we work and live more than the fax did, and faster.

100 million Japanese soon will be using these notebook computers, making them as ubiquitous as telephones, watches, calculators, radios, televisions, and walkmans. Notebook computers soon will be much more widely used than VTRs, faxes or copiers. Japan is about to become the first nation with a computer on every lap.

This revolution was sparked by a pressing need; it is gaining momentum because the Japanese have found a way to satisfy that need. The implications for Japan and the rest of the world are enormous. Unfortunately, the persons, businesses and governments most likely to be most effected seem most ignorant or oblivious.

### THE NEED

The need is for Japan to maintain its economic competitiveness and prosperity; to avoid the economic decline that beset England in the first half of this century and is now dragging down the United States.

Japan's prosperity, like England and the U.S.A. before it, has come from excelling in mass production of items like steel, ships, automobiles and televisions. And, like England and the U.S.A. before it, Japan's success in mass production eventually brought high wages that inhibited its ability to compete with lower-wage nations capable of producing the same items at lower cost.

Most Japanese are not enthralled about America's "post-industrial" or "service economy" approach to this problem. They do not want to have to earn their living washing one another's windows or shirts, selling one another hamburgers or drugs, suing one another, or converting money from one form to another.

Instead, Japan's leading manufacturers are switching from making large quantities of a small variety of products to making small quantities of a much wider range of products. This is information-intensive manufacturing; it requires that massive amounts of data be swiftly obtained, processed, understood and acted upon. Information on who wants what, how, when, where and why. Information to reduce inventory, production and distribution costs so that small volumes of products can be made and sold as cheaply as large volumes were before. For example, a woman now can have her left and right feet measured separately, choose from an vast variety of patterns and materials, and have "self-designed" shoes made

for about the same price as off-the-shelf shoes. Or, she can "design" her own home or automobile by selecting from an enormous variety of factory-made components offered by the maker. The maker will assemble her "custom" home or car, much like children build things with Lego sets.

In distribution, Japan's 7-Eleven stores are thriving, while America's are bankrupt, because of Japan's information-intensive management. Japan's sky-high real estate prices dictated that 7-Eleven stores here be much smaller and carry far fewer items than those in America. So Japan's 7-Eleven collects and analyzes data on how well each item it stocks is selling in every store at every hour of every day. It ships several times each day to each store to keep all stores stocked with fast-selling items. Japan's thriving 7-Eleven recently bought-out its bankrupt American elder brother.

This switch to information-intensive business enables the higher education and skill levels of Japan's workforce to compensate for its higher wage levels. It changes the nature of manufacturing to fit the strengths of Japan's workforce, instead of moving manufacturing offshore to use other nations' low-wage workers.

But it requires so much information to be collected and analyzed so rapidly that it must be done electronically. Paper, pencils, erasers, scissors and paste cannot handle such great volumes of data fast enough. It requires electronic computers that can communicate electronically. But a new kind of computer.

## THE SOLUTION

The computers which have been used widely in business and government for the past forty years haven't satisfied the need described above. If they had, the United States, the nation where computers were invented and still are most widely used, could have moved into information-intensive manufacturing instead of moving its own manufacturing to low-wage countries like Mexico and Taiwan. And pencils and paper might be as rare on desks today as hitching posts or water troughs are on streets.

Only large organizations can afford multi-million dollar, room-size "mainframe" computers. And because mainframes are so arcane that only specialists can use them, there are too few of those specialists, they are so expensive, and their productivity is so low, even large organizations can apply mainframes to only a small portion of their information needs.

Newer "desktop" computers are small and inexpensive enough for most businesses to afford and simple enough for most office workers to use. But they still are too big to put on every desk -- particularly in Japan, where small desks are crowded into small offices. And they still are too expensive to buy for every employee, so most business information has been handled with paper, pencils, erasers, scissors, and paste -- the same tools used in Charles Dickens' days.

But now, Japan's electronics companies, experts in miniaturizing, simplifying and reducing the costs of home appliances, have turned their attention to offices. They have come up with notebook computers which offer all the power and capabilities of larger computers but are easy enough for all desk workers to use, tiny enough to fit on their small desks in their crowded offices, light enough to carry around, and inexpensive enough to buy for every employee. They take up no more desk space than a notepad. Some weigh as little as two pounds. Some cost as little as \$500. One model runs for eight hours on two penlight batteries. Most have screens that are easy to read and keyboards that are comfortable to type on.

Software packages, that make these notebook computers both useful and easy to use, are becoming abundantly available at less than \$70 each. They are making notebook computers as popular as the wide availability of inexpensive recordings made stereo equipment. And, just as most recorded music runs on all brands of stereo equipment, most popular software packages run on all popular notebook computers. This is making the computer industry as competitive as the stereo industry. All major Japanese electronics makers are selling these notebook computers, and their fierce competition is producing newer, better, smaller, less expensive models every month.

The newest models can read data stored on compact disks or digital audio tapes. A single CD contains 600 million characters of data, enough capacity to hold two full sets of the 32-volume Encyclopedia Britannica or 1250 paperback books. Several CDs fit comfortably in a shirt pocket. One DAT tape can store twice as much data as a CD, say 2500 paperback books weighing almost half a ton. Two DAT tapes fit in a cigarette pack. We now can carry around in our pockets more information than we could read in a lifetime and we can read, search, sort, collate, compare, and analyze it from our two-pound, battery-powered, notebook-size "information machines". Now! Today!

We can plug these notebooks into standard telephone lines to communicate and share information instantaneously with persons in other buildings, cities, or countries -- faster than we can pass information on paper to someone down the hall. And, since the Japanese are rapidly converting all of their telephone lines to optical fiber, they soon will be able to communicate unlimited amounts of data at the speed of light anywhere within their country.

## IMPLICATIONS

The implications of all this boggle the mind.

All 36 million of Japan's office workers and salespersons soon will be using notebook computers. Most Japanese workers already produce higher quality goods than ours, with higher productivity. Many of Japan's companies already are more competitive than ours. Consider how these gaps will increase as Japan's office workers switch to electronic information while ours remain in the Charles Dickens' era of paper, pencils, erasers, scissors and paste.

Japan's 24 million students, preparing for a life that will require computer literacy, are starting to use notebook computers in school. The notebooks fit easily on small desks and are light enough for even first-grade students to carry comfortably. Parents can afford to buy their children computers, just as they bought them paper and pencils before. Consider future competitiveness when all of Japan's students are computer literate while 20% of our 18-year-olds can't even read and write English.

Japan's 40 million housewives are becoming computer gurus to ensure that neither their husbands' salaries nor their children's education get lost in the rapid transition from paper to electronic information.

Japan soon will be the first nation with a computer on nearly every lap. With 100 million users of computers costing \$700 and up, and software packages costing \$70 each, Japan will surpass the United States as the world's largest market for computers.

These electronic notebooks are changing the way computers are bought and sold, and the way they are managed in organizations. Until recently, computers were industrial goods sold to specialists by specialists. Large companies had a central department of specialists that acquired computers and controlled how they were applied to the company's business. The role, power, influence and budgets of those departments are shrinking. Increasingly, the central department acquires and manages only the computers used to process that small variety of data which affects the entire company. Each division or business unit of the company autonomously acquires and manages computers for work within that division or unit, like they acquire their own stationery or furniture. And individuals often bring their own "personal" notebook to the office. Computers increasingly are sold like other office equipment and consumer goods.

All of these things change the nature of the computer industry in ways that make the strengths of America's computer manufacturers less relevant and favor the strengths of Japanese consumer-electronics makers. The big names in computers increasingly will be those same names on most of the other electronic items in our homes and offices -- Sony, Matsushita, Toshiba, Sharp, Epson, Canon, Fujitsu, Hitachi, NEC, Casio and so on.