

The Rebirth of a "High-engineering State" —Advanced Industries Coming Back to Life—

By Yoshida Satoshi

For a long time it has been said that the Japanese economy is approaching its twilight. Certainly, foreign criticism of Japan is becoming harsher day by day, and Japanese business people seem to be losing their confidence over prospects for the future.

But there is one healthy group of businesses in Japan that has not been influenced by the domestic recession or the foreign exchange market. This is the Japanese-style "high-engineering," (not "high-tech") industry, which boasts superior thinking and high product quality.

This "high-engineering" industry, which engages in uniquely Japanese technological development and maintains overwhelming competitive strength, is extremely bullish about capital investment and future market expansion. Unhampered by the need to chase after the kind of enormous profits earned in the speculative bubble period of the late 1980s, this industry responds enthusiastically to competition from other countries. It turns out products with higher added value and escapes the hollowing out of Japan's industrial structure, in the wake of the appreciation of the yen, by maintaining its domestic production bases.

The following is an outline of recent trends and future prospects.

Business circles turn bullish

While the Japanese economy is still clamoring to get out of the rut created by the collapse of the bubble economy—slow recovery, bad debts—it is the personal computer industry that is propping it up and steering the way toward recovery.

According to Dataquest Japan K.K., a research organization that studies high-tech industries, sales of domestic personal computers reached a low of 2.23 million units in 1992 and then jumped to 3.21 million units in 1994, up 30%

over the previous year. Although the diffusion rate of 19% for personal computers in Japan is no more than half that of the U.S., it is the highest growth rate for a product since the camcorder hit the market.

According to an estimate by IDC Japan, another research organization, domestic sales of personal computers in 1995 reached 5.55 million units, almost double the 1994 figure. Scheduled fall 1995 sales of the Japanese version of the Windows 95 operating system were expected to fuel the boom.

Taking into account this improvement in basic software, IDC Japan forecasts that the household diffusion rate, which was estimated at 10.7% in 1995, will increase by about four times to 40.2% in 2000.

Backed by this PC boom, Japan's semiconductor makers—the big five general electric appliance manufacturers—have carried out sizable upward revisions of their capital investment plans for semiconductors. Originally, the total fiscal 1995 investment plans of the big five reached ¥650 billion, but they added an extra ¥250 billion in just the first half of the year, bringing it to ¥900 billion. This is considerably greater than the investment plans of the five main steel manufacturers, which fall below ¥500 billion.

In the past, it was always the case that mass production of a new chip with better memory capacity would lead to a decline in demand for old chips, accelerating a generational change. Lately, this so-called silicon cycle of ups and downs in the semiconductor market has begun to disappear. Prices do not come down for either old or new chips; indeed, demand continues to increase for both. Even if full-scale mass production of a 16-megabit dynamic random access memory (DRAM) chip gets underway, 4-megabit chips will still be used in lower-priced PCs and printers, expanding their life span. Leading manufacturers such as NEC Corp. and

Fujitsu Ltd., are taking advantage of this by not only continuing their active capital investments and establishing operations overseas, but also playing a leading role in the recovery of the whole economy. This is further evidenced by the fact that their labor unions made hefty demands in labor-management negotiations over year-ending 1995 bonuses and spring 1996 wage hikes.

In the case of Oki Electric Industry Co., the recovery has been truly phenomenal. In the year ending March 1993, Oki had a recurring deficit of ¥38.3 billion, but thanks to the semiconductor boom, it has turned its red ink into a record-breaking profit in just three years. Oki estimates that its recurring profit for the year ending March 1996 will be ¥43 billion, which would be its highest ever.

While manufacturers' efforts toward rationalization and restructuring have certainly played a part, the main factor behind their prosperity has been the full-scale emergence of a new group of PC-centered businesses.

"Karaoke on demand"

When people come to write the history of Japan's advanced technology industry, they will probably see October 1995 as the beginning of a new chapter. That month heralded the beginning of two important services: "telecom karaoke" and nationwide PHS. Both services mark the completion and successful commercialization of new systems that are unique fruits of Japanese technology.

Japanese are particularly fond of *karaoke*, singing into a mike with an echo-like function along with a stereo that pumps out music in Dolby. The main stage has been bars or special karaoke rooms, but now "telecom karaoke" brings a new service to the home that can be connected to the telephone line and television set.

The "telecom karaoke" service was

launched by Tokyo-based Kyocera Multimedia Corp., a newly established company financed by 54 firms, including Kyocera Corp. and Taito Corp., Ltd. According to Kyocera Chairman Inamori Kazuo, the target is Japan's karaoke population of about 60 million.

The system consists of a terminal, the X-55 (¥64,800), which is connected to the home phone line and TV. The user inputs the desired karaoke tune selection number and it is sent back from a database via the phone line. At present, 10,000 tunes are available, with more than 100 new ones being added monthly.

According to industry sources, the present karaoke market in Japan amounts to ¥2 trillion a year. There are an estimated 600,000 karaoke units in commercial use, and more than 7 million household units.

This "telecom karaoke" system is receiving much attention because it is the epitome of software industry efforts to build not only new forms of entertainment but also a multimedia network that can offer new-age interactive information services.

In the first stage of this new age system, Kyocera Multimedia President Yamamoto Sadao foresees a setup in which the special terminal can be connected not only to the home phone line but also to cellular phones equipped with screens, so that the system can be used outdoors. It will also be possible to pick up and transmit news and other real-time information. The system will offer not simply "videos on demand" but "karaoke on demand."

In the second stage, with the participation of the Kyocera group, the system will link the whole world by means of communication satellites. It would also connect with the Iridium Project, which can be used on phones and so on, making it possible to transmit or receive desired information at any place in the world at any time. The Iridium Project, led by U.S. firm Motorola Inc. and other companies, involves worldwide cooperation in the launching of 66 communication satellites. Service is scheduled to begin in 1998.

Commercialization of the uniquely Japanese PHS

The personal handy phone systems (PHS) of NTT Central Personal Communication Network Inc., and DDI Tokyo Pocket Telephone Inc., meanwhile expanded their businesses in October 1995 to cover the whole country. Astel Tokyo Co., financed by trading companies, electric power companies, and railway companies of the Japan Railways Group, has joined the ranks.

Since the PHS involves the transmission of communication signals by relay from small antennas installed on the tops of telephone booths and buildings, the business was attractive to not only telephone companies but also railway and electric power companies, which have networks of stations, pylons, and utility poles.

A trial business was started in limited areas in July 1995, but the DDI group had trouble with its relay antennas, resulting in sales of existing cellular phones outpacing that of PHS phones.

Still, PHS has several merits. In addition to offering cheaper rates than for cellular phones, the PHS groups are making efforts to extend services by installing antennas in areas where it is difficult for radio waves to reach including underground malls, subways, and buildings. The PHS can be used over a wider area, about three times that of existing digital car and cellular phones and can also transmit various data, including images and sound.

The NTT group already has 55,000 subscriptions and forecasts that the number will increase to 500-600,000 by the end of March 1996. DDI has 64,000 subscriptions and forecasts a rise to 1 million units by the same time. This "born-in-Japan" product, along with the Future Public Land Mobile Telecommunication System (FPLMTS: a new-age terminal that is expected to appear on the market in the near future) are expected to reach total sales of 38 million units in 2010.

Companies involved are also considering the export of the system to other Asian nations, including Indonesia and Thailand, and are currently carrying out

trials for this purpose.

Rapid diffusion of TFT liquid-crystal displays

Japanese manufacturers have a monopoly over the worldwide supply of liquid-crystal displays. The production value of this business has grown at annual rates of more than 20% over the last decade, reaching ¥590 billion in fiscal 1994, an increase of 37% over the previous fiscal year. The capital investment of Sharp Corp. and other companies has reached highs exceeding ¥200 billion a year.

This high rate of growth in the production of liquid-crystal displays has been fueled by demand for use in notebooks. At a time when the demand for personal computers is growing worldwide, the demand for notebook PCs, which are outstanding in terms of portability, is extremely brisk, accounting for 77% of demand for liquid-crystal display.

Particularly, in terms of the driving method, the production of thin-film transistor (TFT) liquid-crystal displays offering a wide-angle view and can withstand moving images, is increasing by the year. TFTs now account for more than 50% of liquid-crystal display production. Color liquid-crystal displays now amount to nearly 80% of production. The new products marketed recently by leading PC makers generally use color and TFT-type liquid-crystal displays.

South Korean manufacturers have been catching up fast with their Japanese counterparts. It is true that the total production capacity of all South Korean makers is only 120,000 units a month (10-inch displays), which is a far cry from the monthly production capacity of Japanese makers—1.63 million units—indeed, South Korea's total production is less than that of a single Japanese maker. But South Korean liquid-crystal displays cost about 20% less than Japanese products. A handful of U.S. PC makers have already begun to use South Korean-made TFT liquid-crystal displays.

A supply glut in liquid-crystal displays is being forecast as the facilities of Japanese makers in recent years has

increased, especially as the price of a TFT liquid-crystal display (10-inch) has fallen from more than ¥100,000 two years ago to less than half that in 1995.

Current liquid-crystal displays have many shortcomings, including the rapid deterioration in quality and production efficiency found in large screens and the narrow angle of vision makes them inappropriate for viewing by a large number of people. As a result, there is a tendency to limit the use of liquid-crystal displays to car navigation systems, notebook PCs and portable TV screens.

As for screens larger than 20 inches, Japanese companies are increasing their capital investment with the goal of commercializing and bringing down the price of thin, wide-screen plasma display panels (PDP) that use gas discharge in their operation.

DVD: Next-generation image and information memory medium

Another product that is enlivening the Japanese electric appliance industry is the digital video disc (DVD), seen as the next-generation image and information memory medium. This product is also indigenous to Japan.

The DVD, which has the same 12 cm diameter as a compact disc, has been dubbed the "ultimate CD." The optical disc can play a movie of more than two hours in high-quality pictures and freely memorize information for PCs and games.

There are two competing factions for the DVD, sparking fears of another "Beta-VHS" kind of battle like the one that hit the videocassette recorder industry in the 1970s. Sony Corp. and Philips of the Netherlands have joined together with 20 affiliates, including Gateway 2000 of the U.S. and Acer Peripherals Inc. of Taiwan, to develop the so-called Multimedia CD format, a single-sided disc with a thickness of 1.2 millimeters, a memory capacity of 3.7 gigabytes, and an image recording time of 135 minutes.

The other format, developed jointly by seven companies from Japan, the U.S., and Europe, including Toshiba

Corp. (Japan), Time-Warner Inc. (U.S.), and Thomson Multimedia (France), is called the Super-Density Optical Disc. The double-sided ultra-thin disc, with a thickness of only 0.6 millimeters, has a memory capacity of 5 gigabytes on each side and a recording time of 142 minutes on each side, totalling four hours and 44 minutes. There are an additional 18 supporting companies behind this format, including MGM of the U.S. and Samsung of South Korea.

Leading computer manufacturers, such as International Business Machines Corp. (IBM) and Microsoft, have been pressing the two groups to unify their DVD formats. As a result, Sony has decided to abandon its independent course, offering instead a compromise to combine Toshiba's super-density disc and Sony's signal modulation format. The two groups seem to be moving towards realization of a unified format.

The DVD, scheduled to go on the market sometime in the second half of this year, is expected to be the last hot-selling electrical product of this century.

Shopping on the Internet

Enterprising efforts are also underway to develop future growth businesses. At the end of 1995, the Ministry of International Trade and Industry (MITI) took the initiative in conducting an electronic commerce trial called World Mart Japan. Participating companies in the field of security technology included ASCII Corp., IBM Japan, Ltd., and Mitsubishi Corp. Microsoft will join in common platform technology and other fields.

As for the content of services to be offered, participants will include leading Japanese mail-order firms, such as Cécile Co. and Mutow Co., 40 large U.S. catalog firms and 20 companies belonging to the Entertainment Contents Council, organized by Namco Ltd. and others. The Japan Credit Association and credit companies will handle technology related to the settlement of accounts. Convenience stores are scheduled to take part by offering services and actually operating the system.

MITI, which is putting a lot of effort

into ironing out the problems of account settlement and user access, hopes that the World Mart Japan project will help alleviate economic friction between Japan and the U.S. The ministry requested ¥12.1 billion for the project through the government's supplementary budget.

The project first underwent trial in November 1995 and is expected to begin operation on the Internet this year. It will involve installing information terminals, called Kiosk information stations, in the more than 5000 convenience stores participating in the project around the country.

The user selects an item from the memory on the touch-panel screen. The screen will display moving or still images and data, voice-accompanied. The user can then do his/her shopping on the screen. In Japan, convenience stores are open late, sometimes all night, and having become a kind of food pantry attracting young people, it is hoped that this network will serve as an information pantry.

The Internet is the world's largest computer network. There are an estimated 4.2 million computers connected to the Internet in Japan and 40 million users worldwide. The market, centering on business between companies, is said to already have exceeded \$200 million.

This market is expected to grow into a mammoth from here on out—one covering not only large corporations but small enterprises and individuals as well. Moreover, as companies carry out restructuring and rationalization, they are going to turn more and more to personal computers and information equipment, thereby furthering the revolution in electrical equipment and telecommunications. This trend is expected to push the Japanese economy to even higher echelons. Through the growth of its software industry, which has been lagging far behind that of the U.S., Japan appears to be undergoing a rebirth as a "high-engineering state."

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