

Information Revolution Transforms Society

By Takashi Ichikawa

Japan, already highly developed economically, is entering a new stage of development—an "information-oriented" society featuring widespread use of electronic information systems, built across industry and interlocking with one another. The information industry is developing new technology and services, both vital to the information revolution. The industry is growing rapidly, and is expected to become Japan's mainstay in the next century.

Progress in information revolution can best be seen in the number of computers in service and the extent to which they are used.

The number of computers in Japan is growing by more than 20% a year. More than 138,000 general-purpose computers are already in operation (Table 1). Office computers, used mainly by smaller businesses, have increased to about 227,000 in the last five years.



Behind the rapid increase in on-line systems are diversification of industrial demand and stiffer competition.

Cumulative shipments of personal computers during this period totaled 2.34 million. The number of personal computers, second only to the 10 million in the U.S., will further increase in coming years. And about 10,000 minicomputers are shipped annually for special applications such as controlling industrial equipment, adding to the more than 100,000 presently in use.

On-line systems increase

The expansion of information activities is also shown by how intensively on-line electronic data transmission systems and communication circuits are utilized. Installation of on-line systems is increasing by more than 10% a year (Table 2). There were 8,034 on-line systems as of the end of March 1983, about 60% for control of production, inventories and sales, 6.7% for finance and 5.3% for information

services. On an industry basis, 37.3% were used by manufacturing and construction, 27.6% by commerce and 7.3% by finance (Fig. 1).

Installation of international on-line systems by industry is also growing fast, increasing by 28 in the past year to reach a total of 229. The utilization of communication lines is growing by more than 20% annually, reaching 190,000 lines by the end of March 1984. Line and packet switching networks are showing particularly sharp growth. In line switching, telephone lines are electrically connected together in random patterns as on cross-bar switchboards. Packet switching moves computer messages in a large digital data communication network, handling each message in much the same way as the post office moves parcels, that is, as complete units containing the addresses of the recipient and the sender.

Diversification of industrial demand

A rapid increase in on-line systems using communication lines has accompanied the spread of computers. Behind this trend are the diversification of industrial demand and intensified corporate competition. To cope with them, businesses are seeking efficiency, boosting the need for information services. A major reason for the new corporate orientation toward information is technological innovation that has made the introduction of information systems possible, both technically and in cost terms.

Electronic information systems were initially introduced in the 1960s and 1970s to automate production and administration. The next stage was to utilize information effectively, understand customer needs, control inventories and streamline transportation. In the 1980s, information systems are being used for strategic purposes, including attracting customers and maintaining price stability. Manufacturers

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Table 1 Computer Installations—General-purpose Computers

	1979	1980	1981	1982	1983	1983*
Number of sets	58,994	72,108	88,223	106,345	128,410	138,198
Value in ¥ million	3,218,272	3,623,896	4,164,728	4,716,420	5,290,916	5,520,754
Annual increase (%)	14.1	12.6	14.9	13.2	12.2	—

Notes: 1. Data as of March 31 each year.

2. *As of September 30, 1983

3. The characteristics of computers covered by the current survey include:

(1) Digital type computers; (2) Stored program computers; (3) Main memory of 2,000 bits or more;

(4) Computing structure based on electronic logical computation

Source: Ministry of International Trade and Industry

Table 2 Installation of Domestic On-line Systems

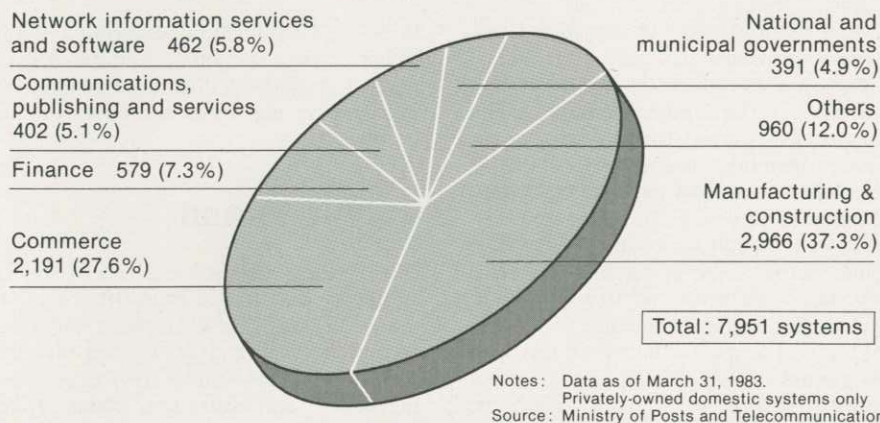
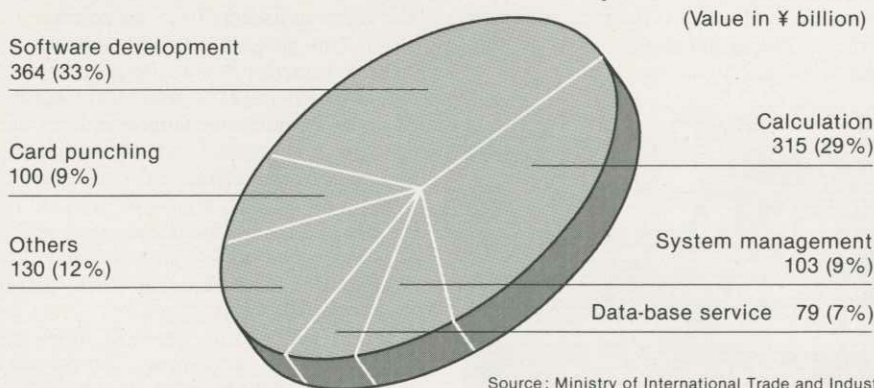
System	FY	1979	1980	1981	1982	1983
Privately-owned systems		3,403	4,598	5,807	7,095	7,951
NTT systems		65	70	72	76	83
Total		3,468	4,668	5,879	7,171	8,034

Notes: Data as of March 31 each year.

NTT Systems: Computers & terminals are supplied by NTT

(Nippon Telegraph and Telephone Public Corporation).

Source: Ministry of Posts and Telecommunications

Fig. 1 On-line Systems by Industry**Fig. 2 Production of Information Services Industry**

and distributors are promoting data transmission networks with firms in different lines of business. Banks are setting up nationwide networks and direct computer links with manufacturers and retailers for in-house corporate banking.

The on-line information processing industry will quintuple from ¥930 billion (\$3.9 billion) in fiscal 1982 to ¥4.7 trillion (\$19.6 billion) in fiscal 1990, according to Ministry of International Trade and Industry (MITI) projections. Two areas

where information services have yet to spread in Japan, however, are homes and public establishments. As banking and shopping information networks suggest, the information revolution in industry is expected to accelerate information business opportunities in public facilities and homes, paced by the appearance of an information infrastructure of videotex, multi-function telephone networks, facsimile networks, cable television and integrated digital network services.

The rapid development of the information industry lies behind Japan's information revolution. This burgeoning industry has a history of only some two dozen years, but already covers a broad spectrum of business ranging from production of computers and communications equipment and their application systems to software development and information services.

The electronics industry, the mainstay of the information industry, produced ¥8.68 trillion (\$36.2 billion) in CY 1983. Computers and related equipment accounted for ¥1.96 trillion (\$8.2 billion), industrial electronic equipment—including communications devices—¥2.49 trillion (\$10.4 billion) and electronic parts ¥4.23 trillion (\$17.6 billion). Sales by the information service industry, consisting of software houses and service businesses, totaled ¥1.09 trillion (\$4.6 billion) in fiscal 1983. Taken together, total information industry sales were nearly ¥10 trillion (\$41.7 billion), establishing it as a major pillar of the Japanese economy.

Fast growth

The information industry will continue to grow fast. Electronics industry sales are projected to expand 12–13% a year reaching ¥21 trillion (\$87.5 billion) in 1990. The information service industry should show an annual sales gain of 17%, reaching ¥3.3 trillion (\$13.7 billion) in 1990. The information industry will have become a ¥25 trillion (\$104.2 billion) business, outshining steel—now ¥17 trillion (\$70.8 billion)—and on a par with the auto industry's ¥24 trillion (\$100 billion).

The information revolution is contributing greatly to industrial and social development. But it has also created new problems such as computer security, protection of privacy and computer crime. It is vital to find solutions to these problems.

It is also necessary to review legal provisions to further encourage the information business. One move in this connection is new legislation, passed by the Diet on December 14, 1984, to liberalize the telecommunications business. Other domestic problems include protection of software and data base copyrights. On the international front, the rapid growth of the Japanese information industry could pose new problems in relations with other countries, particularly in high technology.

These are only a few important examples of the many challenges confronting the information industry. None will be easy to overcome. But Japan, as a market-economy nation must act positively, conducting bilateral negotiations with other countries to surmount these obstacles. It must move on all fronts—including domestic legal problems—and solve them from an international perspective.