

Technological Innovation And the Industrial Structure

By Kazuo Matsunaga

Japanese industry has been facing major structural change since the end of the high economic growth in the 1960s and the two oil crises which ushered in an era of new development. The trigger of the coming change—and the key to surviving it—is technological innovation.

Progress in microelectronics, new materials, biotechnology and other high-technology fields is creating new industries. Integrated circuits (ICs) and other state-of-the-art microelectronic products are reshaping the electronic machinery and information processing industries. Their market alone is expected to reach about ¥24 trillion (\$100 billion) by 1990, 3.1 times the 1981 level.

Fine ceramics and other new materials are projected to develop into a ¥63 trillion (\$262.5 billion) market by the year 2000. And the biotechnology industry based on gene splicing and other new techniques will grow into a ¥4–7 trillion (\$16.7–29.2 billion) market by the turn of the century. The birth of these new markets will be the driving force behind Japan's economic development.

The information flood

Factory and office automation is proceeding rapidly, supported by the wider use of computers, the increasing sophistication of computer applications, and the

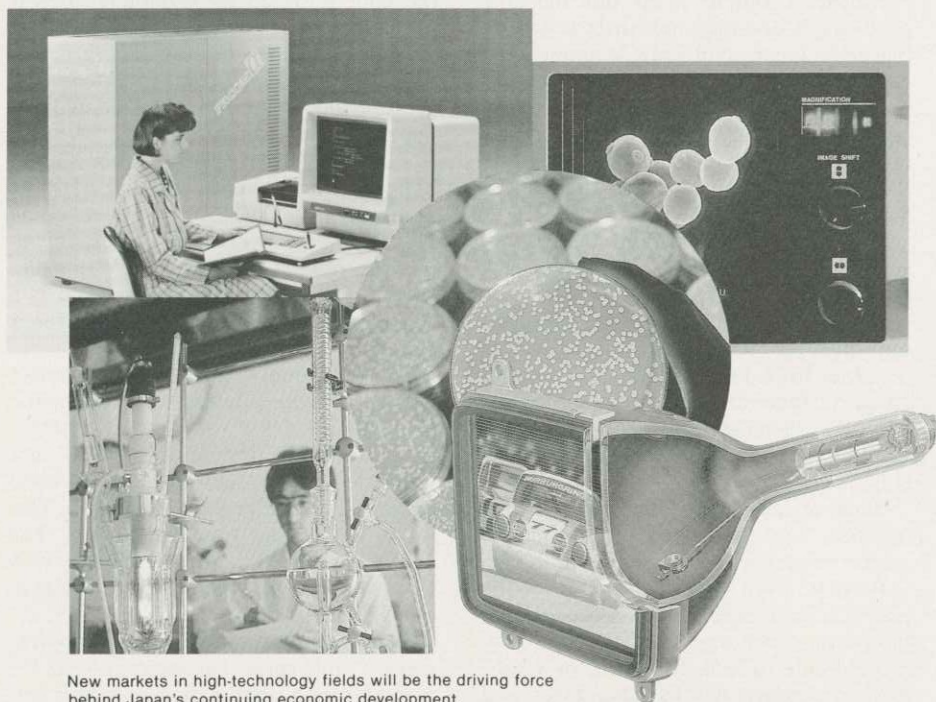
marriage of information processing and communications technology. At the same time, information usage is spreading geographically, establishing a society webbed with information networks.

Japan faces mounting competition from newly industrialized countries (NICs) elsewhere in Asia. The four strongest competitors—South Korea, Taiwan, Hong Kong and Singapore—accounted for a combined 1.9% of world trade in 1965 compared with Japan's 4.8% in 1964, when the country joined the Organization for Economic Cooperation & Development (OECD). By 1981, Japan had boosted its share 1.8 times to 7.9%, but the four NICs saw an even sharper rise—2.6 times to 4.9%.

If Japan is to continue contributing to the development of world trade without being tempted into protectionism, it will need new industries to stimulate economic vitality.

With the weight of services growing in the economy, two sectors are expanding fast—one related to information supply and the other to corporate activities. Behind them are growing demand for services in the manufacturing sector and the increasing use by the services industry of the technical achievements of manufacturing. The latter factor is shown by capital spending growth in the service sector—mainly for the purchase of electrical equipment—which in 1975–80 exceeded growth in manufacturing investment.

Japanese society will gray rapidly through the early part of the 21st century. In 2020, people aged 65 or older will account for 18.8% of the population, compared with 10% at present. One projection shows the number of people with medical problems swelling to 21 million in the year 2000 from 16 million today.



New markets in high-technology fields will be the driving force behind Japan's continuing economic development.

Kazuo Matsunaga is the deputy director of the Industrial Structure Division of the Industrial Policy Bureau of the Ministry of International Trade and Industry. He has served in the International Trade Policy Bureau and held various other positions in the ministry.

Social security and health care will become ever more important.

High-tech and services

These many changes are also having a profound impact on agriculture and other traditional industries.

The primary sector, losing strength in Japan's industrial structure, is drawing closer to the secondary sector through the introduction of high technology such as biotechnology. In agriculture, for example, new species are being developed by cell fusion, while microcomputers now control temperatures inside farm hothouses.

Smokestack industries are also implementing programs designed to streamline their structure under special laws calling for the scrapping of surplus or obsolete facilities. These industries will be revitalized and begin to grow again by taking advantage of high-tech advances with new materials. These materials, such as fine ceramics and high-molecule materials, are expected to find wide application in the future.

The processing and assembly industries are also supporting the re-orientation of Japan's industrial structure toward a more information-intensive pattern. They are

likely to achieve dramatic development thanks to the high-tech revolution.

Meanwhile, the tertiary is expected to be transformed by heightened demand for more varied and sophisticated services at both the corporate and consumer levels. The shift reflects the diversification of business operations, rising personal incomes and other factors. With recent innovations in information-related technology, services should evolve apace with the growth of the manufacturing sector.

Basic research

For Japan to maintain active economic development through this transitional period, it will be necessary to promote policies that meet the following socioeconomic needs:

- (1) A more advanced industrial structure that maintains and creates employment,
- (2) An improved trade structure and positive industrial adjustments,
- (3) Overcoming restrictions on natural resource and energy supplies,
- (4) Coping with diversified consumer needs and aging of the population, including better public welfare.

Technological innovation is vital. It is essential that Japan pursue technological

development in high-tech and other key industries. In doing so, there are three things that should be kept in mind:

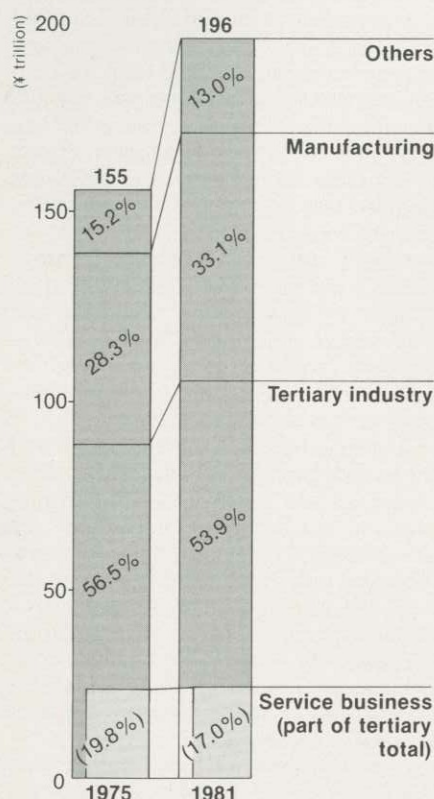
(1) Businesses account for an overwhelming proportion—three quarters—of Japan's research expenditure. Most of this goes to new products, with only a fraction allocated to long-term development of basic and applied technology. Since such technology is indispensable for future industrial development, the government should undertake research in this field to supplement to private sector efforts.

(2) The government should foster a climate conducive to corporate research by offering tax relief, low-interest loans, and other incentives. This would encourage corporate commitment to basic research, and strengthen joint research and cooperation with the private sector.

(3) As emphasized at the London summit of industrial democracies last June, the government should promote international cooperation in technological development.

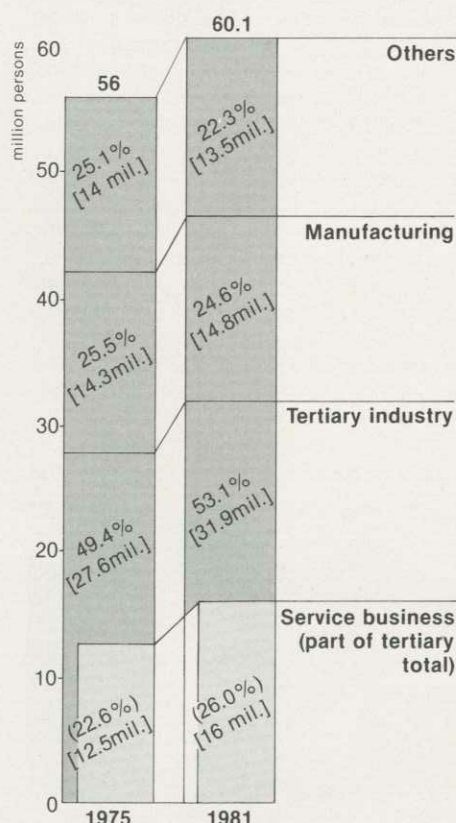
Based on these principles, the Japanese government intends to start a new program for the development of industrial technology in fiscal 1985. It is hoped that this program will help achieve a more advanced industrial structure and preserve the country's economic vitality. ●

**Change in Value Added
(at 1975 prices)**



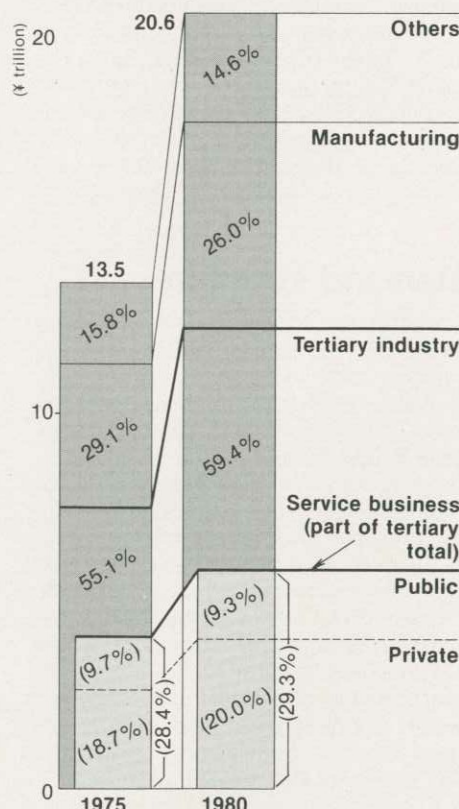
Source: Inter-industry Relations Table

Change in No. of Employees



Source: Annual Report on National Economic Accounts
Note: Figures in brackets denote the number of employees.

**Change in Nominal Value of
Productive Capital Formation**



Source: Inter-industry Relations Table
Note: The value of productive capital formation covers machinery only and excludes investments in buildings and public facilities.