

both the government and the private sector was to imitate and catch up to the West. R and D efforts were directed only to improvement of technologies acquired from the West. Long term R and D for innovative products, let alone science, was almost non-existent. A good example is the petrochemical industry, which was completely copied from the West. Its R and D effort in relation to sales was only 1.5 per cent during this period as compared to today's 6-7 per cent.

R&D Expenditures in Selected Countries

| | | R&D EXPENDITURES (US\$ MILLION) | % OF NATIONAL INCOME | % FINANCED BY PUBLIC FUND |
|---------------|------|--|-------------------------------|------------------------------------|
| JAPAN | 1975 | 15,580 ^{a)} | 2.11% | 27.5% |
| | 1980 | 27,797 ^{a)} | 2.35 | 25.8 |
| | 1985 | 48,169 ^{a)} | 3.19 | 19.4 |
| | 1988 | 76,249 ^{a)} | 3.35 | 18.4 |
| U.S.A. | 1980 | 62,593 | 2.57 | 47.1 |
| | 1985 | 107,436 | 3.02 | 47.7 |
| | 1988 | 126,115 | 2.89 | 48.0 |
| U.S.S.R. | 1987 | 61,481 | 5.47 | 46.8 |
| GERMANY, F.R. | 1987 | 35,690 | 3.21 | 37.7 |
| FRANCE | 1988 | 21,896 | 2.6 ^{b)} | 50.9 |
| U.K. | 1986 | 16,926 | 2.70 | 38.5 |
| CANADA | 1988 | 6,832 | 1.32 | 58.0 |

a) U.S. dollar figures are calculated at the 1988 annual average exchange rates of the IMF, International Finance Statistics. U.S.\$1.00=¥128. b) 1987

Source: Science and Technology Agency, Japan.

With the rapid technological advancement of Japan over the past decade in high tech sectors such as semiconductors, electronics, computers, optoelectronics, robotics, and precision machinery, large corporations began to experience considerable hardships in sourcing new or advanced technologies that were once made available by major Western multinational corporations. Global technological competitiveness resulted in "techno-protectionism" by all nations.

Also, with the increasing degree of economic friction between the U.S.A. and Japan starting in 1980, Japan was criticized for a lack of contribution in the field of Science and Technology, with the least contributions in basic research. Other OECD nations joined the chorus of critical voices. Japan gradually became the key focus of criticism for being a free rider in terms of Science and Technology.

As a result, government policy-makers and the