Japan's Inscrutable Research Budget

U.S. experts find it hard to fathom how much Japan spends on basic research; the matter has political significance

How much does Japan spend on basic research? The question may sound academic and of little interest outside Japan itself, but it has recently become a political issue in the United States. There is widespread sentiment that Japan has been underinvesting in basic research while exploiting American research findings in commercial products. In fact, the White House Office of Science and Technology Policy has suggested that the Japanese government pledge to expand its support of basic research by a set amount to redress the balance (*Science*, 31 July, p. 476).

Whether Japan is indeed underinvesting in basic research is not at all clear, however; experts themselves are divided on how much Japan really spends on these activities.

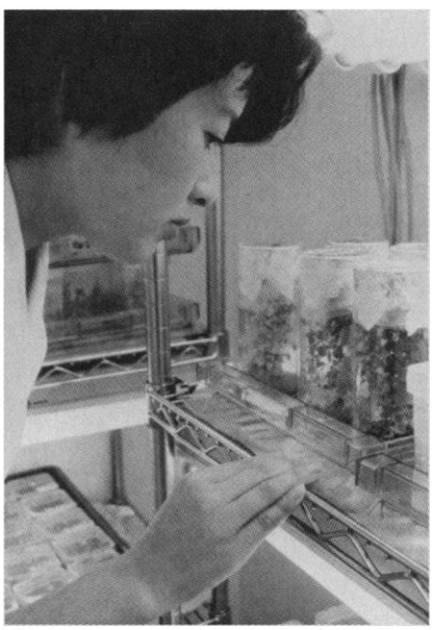
Official Japanese and U.S. statistics give the impression that the two countries spend the same relative amounts on basic and applied research. According to these figures, says Richard Samuels of the Massachusetts Institute of Technology, each country pumps 12.5% of total R&D expenditures—from both public and private sources—into basic research.* The two countries also appear to spend about the same relative amounts on total R&D, some 2.7% of their gross national products.

But comparing Japanese and U.S. figures is like comparing sushi and steak, according to several American experts on Japanese R&D. Because each country has its own methods of tallying expenditures, the results cannot be compared, according to Maria Papadakis, a staff analyst at the National Science Foundation (NSF), who has been poring over Japanese statistics for the past several weeks.

Structural differences in the overall R&D programs also distort comparisons between the two countries. For example, the United States devotes about one-third of its R&D to military programs, while virtually all of Japan's R&D is nonmilitary.

To study Japan's R&D expenditures, Japan watchers rely on statistics collected annually by Japan's Science and Technology Agency (STA), which sends out a lengthy questionnaire to industry, government, nonprofit institutions, and universities. The statistics are then compiled and published in Japanese with English subtitles.

Several specialists suggest that Japanese counting methods inflate how much they actually pay out for basic research. But it is not clear exactly how much the statistics should be adjusted to take these differences into account, says Susan Owens of the Stanford Research Institute, who is a consultant to NSF on Japanese R&D statistics.



Dave Bartruff/FPG

"Be Creative." *That is the new slogan in Japan to promote basic research, but some Americans want more commitment.*

Gary Saxonhouse of the University of Michigan says, for example, that at least since the 1960s the Japanese have counted teaching time as research, so salaries for teaching faculty and teaching assistants are considered part of R&D, "regardless of how much research they actually do." In the United States, funds for teaching are excluded from R&D.

The trend, however, appears to be modestly upward—at least in terms of overall Japanese spending on basic research, which has increased by about $1.5 billion in constant 1980 dollars over the past decade. But the proportion of total R&D devoted to basic research declined by about 3% between 1976 and 1985.

Aware of the confusing picture of Japanese research statistics, staff at NSF are currently trying to decipher a pile of figures in preparation for a report this fall that will compare the R&D expenditures of the United States, Japan, Britain, France, and West Germany.

In the meantime, Japan is trying hard to stimulate more basic research in the public and private sectors. In Japan the government funds about half the nation's basic research, while in the United States the government supports about 65%.

Kaname Ikeda, science counselor at the Japanese embassy in Washington, D.C., notes that during the past few years, the government has promoted a slogan, "Be Creative," to boost basic research nationwide. Eleanor Westney of the Massachusetts Institute of Technology, who has studied the adoption of new technologies by Japanese corporations, says, "There is a big push in basic research in Japan now. Firms are starting to talk a lot about it." According to Charles T. Owens of NSF, "There's no question that the Japanese are application-oriented, but now businesses are saying there's a need for more basic research [in Japan] so they can quickly move to commercialization."

The United States should not expect dramatic increases in government expenditures for basic research, Ikeda remarks. "In Japan, there are no sudden increases or decreases in research budgets, in contrast to the United States. We appreciate stability and continuity." In keeping with this observation, the budgets of Japan's key federal agencies that support scientific research have edged up slightly this year, according to recent translations of their budget documents. Ikeda notes that the small increases are significant at a time when the government is running high deficits—despite trade surpluses—and that budgets of other agencies are being trimmed.

But, perhaps partly in response to the crescendo of American complaints, last month Japanese federal science agencies asked the Ministry of Finance to beef up their budgets by a whopping 12%. The role of the ministry is akin to those of the U.S. Office of Management and Budget and the Treasury Department in that it negotiates budgets with agencies and also dispenses the funds. Some tough interagency battling is expected before the ministry reaches a final decision in December. A bigger increase in basic research would likely deflect some of the criticism that Japan has been getting lately. ■ MARJORIE SUN

*Science previously incorrectly quoted Samuels as saying that the Japanese spend 3% of total R&D on basic research.