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# R&D Growth Exceeded 1995 Expectations, but May Slow in 1996

by Steven Payson

*By preliminary estimates, R&D rose by 4 percent above inflation in 1995 — the largest increase since 1985.*

According to projections, total R&D expenditures in the United States are expected to reach $184.3 billion in 1996 — a 3.2 percent increase over the $178.6 billion spent in 1995. The preliminary 1995 figure represents a 6-percent increase in R&D spending from its 1994 level. In inflation adjusted terms, total R&D expenditures rose by 4 and 1 percent in 1995 and 1996, respectively, with the 1995 increase being the largest since 1985. Last year about this time, R&D was expected to decrease by 2 percent in real terms, but much stronger than anticipated growth in industrial R&D performance led to this upward revision. However in 1996, R&D growth continues to be out paced by growth in the size of the economy, as measured by Gross Domestic Product (GDP). Preliminary estimates of GDP indicate a 2.7-percent growth between 1995 and 1996 in real terms — well over twice the expected growth in real R&D.

According to these projections, the United States will spend $29.8 billion on the performance of basic research in 1996 (16 percent of the total), $38.8 billion on applied research (21 percent), and $115.8 billion on development (62 percent). In comparison to 1995, R&D performance in 1996 will reflect a preliminary 0.9 percent real decrease in basic research; a 1.0 percent real increase in applied research; and a 1.5 percent real increase in development.

## 1996 Funding Patterns

Industry will continue to provide the largest share of total U.S. support for R&D, which will be $113.5 billion in 1996, by current projections (table 1). This funding represents a 3.5 percent increase in real terms over the preliminary level for 1995. Companies will fund most (83 percent and growing) of industry's expected R&D performance total;

**Table 1. National expenditures for research and development, projected, by performing sector and source of funds: 1996**

| | Sources of R&D funds | | | | | |
|---|---|---|---|---|---|---|
| R&D Performers | Total | Industry | Federal Government | Universities and colleges | Other nonprofit institutions | Percent distribution, by performer |
| | (millions of current dollars) | | | | | |
| Total..... | 184,300 | 113,450 | 61,900 | 5,800 | 3,150 | 100.0% |
| Industry..... | 132,100 | 111,000 | 21,100 | -- | -- | 71.7% |
| Industry-admin. FFRDCs..... | 2,100 | -- | 2,100 | -- | -- | 1.1% |
| Fed. Government..... | 16,200 | -- | 16,200 | -- | -- | 8.8% |
| Universities and colleges..... | 22,400 | 1,600 | 13,400 | 5,800 | 1,600 | 12.2% |
| U&C-admin. FFRDCs..... | 5,400 | -- | 5,400 | -- | -- | 2.9% |
| Other nonprofit institutions.... | 5,300 | 850 | 2,900 | -- | 1,550 | 2.9% |
| Nonprofit-admin. FFRDCs..... | 800 | -- | 800 | -- | -- | 0.4% |
| Percent distrib. by source... | 100.0% | 61.6% | 33.6% | 3.1% | 1.7% | |

**KEY:** FFRDC = Federally funded research and development center; U&C = University and college

**NOTE**: State and local government funds included in industry funds reported to industry performers, and in university and college funds reported to university and college performers.

**SOURCE**: National Science Foundation/SRS

## Electronic Dissemination

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*In 1996, the projected share of Federal support for U.S. R&D— 33.6 percent— is the lowest ever reported in NSF's 44-year-old data series.*

Federal funding is likely to account for the rest (17 percent). The Federal share of industry's performance total — including that in related FFRDCs —has fallen considerably; for example, it had been as high as 32 percent of the industry total in 1987.

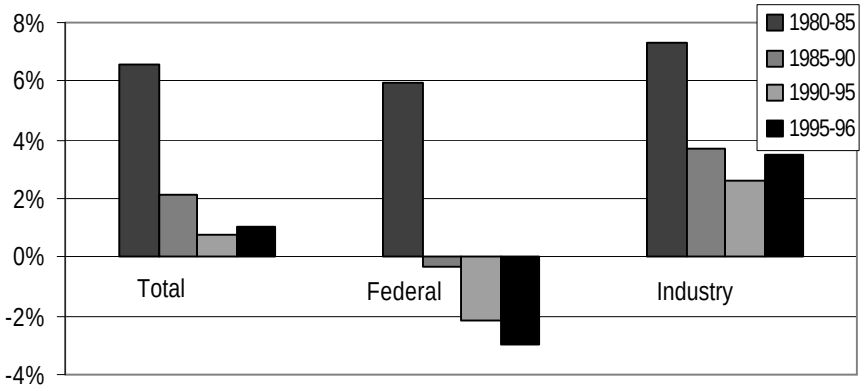
Federal R&D support in 1996 is expected to be $61.9 billion, a 3.0 percent decline in real terms from 1995. The Federal share of R&D funds first fell below 50 percent in 1978, and was consistently between 44 and 47 percent from 1980 to 1990. Since then, the Federal share has dropped steadily, rendering for 1996 the projected value of 33.6 percent, the lowest share reported in NSF's 44-year-old R&D data series.

Nearly all of the remaining R&D funds will come from universities and colleges and from State and local governments. In total, these remaining funds will reach $9.0 billion in 1996, by preliminary tabulations, which will be virtually unchanged in real terms (only 0.3 percent higher) from their 1995 total.

## 1996 R&D Performance Patterns

Industry, including industry-administered Federally Funded Research and Development Centers (FFRDCs) such as Sandia National Laboratory, is expected to account for 73 percent of the Nation's 1996 R&D performance total. The projected $134.2 billion in R&D performance by industry represents a 2-percent increase in real terms over its preliminary 1995 level. The Federal Government is expected to perform $16.2 billion of R&D in 1996, a real decline of 3 percent from 1995. Federal agencies will account for 9 percent of national R&D performance, reflecting, again, a continual decline in the relative Federal participation that began in the mid-1970s. Universities and colleges, excluding academically-administered FFRDCs, are expected to account for 12 percent ($22.4 billion) of the 1996 national R&D performance effort. By these preliminary findings, there will be

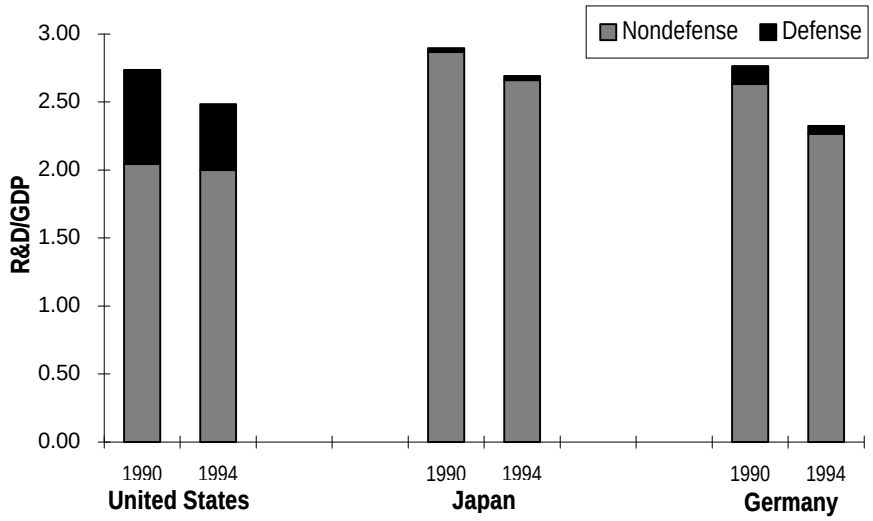
**Chart 1. Average annual rates of change in U.S. R&D support, based on inflation-adjusted dollars**




**NOTE**: These data are based on reports from R&D performers. Rates for 1995 are preliminary and for 1996 are projected.

**SOURCE**: NSF/SRS, National Patterns of R&D Resources, annual series

**Chart 2. U.S., Japanese, and German R&D/GDP Ratios: 1990 and 1994**




**SOURCE**: NSF/SRS, National Patterns of R&D Resources, annual series, and Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database

virtually no change (less than 0.1 percent) between 1995 and 1996 in the amount of real R&D performance carried out in academia.

## U.S. R&D Expenditure Trends

Growth in total U.S. R&D expenditures has been slow since the mid-1980s. From 1980 to 1985, R&D spending increased on average by 6.6 percent per year in real terms. From 1985 to 1996, by preliminary calculations, it slowed to 1.4 percent, in comparison to a 2.6 annual real growth in GDP. Slackening in both Federal and non-Federal support for R&D, as a proportion of GDP, has contributed to this slowing, though Federal support has been declining at a faster rate than non-Federal support (chart 1). Consequently, the 4-percent rise in real R&D during 1995 was much more the exception than the rule. From 1985 to 1996, the proportion of GDP spent on R&D has fallen consistently, from 2.8 percent to 2.5 percent (based on current projections). On the other hand, the relatively high growth in 1995 may be indicative of some reversal in this downward trend.

## International R&D Spending

The United States spends more on R&D activities than any other country, in fact, more than Japan, Germany, France, and the United Kingdom combined. In 1994—the latest year for which foreign data are available—the U.S. spent 2.49 percent of its GDP on R&D, in comparison to 2.69 percent spent by Japan, 2.38 percent by France, 2.33 percent by Germany, 2.19 percent by the United Kingdom, 1.57 percent by Canada, and 1.19 percent by Italy. The nondefense R&D/GDP ratio for the United States in 1994 (2.00 percent) was considerably lower than those for Germany (2.26 percent) and Japan (2.66 percent) (chart 2). France and the United Kingdom, which have substan-

tial defense R&D efforts, reported nondefense R&D/GDP ratios closer to that of the United States, 2.09 and 1.88 percent, respectively. The ratio for Canada was 1.57 percent, and for Italy, 1.14 percent.

## User Notes

U.S. national R&D expenditures data were assembled from several NSF surveys. Projections for 1996 and preliminary tabulations for 1995 are based on data provided by Federal R&D funding agencies, independent surveys of academic and industrial R&D performers, and time series modeling techniques. Foreign R&D expenditure data are derived from national and international sources.

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