Division of Science Resources Studies

DATA BRIEF

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R&D Spending is Highly Concentrated in a Small Number of States

by Richard J. Bennof

California, at nearly $44 billion, had the highest level of R&D expenditures and accounted for one-fifth of the U.S. R&D total in 1998.

Research and development (R&D) expenditures in the United States are highly concentrated in a small number of states. In 1998—the most recent calendar year for which R&D data are available on a state-by-state basis—the 20 highest ranking states in R&D expenditures accounted for 85 percent of the U.S. total, while the lowest 20 states accounted for only 4 percent. California, at nearly $44 billion, had the highest level of R&D expenditures in the Nation and accounted for one-fifth of the $215 billion U.S. R&D total. California's expenditures, plus those of the five states in descending order with the next highest levels of R&D spending—New York, Michigan, Massachusetts, New Jersey, and Texas—accounted for nearly one-half of the entire national R&D effort. And the top 10 states—adding, in descending order, Illinois, Pennsylvania, Washington, and Maryland—accounted for nearly two-thirds of the national R&D (table 1).

Among these top 10 states, California's R&D effort exceeded, by more than a factor of three, that of the next highest state, New York, with $14 billion in R&D expenditures. After New York, R&D levels declined incrementally to $8 billion for Maryland.

State Distribution of Sector-Specific R&D

States that are national leaders in total R&D performance usually are ranked among the leading states in industrial and academic R&D performance (table 1). For industrial R&D, nine of the top 10 states were among the top

Table 1. R&D performance by sector and R&D as a percentage of GSP, for the top 10 R&D performing states: 1998

		Top 10 states in R&D performance, by performing sector				Top 10 states in R&D intensity (states with the highest R&D/GSP ratio)		
Rank	Total R&D (in millions of dollars)	All R&D performers in the state[1]	Industry[2]	Universities & colleges[3]	Federal Government	Top 10 states	R&D/GSP (percent)	GSP (in billions of dollars)
1	43,919	California	California	California	Maryland	Delaware	7.6	33.7
2	13,731	New York	Michigan	New York	District of Columbia	New Mexico	6.4	47.7
3	13,655	Michigan	New York	Texas	California	Massachusetts	5.6	239.4
4	13,382	Massachusetts	Massachusetts	Massachusetts	Virginia	Rhode Island	5.5	30.4
5	11,368	New Jersey	New Jersey	Pennsylvania	Alabama	Maryland	4.9	164.8
6	10,774	Texas	Texas	Maryland	Florida	District of Columbia	4.8	54.1
7	8,830	Illinois	Washington	Illinois	Ohio	Michigan	4.6	294.5
8	8,762	Pennsylvania	Pennsylvania	North Carolina	Texas	Washington	4.4	192.9
9	8,466	Washington	Illinois	Michigan	New Mexico	California	3.9	1,118.9
10	8,019	Maryland	Ohio	Ohio	New Jersey	Idaho	3.6	30.9

[1]Includes in-state total R&D performance of industry, universities, Federal agencies, and Federally Funded Research and Development Centers (FFRDCs), and federally-financed nonprofit R&D performance. For the tabulations, states include the District of Columbia.

[2]Includes R&D activities of industry-administered FFRDCs located within these states.

[3]Excludes R&D activities of university-administered FFRDCs located within these states.

NOTE: Reliability of the estimates of industry R&D varies by state because the sample allocation was not based on geography. The rankings do not take into account the margin of error of estimates from sample surveys.

KEY: R&D = research and development
GSP = gross state product

SOURCE: National Science Foundation/Division of Science Resources Studies, *National Patterns of R&D Resources,* annual series; GSP data are from the Department of Commerce/Bureau of Economic Analysis.

Electronic Dissemination

SRS data are available through the World Wide Web (http://www.nsf.gov/sbe/srs/). For more information about obtaining reports, contact paperpubs@nsf.gov or call 301-947-2722. For NSF's Telephonic Device for the Deaf, dial 703-292-5090.

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Delaware had the highest R&D intensity (R&D/GSP) in 1998 – 7.6 percent.

10 for total R&D, with Ohio in the top 10 industrial R&D states in place of Maryland in the top 10 total R&D states. The leading six industrial R&D-performing states were among the top six states ranked in total R&D performance. For academic R&D, North Carolina and Ohio replaced New Jersey and Washington.

There was less commonality between the top 10 states for total R&D and those states performing the most Federal intramural research. Only four states were found in both top-10 lists: Maryland, California, Texas, and New Jersey. The six additions to the Federal intramural list, listed in descending order of Federal R&D performance, were the District of Columbia, Virginia, Alabama, Florida, Ohio, and New Mexico. Maryland ranked first among Federal R&D performers, followed by the District of Columbia, California, and Virginia.

The placement of Maryland, the District of Columbia, and Virginia among the top four in Federal R&D performance reflects the concentration of Federal facilities and administrative offices within the national capital area. Alabama, Florida, and New Mexico rank among the highest in Federal R&D because of their relatively high shares of Federal space- and defense-related R&D.

The leading 10 states in total R&D performance in 1998, and in each of the three performing sectors discussed above, were also among the 10 leading R&D-performing states in 1997, with the exception of Ohio, which replaced Georgia among the top academic R&D performers in 1998.

Ratio of R&D to Gross State Product

States vary significantly in the size of their economies, owing to differences in population, land area, infrastructure, natural resources, and history. Consequently, variations in the R&D expenditure levels of states may simply reflect differences in economic size or the nature of their R&D efforts. An easy way of controlling for the size effect is to measure each state's R&D level as a proportion of its gross state product GSP). That proportion is referred to as R&D "intensity" or "concentration."

Overall, the Nation's total R&D to gross domestic product ratio was 2.5 percent in 1998. The top 10 rankings for state R&D intensity in 1998 were—in descending order—Delaware (7.6 percent), New Mexico, Massachusetts, Rhode Island, Maryland, the District of Columbia, Michigan, Washington, California, and Idaho (the last with an intensity of 3.6 percent). The emergence of Delaware as having the highest R&D intensity in 1998 reflected a total level of R&D performance ($2.6 billion) that was more than twice its 1997 R&D total, nearly all from increased industrial R&D spending. Delaware ranked 11th in 1997 with a 3.5 percent R&D intensity; it replaced New Jersey in 1998's top 10 list. (New Jersey ranked 11th in R&D intensity level in 1998 after being ranked 8th in 1997). New Mexico's high R&D intensity is largely attributable to Federal (specifically Department of Energy) support of Federally Funded Research and Development Centers (FFRDCs) in the state.

Federal Support for R&D[1]

The leading ten Federal agencies that fund R&D reported a total of $70 billion in Federal R&D obligations to all types of performers in fiscal year (FY) 1998 (table 2). California and Maryland were the two largest recipients of total Federal R&D funds. The Department of Defense (DOD) and the Department of Health and Human Services (HHS) together provided 69 percent of this total. Performers in California received 18 percent of DOD's R&D support, nearly three-fourths of it supporting industrial firms. Maryland received 24 percent of HHS' funding, almost three-fourths of it for intramural activities at the National Institutes of Health's biomedical research facilities. In addition to DOD, California was the recipient of more R&D funds from the

[1]The Federal R&D totals in this section are based on reports by Federal funding agencies. The R&D totals in the previous sections are based on reports by the performers of R&D.

Table 2. Federal R&D obligations, by agency and state: FY 1998

Agency	Total R&D (in millions of dollars)	Largest recipient	Percent of total received	Second-largest recipient	Percent of total received
Total for the ten agencies listed	70,445	California	17.3	Maryland	11.3
Department of Agriculture	1,434	District of Columbia	11.7	Maryland	9.6
Department of Commerce	948	Maryland	36.7	Colorado	9.1
Department of Defense	35,068	California	18.4	Ohio	13.0
Department of Energy	5,872	New Mexico	20.0	California	17.4
Department of Health and Human Services	13,663	Maryland	23.7	California	11.2
Department of the Interior	525	Colorado	8.6	Virginia	8.3
Department of Transportation	565	District of Columbia	25.7	New Jersey	19.1
Environmental Protection Agency	569	North Carolina	23.3	District of Columbia	12.5
National Aeronautics and Space Administration	9,521	California	27.6	Texas	23.8
National Science Foundation	2,280	California	15.2	New York	7.8

SOURCE: National Science Foundation/Division of Science Resources Studies, *Federal Funds for Research and Development: Fiscal Years 1998, 1999, 2000.*

National Aeronautics and Space Administration (NASA) and from the National Science Foundation (NSF) than any other state. The main recipients in California of NASA R&D funding were FFRDCs (most notably, its Jet Propulsion Laboratory) and industrial firms. Ninety percent of NSF's funding in California was for universities and colleges. Maryland had the largest share of any one Federal agency's total R&D support, with 37 percent of the Department of Commerce's R&D funds; nearly all of this funding was for intramural research activities.

User Notes

The NSF's Division of Science Resources Studies (SRS) collects and analyzes statistics on the geographic distribution of R&D expenditures in the United States among the 50 states, the District of Columbia, and Puerto Rico. These data are categorized by type of performer (industry, Federal Government, academia, FFRDCs, and other nonprofit organizations) and by source of funds (industry, Federal Government, and academia).[2] The amounts of R&D funding from specific Federal agencies are also provided. The most recent R&D data available by state are for 1998. In that year, total R&D expenditures in the United States were $227 billion, of which $215 billion could be attributed to expenditures within individual states, with the remainder falling under an undistributed, "other/unknown" category. The statistics and discussion in this Data Brief refer to state R&D levels in relation to the distributed total of $215 billion.

In addition to these state R&D statistics, SRS collects state-specific data in its surveys of science and engineering (S&E) personnel and institutions. These data and those assembled from non-SRS sources (e.g., data on population, patents, and GSP) are included in a set of 52 one-page S&E state profiles available on the World Wide Web at http://www.nsf.gov/sbe/srs/.

Data on U.S. and state R&D expenditures were assembled from ongoing NSF surveys. For information about, and copies of, S&E State Profiles, please contact:

Richard J. Bennof
Research and Development Statistics Program
Division of Science Resources Studies
National Science Foundation
4201 Wilson Boulevard, Suite 965
Arlington, VA 22230

rbennof@nsf.gov
(703) 292-7783.

[2] Note that data on industry R&D—and therefore on total R&D—performance are not available for Puerto Rico.

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