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ABSTRACT

This booklet provides 43 graphs and tables organized into broad topics such as research and development funding patterns, academic research and development, research and development in United States industry, education of scientists and engineers, working scientists and engineers, public attitudes toward science and technology, and international science and technology trends. The graphs and tables provide detailed information about national research and development expenditures by function, type of activity and selected agency; academic research and development expenditures by sector, source of funds, and field; number of scientists and engineers with Bachelor's degrees, Master's degrees, and doctorates; enrollment of full-time graduate students in science and engineering by source and type of major support; ethnicity and gender of federal scientists, engineers and college graduates in science and engineering; public understanding of the nature of scientific inquiry and public use of information resources; and research and development expenditures by country, source, and performer. (DDR)

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Division of Science Resources Studies
National Science Foundation
Arlington, Virginia 22230

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POCKET DATA BOOK

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NSF 96-325

Division of Science Resources Studies
National Science Foundation
Arlington, Virginia 22230

Additional Information

Several data series have been revised since the publication of the previous S&T Pocket Data Book. In particular, the U.S. industry R&D data and the Federal support for R&D series have been substantially revised and industry R&D data are subject to future revisions. Additional information on any figure in this booklet may be obtained by calling the Division of Science Resources Studies at (703) 306-1777. Additional copies of this booklet may be obtained by calling (703) 306-1773. All SRS reports are accessible on the World Wide Web at ***http://www.nsf.gov/sbe/srs/stats.htm***.

Telephonic Device for the Deaf

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Suggested Citation

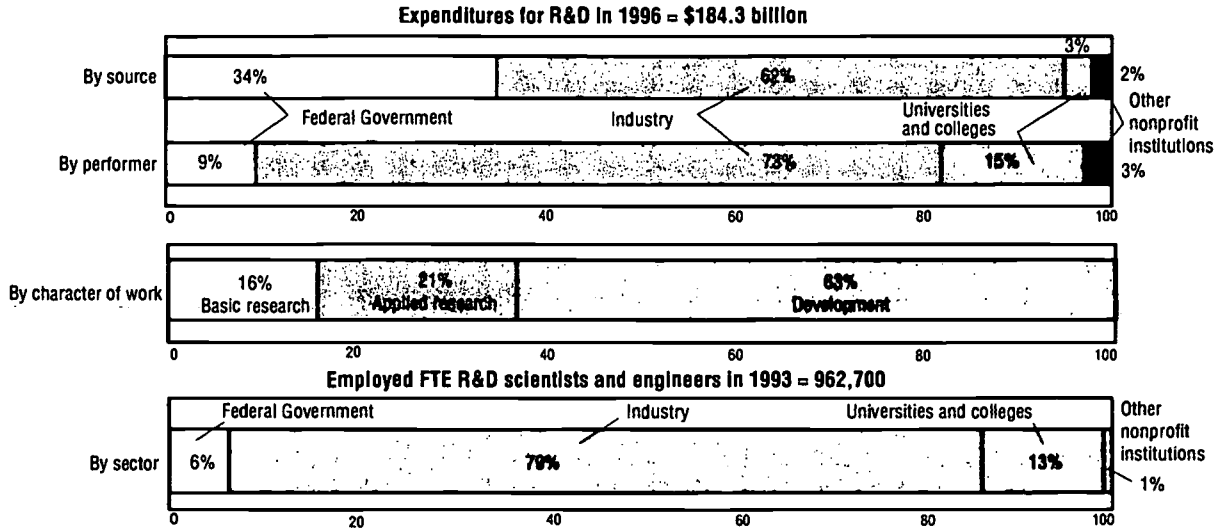
National Science Foundation, *Science and Technology Pocket Data Book, 1996*, NSF 96-325 (Arlington, VA, 1996).

Contents

National R&D Funding Patterns

[redacted]

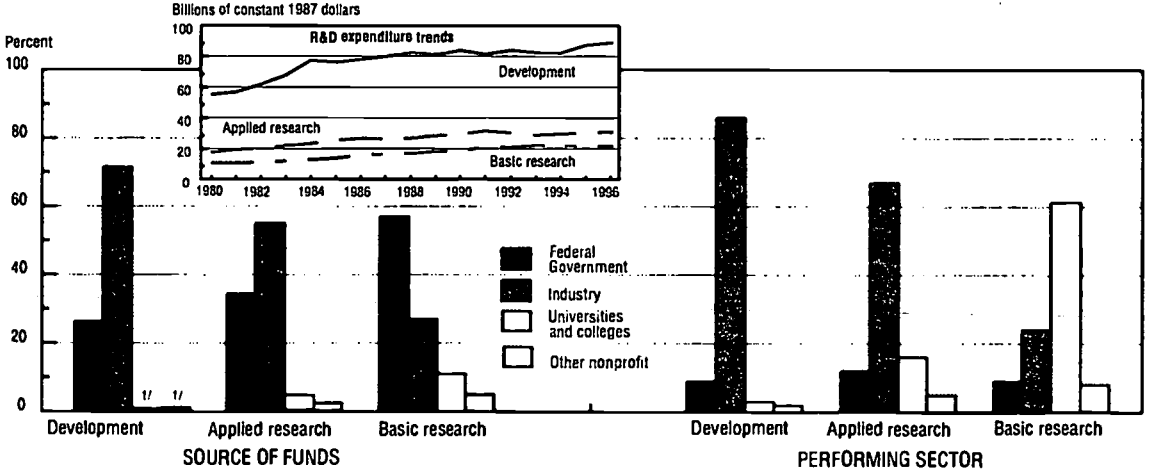
Figure 1. The national R&D effort



NOTES: Details may not add to 100 because of rounding. R&D funds for federally funded R&D centers are included in their affiliated sectors.

SOURCE: National Science Foundation, Division of Science Resources Studies, *National Patterns of R&D Resources: 1996*, NSF 96-333.

Figure 2. **National R&D expenditures, funders, and performers, by character of work: 1996**

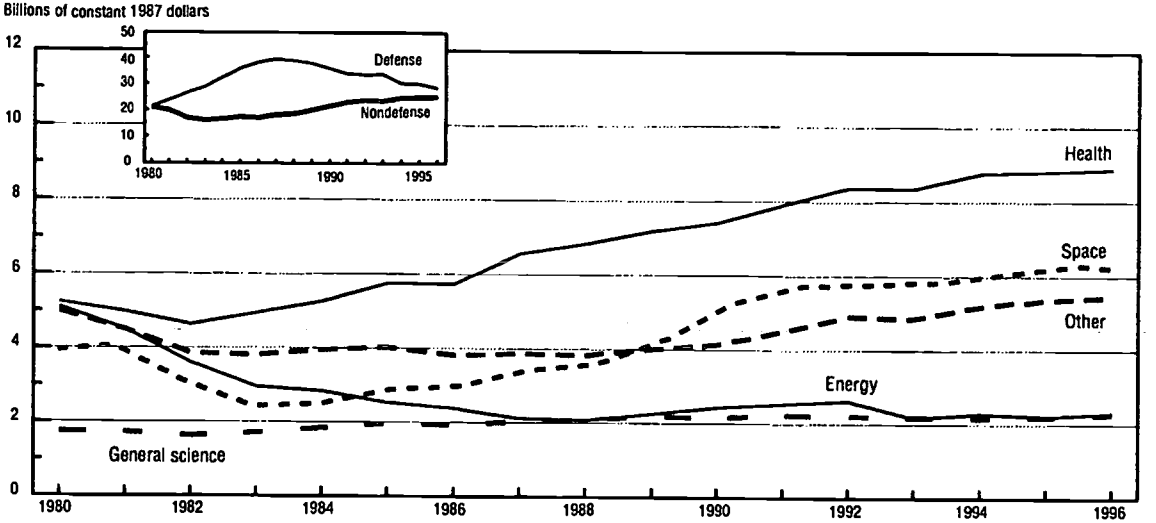


1/ Less than 1 percent.

NOTE: Funds for federally funded research and development center performers are included in their affiliated sectors.

SOURCE: National Science Foundation, Division of Science Resources Studies, *National Patterns of R&D Resources: 1996*, NSF 96-333.

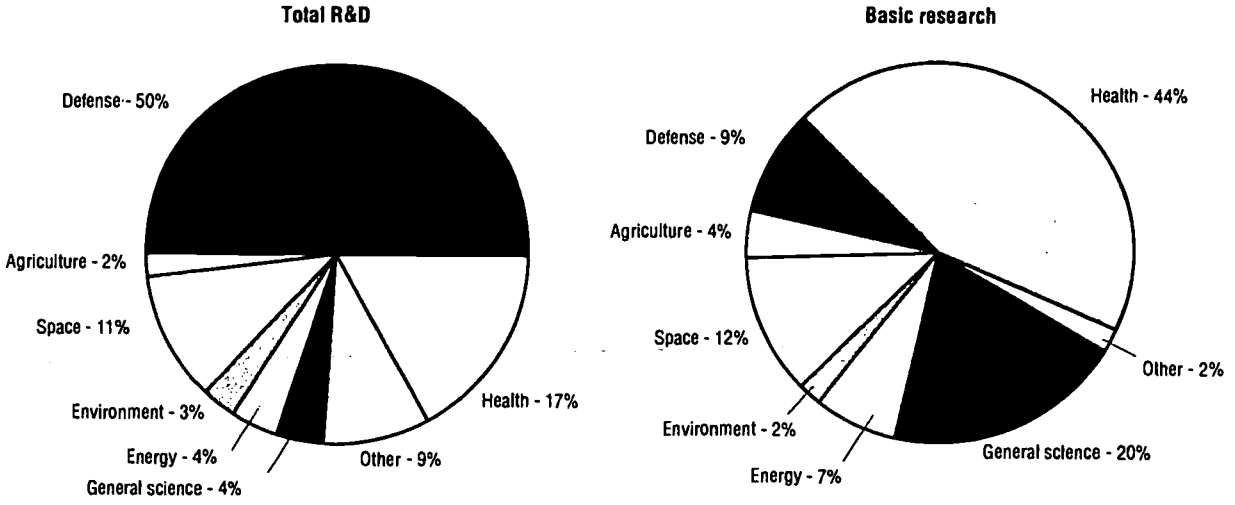
Figure 3. Federal R&D funding, by budget function



NOTE: "Other" includes all nondefense functions not separately graphed, such as agriculture and transportation.

SOURCES: National Science Foundation, Division of Science Resources Studies, *Federal R&D Funding by Budget Function: Fiscal Years 1994-96,* (Arlington,VA: NSF, 1995); and Executive Office of the President, Office of Management and Budget.

Figure 4. Federal R&D budget authority, by function: 1996

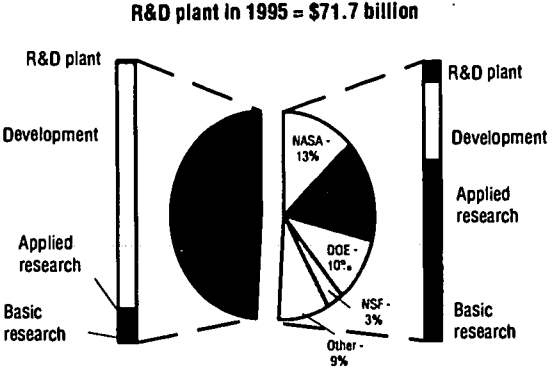


SOURCE: National Science Foundation, Division of Science Resources Studies, *Federal R&D Funding by Budget Function: Fiscal Years 1994-96*, NSF 95-342 (Arlington, VA: NSF, 1995).

Figure 5. Federal obligations, by type of activity

(Millions of dollars)

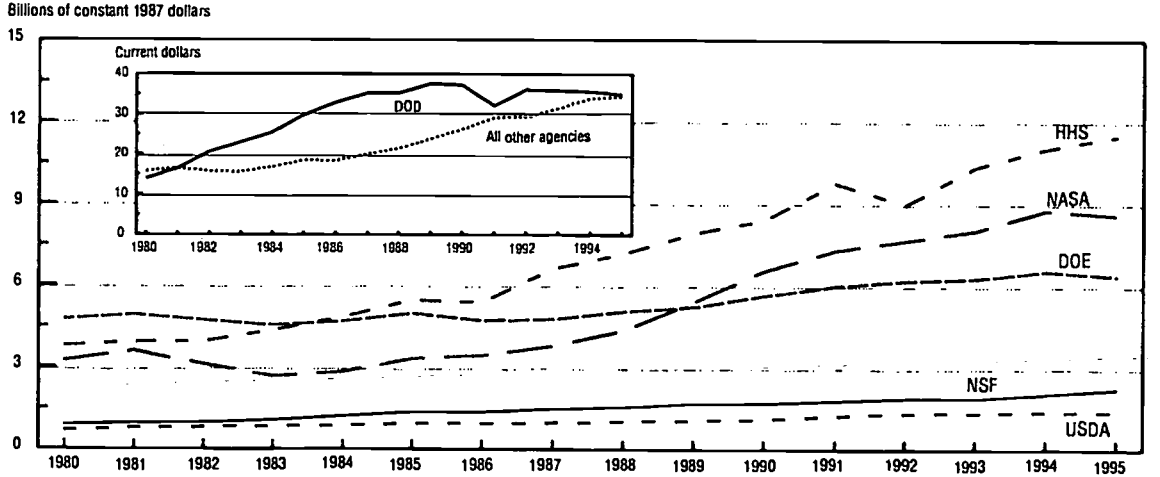
Year	Basic research		Applied research		Development	
	Current dollars	Constant 1987 dollars	Current dollars	Constant 1987 dollars	Current dollars	Constant 1987 dollars
1980	4,674	6,621	6,923	9,806	18,233	25,826
1981	5,041	6,480	7,172	9,218	20,891	26,852
1982	5,482	6,557	7,541	9,020	23,410	28,002
1983	6,260	7,196	7,993	9,186	24,458	28,113
1984	7,067	7,775	7,911	8,703	27,246	29,974
1985	7,819	8,291	8,315	8,817	32,226	34,174
1986	8,153	8,397	8,349	8,598	34,910	35,953
1987	8,942	8,942	8,998	8,998	37,313	37,313
1988	9,474	9,145	9,177	8,858	38,119	36,794
1989	10,602	9,799	10,164	9,393	40,641	37,561
1990	11,286	10,077	10,337	9,229	41,937	37,444
1991	12,171	10,429	11,798	10,109	37,327	31,985
1992	12,490	10,400	12,001	9,992	41,102	34,223
1993	13,399	10,894	13,491	10,969	40,424	32,865
1994 (est.)	14,043	11,199	13,990	11,156	41,560	33,142
1995 (est.)	14,201	11,026	13,960	10,839	41,205	31,991



KEY: HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; DOE = Department of Energy; NSF = National Science Foundation; DOD = Department of Defense.

SOURCES: National Science Foundation, Division of Resources Studies, *Federal Funds for Research and Development: Fiscal Years 1993, 1994, and 1995*, NSF 95-334 (Arlington, VA: NSF, 1995); and Office of Management and Budget, unpublished tabulations.

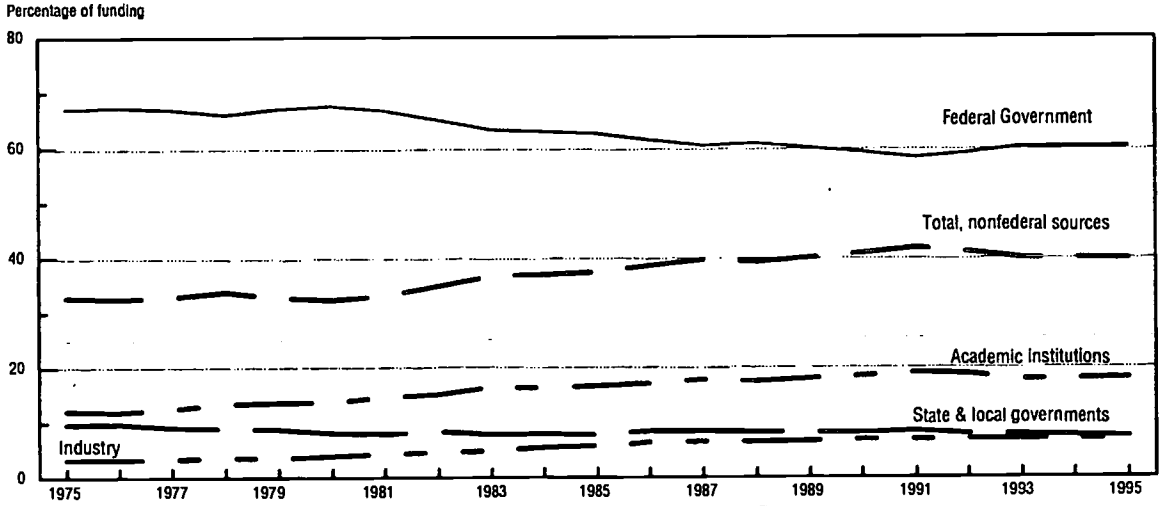
Figure 6. Federal R&D obligations, by selected agency



KEY: DDD = Department of Defense; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; DDE = Department of Energy; NSF = National Science Foundation; USDA = U.S. Department of Agriculture.

SDURCES: National Science Foundation, Division of Science Resources Studies, *Federal Funds for Research and Development: Fiscal Years 1993, 1994, and 1995*, NSF 95-334 (Arlington,VA: NSF, 1995); and Office of Management and Budget, unpublished tabulations.

Figure 7. Sources of academic R&D funding, by sector



NOTE: Data for 1994 and 1995 are estimates.

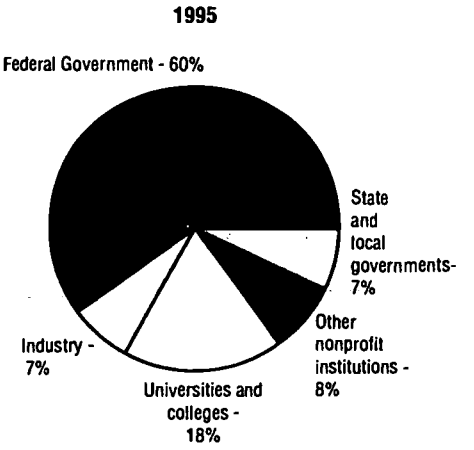
SOURCES: National Science Foundation, Division of Science Resources Studies (SRS), *Academic Science and Engineering: R&D Expenditures: Fiscal Year 1993*, Detailed Statistical Tables, NSF 95-332 (Arlington, VA: NSF, 1995); and SRS, annual series.

Figure 8. Academic R&D expenditures, by source of funds

(Millions of dollars)

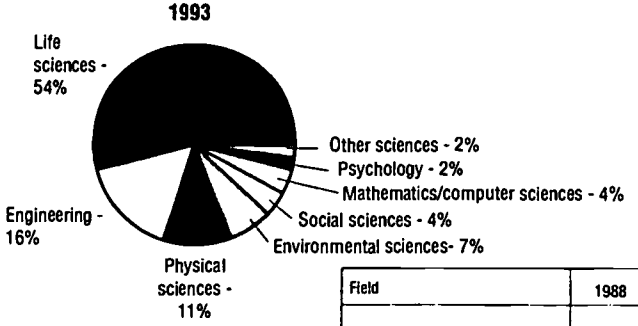
Year	Total	Federal Govt.	State and local govt.s	Industry	U&C	Other nonprofit institutions
1985	9,686	6,063	752	560	1,617	694
1986	10,927	6,710	915	700	1,869	733
1987	12,152	7,342	1,023	790	2,169	828
1988	13,462	8,191	1,106	872	2,356	936
1989	14,975	8,988	1,233	995	2,698	1,071
1990	16,283	9,634	1,324	1,128	3,006	1,192
1991	17,577	10,230	1,473	1,205	3,362	1,307
1992	18,794	11,090	1,491	1,291	3,527	1,395
1993	19,911	11,957	1,559	1,374	3,552	1,469
1994 (prelim.)	20,950	12,600	1,600	1,450	3,750	1,550
1995 (prelim.)	21,600	13,000	1,600	1,500	3,900	1,600

NOTE: Details may not add to total because of rounding.
KEY: U&C = Universities and colleges.



lational Science Foundation, Division of Science Resources Studies (SRS), *Academic Science and R&D Expenditures: Fiscal Year 1993*, Detailed Statistical Tables, NSF 95-332 (Arlington, VA: NSF, 1995); published tabulations.

Figure 9. Academic R&D expenditures, by field



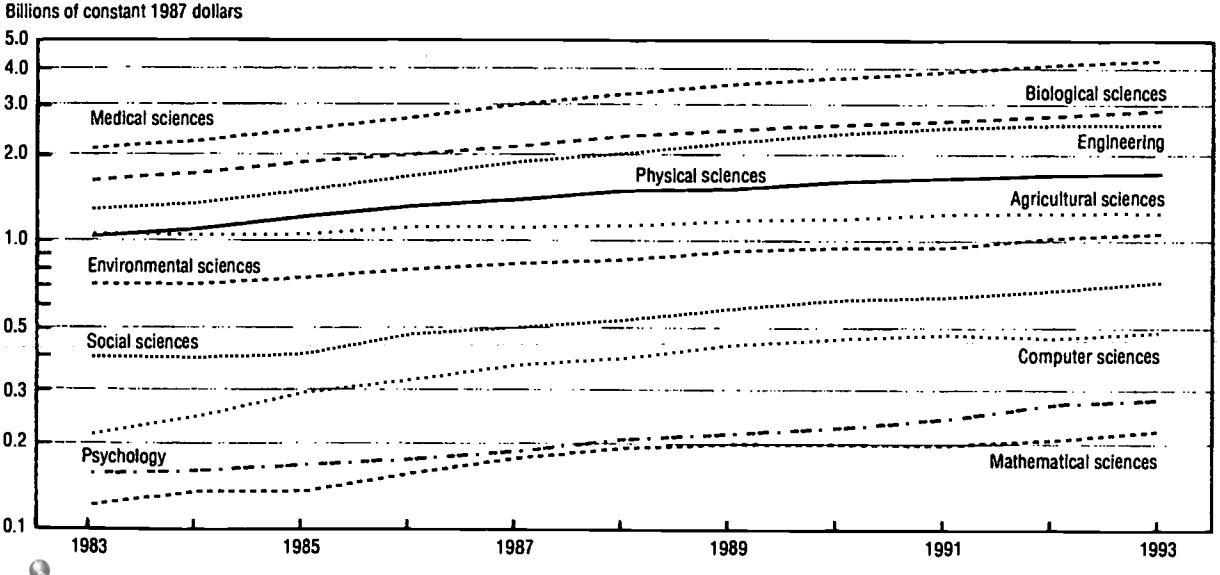
NOTE: Because of rounding, details may not add to 100.

SOURCES: National Science Foundation, Division of Science Resources Studies (SRS), *Academic Science and Engineering: R&D Expenditures: Fiscal Year 1993*, Detailed Statistical Tables, NSF 95-332 (Arlington, VA: NSF, 1995); and SRS, unpublished tabulations.

(Millions of dollars)

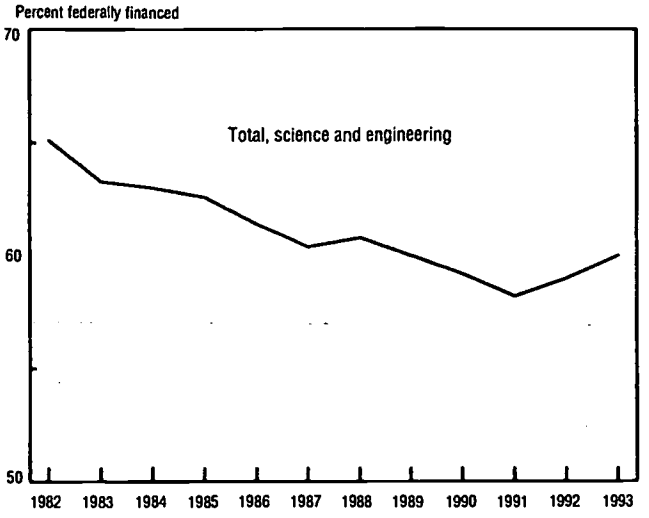
Field	1988	1987	1988	1989	1990	1991	1992	1993
Total	10,927	12,152	13,462	14,975	16,283	17,577	18,794	19,991
Physical sciences	1,286	1,398	1,554	1,646	1,806	1,939	2,051	2,124
Mathematics	152	177	199	215	222	230	247	272
Computer sciences	321	372	408	473	515	554	556	597
Environmental sciences	776	839	894	1,003	1,068	1,116	1,239	1,318
Life sciences	5,890	6,528	7,257	8,060	8,725	9,471	10,183	10,828
Psychology	170	187	213	233	253	283	328	349
Social sciences	462	502	552	633	703	750	815	896
Other sciences	228	256	290	318	338	331	314	375
Engineering	1,641	1,892	2,096	2,392	2,656	2,903	3,060	3,151

Figure 10. Academic R&D expenditures, by field



E: National Science Foundation, Division of Science Resources Studies, *Science and Engineering Indicators 1996*, NSB 96-21 (Arlington, VA: NSF, 1996).

Figure 11. Percent of academic R&D which is federally financed, by field



Percent federally financed

Field	1982	1986	1992	1993
Total science & engineering	65	61	59	60
Total sciences	65	62	59	60
Physical sciences	79	76	72	71
Mathematical sciences	74	76	74	75
Computer sciences	72	72	68	71
Environmental sciences	70	67	64	66
Life sciences	62	59	58	59
Psychology	68	67	65	67
Social sciences	46	37	35	38
Other sciences	57	47	33	36
Engineering	68	60	57	59

SOURCE: National Science Foundation, Division of Science Resources Studies, *Academic Science and Engineering: R&D Expenditures: Fiscal Year 1993*, Detailed Statistical Tables, NSF 95-332 (Arlington, VA: NSF, 1995).

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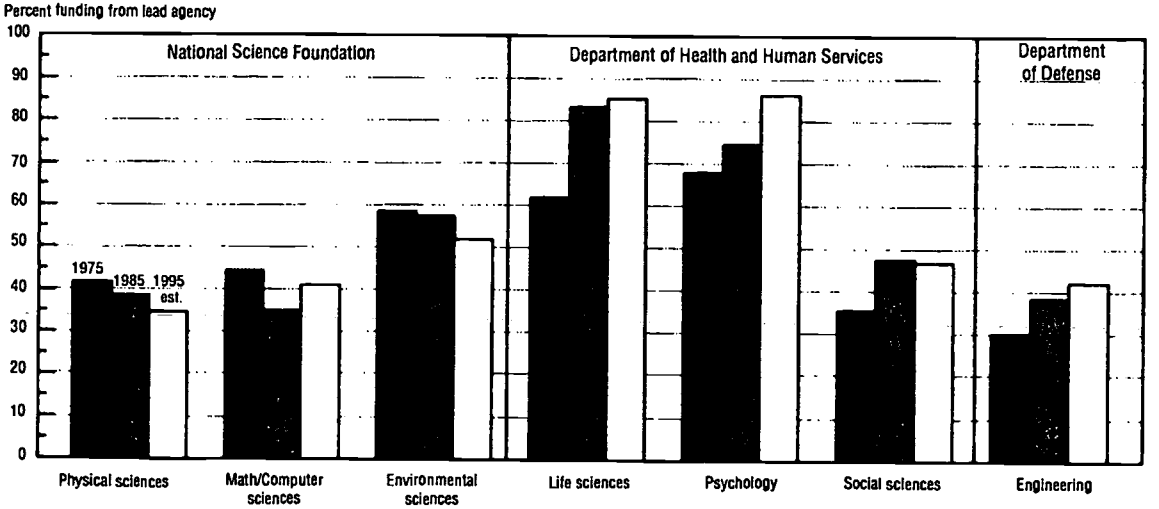
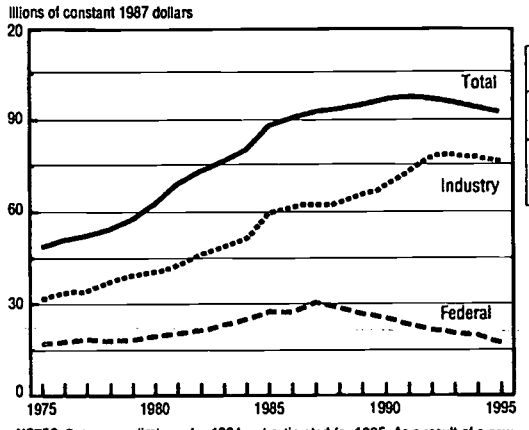
Figure 12. Academic funding provided by current lead Federal R&D funder, by field



NOTE: These data represent Federal obligations to U.S. universities and colleges.

SOURCE: National Science Foundation, Division of Science Resources Studies, *Federal Funds for Research and Development: Federal Obligations for Research to Universities and ... Agency and Detailed Field of Science and Engineering: Fiscal Years 1975-95*, NSF 95-323 (Arlington, VA: NSF, 1995).

Figure 13. Industrial R&D performance, by source of funds and character of work



NOTES: Data are preliminary for 1994 and estimated for 1995. As a result of a new sample design for the underlying Survey of Industrial Research and Development, statistics for 1988-92 were revised and first reported in *National Patterns of R&D Resources: 1994*.

SOURCES: National Science Foundation (NSF), Division of Science Resources Studies (SRS). Data were derived from NSF/SRS, *Research and Development in Industry 1993*; NSF/SRS, *Academic Science/Engineering: R&D Expenditures, Fiscal Year 1994*; NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1993, 1994, and 1995*; and an independent survey conducted by the Industrial Research Institute.

Source of funds

(Millions of current dollars)

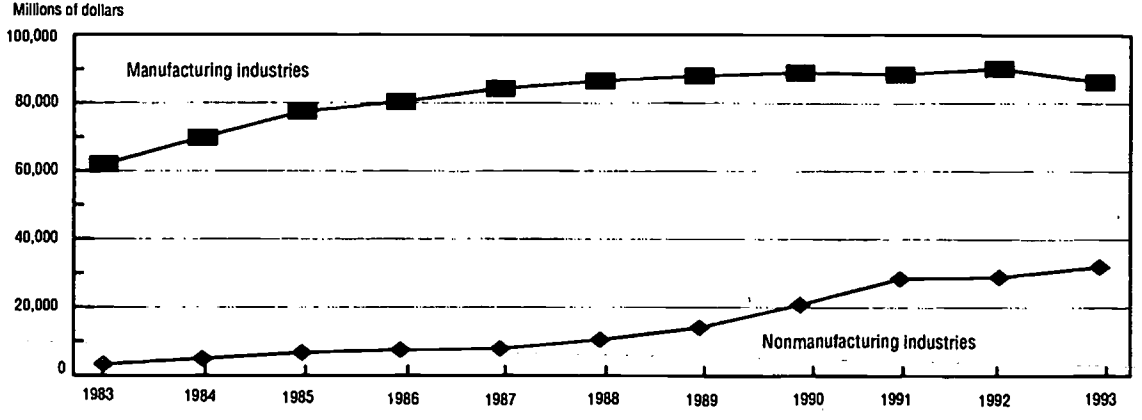
	1970	1980	1990	1992	1993	1994 (est.)	1995 (est.)
Total	18,067	44,505	109,727	119,110	118,334	119,700	121,400
Industry	10,288	30,476	81,602	94,388	95,521	97,400	99,300
Federal	7,779	14,029	28,125	24,722	22,813	22,300	22,100

Character of work

(Millions of dollars)

Year	Total	Basic research	Applied research	Development
1985	84,239	2,862	18,255	63,122
1986	87,823	4,047	19,760	64,016
1987	92,155	4,323	19,813	68,019
1988	97,015	4,500	20,748	71,767
1989	102,055	5,216	22,691	74,148
1990	109,727	5,128	24,785	79,814
1991	116,952	7,837	27,446	81,669
1992	119,110	7,075	26,605	85,430
1993	118,334	7,926	24,877	85,531
1994 (est.)	119,700	7,200	26,300	86,200
1995 (est.)	121,400	7,150	26,850	87,600

Figure 14. Industrial R&D performance, by sector

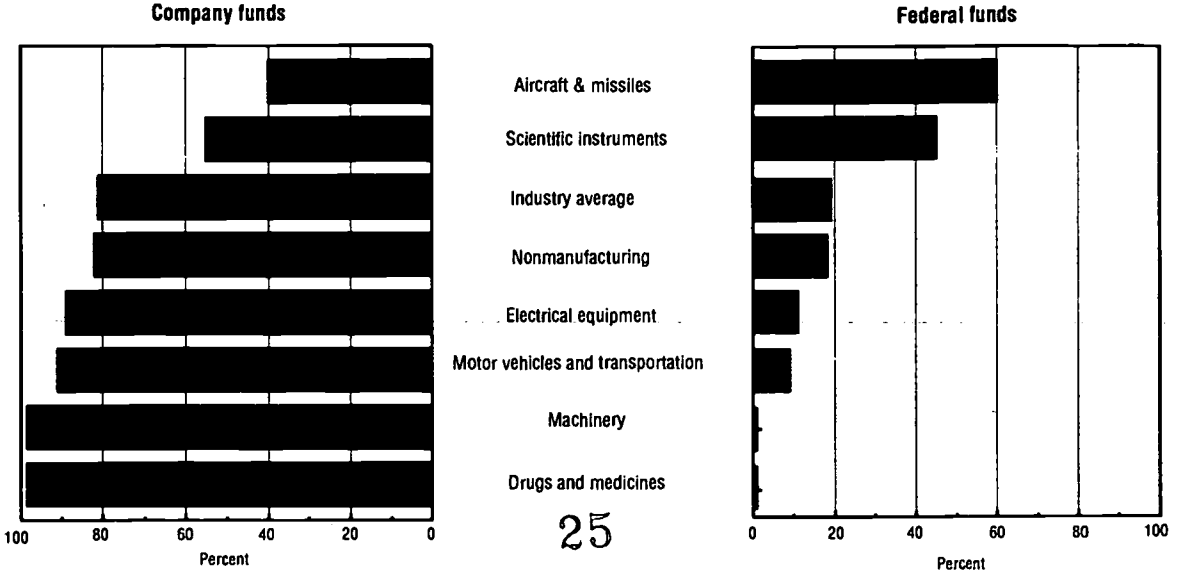


(Millions of current dollars)

Sector	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Manufacturing industries	61,931	69,895	77,525	80,377	84,311	86,502	88,024	88,934	88,506	90,167	87,014
Nonmanufacturing industries	3,337	4,905	6,714	7,446	7,844	10,513	14,031	20,793	28,446	28,933	31,320

SOURCE: National Science Foundation, Division of Science Resources Studies, *Survey of Industrial Research and Development: 1993*, NSF 96-304 (Arlington, VA: NSF, 1996).

Figure 15. Share of industrial R&D funding, by source and industry: 1993

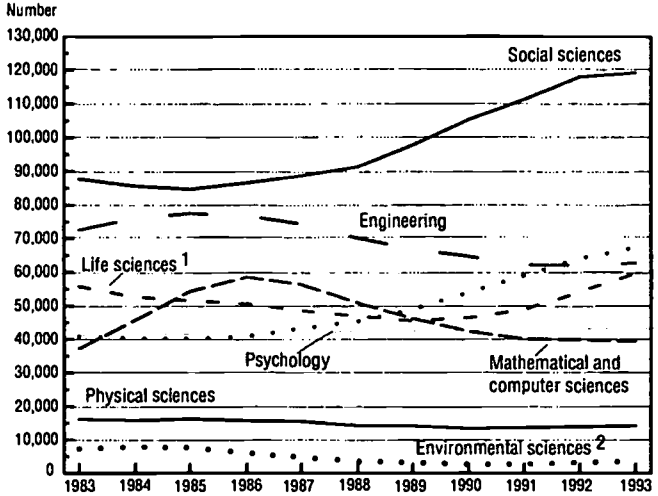


SOURCE: National Science Foundation, Division of Science Resources Studies, *Survey of Industrial Research and Development: 1993*, NSF 96-304 (Arlington, VA: NSF, 1996).

Education of Scientists and Engineers

[redacted]

Figure 16. Bachelor's degrees awarded in major science and engineering fields



1 "Life sciences" refer to biological and agricultural sciences only.
2 "Environmental sciences" include earth, atmospheric, and marine sciences.

Field	1983	1993
All fields (science and engineering and non-science and -engineering)	980,679	1,179,278
Total science and engineering	317,875	336,035
Physical sciences	16,197	14,188
Mathematical and computer sciences	37,239	39,433
Environmental sciences	7,298	3,503
Biological and agricultural sciences	55,820	59,621
Psychology	40,825	67,251
Social sciences	87,826	119,334
Engineering	72,670	62,705

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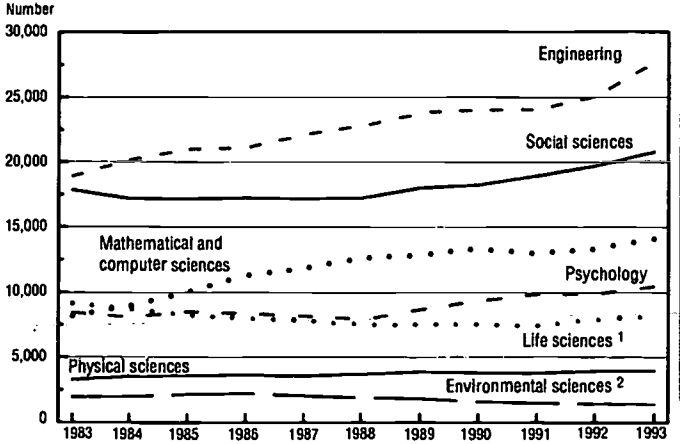
SOURCE: National Science Foundation, Division of Science Resources Studies, *Science and Engineering Degrees: 1966-93*, Detailed Statistical Tables, NSF 95-312 (Arlington, VA: NSF, 1995)

Figure 17. Master's degrees awarded in major science and engineering fields

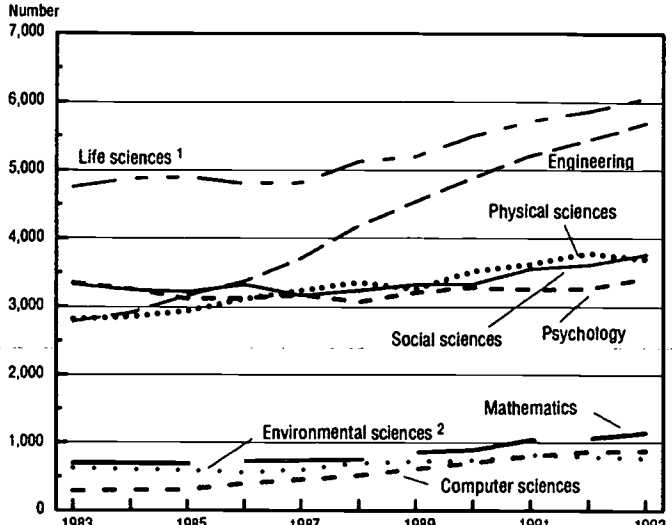


Field	1983	1993
All fields (science and engineering and non-science and -engineering)	290,931	370,973
Total science and engineering	67,716	86,425
Physical sciences	3,285	3,965
Mathematical and computer sciences	8,160	14,100
Environmental sciences	1,959	1,397
Biological and agricultural sciences	9,136	8,112
Psychology	8,439	10,412
Social sciences	17,851	20,775
Engineering	18,886	27,664

1 "Life sciences" refer to the biological and agricultural sciences only.
2 "Environmental sciences" include earth, atmospheric, and marine sciences.

SOURCE: National Science Foundation, Division of Science Resources Studies. *Science and Engineering Degrees: 1966-93*, Detailed Statistical Tables, NSF 95-312 (Arlington, VA: NSF, 1995).

Figure 18. Doctorates awarded in major science and engineering fields



Field	1983	1993
All fields (science and engineering and non-science and -engineering)	31,282	39,754
Total science and engineering	18,635	25,438
Physical sciences	2,815	3,700
Mathematics	701	1,146
Computer sciences	286	878
Environmental sciences	624	772
Biological and agricultural sciences	4,758	6,058
Psychology	3,347	3,419
Social sciences	3,325	3,769
Engineering	2,781	5,696

1 "Life sciences" refer to the biological and agricultural sciences only.
2 "Environmental sciences" include earth, atmospheric, and marine sciences.

SOURCE: National Science Foundation, Division of Science Resources Studies, *Selected Data on Science and Engineering Doctorates: 1960-93*, NSF 95-337 (Arlington, VA: NSF, 1995).

Figure 19. Full-time science and engineering graduate students in all institutions, by source of major support

Source of major support	1985	1990	1991	1992	1993
Total, all sources	257,411	292,958	307,249	322,895	330,249
Federal Government	49,062	59,282	63,021	65,606	67,327
Institutional support	104,100	123,138	125,470	128,035	129,462
Other outside support	18,780	26,110	27,031	27,744	26,932
Self-support	77,693	84,428	91,727	101,510	106,528

SOURCE: National Science Foundation, Division of Science Resources Studies, *Selected Data on Graduate Students and Postdoctorates in Science and Engineering, Fall 1993*, NSF 95-316 (Arlington, VA: NSF, 1995).

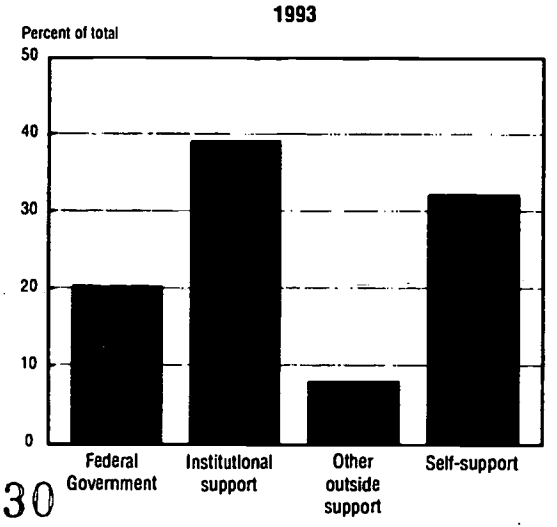


Figure 20. Full-time science and engineering graduate students in all institutions, by type of major support

Type of major support	1985	1990	1991	1992	1993
Total, all types	257,411	292,958	307,249	322,895	330,249
Fellowships and traineeships	36,241	40,518	42,168	44,088	44,652
Research assistantships	61,007	80,714	85,154	88,006	89,729
Teaching assistantships	61,827	65,056	65,312	65,719	66,996
Other types of support	98,336	106,670	114,615	125,082	128,872

SOURCE: National Science Foundation, Division of Science Resources Studies, *Selected Data on Graduate Students and Postdoctorates in Science and Engineering, Fall 1993*, NSF 95-316 (Arlington, VA: NSF, 1995).

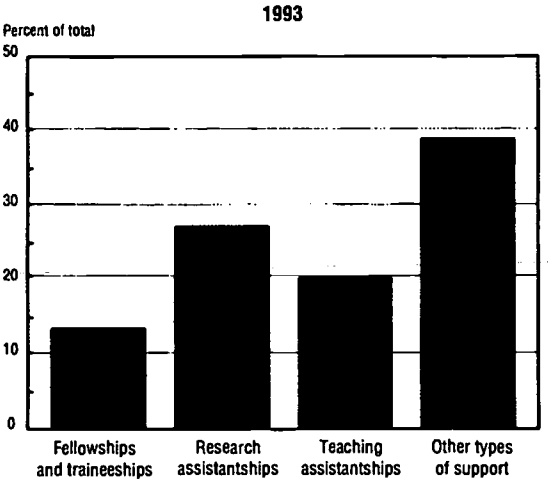
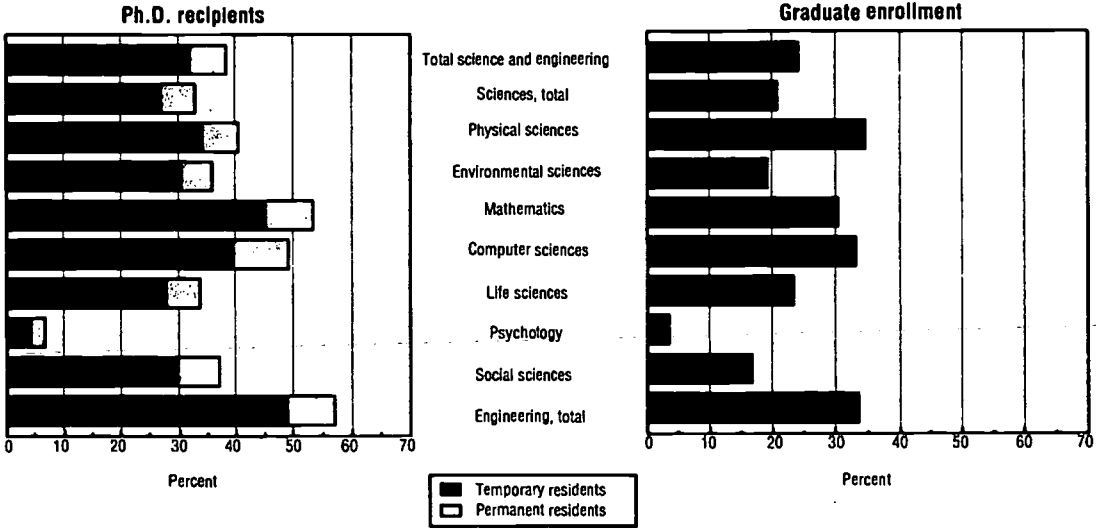
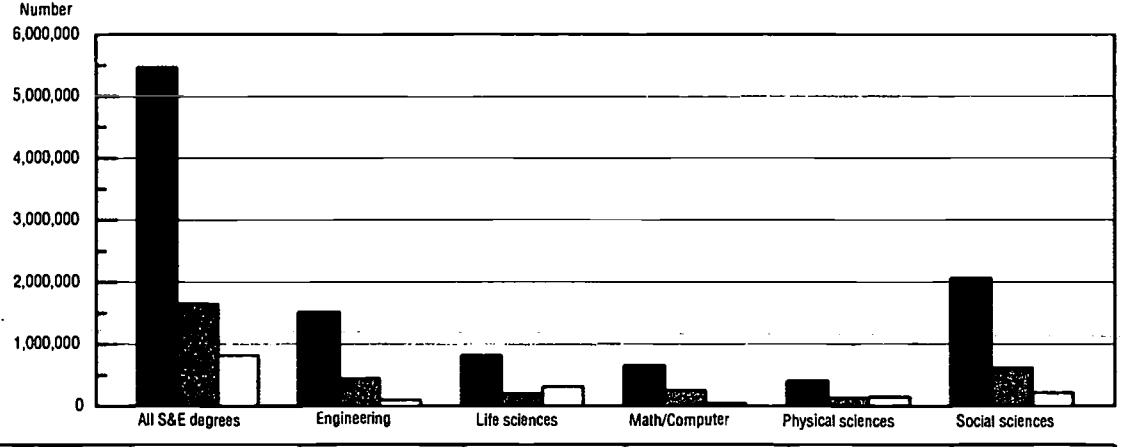


Figure 21. Foreign citizen representation in 1993 U.S. science and engineering graduate education



SOURCES: National Science Foundation, Division of Science Resources Studies, *Selected Data on Science and Engineering Doctorate Awards: 1994*, NSF 95-337 (Arlington, VA: NSF, 1995); and *Selected Data on Graduate Students and Postdoctorates in Science and Engineering, Fall 1993*, NSF 95-316 (Arlington, VA: NSF, 1995).

Figure 22. Scientists and engineers, by highest degree: 1993



	All S&E degrees	Engineering	Life sciences	Math/Computer	Physical sciences	Social sciences
Bachelor's	5,465,800	1,516,700	819,700	653,600	411,400	2,064,400
Master's/Prof.	1,647,793	443,800	195,100	255,693	132,500	620,700
Doctorate	819,000	101,000	313,500	45,400	143,400	215,700

[redacted]E = Science and engineering; Prof = Professional.

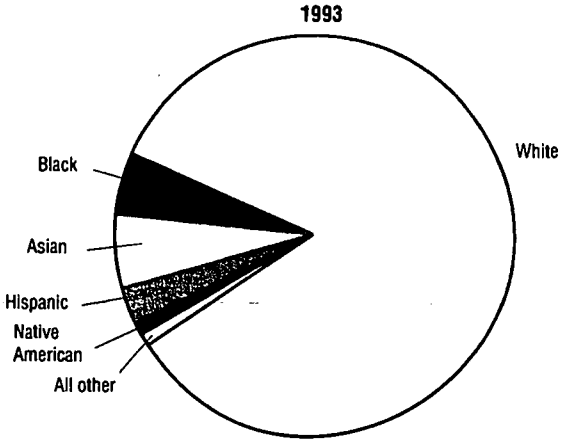
[redacted]ES: National Science Foundation, *1993 National Survey of College Graduates;* and *1993 Survey of Doctoral Recipients*, unpublished tabulations.

Figure 23. Federal scientists and engineers, by major occupational group: 1989-93

Occupation	1989	1990	1991	1992	1993
Total science and engineering occupations	185,623	189,049	194,726	198,853	196,908
All scientists	89,530	92,467	96,919	101,006	101,348
Computer and mathematical scientists	25,737	26,725	28,210	29,371	29,691
Life scientists	23,082	24,009	25,280	26,765	26,920
Physical scientists	23,204	23,725	24,140	24,427	24,118
Social scientists	17,507	18,008	19,289	20,443	20,619
All engineers	96,093	96,582	97,807	97,847	95,560
Aerospace engineers	8,433	8,624	8,777	8,584	8,330
Chemical engineers	1,503	1,413	1,344	1,311	1,245
Civil engineers	13,945	13,621	13,357	13,231	12,874
Electrical, electronics, and computer engineers	31,121	31,899	32,753	32,955	32,374
Industrial engineers	3,463	3,419	3,173	3,016	2,725
Mechanical engineers	12,186	11,787	11,763	11,532	11,159
Other engineers	25,422	25,819	26,640	27,218	26,853

SOURCES: National Science Foundation, Division of Science Resources Studies, *Federal Scientists and Engineers: 1989-93*, Special Report, NSF 95-336 (Arlington, VA: NSF, 1995); and Office of Personnel Management Central Personnel Data File, unpublished tabulations.

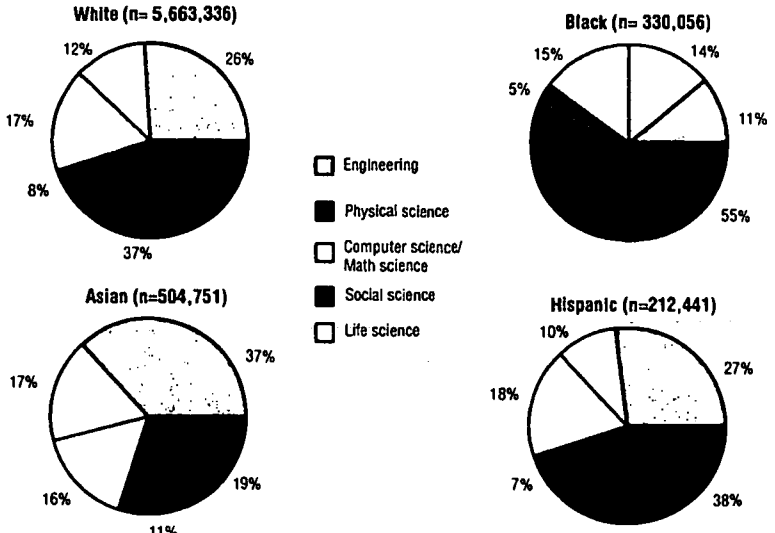
Figure 24. Federal scientists and engineers, by race/ethnicity: 1989-93



Race/ethnicity	1989	1990	1991	1992	1993
Total	185,623	189,049	194,726	198,853	196,908
White	159,401	161,431	165,564	168,316	166,084
Black	8,409	8,712	9,216	9,579	9,682
Asian	9,866	10,565	11,192	11,764	11,930
Hispanic	5,331	5,687	6,071	6,354	6,394
Native American	929	1,002	1,106	1,198	1,249
All other	1,517	1,576	1,523	1,516	1,555
No report	170	76	54	126	14

SOURCES: National Science Foundation, Division of Science Resources Studies, *Federal Scientists and Engineers: 1989-93*, Special Report, NSF 95-336 (Arlington, VA: NSF, 1995); and Office of Personnel Management Central Personnel Data File, unpublished tabulations.

Figure 25. College graduates in science and engineering in U.S. labor force, by field of degree and race/ethnicity: 1993



SOURCE: National Science Foundation, Division of Science Resources Studies, *1993 National Survey of College Graduates*, unpublished tabulations.

Figure 26. Percentage of women and minority scientists and engineers in labor force, by field of degree: 1993

Field of degree	Women	Black	Asian	Hispanic	Native American
Total science and engineering	30.0	6.2	7.5	3.9	0.3
Sciences, total	35.5	5.0	5.5	2.7	0.2
Mathematical/Computer sciences	31.7	5.3	10.2	2.5	0.2
Life sciences	35.4	4.3	7.0	3.4	0.2
Physical sciences	18.8	3.2	9.6	2.5	0.3
Social sciences	45.9	7.4	3.9	3.4	0.3
Engineering, total	7.3	2.2	10.9	3.3	0.1

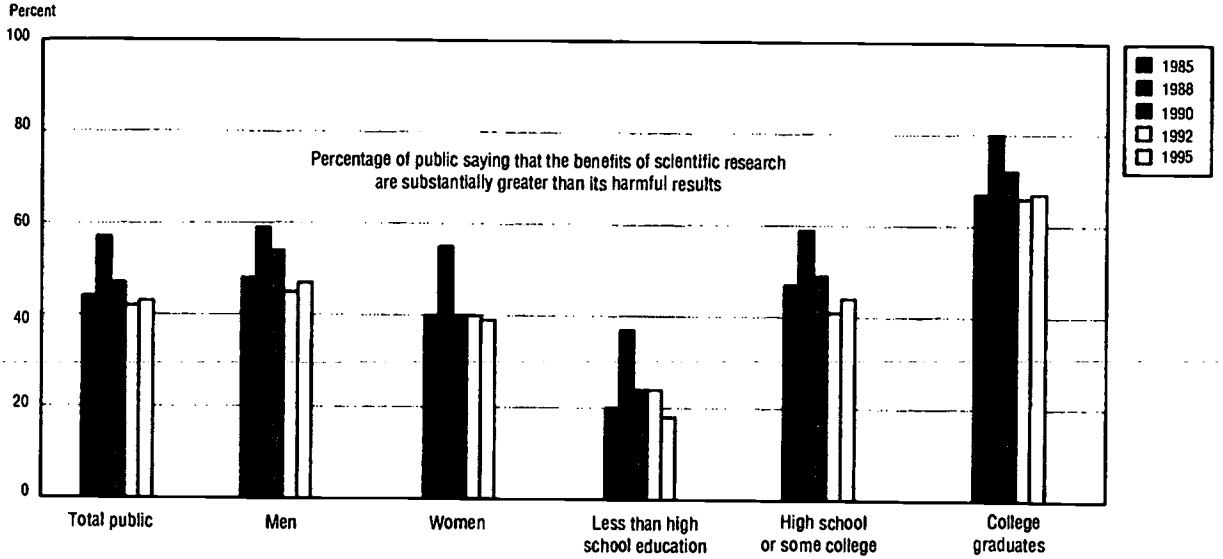
SOURCE: National Science Foundation, Division of Science Resources Studies, *1993 National Survey of College Graduates.*

Figure 27. Percentage of minorities in U.S. doctoral science and engineering labor force, by field of degree: 1993

Field of degree	Black	Asian	Hispanic	Native American
Total science and engineering	2.1	11.2	2.0	0.4
Sciences	2.2	8.4	2.1	0.4
Mathematics	6.4	26.5	3.0	0.2
Computer sciences	0.3	12.7	2.5	0.3
Physical sciences	1.1	12.3	1.9	0.3
Life sciences	1.9	8.7	1.8	0.3
Social sciences	3.5	3.8	2.4	0.6
Engineering	1.3	25.6	1.8	0.2
Chemical engineering	0.8	24.2	2.0	0.0
Civil engineering	1.9	27.4	1.8	0.2
Electrical engineering	1.4	26.7	2.1	0.4
Industrial engineering	0.9	21.9	1.6	0.6

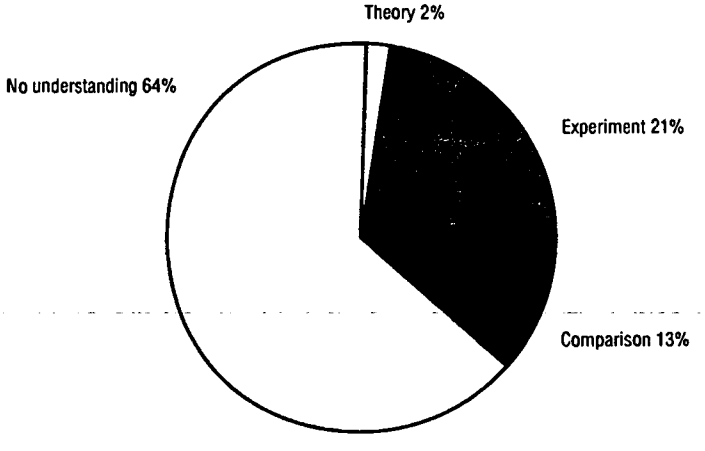
SOURCE: National Science Foundation, Division of Science Resources Studies, *1993 Survey of Doctorate Recipients*, unpublished tabulations.

Figure 28. Assessments of scientific research



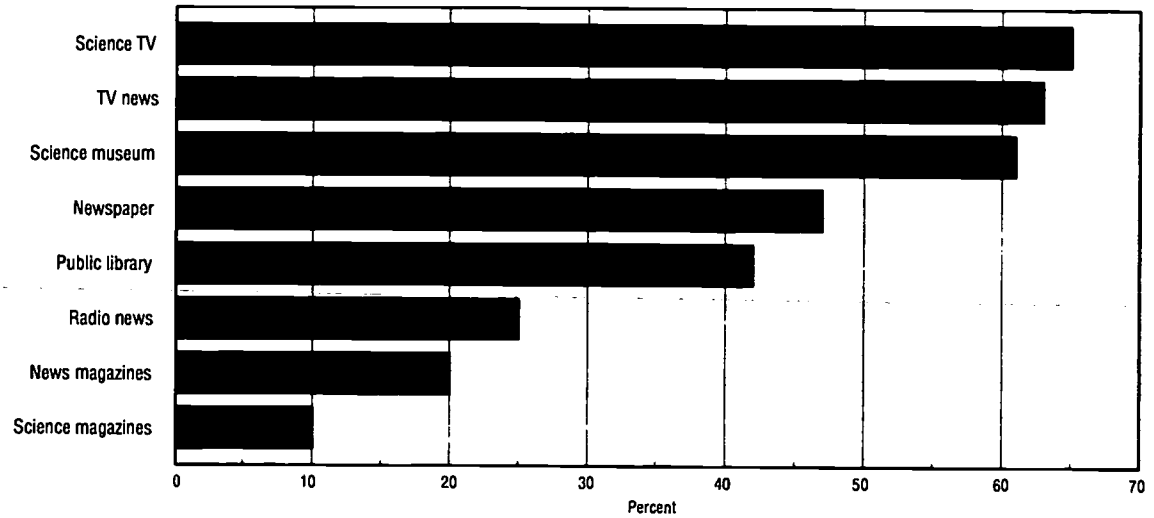
SOURCES: J.D. Miller, *Public Attitudes Toward Science and Technology, 1979-90*, Integrated Codebook (Chicago: International Center for the Advancement of Scientific Literacy, Academy of Sciences, 1991); and unpublished tabulations.

Figure 29. Public understanding of the nature of scientific inquiry: 1995



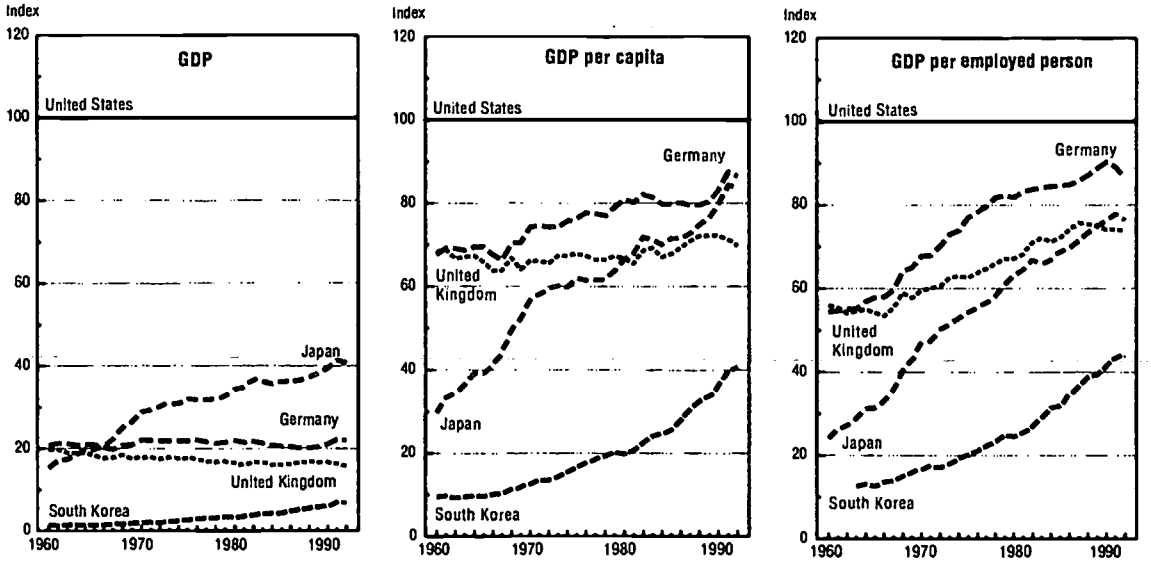
SOURCE: National Science Foundation, Division of Science Resources Studies, *Science and Engineering Indicators 1996*, NSB 96-21 (Arlington, VA: NSF, 1996).

Figure 30. Public use of selected information sources: 1995



National Science Foundation, Division of Science Resources Studies, *Science and Engineering Indicators 1996*, NSB 96-21 (Arlington, VA: NSF, 1996).

Figure 31. Comparisons of economic growth



NOTES: Index: United States = 100. Country GDPs were calculated using 1985 purchasing power parities. German data are for the former West Germany only.

SOURCE: Bureau of Labor Statistics, unpublished tabulations.

Figure 32. National expenditures on R&D, by selected countries

(Billions of constant 1987 dollars)

Year	United States	Japan [1]	Germany [2]	France	United Kingdom
1975	71.6	19.9	16.7	11.3	12.2
1976	74.6	20.6	17.0	11.5	NA
1977	76.5	21.3	17.4	11.8	NA
1978	79.8	22.3	18.7	12.1	13.5
1979	83.8	24.6	20.5	12.9	NA
1980	87.3	26.9	21.4	13.3	NA
1981	91.4	28.7	20.3	14.1	14.7
1982	95.5	30.9	20.8	15.1	NA
1983	102.3	33.5	21.2	15.5	14.4
1984	111.2	35.9	21.6	16.4	NA
1985	120.6	40.0	23.7	17.0	15.6
1986	123.3	40.6	24.4	17.2	18.1
1987	125.4	43.4	26.0	17.9	16.8
1988	128.0	46.9	26.9	18.7	17.3
1989	130.0	51.3	27.9	19.8	17.6
1990	134.1	55.5	28.2	21.0	18.0
1991	136.4	57.2	30.2	21.2	16.5
1992	136.3	58.0	31.0	21.9	17.6
1993	134.4	56.3	30.2	21.0	17.4
1994	134.3	NA	NA	NA	NA
1995	132.1	NA	NA	NA	NA

[1] Japanese data for 1970-74 are NSF estimates. The Japanese data have been revised from estimates previously published in NSF reports.

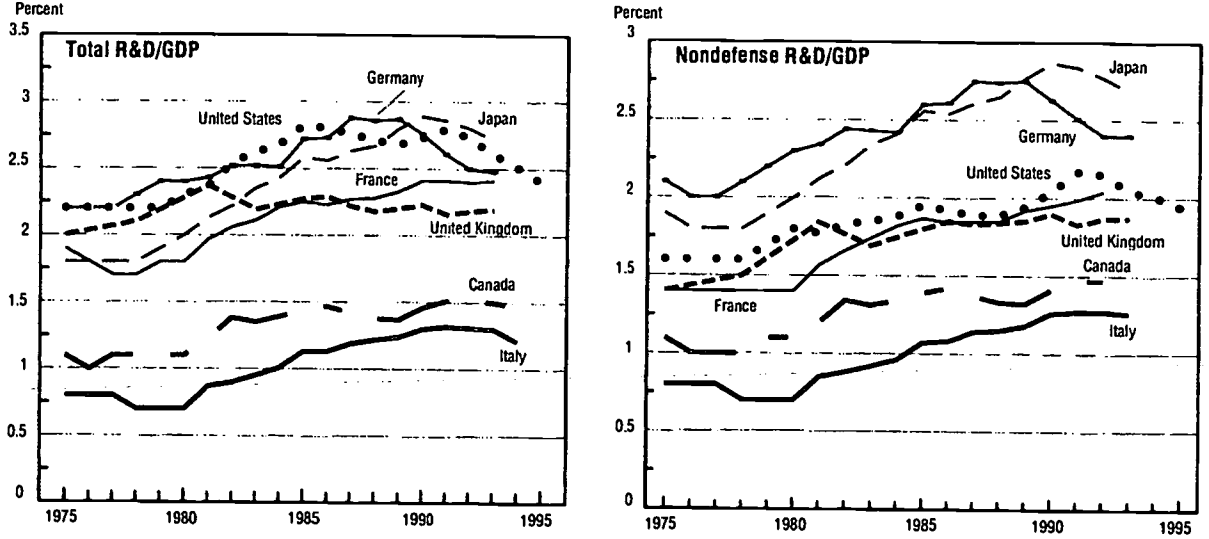
[2] Data after 1990 are for Unified Germany.

NOTES: Conversions of foreign currencies to U.S. dollars are calculated with Organisation for Economic Co-operation and Development purchasing power parity exchange rates. Constant 1987 dollars are based on U.S. Department of Commerce GDP implicit price deflators.

KEY: NA = Not available.

SOURCES: National Science Foundation, Division of Science Resources Studies; Organisation for Economic Co-operation and Development; and national sources.

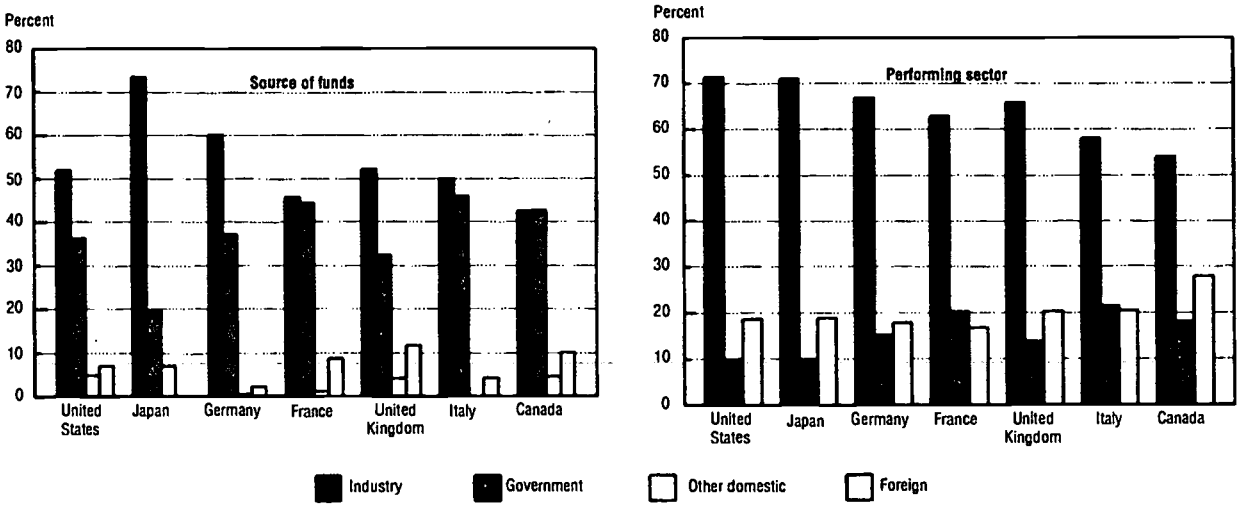
Figure 33. R&D as a percentage of GDP, by country



NOTES: After 1990, data are for Unified Germany. Japanese data for 1970-74 and 1992 are NSF estimates; the Japanese data have been revised from previously published NSF reports.

SOURCES: National Science Foundation, Division of Science Resources Studies, *National Patterns of R&D Resources: 1994, NSF 95-304* (Arlington, VA: NSF, 1995); unpublished tabulations; Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database.

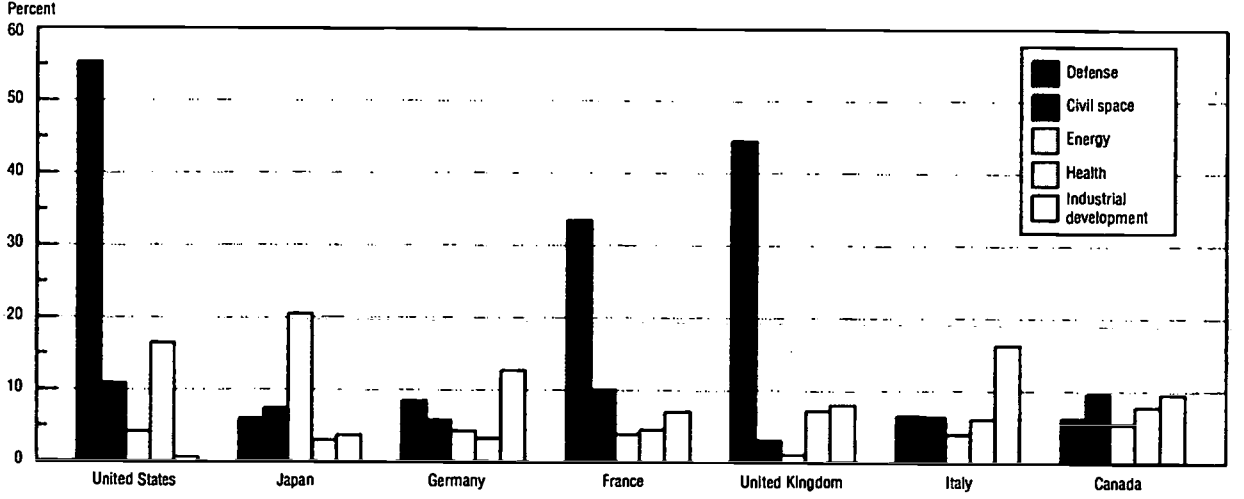
Figure 34. R&D expenditures, by country, source, and performer: 1993



NOTE: Foreign performers are included in the "industry" and "other domestic" sectors.

SOURCES: National Science Foundation, Division of Science Resources Studies, *National Patterns of R&D Resources: 1994*, NSF 95-304 (Arlington, VA: NSF, 1995); and Organisation for Economic Co-operation and Development, unpublished tabulations.

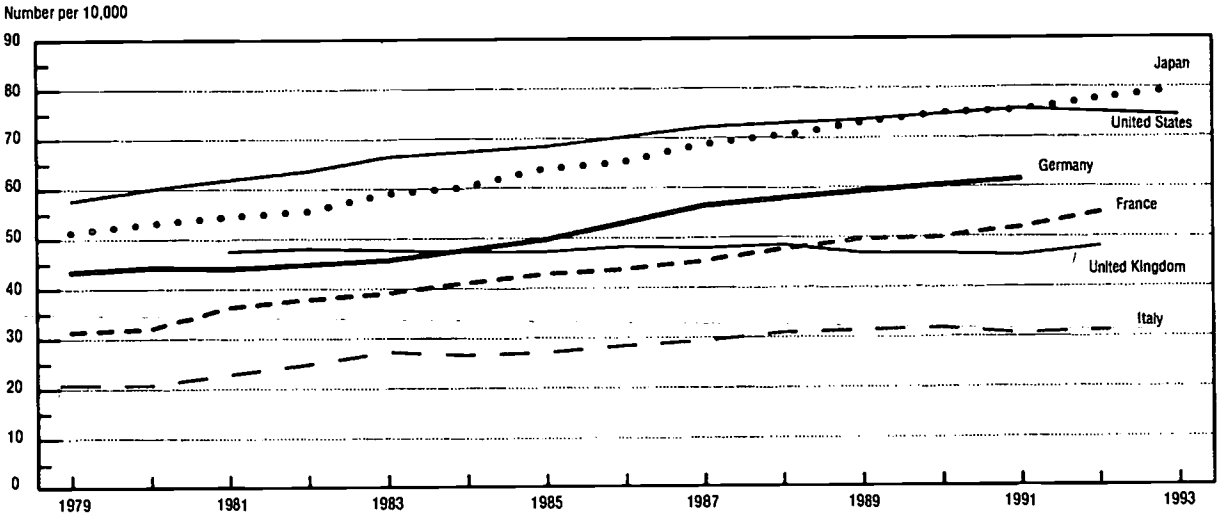
Figure 35. Government R&D support, by country and socioeconomic objective: early 1990s



NOTES: Details do not add to 100% because funding for some objectives (for example, advancement of knowledge) is not graphed. R&D is classified according to its primary government objective, although it may support any number of complementary goals. For example, defense R&D with commercial spin-offs is classified as supporting defense, not industrial development.

National Science Foundation, Division of Science Resources Studies, *Federal R&D Funding by Budget Function: Fiscal Years 1993-95* (Arlington, VA: NSF, in press); and Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* database (1995).

Figure 36. Ratio of R&D scientists and engineers per 10,000 workers in the general labor force, by country



SOURCES: National Science Foundation, Division of Science Resources Studies, *Science and Engineering Indicators 1996*, NSB 96-21 (Arlington, VA: NSF, 1996); and Organisation for Economic Co-operation and Development.

Figure 37. Scientists and engineers engaged in R&D, by country

(In thousands)

Year	France	Italy	Japan	United Kingdom	United States	Germany
1975	65.3	37.9	253.6	80.5	527.4	103.7
1976	67.0	37.9	263.2	NA	535.2	104.5
1977	68.0	39.7	264.8	NA	560.6	111.0
1978	70.9	40.8	272.8	87.7	586.6	113.9
1979	72.9	46.4	291.2	NA	614.5	116.9
1980	74.9	47.0	303.2	NA	651.1	120.7
1981	85.5	52.1	311.0	127.0	683.2	124.7
1982	90.1	56.7	321.0	128.0	711.8	NA
1983	92.7	63.0	347.4	127.0	751.6	130.8
1984	98.2	62.0	357.4	129.0	NA	NA
1985	102.3	63.8	380.3	131.0	801.9	143.6
1986	105.0	67.8	393.0	134.0	NA	NA
1987	109.4	70.6	415.6	134.0	877.8	165.6
1988	115.2	74.8	434.6	137.0	NA	NA
1989	120.4	76.1	457.5	133.0	924.2	176.4
1990	123.9	77.9	477.9	133.0	NA	NA
1991	129.8	75.2	491.1	131.0	960.4	240.8
1992	137.6	74.4	511.4	135.0	NA	NA
	NA	NA	526.5	NA	962.7	NA

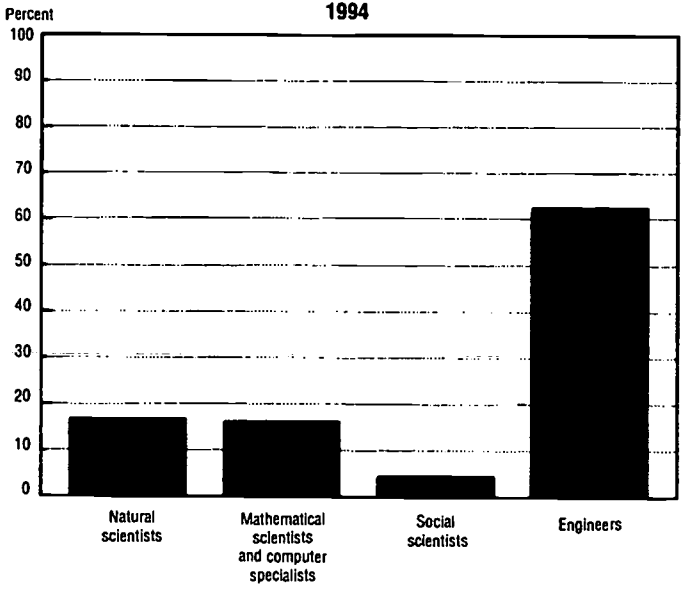
NOTES: Table includes all scientists and engineers (S&Es) engaged in R&D on a full-time equivalent (FTE) basis with the following exceptions: Japanese data include persons primarily employed in R&D in the natural sciences and engineering, and the U.S. data are a mix of S&Es engaged in R&D on an FTE basis and counts of S&Es whose primary work activity is R&D.

As a result of ongoing improvements in methodology and measurement, there are several major breaks in the continuity of the following time series: France (1980-81), Germany (1978-79), United Kingdom (1984-85), and the United States (1984-85).

KEY: NA = Not available.

SOURCES: National Science Foundation, Division of Science Resources Studies; Organisation for Economic Co-operation and Development; and national sources.

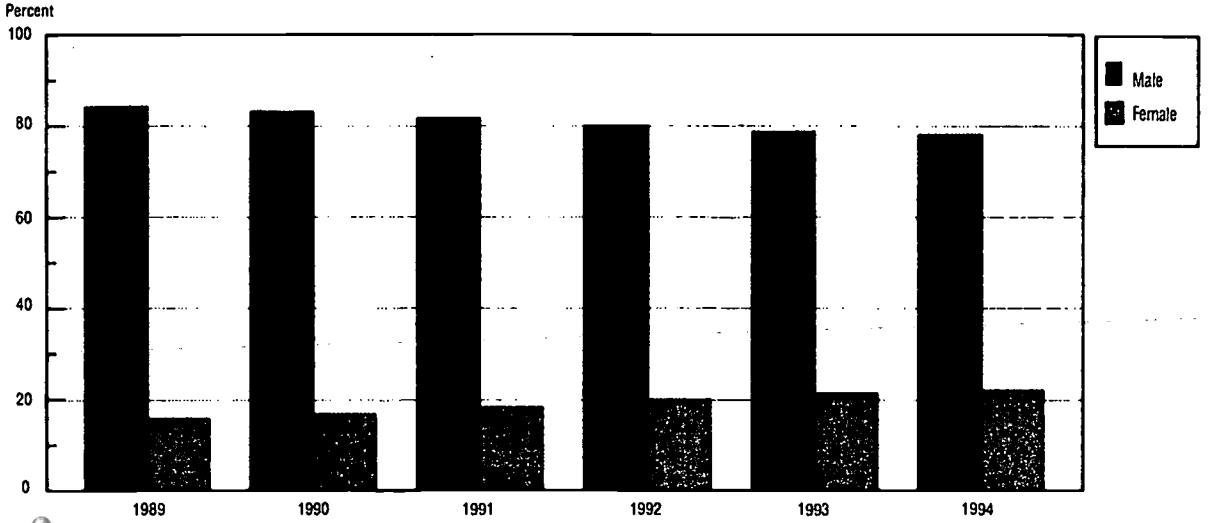
Figure 38. Immigrant scientists and engineers in the United States, by occupation



Field	1992	1993	1994
Total scientists and engineers	22,871	23,534	11,934
Natural scientists	2,796	3,901	1,991
Mathematical scientists and computer specialists	3,402	4,157	1,932
Social scientists	1,088	979	545
Engineers	15,585	14,497	7,468

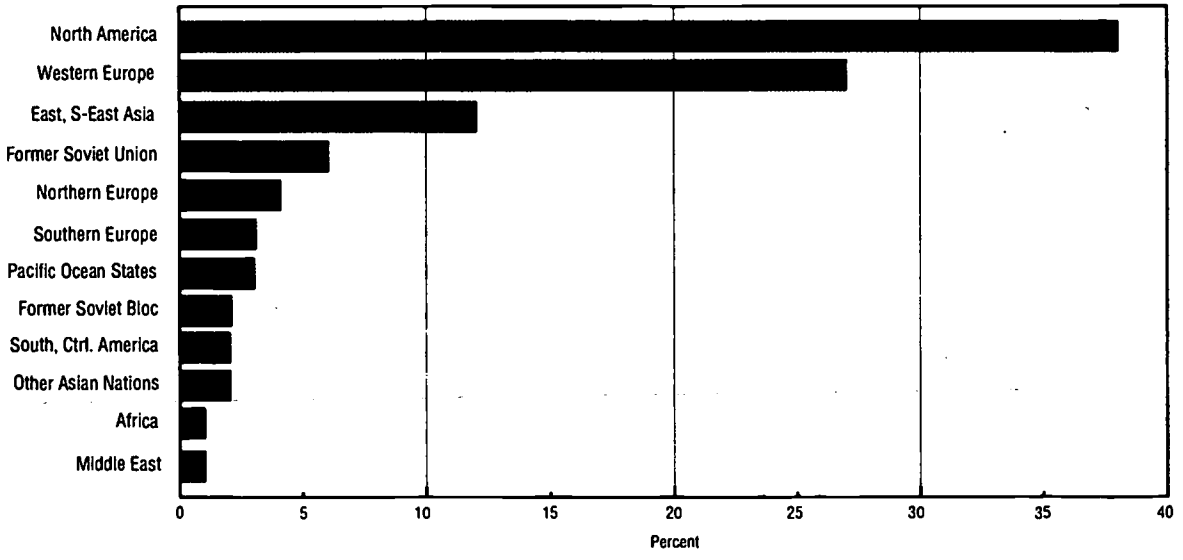
SOURCES: National Science Foundation, Division of Science Resources Studies, using unpublished data provided by the U.S. Department of Justice/Immigration and Naturalization Service.

Figure 39. **Scientists and engineers admitted to the United States on permanent visas, by fiscal year of admission and sex: 1989-94**



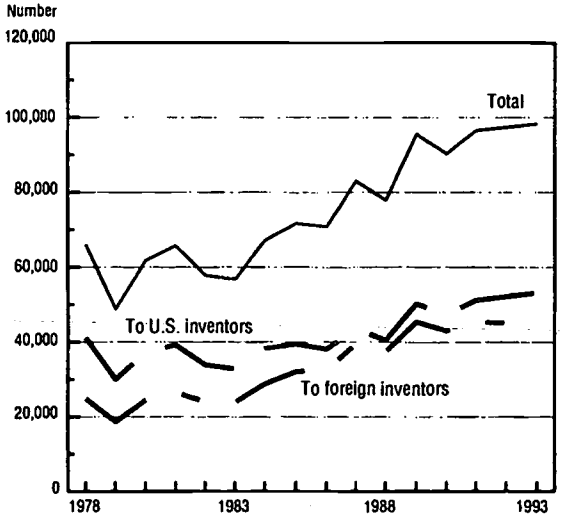
ICES: National Science Foundation, Division of Science Resources Studies, using unpublished data provided by the U.S. Department of Justice/Immigration and alization Service.

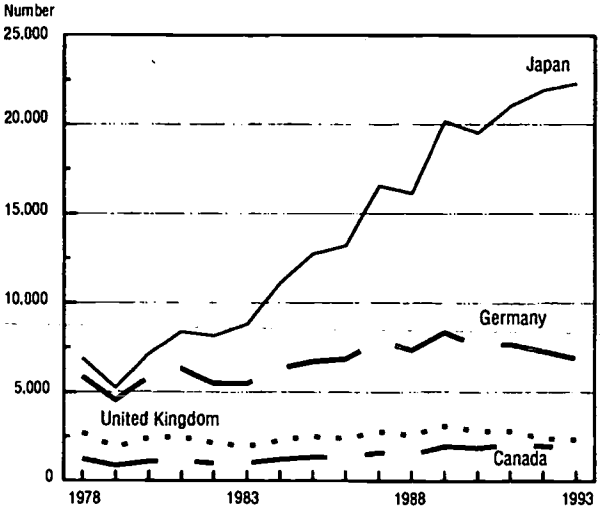
Figure 40. Distribution of articles in world scientific journals, by region: 1993



SOURCES: Institute for Scientific Information, SCI data base; CHI Research, Inc., *Science & Engineering Indicators* Literature Database, 1995; and NSF special tabulations.

Figure 41. U.S. patents granted, by nationality of inventor

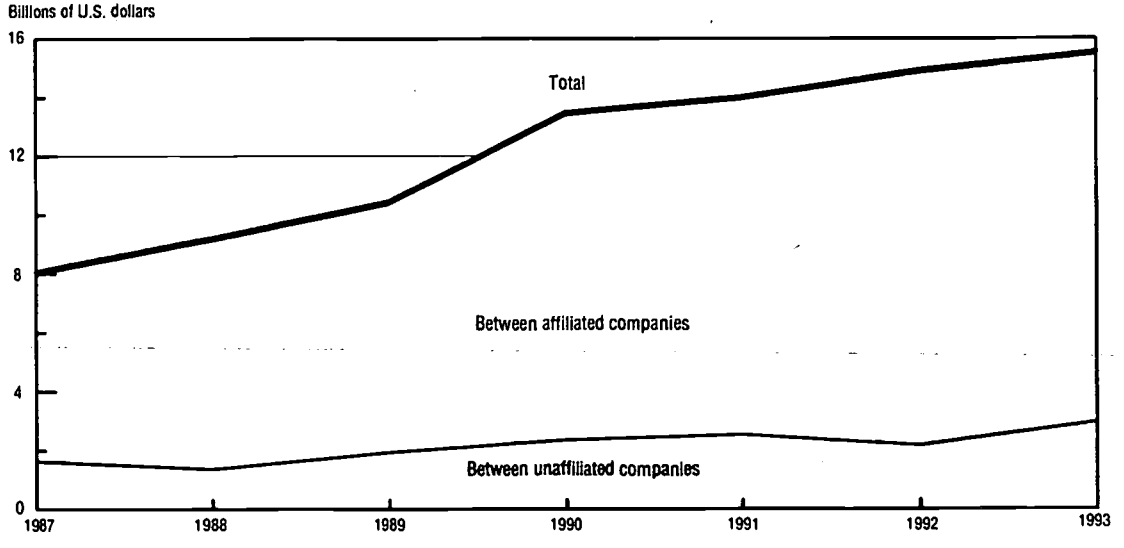




NOTE: German data are for the former West Germany only.

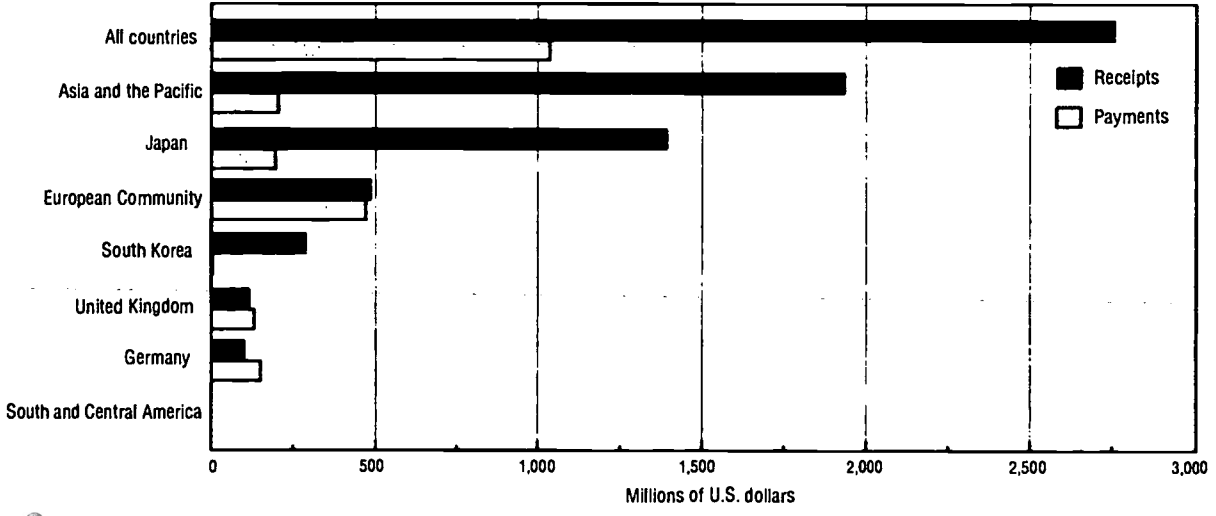
SOURCE: U.S. Patent and Trademark Office, *Patenting Trends in the United States*, 1963-93 (Washington, DC: Sept. 1994).

Figure 42. Royalties and fees: U.S. trade balance



SOURCE: U.S Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, Vol. 74. No. 9 (Sept. 1994).

Figure 43. U.S. royalties and fees generated from the exchange of industrial processes between unaffiliated companies: 1993



SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, Vol. 72, No. 9 (Sept. 1994), pp. 111-114.

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Title	Pub. Type	NSF Pub. No.
Overviews		
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Guide to NSF Science and Engineering Resources Data	Report	95-318
Human Resources for Science and Technology: The Asian Region	Report	93-303
National Patterns of R&D Resources: 1994	Report	95-304
National Patterns of R&D Resources: 1996	Report	96-333 (in press)
NSF Survey Instruments Used in Collecting Science and Engineering Resources Data	Report	95-317
Science and Engineering Indicators—1996	Report	NSB 96-21
Science and Engineering Indicators—1993	Report	NSB 93-1
Science and Technology Pocket Data Book: 1994	Report	94-323
SRS Publications List: June 1995	Report	95-328
SRS Publications Update	Report	95-333
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Federal Funds for R&D: Federal Obligations for Research by Agency and Detailed Field of Science and Engineering: FYs 1972-1995	Tables	95-322

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Selected Data on Academic Science/Engineering R&D Expenditures: Fiscal Year 1993 (electronic form only)	Tables	95-326
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Selected Data on Federal Support to Universities and Colleges: Fiscal Year 1993	Tables	95-320
Six States Account for Majority of R&D Spending, New NSF State Science and Engineering Profiles Available	Data Brief	95-338
Small Decreases in Federal Funding for R&D and R&D Plant Expected in FY 1995	Data Brief	95-315
U.S. R&D Expenditures Continued Slow Growth in 1994	Data Brief	95-303
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Characteristics of Recent Science and Engineering Graduates: 1993 (electronic form only)	Tables	96-309
Employment Status of Recent Science and Engineering Graduates by Level and Field of Degree	Data Brief	95-308

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Human Resources *(continued)*		
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Federal Scientists and Engineers: 1989-93	Tables	95-336
For 1993, Doctoral Scientists & Engineers Reported 1.6 Percent Unemployment Rate But 4.3 Percent Underemployment	Data Brief	95-307
Graduate Enrollment in Science and Engineering Decreased by 1 Percent in 1994	Data Brief	96-312
Immigrant Scientists, Engineers, and Technicians in S&E: 1991-92	Tables	95-310
Immigrants Are 23 Percent of U.S. Residents with S&E Doctorates	Data Brief	95-339
Immigration of Scientists and Engineers Increased Slightly in 1993, Despite Decline in Immigration Overall	Data Brief	95-327
More S&E Bachelor's Degrees Are Being Earned by Racial/Ethnic Minorities	Data Brief	95-329
More Than 10.3 Million U.S. Residents Have Science or Engineering Degrees	Data Brief	95-340
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