

Appendix table 4-1
GDP and GDP implicit price deflators: 1953–2003

Year	Calendar year			Fiscal year		
	GDP (billions)		GDP price deflator ^a	GDP (billions)		GDP price deflator ^a
	Current dollars	Constant 1996 dollars		Current dollars	Constant 1996 dollars	
1953	379.9	1,973.9	19.25	373.4	1,941.8	19.23
1954	381.1	1,960.5	19.44	378.0	1,942.4	19.46
1955	415.2	2,099.5	19.78	395.2	2,014.3	19.62
1956	438.0	2,141.1	20.45	427.7	2,123.6	20.14
1957	461.5	2,183.9	21.13	450.7	2,157.5	20.89
1958	467.9	2,162.8	21.64	461.1	2,142.7	21.52
1959	507.4	2,319.0	21.88	492.1	2,250.1	21.87
1960	527.4	2,376.7	22.19	518.9	2,345.8	22.12
1961	545.7	2,432.0	22.44	531.8	2,370.9	22.43
1962	586.5	2,578.9	22.74	568.5	2,506.6	22.68
1963	618.7	2,690.4	23.00	599.7	2,609.7	22.98
1964	664.4	2,846.5	23.34	641.3	2,758.3	23.25
1965	720.1	3,028.5	23.78	687.9	2,907.4	23.66
1966	789.3	3,227.5	24.46	754.2	3,120.4	24.17
1967	834.1	3,308.3	25.21	813.5	3,261.8	24.94
1968	911.5	3,466.1	26.30	868.4	3,360.7	25.84
1969	985.3	3,571.4	27.59	949.2	3,514.3	27.01
1970	1,039.7	3,578.0	29.06	1,013.2	3,556.3	28.49
1971	1,128.6	3,697.7	30.52	1,081.4	3,614.3	29.92
1972	1,240.4	3,898.4	31.82	1,181.5	3,772.3	31.32
1973	1,385.5	4,123.4	33.60	1,308.1	3,999.1	32.71
1974	1,501.0	4,099.0	36.62	1,442.1	4,115.6	35.04
1975	1,635.2	4,084.4	40.03	1,559.8	4,033.6	38.67
1976	1,823.9	4,311.7	42.30	1,736.7	4,194.9	41.40
1977	2,031.4	4,511.8	45.02	1,971.3	4,428.9	44.51
1978	2,295.9	4,760.6	48.23	2,218.6	4,664.8	47.56
1979	2,566.4	4,912.1	52.25	2,503.8	4,869.3	51.42
1980	2,795.6	4,900.9	57.04	2,732.1	4,879.6	55.99
1981	3,131.3	5,021.0	62.37	3,061.6	4,984.7	61.42
1982	3,259.2	4,919.3	66.25	3,228.6	4,912.7	65.72
1983	3,534.9	5,132.3	68.88	3,440.5	5,014.6	68.61
1984	3,932.7	5,505.2	71.44	3,839.4	5,397.0	71.14
1985	4,213.0	5,717.1	73.69	4,136.6	5,628.8	73.49
1986	4,452.9	5,912.4	75.31	4,401.4	5,848.3	75.26
1987	4,742.5	6,113.3	77.58	4,647.0	6,009.3	77.33
1988	5,108.3	6,368.4	80.21	5,014.7	6,279.4	79.86
1989	5,489.1	6,591.8	83.27	5,405.5	6,518.1	82.93
1990	5,803.2	6,707.9	86.51	5,735.6	6,665.4	86.05
1991	5,986.2	6,676.4	89.66	5,930.4	6,633.6	89.40
1992	6,318.9	6,880.0	91.84	6,218.6	6,778.5	91.74
1993	6,642.3	7,062.6	94.05	6,558.4	6,982.2	93.93
1994	7,054.3	7,347.7	96.01	6,944.6	7,237.0	95.96
1995	7,400.5	7,543.8	98.10	7,324.0	7,470.4	98.04
1996	7,813.2	7,813.2	100.00	7,694.6	7,694.6	100.00
1997	8,318.4	8,159.5	101.95	8,185.2	8,028.6	101.95
1998	8,781.5	8,508.9	103.20	8,663.9	8,379.8	103.39
1999	9,274.3	8,858.9	104.65	9,141.4	8,719.2	104.80
2000	9,824.6	9,191.4	106.89	9,715.4	9,091.8	106.86
2001	10,082.2	9,214.6	109.42	10,032.3	9,164.3	109.47
2002 ^b	10,442.0	9,439.8	110.62	10,336.6	9,322.2	110.29
2003 ^b	10,884.4	9,709.5	112.10	10,756.8	9,578.1	111.71

GDP gross domestic product

^a1996 = 100.

^bProjected data.

SOURCES: FY GDP and deflators for 1953–2001 are from Office of Management and Budget, *Budget of the United States, Fiscal Year 2004* (Washington, DC, 2003); calendar-year GDP and deflators for 1953–2001 are from U.S. Bureau of Economic Analysis, Washington, DC, various years, <http://www.bea.gov>; and all projected values were provided by Office of Management and Budget based on economic assumptions in *FY 2004 Budget of the United States, Fiscal Year 2004*.

Appendix table 4-2

PPP and market exchange rates, by selected country: 1981–2002

(Foreign currency/U.S. dollar)

Year	PPP							Market exchange rate	
	Canada	France	Germany ^a	Italy	Japan	Russian Federation	United Kingdom	Germany ^a	Japan
1981	1.27	0.87	1.23	0.46	241.46	—	0.53	1.16	220.54
1982	1.31	0.92	1.21	0.51	231.67	—	0.53	1.24	249.08
1983	1.31	0.96	1.19	0.56	225.65	—	0.54	1.31	237.51
1984	1.30	0.99	1.16	0.60	221.39	—	0.54	1.46	237.52
1985	1.28	1.01	1.14	0.63	218.40	—	0.55	1.51	238.54
1986	1.29	1.04	1.14	0.66	216.91	—	0.55	1.11	168.52
1987	1.31	1.04	1.13	0.68	210.16	—	0.56	0.92	144.64
1988	1.31	1.03	1.10	0.70	203.80	—	0.58	0.90	128.15
1989	1.32	1.02	1.08	0.71	199.17	—	0.59	0.96	137.96
1990	1.30	1.01	1.07	0.73	195.30	—	0.60	0.83	144.79
1991	1.29	0.99	1.07	0.76	193.06	—	0.64	0.85	134.71
1992	1.28	0.98	1.06	0.75	188.16	0.02	0.62	0.80	126.65
1993	1.26	1.00	1.08	0.79	184.31	0.18	0.64	0.85	111.20
1994	1.25	1.01	1.06	0.79	180.59	0.72	0.65	0.83	102.21
1995	1.18	0.98	1.03	0.80	169.94	1.83	0.65	0.73	94.06
1996	1.19	1.00	1.04	0.82	165.62	2.58	0.64	0.77	108.78
1997	1.18	0.99	0.99	0.82	163.01	2.95	0.63	0.89	120.99
1998	1.19	0.99	0.99	0.81	166.63	3.33	0.65	0.90	130.91
1999	1.19	0.97	0.98	0.80	162.04	5.41	0.65	0.94	113.91
2000	1.21	0.95	0.95	0.79	155.28	7.25	0.65	1.09	107.77
2001	1.20	0.94	0.95	0.79	149.81	8.35	0.65	1.12	121.53
2002	1.19	0.94	0.95	0.80	145.62	—	0.66	—	—

— data not used in this report

PPP purchasing power parity

^aData for 1981–90 are for West Germany.SOURCE: Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 2002).*Science & Engineering Indicators – 2004*

Appendix table 4-3

U.S. R&D expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs ^b		
	Funding sector:	Total	Federal	Total	Federal ^c	Industry ^d	Federal ^e	Total	Federal	Non-Federal ^e	Industry	U&C	Non-profits	Federal ^f	Total	Federal ^c	Industry	Non-profits	Federal ^g
1953		5,160	1,015	3,630	1,430	2,200	—	273	149	40	21	37	27	131	112	58	26	28	—
1954		5,621	963	4,070	1,750	2,320	—	301	165	45	24	40	29	161	127	65	31	31	—
1955		6,386	973	4,517	2,057	2,460	228	342	191	50	27	42	32	187	131	64	35	32	9
1956		8,537	1,130	6,272	2,995	3,277	370	391	221	57	32	46	36	217	146	71	37	38	11
1957		9,866	1,297	7,324	3,928	3,396	365	433	242	64	37	51	40	267	167	79	37	51	14
1958		10,963	1,507	8,066	4,436	3,630	371	491	280	72	39	56	45	316	195	95	38	62	18
1959		12,519	1,681	9,200	5,217	3,983	448	586	356	81	40	61	50	349	234	125	42	67	22
1960		13,750	1,801	10,032	5,604	4,428	516	705	453	90	40	67	55	385	264	148	48	68	48
1961		14,500	1,987	10,353	5,685	4,668	491	834	557	101	40	75	62	440	304	169	49	86	92
1962		15,630	2,188	11,037	6,008	5,029	420	993	687	112	41	84	70	500	363	200	54	109	130
1963		17,543	2,558	12,216	6,856	5,360	439	1,178	839	125	41	96	78	580	408	234	55	119	165
1964		19,058	2,965	13,049	7,257	5,792	418	1,375	995	138	41	114	88	629	417	250	55	112	205
1965		20,243	3,156	13,812	7,367	6,445	364	1,595	1,167	150	42	136	101	630	472	286	62	124	215
1966		22,104	3,308	15,193	7,977	7,216	387	1,818	1,335	160	45	165	114	652	537	329	70	138	210
1967		23,344	3,444	15,966	7,946	8,020	417	2,035	1,491	168	52	200	126	696	561	342	74	145	225
1968		24,691	3,497	17,014	8,145	8,869	440	2,187	1,586	185	58	221	139	722	596	364	81	151	235
1969		26,000	3,790	17,844	7,987	9,857	469	2,280	1,624	208	61	233	155	731	642	388	93	161	245
1970		26,280	4,154	17,594	7,306	10,288	482	2,418	1,686	237	66	259	171	727	677	410	95	172	230
1971		26,980	4,409	17,829	7,175	10,654	520	2,565	1,760	262	72	290	182	735	709	427	98	184	215
1972		28,739	4,676	19,004	7,469	11,535	547	2,757	1,890	282	79	312	195	785	771	472	101	198	200
1973		31,003	4,837	20,704	7,600	13,104	597	2,953	2,009	302	90	343	211	841	882	566	105	211	190
1974		33,398	5,132	22,239	7,572	14,667	688	3,216	2,160	320	104	393	239	926	988	639	114	235	210
1975		35,753	5,561	23,460	7,878	15,582	809	3,570	2,400	348	118	432	272	1,067	1,062	675	124	262	225
1976		39,471	5,890	26,107	8,671	17,436	926	3,899	2,619	369	131	480	300	1,266	1,139	711	135	292	245
1977		43,368	6,211	28,863	9,523	19,340	992	4,346	2,893	394	155	569	337	1,467	1,213	740	147	326	275
1978		48,740	6,962	32,222	10,107	22,115	1,103	4,996	3,329	443	182	679	364	1,772	1,353	830	160	363	333
1979		55,407	7,471	37,062	11,354	25,708	1,192	5,715	3,848	482	215	785	386	2,013	1,564	985	174	405	390
1980		63,240	7,831	43,228	12,752	30,476	1,304	6,455	4,335	519	264	920	419	2,306	1,641	1,000	189	452	475
1981		72,293	8,605	50,425	14,997	35,428	1,410	7,085	4,670	581	314	1,058	463	2,484	1,747	1,038	206	504	538
1982		80,808	9,501	57,166	17,061	40,105	1,509	7,603	4,879	621	363	1,207	534	2,544	1,961	1,175	224	561	525
1983		90,010	10,830	63,683	19,095	44,588	1,624	8,251	5,210	658	432	1,357	595	2,840	2,182	1,313	244	626	600
1984		102,282	11,916	73,061	21,657	51,404	1,770	9,154	5,748	721	518	1,514	654	3,243	2,513	1,550	265	698	625
1985		114,692	13,093	82,376	25,333	57,043	1,870	10,308	6,388	834	630	1,743	713	3,616	2,767	1,700	289	778	663
1986		120,285	13,504	85,932	26,000	59,932	1,917	11,540	7,028	969	745	2,019	780	3,973	2,882	1,700	314	867	538
1987		126,249	13,588	90,160	28,757	61,403	2,027	12,807	7,768	1,065	831	2,262	882	4,287	2,878	1,569	342	967	501
1988		133,898	14,342	94,893	28,221	66,672	2,140	14,220	8,592	1,165	933	2,527	1,003	4,581	3,213	1,762	372	1,078	510
1989		141,921	15,231	99,860	26,359	73,501	2,227	15,632	9,315	1,274	1,061	2,852	1,131	4,756	3,669	2,062	405	1,202	547
1990		151,978	15,671	107,404	25,802	81,602	2,312	16,936	9,936	1,399	1,166	3,187	1,249	4,894	4,126	2,346	440	1,340	636
1991		160,891	15,249	114,675	24,095	90,580	2,296	18,203	10,664	1,483	1,242	3,457	1,358	5,120	4,652	2,679	479	1,494	696
1992		165,250	15,853	116,757	22,369	94,388	2,256	19,385	11,525	1,525	1,320	3,568	1,448	5,259	4,993	2,806	521	1,666	748

U.S. R&D expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs ^b		
	Funding sector:	Total	Federal	Total	Federal ^c	Industry ^d	Federal ^e	Total	Federal	Non-Federal ^e	Industry	U&C	Non-profits	Federal ^f	Total	Federal ^c	Industry	Non-profits	Federal ^g
1993		165,782	16,531	115,435	20,844	94,591	2,024	20,487	12,302	1,557	1,391	3,708	1,530	5,289	5,267	2,843	567	1,857	749
1994		169,212	16,355	117,392	20,261	97,131	2,220	21,595	12,987	1,622	1,456	3,937	1,594	5,294	5,599	2,911	617	2,071	758
1995		183,617	16,904	129,830	21,178	108,652	2,279	22,603	13,582	1,750	1,547	4,109	1,616	5,367	5,827	2,847	671	2,308	808
1996		197,288	16,585	142,371	21,356	121,015	2,255	23,702	14,073	1,860	1,671	4,434	1,665	5,395	6,209	2,906	730	2,574	772
1997		212,121	16,819	155,409	21,798	133,611	2,117	24,866	14,517	1,921	1,807	4,836	1,785	5,463	6,626	3,014	809	2,804	821
1998		226,305	17,362	167,102	22,086	145,016	2,062	26,151	15,147	1,970	1,947	5,168	1,919	5,559	7,225	3,281	880	3,064	843
1999		243,517	17,851	180,712	20,536	160,176	1,999	28,135	16,223	2,095	2,077	5,630	2,110	5,652	8,175	3,761	975	3,440	993
2000		264,725	17,917	197,604	17,183	180,421	1,935	30,633	17,681	2,242	2,180	6,205	2,327	5,741	9,429	4,449	1,103	3,877	1,465
2001 preliminary		273,565	21,048	198,505	16,899	181,606	1,965	33,295	19,332	2,375	2,263	6,819	2,507	5,957	10,667	5,309	1,110	4,248	2,129
2002 preliminary		276,185	23,788	194,430	17,085	177,345	2,235	36,019	21,066	2,472	2,341	7,455	2,685	6,060	11,620	5,918	1,083	4,619	2,034

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. Data for 1998 and later years are not directly comparable to data for 1997 and earlier years. For FY 1998, \$479 million in passthrough funds were reported. For FY 2002, \$865 million in passthrough funds are estimated.

^bBeginning in 2001, data for nonprofit FFRDCs are reported by FFRDCs. In prior years, data were collected from the Federal agencies supporting the FFRDCs.

^cExpenditures of industry FFRDCs for 1953–54 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–54.

^dIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^eBecause of limitations in the survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofit support for their own R&D.

^fIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures before 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Technical notes explaining methodological issues of measurement will be provided in National Science Foundation, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. This table incorporates the latest revisions to prior-year data. Do not use data published earlier.

SOURCES: National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-4

U.S. inflation-adjusted R&D expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

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Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs ^b		
	Funding sector:	Total	Federal	Total	Federal ^c	Industry ^d	Federal ^e	Total	Federal	Non-Federal ^e	Industry	U&C	Non-profits	Federal ^f	Total	Federal ^c	Industry	Non-profits	Federal ^g
1953		26,805	5,273	18,857	7,429	11,429	—	1,416	774	205	106	190	140	681	579	299	135	145	—
1954		28,912	4,951	20,936	9,002	11,934	—	1,548	846	229	121	203	149	826	651	332	159	159	—
1955		32,286	4,918	22,836	10,399	12,437	1,153	1,729	966	253	137	212	162	945	662	324	177	162	43
1956		41,746	5,528	30,670	14,645	16,024	1,809	1,912	1,081	276	154	225	176	1,061	711	345	181	186	54
1957		46,693	6,139	34,662	18,590	16,072	1,727	2,049	1,143	303	173	241	189	1,261	788	372	175	241	66
1958		50,659	6,962	37,274	20,499	16,774	1,712	2,269	1,294	333	180	256	206	1,458	901	439	176	287	83
1959		57,217	7,683	42,048	23,844	18,204	2,045	2,678	1,625	368	181	279	226	1,595	1,067	569	192	306	101
1960		61,966	8,115	45,210	25,255	19,955	2,325	3,175	2,039	406	180	302	248	1,735	1,190	667	216	306	216
1961		64,616	8,856	46,136	25,334	20,802	2,186	3,714	2,480	448	178	332	276	1,961	1,355	753	218	383	408
1962		68,734	9,620	48,536	26,420	22,115	1,847	4,365	3,019	493	178	369	306	2,199	1,596	880	237	479	572
1963		76,276	11,124	53,113	29,809	23,304	1,907	5,122	3,646	543	176	417	339	2,520	1,774	1,017	239	517	717
1964		81,653	12,705	55,908	31,093	24,816	1,791	5,889	4,263	589	174	486	377	2,695	1,787	1,071	236	480	878
1965		85,127	13,272	58,082	30,980	27,103	1,531	6,705	4,907	629	175	572	423	2,647	1,985	1,203	261	521	904
1966		90,367	13,523	62,114	32,612	29,501	1,582	7,433	5,458	654	184	673	464	2,664	2,193	1,343	286	564	859
1967		92,600	13,663	63,332	31,519	31,813	1,654	8,072	5,912	666	204	791	498	2,761	2,225	1,357	294	575	893
1968		93,881	13,297	64,692	30,970	33,722	1,671	8,316	6,030	702	219	838	527	2,745	2,266	1,384	308	574	894
1969		94,238	13,738	64,676	28,949	35,727	1,698	8,264	5,884	754	219	845	562	2,650	2,325	1,404	337	584	888
1970		90,435	14,294	60,544	25,141	35,403	1,659	8,319	5,800	816	225	890	588	2,500	2,328	1,409	327	592	791
1971		88,402	14,445	58,417	23,509	34,908	1,702	8,404	5,765	858	236	949	596	2,407	2,321	1,397	321	603	704
1972		90,316	14,694	59,723	23,473	36,251	1,717	8,664	5,940	886	248	979	611	2,467	2,421	1,482	317	622	629
1973		92,271	14,394	61,619	22,619	39,000	1,775	8,789	5,978	897	266	1,021	626	2,503	2,625	1,685	313	628	565
1974		91,203	14,015	60,729	20,677	40,052	1,877	8,781	5,898	874	284	1,072	653	2,529	2,698	1,744	312	642	573
1975		89,315	13,893	58,606	19,680	38,926	2,020	8,917	5,996	869	295	1,078	679	2,666	2,652	1,686	310	655	562
1976		93,312	13,925	61,719	20,499	41,220	2,189	9,216	6,191	872	310	1,135	708	2,992	2,692	1,681	320	691	579
1977		96,330	13,797	64,112	21,153	42,959	2,203	9,653	6,425	875	343	1,263	747	3,259	2,695	1,644	327	724	611
1978		101,057	14,435	66,809	20,956	45,853	2,286	10,358	6,901	919	376	1,408	754	3,673	2,806	1,721	332	754	689
1979		106,042	14,299	70,932	21,730	49,202	2,282	10,937	7,365	922	411	1,502	738	3,852	2,994	1,885	333	775	746
1980		110,869	13,728	75,785	22,356	53,429	2,286	11,317	7,599	909	462	1,612	735	4,043	2,877	1,753	332	792	833
1981		115,910	13,796	80,848	24,045	56,803	2,260	11,360	7,487	932	503	1,696	742	3,983	2,801	1,663	330	807	862
1982		121,975	14,342	86,288	25,752	60,536	2,278	11,475	7,364	937	548	1,821	805	3,839	2,960	1,774	339	848	792
1983		130,676	15,722	92,455	27,722	64,733	2,357	11,979	7,564	955	627	1,969	863	4,123	3,169	1,905	354	909	871
1984		143,171	16,679	102,269	30,315	71,954	2,478	12,813	8,045	1,009	724	2,119	915	4,540	3,518	2,170	372	977	875
1985		155,641	17,767	111,787	34,378	77,409	2,538	13,988	8,669	1,131	855	2,365	968	4,907	3,755	2,307	392	1,056	899
1986		159,720	17,932	114,104	34,524	79,580	2,545	15,323	9,331	1,287	989	2,680	1,036	5,275	3,826	2,257	417	1,152	714
1987		162,734	17,515	116,216	37,068	79,148	2,612	16,508	10,013	1,372	1,071	2,916	1,136	5,526	3,710	2,023	441	1,247	646
1988		166,935	17,881	118,306	35,184	83,122	2,668	17,728	10,712	1,452	1,163	3,150	1,250	5,711	4,005	2,197	464	1,344	635
1989		170,434	18,291	119,923	31,655	88,268	2,674	18,773	11,186	1,530	1,274	3,425	1,358	5,711	4,406	2,476	486	1,444	657
1990		175,677	18,115	124,152	29,825	94,327	2,672	19,577	11,485	1,617	1,347	3,683	1,444	5,657	4,769	2,711	509	1,549	735
1991		179,446	17,008	127,900	26,874	101,026	2,561	20,302	11,893	1,653	1,385	3,856	1,515	5,711	5,189	2,988	534	1,666	776
1992		179,933	17,261	127,131	24,356	102,774	2,456	21,107	12,549	1,660	1,437	3,885	1,576	5,726	5,436	3,055	567	1,814	814

U.S. inflation-adjusted R&D expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a				U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs ^b			
	Funding sector:			Total	Federal	Total		Federal ^c	Industry ^d	Federal ^e	Total		Federal	Non-Federal ^e	Industry		U&C	Non-profits	Federal ^f
1993	176,270	17,576	122,738	22,163	100,575	2,152	21,783	13,080	1,655	1,479	3,943	1,627	5,624	5,601	3,023	603	1,975	796
1994	176,245	17,035	122,271	21,103	101,168	2,312	22,492	13,527	1,689	1,516	4,101	1,660	5,514	5,831	3,032	642	2,157	790
1995	187,174	17,231	132,345	21,588	110,756	2,323	23,041	13,845	1,784	1,577	4,188	1,647	5,471	5,940	2,902	684	2,353	823
1996	197,288	16,585	142,371	21,356	121,015	2,255	23,702	14,073	1,860	1,671	4,434	1,665	5,395	6,209	2,906	730	2,574	772
1997	208,064	16,497	152,436	21,381	131,055	2,077	24,391	14,239	1,885	1,773	4,744	1,751	5,358	6,500	2,956	793	2,750	805
1998	219,288	16,824	161,921	21,401	140,519	1,998	25,340	14,677	1,909	1,886	5,008	1,860	5,387	7,001	3,179	853	2,969	817
1999	232,697	17,058	172,683	19,624	153,059	1,910	26,885	15,503	2,002	1,985	5,380	2,016	5,401	7,812	3,594	932	3,287	949
2000	247,663	16,763	184,868	16,075	168,793	1,811	28,659	16,541	2,097	2,039	5,805	2,177	5,371	8,821	4,162	1,032	3,627	1,371
2001	preliminary	250,024	19,237	181,423	15,445	165,978	1,796	30,430	17,668	2,170	2,068	6,232	2,292	5,444	9,750	4,852	1,015	3,883	1,945
2002	preliminary	249,678	21,505	175,769	15,445	160,324	2,020	32,562	19,044	2,234	2,116	6,740	2,427	5,478	10,505	5,350	979	4,176	1,839

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^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. Data for 1998 and later years are not directly comparable to data for 1997 and earlier years. For FY 1998, \$479 million in passthrough funds were reported. For FY 2002, \$865 million in passthrough funds are estimated.

^bBeginning in 2001, data for nonprofit FFRDCs are reported by FFRDCs. In prior years, data were collected from the Federal agencies supporting the FFRDCs.

^cExpenditures of industry FFRDCs for 1953–54 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–54.

^dIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^eBecause of limitations in the survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofit support for their own R&D.

^fIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures before 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Technical notes explaining methodological issues of measurement will be provided in National Science Foundation, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. This table incorporates the latest revisions to prior-year data. Do not use data published earlier.

SOURCES: National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-5

U.S. R&D expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Funding sector:	Total	Federal Government								Industry			U&C	Nonprofit		Non-Federal ^a		
	Performing sector:		Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profit ^e	Nonprofit FFRDCs ^{b,e}	Total	Industry ^f	U&C ^c	Non-profit	Total	Non-profit	U&C ^c	U&C ^c	
1953		5,160	2,783	1,015	1,430	—	149	131	58	—	2,247	2,200	21	26	37	55	28	27	40
1954		5,621	3,102	963	1,750	—	165	161	65	—	2,375	2,320	24	31	40	60	31	29	45
1955		6,386	3,708	973	2,057	228	191	187	64	9	2,522	2,460	27	35	42	64	32	32	50
1956		8,537	5,015	1,130	2,995	370	221	217	71	11	3,346	3,277	32	37	46	74	38	36	57
1957		9,866	6,191	1,297	3,928	365	242	267	79	14	3,470	3,396	37	37	51	91	51	40	64
1958		10,963	7,022	1,507	4,436	371	280	316	95	18	3,707	3,630	39	38	56	107	62	45	72
1959		12,519	8,197	1,681	5,217	448	356	349	125	22	4,065	3,983	40	42	61	117	67	50	81
1960		13,750	8,954	1,801	5,604	516	453	385	148	48	4,516	4,428	40	48	67	123	68	55	90
1961		14,500	9,420	1,987	5,685	491	557	440	169	92	4,757	4,668	40	49	75	148	86	62	101
1962		15,630	10,132	2,188	6,008	420	687	500	200	130	5,124	5,029	41	54	84	179	109	70	112
1963		17,543	11,670	2,558	6,856	439	839	580	234	165	5,456	5,360	41	55	96	197	119	78	125
1964		19,058	12,719	2,965	7,257	418	995	629	250	205	5,888	5,792	41	55	114	200	112	88	138
1965		20,243	13,185	3,156	7,367	364	1,167	630	286	215	6,549	6,445	42	62	136	225	124	101	150
1966		22,104	14,197	3,308	7,977	387	1,335	652	329	210	7,331	7,216	45	70	165	252	138	114	160
1967		23,344	14,561	3,444	7,946	417	1,491	696	342	225	8,146	8,020	52	74	200	271	145	126	168
1968		24,691	14,989	3,497	8,145	440	1,586	722	364	235	9,008	8,869	58	81	221	290	151	139	185
1969		26,000	15,233	3,790	7,987	469	1,624	731	388	245	10,011	9,857	61	93	233	316	161	155	208
1970		26,280	14,993	4,154	7,306	482	1,686	727	410	230	10,449	10,288	66	95	259	343	172	171	237
1971		26,980	15,239	4,409	7,175	520	1,760	735	427	215	10,824	10,654	72	98	290	366	184	182	262
1972		28,739	16,038	4,676	7,469	547	1,890	785	472	200	11,715	11,535	79	101	312	393	198	195	282
1973		31,003	16,639	4,837	7,600	597	2,009	841	566	190	13,299	13,104	90	105	343	422	211	211	302
1974		33,398	17,326	5,132	7,572	688	2,160	926	639	210	14,885	14,667	104	114	393	474	235	239	320
1975		35,753	18,615	5,561	7,878	809	2,400	1,067	675	225	15,824	15,582	118	124	432	534	262	272	348
1976		39,471	20,328	5,890	8,671	926	2,619	1,266	711	245	17,702	17,436	131	135	480	592	292	300	369
1977		43,368	22,101	6,211	9,523	992	2,893	1,467	740	275	19,642	19,340	155	147	569	662	326	337	394
1978		48,740	24,434	6,962	10,107	1,103	3,329	1,772	830	333	22,457	22,115	182	160	679	727	363	364	443
1979		55,407	27,253	7,471	11,354	1,192	3,848	2,013	985	390	26,097	25,708	215	174	785	791	405	386	482
1980		63,240	30,002	7,831	12,752	1,304	4,335	2,306	1,000	475	30,929	30,476	264	189	920	871	452	419	519
1981		72,293	33,740	8,605	14,997	1,410	4,670	2,484	1,038	538	35,948	35,428	314	206	1,058	967	504	463	581
1982		80,808	37,194	9,501	17,061	1,509	4,879	2,544	1,175	525	40,692	40,105	363	224	1,207	1,095	561	534	621
1983		90,010	41,511	10,830	19,095	1,624	5,210	2,840	1,313	600	45,264	44,588	432	244	1,357	1,220	626	595	658
1984		102,282	46,508	11,916	21,657	1,770	5,748	3,243	1,550	625	52,187	51,404	518	265	1,514	1,351	698	654	721
1985		114,692	52,662	13,093	25,333	1,870	6,388	3,616	1,700	663	57,962	57,043	630	289	1,743	1,491	778	713	834
1986		120,285	54,659	13,504	26,000	1,917	7,028	3,973	1,700	538	60,991	59,932	745	314	2,019	1,647	867	780	969
1987		126,249	58,498	13,588	28,757	2,027	7,768	4,287	1,569	501	62,576	61,403	831	342	2,262	1,849	967	882	1,065
1988		133,898	60,148	14,342	28,221	2,140	8,592	4,581	1,762	510	67,977	66,672	933	372	2,527	2,081	1,078	1,003	1,165
1989		141,921	60,495	15,231	26,359	2,227	9,315	4,756	2,062	547	74,966	73,501	1,061	405	2,852	2,333	1,202	1,131	1,274
1990		151,978	61,596	15,671	25,802	2,312	9,936	4,894	2,346	636	83,208	81,602	1,166	440	3,187	2,589	1,340	1,249	1,399
1991		160,891	60,799	15,249	24,095	2,296	10,664	5,120	2,679	696	92,300	90,580	1,242	479	3,457	2,852	1,494	1,358	1,483
1992		165,250	60,815	15,853	22,369	2,256	11,525	5,259	2,806	748	96,229	94,388	1,320	521	3,568	3,113	1,666	1,448	1,525

U.S. R&D expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

Year	Funding sector:	Total	Federal Government							Industry			U&C	Nonprofit		Non-Federal ^a			
	Performing sector:		Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profit ^e	Nonprofit FFRDCs ^{b,e}	Total	Industry ^f	U&C ^c	Non-profit	U&C ^c	U&C ^c		
1993	165,782	60,581	16,531	20,844	2,024	12,302	5,289	2,843	749	96,549	94,591	1,391	567	3,708	3,387	1,857	1,530	1,557
1994	169,212	60,787	16,355	20,261	2,220	12,987	5,294	2,911	758	99,203	97,131	1,456	617	3,937	3,664	2,071	1,594	1,622
1995	183,617	62,965	16,904	21,178	2,279	13,582	5,367	2,847	808	110,870	108,652	1,547	671	4,109	3,924	2,308	1,616	1,750
1996	197,288	63,341	16,585	21,356	2,255	14,073	5,395	2,906	772	123,416	121,015	1,671	730	4,434	4,238	2,574	1,665	1,860
1997	212,121	64,548	16,819	21,798	2,117	14,517	5,463	3,014	821	136,227	133,611	1,807	809	4,836	4,589	2,804	1,785	1,921
1998	226,305	66,340	17,362	22,086	2,062	15,147	5,559	3,281	843	147,843	145,016	1,947	880	5,168	4,984	3,064	1,919	1,970
1999	243,517	67,015	17,851	20,536	1,999	16,223	5,652	3,761	993	163,229	160,176	2,077	975	5,630	5,549	3,440	2,110	2,095
2000	264,725	66,371	17,917	17,183	1,935	17,681	5,741	4,449	1,465	183,703	180,421	2,180	1,103	6,205	6,204	3,877	2,327	2,242
2001 preliminary	273,565	72,637	21,048	16,899	1,965	19,332	5,957	5,309	2,129	184,978	181,606	2,263	1,110	6,819	6,756	4,248	2,507	2,375
2002 preliminary	276,185	78,185	23,788	17,085	2,235	21,066	6,060	5,918	2,034	180,769	177,345	2,341	1,083	7,455	7,304	4,619	2,685	2,472

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^aBecause of limitations in the survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofit support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–54 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–63.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. Data for 1998 and later years are not directly comparable to data for 1997 and earlier years. For FY 1998, \$479 million in passthrough funds were reported. For FY 2002, \$865 million in passthrough funds are estimated.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eBeginning in 2001, data for nonprofit FFRDCs are reported by FFRDCs. In prior years, data were collected from the Federal agencies supporting the FFRDCs.

^fIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures before 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Technical notes explaining methodological issues of measurement will be provided in National Science Foundation, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. This table incorporates the latest revisions to prior-year data. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-6
U.S. inflation-adjusted R&D expenditures, by source of funds and performing sector: 1953–2002
(Millions of constant 1996 dollars)

Year	Funding sector:		Federal Government								Industry				U&C		Nonprofits		Non-Federal ^a
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^{b,e}	Total	Industry ^f	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1953	26,805	14,455	5,273	7,429	—	774	681	299	—	11,670	11,429	106	135	190	286	145	140	205
1954	28,912	15,957	4,951	9,002	—	846	826	332	—	12,215	11,934	121	159	203	309	159	149	229
1955	32,286	18,747	4,918	10,399	1,153	966	945	324	43	12,750	12,437	137	177	212	324	162	162	253
1956	41,746	24,523	5,528	14,645	1,809	1,081	1,061	345	54	16,359	16,024	154	181	225	362	186	176	276
1957	46,693	29,298	6,139	18,590	1,727	1,143	1,261	372	66	16,420	16,072	173	175	241	431	241	189	303
1958	50,659	32,447	6,962	20,499	1,712	1,294	1,458	439	83	17,130	16,774	180	176	256	492	287	206	333
1959	57,217	37,462	7,683	23,844	2,045	1,625	1,595	569	101	18,576	18,204	181	192	279	532	306	226	368
1960	61,966	40,352	8,115	25,255	2,325	2,039	1,735	667	216	20,352	19,955	180	216	302	554	306	248	406
1961	64,616	41,978	8,856	25,334	2,186	2,480	1,961	753	408	21,199	20,802	178	218	332	660	383	276	448
1962	68,734	44,557	9,620	26,420	1,847	3,019	2,199	880	572	22,531	22,115	178	237	369	785	479	306	493
1963	76,276	50,739	11,124	29,809	1,907	3,646	2,520	1,017	717	23,720	23,304	176	239	417	857	517	339	543
1964	81,653	54,496	12,705	31,093	1,791	4,263	2,695	1,071	878	25,225	24,816	174	236	486	857	480	377	589
1965	85,127	55,444	13,272	30,980	1,531	4,907	2,647	1,203	904	27,538	27,103	175	261	572	944	521	423	629
1966	90,367	58,040	13,523	32,612	1,582	5,458	2,664	1,343	859	29,971	29,501	184	286	673	1,028	564	464	654
1967	92,600	57,758	13,663	31,519	1,654	5,912	2,761	1,357	893	32,311	31,813	204	294	791	1,073	575	498	666
1968	93,881	56,991	13,297	30,970	1,671	6,030	2,745	1,384	894	34,249	33,722	219	308	838	1,101	574	527	702
1969	94,238	55,211	13,738	28,949	1,698	5,884	2,650	1,404	888	36,283	35,727	219	337	845	1,145	584	562	754
1970	90,435	51,594	14,294	25,141	1,659	5,800	2,500	1,409	791	35,955	35,403	225	327	890	1,180	592	588	816
1971	88,402	49,930	14,445	23,509	1,702	5,765	2,407	1,397	704	35,465	34,908	236	321	949	1,199	603	596	858
1972	90,316	50,401	14,694	23,473	1,717	5,940	2,467	1,482	629	36,816	36,251	248	317	979	1,234	622	611	886
1973	92,271	49,519	14,394	22,619	1,775	5,978	2,503	1,685	565	39,579	39,000	266	313	1,021	1,254	628	626	897
1974	91,203	47,314	14,015	20,677	1,877	5,898	2,529	1,744	573	40,648	40,052	284	312	1,072	1,295	642	653	874
1975	89,315	46,502	13,893	19,680	2,020	5,996	2,666	1,686	562	39,531	38,926	295	310	1,078	1,335	655	679	869
1976	93,312	48,056	13,925	20,499	2,189	6,191	2,992	1,681	579	41,849	41,220	310	320	1,135	1,399	691	708	872
1977	96,330	49,092	13,797	21,153	2,203	6,425	3,259	1,644	611	43,629	42,959	343	327	1,263	1,472	724	747	875
1978	101,057	50,662	14,435	20,956	2,286	6,901	3,673	1,721	689	46,561	45,853	376	332	1,408	1,507	754	754	919
1979	106,042	52,159	14,299	21,730	2,282	7,365	3,852	1,885	746	49,946	49,202	411	333	1,502	1,513	775	738	922
1980	110,869	52,599	13,728	22,356	2,286	7,599	4,043	1,753	833	54,223	53,429	462	332	1,612	1,527	792	735	909
1981	115,910	54,097	13,796	24,045	2,260	7,487	3,983	1,663	862	57,637	56,803	503	330	1,696	1,550	807	742	932
1982	121,975	56,141	14,342	25,752	2,278	7,364	3,839	1,774	792	61,422	60,536	548	339	1,821	1,653	848	805	937
1983	130,676	60,265	15,722	27,722	2,357	7,564	4,123	1,905	871	65,714	64,733	627	354	1,969	1,772	909	863	955
1984	143,171	65,101	16,679	30,315	2,478	8,045	4,540	2,170	875	73,050	71,954	724	372	2,119	1,892	977	915	1,009
1985	155,641	71,465	17,767	34,378	2,538	8,669	4,907	2,307	899	78,656	77,409	855	392	2,365	2,023	1,056	968	1,131
1986	159,720	72,579	17,932	34,524	2,545	9,331	5,275	2,257	714	80,987	79,580	989	417	2,680	2,188	1,152	1,036	1,287
1987	162,734	75,404	17,515	37,068	2,612	10,013	5,526	2,023	646	80,660	79,148	1,071	441	2,916	2,383	1,247	1,136	1,372
1988	166,935	74,988	17,881	35,184	2,668	10,712	5,711	2,197	635	84,749	83,122	1,163	464	3,150	2,595	1,344	1,250	1,452
1989	170,434	72,650	18,291	31,655	2,674	11,186	5,711	2,476	657	90,028	88,268	1,274	486	3,425	2,802	1,444	1,358	1,530
1990	175,677	71,201	18,115	29,825	2,672	11,485	5,657	2,711	735	96,183	94,327	1,347	509	3,683	2,993	1,549	1,444	1,617
1991	179,446	67,811	17,008	26,874	2,561	11,893	5,711	2,988	776	102,945	101,026	1,385	534	3,856	3,181	1,666	1,515	1,653
1992	179,933	66,219	17,261	24,356	2,456	12,549	5,726	3,055	814	104,779	102,774	1,437	567	3,885	3,390	1,814	1,576	1,660
1993	176,270	64,414	17,576	22,163	2,152	13,080	5,624	3,023	796	102,657	100,575	1,479	603	3,943	3,601	1,975	1,627	1,655

U.S. inflation-adjusted R&D expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

Year	Funding sector:	Federal Government									Industry			U&C	Nonprofits			Non-Federal ^a	
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^{b,e}	Total	Industry ^f	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1994	176,245	63,313	17,035	21,103	2,312	13,527	5,514	3,032	790	103,326	101,168	1,516	642	4,101	3,816	2,157	1,660	1,689
1995	187,174	64,184	17,231	21,588	2,323	13,845	5,471	2,902	823	113,017	110,756	1,577	684	4,188	4,000	2,353	1,647	1,784
1996	197,288	63,341	16,585	21,356	2,255	14,073	5,395	2,906	772	123,416	121,015	1,671	730	4,434	4,238	2,574	1,665	1,860
1997	208,064	63,313	16,497	21,381	2,077	14,239	5,358	2,956	805	133,622	131,055	1,773	793	4,744	4,501	2,750	1,751	1,885
1998	219,288	64,283	16,824	21,401	1,998	14,677	5,387	3,179	817	143,258	140,519	1,886	853	5,008	4,829	2,969	1,860	1,909
1999	232,697	64,037	17,058	19,624	1,910	15,503	5,401	3,594	949	155,976	153,059	1,985	932	5,380	5,303	3,287	2,016	2,002
2000	247,663	62,093	16,763	16,075	1,811	16,541	5,371	4,162	1,371	171,863	168,793	2,039	1,032	5,805	5,804	3,627	2,177	2,097
2001 preliminary	250,024	66,387	19,237	15,445	1,796	17,668	5,444	4,852	1,945	169,060	165,978	2,068	1,015	6,232	6,174	3,883	2,292	2,170
2002 preliminary	249,678	70,681	21,505	15,445	2,020	19,044	5,478	5,350	1,839	163,420	160,324	2,116	979	6,740	6,603	4,176	2,427	2,234

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in the survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofit support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–54 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–63.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. Data for 1998 and later years are not directly comparable to data for 1997 and earlier years. For FY 1998, \$479 million in passthrough funds were reported. For FY 2002, \$865 million in passthrough funds are estimated.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eBeginning in 2001, data for nonprofit FFRDCs are reported by FFRDCs. In prior years, data were collected from the Federal agencies supporting the FFRDCs.

^fIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and for Federal Government expenditures before 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Technical notes explaining methodological issues of measurement will be provided in National Science Foundation, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. This table incorporates the latest revisions to prior-year data. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-7

U.S. basic research expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1953		460	102	151	19	132	—	123	82	7	13	6	16	36	48	27	9	12	—
1954		509	96	166	23	143	—	148	97	10	15	8	18	44	55	31	11	13	—
1955		579	98	189	27	162	—	180	117	14	17	12	21	50	63	36	13	14	—
1956		718	114	253	37	216	—	220	143	19	20	15	24	58	74	42	15	17	—
1957		814	124	271	41	230	—	261	167	25	23	20	27	72	87	49	15	23	—
1958		944	149	295	43	252	—	312	202	31	24	24	31	85	103	59	16	28	—
1959		1,087	165	320	72	248	—	388	263	38	24	28	36	95	120	72	18	30	—
1960		1,286	184	376	79	297	—	485	341	45	25	33	41	106	136	85	21	30	—
1961		1,512	230	395	81	314	—	598	432	54	25	40	48	126	164	105	22	37	—
1962		1,824	252	488	143	345	—	737	546	64	25	48	55	148	200	130	24	46	—
1963		2,115	285	522	147	375	—	909	689	75	25	58	63	175	225	150	25	50	—
1964		2,390	339	507	123	384	36	1,071	824	84	25	70	68	200	238	166	25	47	—
1965		2,665	375	563	157	406	30	1,221	944	94	27	86	70	218	260	179	29	52	—
1966		2,932	410	593	142	451	33	1,380	1,066	104	29	106	75	239	278	188	32	58	—
1967		3,168	434	595	168	427	35	1,554	1,188	114	34	136	83	263	289	194	34	61	—
1968		3,377	482	607	145	462	36	1,681	1,265	131	38	156	91	276	296	196	37	63	—
1969		3,490	545	581	123	458	37	1,754	1,288	153	40	171	103	272	302	192	43	67	—
1970		3,592	562	566	122	444	35	1,855	1,323	179	43	196	115	265	311	195	44	72	—
1971		3,723	581	557	101	456	36	1,968	1,385	194	50	214	127	252	329	207	45	77	—
1972		3,849	603	554	91	463	38	2,038	1,437	195	55	216	134	270	347	216	47	84	—
1973		4,106	652	595	96	499	43	2,103	1,489	196	59	223	137	343	371	232	49	90	—
1974		4,513	715	650	114	536	51	2,282	1,609	204	66	250	153	415	401	245	54	102	—
1975		4,883	760	677	104	573	61	2,480	1,768	212	72	264	164	476	430	255	59	116	—
1976		5,376	850	750	116	634	72	2,675	1,924	218	75	283	175	556	474	278	65	131	—
1977		6,013	943	836	135	701	80	2,967	2,114	232	89	334	198	667	521	301	72	148	—
1978		6,961	1,044	941	156	785	97	3,376	2,399	260	107	398	213	906	598	351	79	168	—
1979		7,840	1,112	1,054	161	893	108	3,828	2,719	286	128	466	229	1,050	689	413	87	190	—
1980		8,794	1,212	1,205	170	1,035	124	4,315	3,061	307	156	544	248	1,167	771	461	95	215	—
1981		9,828	1,343	1,477	164	1,313	135	4,737	3,331	338	183	615	269	1,284	853	505	105	243	—
1982		10,821	1,522	1,776	253	1,523	125	5,091	3,475	368	215	716	317	1,366	941	551	115	275	—
1983		12,064	1,733	2,106	346	1,760	122	5,518	3,689	396	260	816	358	1,536	1,050	613	127	311	—
1984		13,483	1,877	2,472	340	2,132	135	6,145	4,087	436	313	915	395	1,709	1,147	656	139	351	—
1985		14,854	1,947	2,731	358	2,373	128	7,024	4,606	514	389	1,075	440	1,793	1,231	681	153	397	—
1986		17,253	2,026	3,930	434	3,496	123	7,943	5,122	606	466	1,262	488	1,915	1,317	700	168	449	—
1987		18,547	2,047	4,181	598	3,583	191	8,644	5,527	659	514	1,399	545	2,086	1,399	707	185	507	—
1988		19,801	2,116	4,163	656	3,507	352	9,343	5,937	705	565	1,529	607	2,272	1,531	756	203	573	24
1989		21,914	2,309	4,818	986	3,832	423	10,218	6,422	766	637	1,714	680	2,371	1,730	860	223	647	46
1990		23,018	2,319	4,629	869	3,760	490	11,125	6,888	847	705	1,929	756	2,470	1,922	947	245	730	65
1991		27,143	2,378	7,376	1,251	6,125	464	12,061	7,423	912	764	2,127	836	2,657	2,129	1,036	269	825	77
1992		27,608	2,419	6,528	712	5,816	479	12,910	8,058	941	814	2,202	893	2,867	2,340	1,114	295	931	67

U.S. basic research expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs	
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1993		28,742	2,621	6,427	466	5,961	495	13,643	8,637	952	851	2,268	936	2,953	2,532	1,157	324	1,051	72
1994		29,650	2,547	6,514	436	6,078	510	14,393	9,135	991	889	2,405	973	2,934	2,678	1,137	356	1,186	75
1995		29,647	2,689	5,569	190	5,379	575	15,139	9,629	1,069	945	2,509	987	2,702	2,899	1,170	390	1,338	75
1996		32,770	2,680	7,498	650	6,848	687	16,033	10,087	1,148	1,032	2,738	1,028	2,606	3,187	1,248	428	1,510	79
1997		36,903	2,746	9,795	1,029	8,766	611	17,651	10,912	1,250	1,177	3,149	1,163	2,671	3,322	1,317	449	1,557	108
1998		35,252	3,003	5,853	1,002	4,851	564	19,309	11,875	1,331	1,315	3,491	1,296	2,660	3,651	1,461	489	1,701	213
1999		38,710	3,347	6,571	1,209	5,362	546	20,900	12,773	1,429	1,417	3,841	1,439	2,765	4,185	1,734	541	1,910	397
2000		42,367	3,765	6,960	943	6,017	529	22,760	13,887	1,536	1,493	4,250	1,594	2,873	4,864	2,099	612	2,153	616
2001 preliminary		46,723	4,317	7,911	754	7,157	537	24,646	15,127	1,619	1,542	4,649	1,709	2,912	5,495	2,520	616	2,359	904
2002 preliminary		49,567	4,617	7,751	762	6,989	611	26,678	16,484	1,685	1,596	5,082	1,830	2,962	6,020	2,854	601	2,565	928

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^dBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^eIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years.

Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-8

U.S. inflation-adjusted basic research expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

(Page 1 of 2)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs	
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1953		2,387	527	784	99	686	—	639	423	34	68	31	83	187	249	140	47	62	—
1954		2,616	494	854	118	736	—	759	496	49	77	43	93	226	283	159	57	67	—
1955		2,927	493	956	137	819	—	907	589	70	86	59	104	253	319	182	66	71	—
1956		3,511	555	1,237	181	1,056	—	1,076	697	93	95	76	115	284	359	203	73	83	—
1957		3,850	587	1,283	194	1,088	—	1,233	788	117	106	93	128	338	409	230	71	109	—
1958		4,360	689	1,363	199	1,165	—	1,442	933	144	111	111	143	393	474	270	74	129	—
1959		4,968	752	1,463	329	1,133	—	1,773	1,200	172	110	130	162	432	548	329	82	137	—
1960		5,795	827	1,694	356	1,338	—	2,183	1,534	203	110	151	185	478	613	383	95	135	—
1961		6,736	1,023	1,760	361	1,399	—	2,663	1,923	239	111	177	212	559	731	468	98	165	—
1962		8,021	1,108	2,146	629	1,517	—	3,239	2,399	280	110	210	240	649	880	572	106	202	—
1963		9,196	1,237	2,270	639	1,630	—	3,950	2,996	326	107	250	272	761	978	652	109	217	—
1964		10,238	1,452	2,172	527	1,645	152	4,587	3,528	361	107	298	291	855	1,020	711	107	201	—
1965		11,207	1,575	2,368	660	1,707	126	5,132	3,968	397	111	362	294	915	1,091	751	122	219	—
1966		11,985	1,676	2,424	581	1,844	133	5,642	4,358	423	119	435	307	975	1,135	767	131	237	—
1967		12,566	1,720	2,360	666	1,694	137	6,162	4,710	452	133	538	329	1,043	1,144	768	135	242	—
1968		12,840	1,833	2,308	551	1,757	137	6,390	4,810	497	143	594	346	1,048	1,125	745	141	240	—
1969		12,650	1,976	2,106	446	1,660	132	6,356	4,667	554	143	620	372	986	1,095	696	156	243	—
1970		12,362	1,934	1,948	420	1,528	119	6,383	4,551	617	148	673	394	910	1,068	669	151	248	—
1971		12,199	1,904	1,825	331	1,494	118	6,448	4,536	635	162	701	414	826	1,078	678	147	252	—
1972		12,095	1,894	1,741	286	1,455	118	6,403	4,516	614	173	679	421	849	1,091	679	148	264	—
1973		12,220	1,940	1,771	286	1,485	126	6,259	4,430	584	174	664	406	1,021	1,103	689	146	268	—
1974		12,323	1,952	1,775	311	1,464	139	6,230	4,394	557	180	683	416	1,132	1,095	669	147	278	—
1975		12,197	1,898	1,691	260	1,431	152	6,194	4,417	531	179	658	410	1,188	1,074	637	148	289	—
1976		12,709	2,010	1,773	274	1,499	170	6,323	4,548	515	177	670	413	1,314	1,120	656	154	309	—
1977		13,356	2,094	1,857	300	1,557	177	6,589	4,696	515	198	742	439	1,481	1,158	669	159	329	—
1978		14,434	2,165	1,951	323	1,628	200	7,000	4,974	539	221	826	441	1,878	1,239	728	164	348	—
1979		15,006	2,129	2,017	308	1,709	207	7,325	5,204	547	244	892	438	2,009	1,319	789	166	363	—
1980		15,418	2,125	2,113	298	1,815	218	7,565	5,366	538	273	954	435	2,045	1,352	809	167	376	—
1981		15,757	2,153	2,368	263	2,105	216	7,594	5,341	542	293	987	432	2,059	1,367	810	168	389	—
1982		16,334	2,297	2,681	382	2,299	189	7,685	5,245	556	325	1,081	478	2,062	1,421	832	174	415	—
1983		17,514	2,515	3,057	502	2,555	177	8,011	5,355	575	377	1,185	519	2,229	1,524	889	184	451	—
1984		18,873	2,627	3,460	476	2,984	189	8,601	5,720	610	438	1,281	553	2,392	1,605	919	195	492	—
1985		20,157	2,643	3,706	486	3,220	173	9,532	6,250	698	528	1,459	597	2,433	1,671	924	207	539	—
1986		22,910	2,690	5,218	576	4,642	164	10,546	6,801	804	618	1,676	647	2,543	1,748	929	223	596	—
1987		23,907	2,639	5,389	771	4,618	246	11,141	7,124	849	663	1,804	703	2,689	1,803	912	238	653	—
1988		24,687	2,638	5,190	818	4,372	439	11,648	7,401	879	704	1,907	757	2,832	1,909	943	253	714	30
1989		26,317	2,773	5,786	1,184	4,602	508	12,270	7,712	919	765	2,058	816	2,847	2,077	1,033	267	777	56
1990		26,607	2,680	5,351	1,005	4,346	566	12,859	7,962	979	815	2,230	874	2,855	2,222	1,095	283	844	75
1991		30,273	2,652	8,227	1,395	6,831	518	13,452	8,278	1,017	852	2,372	932	2,963	2,375	1,155	300	920	86
1992		30,061	2,634	7,108	775	6,333	521	14,057	8,774	1,025	887	2,398	973	3,121	2,548	1,213	321	1,014	73

U.S. inflation-adjusted basic research expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1993		30,560	2,787	6,834	495	6,338	526	14,506	9,183	1,012	905	2,411	995	3,140	2,692	1,230	344	1,117	77
1994		30,883	2,653	6,785	454	6,331	531	14,991	9,515	1,032	926	2,505	1,014	3,056	2,790	1,184	370	1,235	78
1995		30,221	2,741	5,677	194	5,483	586	15,432	9,815	1,089	963	2,558	1,006	2,754	2,955	1,193	398	1,364	77
1996		32,770	2,680	7,498	650	6,848	687	16,033	10,087	1,148	1,032	2,738	1,028	2,606	3,187	1,248	428	1,510	79
1997		36,198	2,693	9,608	1,009	8,598	599	17,313	10,704	1,226	1,155	3,088	1,140	2,620	3,259	1,291	440	1,527	106
1998		34,158	2,910	5,672	971	4,701	546	18,710	11,507	1,289	1,274	3,383	1,256	2,578	3,538	1,415	474	1,649	206
1999		36,990	3,198	6,279	1,155	5,124	522	19,971	12,206	1,366	1,354	3,670	1,376	2,642	3,999	1,657	517	1,825	379
2000		39,637	3,522	6,511	882	5,629	495	21,293	12,992	1,437	1,397	3,976	1,491	2,688	4,551	1,964	573	2,014	576
2001 preliminary		42,702	3,945	7,230	689	6,541	491	22,525	13,825	1,480	1,410	4,249	1,562	2,662	5,022	2,303	563	2,156	827
2002 preliminary		44,810	4,174	7,007	689	6,318	552	24,117	14,902	1,523	1,443	4,595	1,655	2,678	5,442	2,580	544	2,319	839

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^dBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^eIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-9

U.S. basic research expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c
1953		460	265	102	19	—	82	36	27	—	154	132	13	9	6	28	12	16	7
1954		509	291	96	23	—	97	44	31	—	169	143	15	11	8	31	13	18	10
1955		579	327	98	27	—	117	50	36	—	192	162	17	13	12	35	14	21	14
1956		718	393	114	37	—	143	58	42	—	251	216	20	15	15	41	17	24	19
1957		814	452	124	41	—	167	72	49	—	268	230	23	15	20	50	23	27	25
1958		944	538	149	43	—	202	85	59	—	292	252	24	16	24	59	28	31	31
1959		1,087	666	165	72	—	263	95	72	—	290	248	24	18	28	66	30	36	38
1960		1,286	794	184	79	—	341	106	85	—	343	297	25	21	33	71	30	41	45
1961		1,512	973	230	81	—	432	126	105	—	361	314	25	22	40	85	37	48	54
1962		1,824	1,218	252	143	—	546	148	130	—	394	345	25	24	48	101	46	55	64
1963		2,115	1,446	285	147	—	689	175	150	—	425	375	25	25	58	113	50	63	75
1964		2,390	1,687	339	123	36	824	200	166	—	434	384	25	25	70	115	47	68	84
1965		2,665	1,901	375	157	30	944	218	179	—	462	406	27	29	86	122	52	70	94
1966		2,932	2,077	410	142	33	1,066	239	188	—	512	451	29	32	106	133	58	75	104
1967		3,168	2,280	434	168	35	1,188	263	194	—	495	427	34	34	136	144	61	83	114
1968		3,377	2,400	482	145	36	1,265	276	196	—	537	462	38	37	156	154	63	91	131
1969		3,490	2,456	545	123	37	1,288	272	192	—	541	458	40	43	171	170	67	103	153
1970		3,592	2,500	562	122	35	1,323	265	195	—	531	444	43	44	196	187	72	115	179
1971		3,723	2,562	581	101	36	1,385	252	207	—	551	456	50	45	214	204	77	127	194
1972		3,849	2,654	603	91	38	1,437	270	216	—	565	463	55	47	216	218	84	134	195
1973		4,106	2,853	652	96	43	1,489	343	232	—	607	499	59	49	223	227	90	137	196
1974		4,513	3,148	715	114	51	1,609	415	245	—	656	536	66	54	250	254	102	153	204
1975		4,883	3,423	760	104	61	1,768	476	255	—	704	573	72	59	264	280	116	164	212
1976		5,376	3,796	850	116	72	1,924	556	278	—	774	634	75	65	283	305	131	175	218
1977		6,013	4,240	943	135	80	2,114	667	301	—	862	701	89	72	334	346	148	198	232
1978		6,961	4,953	1,044	156	97	2,399	906	351	—	970	785	107	79	398	380	168	213	260
1979		7,840	5,562	1,112	161	108	2,719	1,050	413	—	1,107	893	128	87	466	419	190	229	286
1980		8,794	6,195	1,212	170	124	3,061	1,167	461	—	1,286	1,035	156	95	544	463	215	248	307
1981		9,828	6,762	1,343	164	135	3,331	1,284	505	—	1,600	1,313	183	105	615	512	243	269	338
1982		10,821	7,292	1,522	253	125	3,475	1,366	551	—	1,854	1,523	215	115	716	591	275	317	368
1983		12,064	8,037	1,733	346	122	3,689	1,536	613	—	2,146	1,760	260	127	816	668	311	358	396
1984		13,483	8,803	1,877	340	135	4,087	1,709	656	—	2,584	2,132	313	139	915	746	351	395	436
1985		14,854	9,512	1,947	358	128	4,606	1,793	681	—	2,915	2,373	389	153	1,075	837	397	440	514
1986		17,253	10,320	2,026	434	123	5,122	1,915	700	—	4,130	3,496	466	168	1,262	936	449	488	606
1987		18,547	11,156	2,047	598	191	5,527	2,086	707	—	4,282	3,583	514	185	1,399	1,052	507	545	659
1988		19,801	12,113	2,116	656	352	5,937	2,272	756	24	4,274	3,507	565	203	1,529	1,180	573	607	705
1989		21,914	13,417	2,309	986	423	6,422	2,371	860	46	4,692	3,832	637	223	1,714	1,326	647	680	766
1990		23,018	14,046	2,319	869	490	6,888	2,470	947	65	4,710	3,760	705	245	1,929	1,486	730	756	847
1991		27,143	15,286	2,378	1,251	464	7,423	2,657	1,036	77	7,157	6,125	764	269	2,127	1,660	825	836	912
1992		27,608	15,715	2,419	712	479	8,058	2,867	1,114	67	6,925	5,816	814	295	2,202	1,824	931	893	941

U.S. basic research expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1993		28,742	16,400	2,621	466	495	8,637	2,953	1,157	72	7,136	5,961	851	324	2,268	1,987	1,051	936	952
1994		29,650	16,773	2,547	436	510	9,135	2,934	1,137	75	7,323	6,078	889	356	2,405	2,159	1,186	973	991
1995		29,647	17,030	2,689	190	575	9,629	2,702	1,170	75	6,714	5,379	945	390	2,509	2,325	1,338	987	1,069
1996		32,770	18,037	2,680	650	687	10,087	2,606	1,248	79	8,308	6,848	1,032	428	2,738	2,538	1,510	1,028	1,148
1997		36,903	19,394	2,746	1,029	611	10,912	2,671	1,317	108	10,392	8,766	1,177	449	3,149	2,719	1,557	1,163	1,250
1998		35,252	20,777	3,003	1,002	564	11,875	2,660	1,461	213	6,655	4,851	1,315	489	3,491	2,998	1,701	1,296	1,331
1999		38,710	22,770	3,347	1,209	546	12,773	2,765	1,734	397	7,320	5,362	1,417	541	3,841	3,349	1,910	1,439	1,429
2000		42,367	24,713	3,765	943	529	13,887	2,873	2,099	616	8,122	6,017	1,493	612	4,250	3,747	2,153	1,594	1,536
2001 preliminary		46,723	27,071	4,317	754	537	15,127	2,912	2,520	904	9,316	7,157	1,542	616	4,649	4,068	2,359	1,709	1,619
2002 preliminary		49,567	29,218	4,617	762	611	16,484	2,962	2,854	928	9,186	6,989	1,596	601	5,082	4,395	2,565	1,830	1,685

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-10

U.S. inflation-adjusted basic research expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

(Page 1 of 2)

Year	Funding sector:	Total	Federal Government							Industry			U&C	Nonprofits			Non-Federal ^a		
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1953		2,387	1,377	527	99	—	423	187	140	—	800	686	68	47	31	145	62	83	34
1954		2,616	1,494	494	118	—	496	226	159	—	869	736	77	57	43	159	67	93	49
1955		2,927	1,653	493	137	—	589	253	182	—	971	819	86	66	59	174	71	104	70
1956		3,511	1,919	555	181	—	697	284	203	—	1,225	1,056	95	73	76	198	83	115	93
1957		3,850	2,137	587	194	—	788	338	230	—	1,266	1,088	106	71	93	237	109	128	117
1958		4,360	2,484	689	199	—	933	393	270	—	1,349	1,165	111	74	111	273	129	143	144
1959		4,968	3,042	752	329	—	1,200	432	329	—	1,325	1,133	110	82	130	299	137	162	172
1960		5,795	3,578	827	356	—	1,534	478	383	—	1,543	1,338	110	95	151	320	135	185	203
1961		6,736	4,334	1,023	361	—	1,923	559	468	—	1,609	1,399	111	98	177	377	165	212	239
1962		8,021	5,356	1,108	629	—	2,399	649	572	—	1,733	1,517	110	106	210	442	202	240	280
1963		9,196	6,285	1,237	639	—	2,996	761	652	—	1,846	1,630	107	109	250	489	217	272	326
1964		10,238	7,226	1,452	527	152	3,528	855	711	—	1,859	1,645	107	107	298	493	201	291	361
1965		11,207	7,994	1,575	660	126	3,968	915	751	—	1,941	1,707	111	122	362	513	219	294	397
1966		11,985	8,489	1,676	581	133	4,358	975	767	—	2,093	1,844	119	131	435	544	237	307	423
1967		12,566	9,044	1,720	666	137	4,710	1,043	768	—	1,962	1,694	133	135	538	571	242	329	452
1968		12,840	9,124	1,833	551	137	4,810	1,048	745	—	2,040	1,757	143	141	594	586	240	346	497
1969		12,650	8,903	1,976	446	132	4,667	986	696	—	1,959	1,660	143	156	620	614	243	372	554
1970		12,362	8,603	1,934	420	119	4,551	910	669	—	1,827	1,528	148	151	673	642	248	394	617
1971		12,199	8,393	1,904	331	118	4,536	826	678	—	1,804	1,494	162	147	701	667	252	414	635
1972		12,095	8,341	1,894	286	118	4,516	849	679	—	1,776	1,455	173	148	679	685	264	421	614
1973		12,220	8,493	1,940	286	126	4,430	1,021	689	—	1,805	1,485	174	146	664	674	268	406	584
1974		12,323	8,597	1,952	311	139	4,394	1,132	669	—	1,791	1,464	180	147	683	695	278	416	557
1975		12,197	8,552	1,898	260	152	4,417	1,188	637	—	1,758	1,431	179	148	658	698	289	410	531
1976		12,709	8,973	2,010	274	170	4,548	1,314	656	—	1,830	1,499	177	154	670	722	309	413	515
1977		13,356	9,417	2,094	300	177	4,696	1,481	669	—	1,914	1,557	198	159	742	768	329	439	515
1978		14,434	10,269	2,165	323	200	4,974	1,878	728	—	2,012	1,628	221	164	826	788	348	441	539
1979		15,006	10,646	2,129	308	207	5,204	2,009	789	—	2,119	1,709	244	166	892	801	363	438	547
1980		15,418	10,860	2,125	298	218	5,366	2,045	809	—	2,255	1,815	273	167	954	811	376	435	538
1981		15,757	10,841	2,153	263	216	5,341	2,059	810	—	2,566	2,105	293	168	987	821	389	432	542
1982		16,334	11,007	2,297	382	189	5,245	2,062	832	—	2,798	2,299	325	174	1,081	893	415	478	556
1983		17,514	11,668	2,515	502	177	5,355	2,229	889	—	3,116	2,555	377	184	1,185	970	451	519	575
1984		18,873	12,322	2,627	476	189	5,720	2,392	919	—	3,617	2,984	438	195	1,281	1,044	492	553	610
1985		20,157	12,909	2,643	486	173	6,250	2,433	924	—	3,955	3,220	528	207	1,459	1,135	539	597	698
1986		22,910	13,703	2,690	576	164	6,801	2,543	929	—	5,484	4,642	618	223	1,676	1,243	596	647	804
1987		23,907	14,380	2,639	771	246	7,124	2,689	912	—	5,519	4,618	663	238	1,804	1,356	653	703	849
1988		24,687	15,101	2,638	818	439	7,401	2,832	943	30	5,329	4,372	704	253	1,907	1,471	714	757	879
1989		26,317	16,113	2,773	1,184	508	7,712	2,847	1,033	56	5,635	4,602	765	267	2,058	1,593	777	816	919
1990		26,607	16,236	2,680	1,005	566	7,962	2,855	1,095	75	5,444	4,346	815	283	2,230	1,718	844	874	979
1991		30,273	17,049	2,652	1,395	518	8,278	2,963	1,155	86	7,983	6,831	852	300	2,372	1,852	920	932	1,017
1992		30,061	17,111	2,634	775	521	8,774	3,121	1,213	73	7,541	6,333	887	321	2,398	1,987	1,014	973	1,025

U.S. inflation-adjusted basic research expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

Year	Funding sector:	Federal Government									Industry			U&C	Nonprofits			Non-Federal ^a	
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1993		30,560	17,438	2,787	495	526	9,183	3,140	1,230	77	7,587	6,338	905	344	2,411	2,112	1,117	995	1,012
1994		30,883	17,470	2,653	454	531	9,515	3,056	1,184	78	7,627	6,331	926	370	2,505	2,249	1,235	1,014	1,032
1995		30,221	17,359	2,741	194	586	9,815	2,754	1,193	77	6,844	5,483	963	398	2,558	2,370	1,364	1,006	1,089
1996		32,770	18,037	2,680	650	687	10,087	2,606	1,248	79	8,308	6,848	1,032	428	2,738	2,538	1,510	1,028	1,148
1997		36,198	19,023	2,693	1,009	599	10,704	2,620	1,291	106	10,193	8,598	1,155	440	3,088	2,667	1,527	1,140	1,226
1998		34,158	20,133	2,910	971	546	11,507	2,578	1,415	206	6,448	4,701	1,274	474	3,383	2,905	1,649	1,256	1,289
1999		36,990	21,759	3,198	1,155	522	12,206	2,642	1,657	379	6,995	5,124	1,354	517	3,670	3,200	1,825	1,376	1,366
2000		39,637	23,120	3,522	882	495	12,992	2,688	1,964	576	7,599	5,629	1,397	573	3,976	3,505	2,014	1,491	1,437
2001 preliminary		42,702	24,742	3,945	689	491	13,825	2,662	2,303	827	8,514	6,541	1,410	563	4,249	3,718	2,156	1,562	1,480
2002 preliminary		44,810	26,414	4,174	689	552	14,902	2,678	2,580	839	8,305	6,318	1,443	544	4,595	3,973	2,319	1,655	1,523

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

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Appendix table 4-11

U.S. applied research expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1953		1,289	347	726	288	438	—	134	59	30	7	28	10	48	35	14	11	10	—
1954		1,378	330	814	322	492	—	137	60	32	8	28	10	58	40	16	13	11	—
1955		1,514	333	928	368	560	—	142	63	32	9	27	11	68	43	18	14	11	—
1956		1,928	387	1,268	474	794	—	146	65	33	10	27	11	79	49	21	14	14	—
1957		2,414	446	1,670	678	992	—	147	63	34	12	27	11	94	58	24	14	20	—
1958		2,758	516	1,911	774	1,137	—	152	66	35	12	27	12	111	69	30	14	25	—
1959		2,940	577	1,991	813	1,178	—	167	78	37	13	28	12	121	85	43	15	27	—
1960		3,065	615	2,029	833	1,196	—	186	93	39	13	29	12	129	108	63	17	28	—
1961		3,123	668	1,977	812	1,165	—	199	104	40	13	30	13	145	135	83	17	35	—
1962		3,698	709	2,449	1,011	1,438	—	216	119	41	14	30	13	163	162	98	19	45	—
1963		3,865	809	2,457	1,007	1,450	—	230	128	42	14	32	14	186	183	115	19	49	—
1964		4,193	947	2,538	978	1,560	54	256	142	45	14	37	18	203	196	130	19	47	—
1965		4,377	994	2,612	992	1,620	50	304	176	46	13	42	27	206	213	140	21	52	—
1966		4,668	1,012	2,790	986	1,804	68	351	208	47	14	48	34	213	234	153	24	57	—
1967		4,850	1,069	2,832	983	1,849	85	389	238	46	16	54	36	225	251	166	25	60	—
1968		5,141	1,112	3,037	956	2,081	91	405	250	46	16	55	39	221	276	186	28	62	—
1969		5,455	1,229	3,192	920	2,272	96	417	257	48	16	54	43	213	308	210	32	66	—
1970		5,737	1,334	3,330	952	2,378	82	451	280	51	18	56	47	213	328	225	33	70	—
1971		5,853	1,355	3,348	907	2,441	87	499	306	61	19	67	47	216	349	241	34	74	—
1972		6,148	1,434	3,407	845	2,562	109	619	391	74	21	82	52	224	357	243	35	79	—
1973		6,660	1,527	3,715	883	2,832	115	725	450	88	26	100	62	203	376	257	36	83	—
1974		7,354	1,652	4,168	905	3,263	130	794	477	96	32	118	72	191	420	290	39	91	—
1975		8,105	1,912	4,431	991	3,440	153	934	550	113	39	141	92	219	456	315	42	100	—
1976		8,999	2,068	4,945	1,033	3,912	190	1,042	596	127	45	166	109	263	492	338	45	109	—
1977		9,668	2,081	5,424	1,113	4,311	218	1,126	626	134	51	194	121	297	523	355	48	120	—
1978		10,708	2,242	6,065	1,195	4,870	239	1,247	676	151	61	232	128	324	592	409	52	132	—
1979		12,103	2,415	6,975	1,305	5,670	256	1,418	793	161	71	263	129	360	680	480	55	144	—
1980		13,751	2,546	8,175	1,625	6,550	281	1,622	912	174	88	308	140	421	706	489	60	158	—
1981		16,409	2,731	10,401	2,042	8,359	315	1,781	953	199	108	363	159	422	758	521	64	173	—
1982		18,291	2,802	11,956	2,593	9,363	379	1,915	1,007	207	121	402	178	433	808	550	69	189	—
1983		20,406	2,991	13,513	3,227	10,286	447	2,116	1,122	215	141	443	194	473	866	585	74	207	—
1984		22,526	2,961	15,218	3,677	11,541	568	2,332	1,226	234	168	491	212	548	899	594	79	226	—
1985		25,410	3,135	17,625	4,717	12,908	630	2,527	1,296	262	198	547	224	579	913	581	85	247	—
1986		27,257	3,204	19,131	4,049	15,082	628	2,780	1,393	298	229	620	240	554	961	600	91	270	—
1987		27,852	3,366	19,190	4,037	15,153	560	3,219	1,643	333	260	707	276	532	986	593	98	295	—
1988		29,528	3,362	20,377	3,846	16,531	372	3,779	1,957	377	302	818	325	547	1,026	599	105	322	66
1989		32,280	3,566	22,317	4,324	17,993	377	4,188	2,120	417	347	933	370	603	1,159	695	112	352	70
1990		34,907	3,652	24,399	5,967	18,432	398	4,405	2,139	453	377	1,031	404	689	1,284	780	120	384	81
1991		38,648	4,094	27,013	5,588	21,425	452	4,608	2,230	468	392	1,091	428	927	1,468	921	129	419	86
1992		37,915	4,337	25,660	4,476	21,184	489	4,880	2,413	479	414	1,120	454	940	1,528	933	138	456	81

U.S. applied research expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:			Total	Federal ^b	Industry ^c		Federal ^b	Total	Federal	Non-Federal ^d	Industry		U&C	Non-profits	Federal ^e		Total	Federal ^e
1993		37,297	4,838	24,251	4,295	19,956	452	5,146	2,539	496	443	1,181	487	962	1,544	900	148	497	103
1994		36,623	4,985	22,988	3,616	19,372	511	5,387	2,640	517	464	1,256	508	982	1,659	960	158	541	111
1995		40,856	4,952	26,919	3,164	23,755	459	5,655	2,775	559	494	1,311	516	1,050	1,692	934	170	589	129
1996		43,160	4,872	29,010	3,640	25,370	227	5,879	2,859	584	524	1,390	522	1,270	1,781	960	182	640	122
1997		46,547	4,997	32,430	2,648	29,782	217	5,511	2,549	551	517	1,384	510	1,337	1,926	1,011	205	711	128
1998		46,364	5,146	32,208	2,632	29,576	241	5,215	2,286	524	518	1,375	511	1,372	2,060	1,060	223	777	123
1999		51,864	5,530	36,418	3,109	33,309	272	5,843	2,739	546	542	1,467	550	1,251	2,420	1,301	247	872	130
2000		56,511	6,105	38,818	2,688	36,130	263	6,688	3,342	579	563	1,603	601	1,329	3,099	1,837	279	983	209
2001 preliminary		63,609	7,164	43,486	3,603	39,883	267	7,350	3,706	620	591	1,780	654	1,473	3,567	2,209	281	1,077	302
2002 preliminary		64,802	8,083	42,590	3,643	38,947	304	8,007	4,105	645	611	1,946	701	1,645	3,901	2,456	275	1,171	271

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^dBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^eIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

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Appendix table 4-12

U.S. inflation-adjusted applied research expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

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Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1953		6,696	1,803	3,771	1,496	2,275	—	694	306	157	34	145	52	247	182	73	57	52	—
1954		7,088	1,695	4,187	1,656	2,531	—	702	306	162	39	144	51	298	206	82	67	57	—
1955		7,652	1,684	4,692	1,860	2,831	—	715	319	163	43	137	53	344	217	91	71	56	—
1956		9,425	1,890	6,200	2,318	3,883	—	714	318	162	49	132	54	384	237	100	68	68	—
1957		11,422	2,108	7,903	3,209	4,695	—	693	298	161	54	128	52	445	272	111	66	95	—
1958		12,745	2,384	8,831	3,577	5,254	—	700	303	163	55	126	53	511	319	139	65	116	—
1959		13,435	2,635	9,100	3,716	5,384	—	763	354	169	57	128	55	551	386	194	69	123	—
1960		13,813	2,769	9,144	3,754	5,390	—	836	419	174	59	130	54	579	484	282	77	126	—
1961		13,917	2,977	8,810	3,619	5,192	—	885	461	178	58	132	56	646	599	368	76	156	—
1962		16,260	3,116	10,770	4,446	6,324	—	950	521	178	59	134	57	715	710	429	84	198	—
1963		16,802	3,517	10,683	4,378	6,304	—	998	554	183	61	141	59	809	796	500	83	213	—
1964		17,965	4,055	10,874	4,190	6,684	231	1,095	608	194	58	160	75	870	840	557	81	201	—
1965		18,406	4,178	10,984	4,172	6,812	208	1,276	738	195	55	177	111	864	896	589	88	219	—
1966		19,082	4,137	11,406	4,031	7,375	278	1,435	850	192	57	198	137	871	955	623	98	233	—
1967		19,238	4,238	11,234	3,899	7,334	337	1,541	942	181	61	214	143	893	996	658	99	238	—
1968		19,548	4,226	11,548	3,635	7,913	346	1,540	949	175	61	209	146	838	1,049	707	106	236	—
1969		19,773	4,455	11,569	3,335	8,235	348	1,511	930	174	58	195	154	772	1,116	761	116	239	—
1970		19,744	4,590	11,459	3,276	8,183	282	1,550	962	176	60	192	160	733	1,129	774	114	241	—
1971		19,178	4,440	10,970	2,972	7,998	285	1,635	1,003	198	61	219	154	706	1,142	788	111	242	—
1972		19,323	4,506	10,707	2,656	8,052	341	1,944	1,227	233	64	257	162	704	1,120	762	110	248	—
1973		19,822	4,546	11,057	2,628	8,429	342	2,156	1,338	261	77	297	183	603	1,119	765	107	247	—
1974		20,081	4,512	11,382	2,471	8,910	354	2,167	1,301	262	86	322	195	520	1,146	792	106	249	—
1975		20,248	4,776	11,069	2,476	8,594	382	2,333	1,373	283	96	351	230	547	1,140	787	104	249	—
1976		21,274	4,890	11,690	2,442	9,248	448	2,463	1,408	301	105	391	258	621	1,162	798	106	259	—
1977		21,475	4,621	12,048	2,472	9,576	484	2,500	1,389	299	113	431	268	660	1,162	789	107	267	—
1978		22,202	4,648	12,575	2,478	10,097	495	2,585	1,401	314	125	481	264	672	1,227	848	107	273	—
1979		23,164	4,622	13,349	2,498	10,852	490	2,713	1,517	309	137	504	247	689	1,301	919	106	276	—
1980		24,108	4,463	14,332	2,849	11,483	492	2,844	1,599	304	155	540	246	738	1,238	857	104	277	—
1981		26,308	4,379	16,676	3,274	13,402	505	2,855	1,527	319	173	581	255	677	1,215	836	102	277	—
1982		27,610	4,229	18,047	3,914	14,133	572	2,890	1,519	313	183	607	268	653	1,219	830	104	285	—
1983		29,625	4,343	19,618	4,685	14,933	649	3,072	1,629	312	205	643	282	687	1,257	849	107	300	—
1984		31,531	4,145	21,302	5,147	16,155	795	3,264	1,716	328	235	688	297	768	1,258	831	111	317	—
1985		34,482	4,254	23,918	6,401	17,517	855	3,430	1,759	355	268	743	304	786	1,240	789	115	336	—
1986		36,193	4,254	25,403	5,376	20,027	833	3,691	1,849	396	304	824	318	735	1,276	797	121	359	—
1987		35,901	4,338	24,736	5,204	19,532	722	4,149	2,118	429	335	912	356	685	1,271	764	126	381	—
1988		36,814	4,191	25,405	4,795	20,610	463	4,712	2,440	470	377	1,020	405	682	1,279	746	131	402	82
1989		38,765	4,283	26,801	5,193	21,608	453	5,029	2,546	501	417	1,121	445	724	1,392	834	135	423	84
1990		40,351	4,222	28,204	6,897	21,306	460	5,092	2,473	523	436	1,192	467	796	1,484	901	139	444	94
1991		43,105	4,566	30,128	6,232	23,896	504	5,140	2,487	522	437	1,216	478	1,033	1,638	1,027	144	467	96
1992		41,284	4,722	27,940	4,874	23,066	532	5,314	2,627	521	451	1,219	495	1,024	1,664	1,016	150	497	89

U.S. inflation-adjusted applied research expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:			Total	Federal ^b	Industry ^c		Federal ^b	Total	Federal	Non-Federal ^d	Industry		U&C	Non-profits	Federal ^e		Total	Federal ^b
1993		39,656	5,144	25,785	4,567	21,219	481	5,472	2,700	527	471	1,256	518	1,023	1,642	957	157	528	109
1994		38,145	5,192	23,943	3,766	20,177	532	5,611	2,750	539	484	1,308	530	1,022	1,728	999	165	563	116
1995		41,647	5,048	27,440	3,225	24,215	468	5,764	2,829	569	503	1,337	526	1,070	1,725	952	173	600	131
1996		43,160	4,872	29,010	3,640	25,370	227	5,879	2,859	584	524	1,390	522	1,270	1,781	960	182	640	122
1997		45,656	4,901	31,810	2,597	29,212	213	5,405	2,500	540	507	1,357	501	1,312	1,890	992	201	697	126
1998		44,926	4,986	31,209	2,550	28,659	234	5,053	2,215	508	502	1,333	495	1,329	1,996	1,027	216	752	119
1999		49,559	5,284	34,800	2,971	31,829	260	5,584	2,618	522	517	1,402	525	1,196	2,312	1,243	236	833	124
2000		52,868	5,712	36,316	2,515	33,801	246	6,257	3,127	542	527	1,499	562	1,243	2,899	1,718	261	919	195
2001 preliminary		58,135	6,548	39,744	3,293	36,451	244	6,718	3,387	566	540	1,627	598	1,347	3,260	2,019	257	984	276
2002 preliminary		58,583	7,307	38,502	3,293	35,209	275	7,239	3,711	583	552	1,759	633	1,487	3,527	2,220	248	1,058	245

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^dBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^eIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-13

U.S. applied research expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1953		1,289	756	347	288	—	59	48	14	—	456	438	7	11	28	20	10	10	30
1954		1,378	785	330	322	—	60	58	16	—	513	492	8	13	28	21	11	10	32
1955		1,514	850	333	368	—	63	68	18	—	583	560	9	14	27	22	11	11	32
1956		1,928	1,025	387	474	—	65	79	21	—	818	794	10	14	27	25	14	11	33
1957		2,414	1,304	446	678	—	63	94	24	—	1,018	992	12	14	27	31	20	11	34
1958		2,758	1,496	516	774	—	66	111	30	—	1,163	1,137	12	14	27	37	25	12	35
1959		2,940	1,630	577	813	—	78	121	43	—	1,206	1,178	13	15	28	39	27	12	37
1960		3,065	1,732	615	833	—	93	129	63	—	1,226	1,196	13	17	29	40	28	12	39
1961		3,123	1,811	668	812	—	104	145	83	—	1,195	1,165	13	17	30	48	35	13	40
1962		3,698	2,098	709	1,011	—	119	163	98	—	1,471	1,438	14	19	30	58	45	13	41
1963		3,865	2,245	809	1,007	—	128	186	115	—	1,483	1,450	14	19	32	63	49	14	42
1964		4,193	2,454	947	978	54	142	203	130	—	1,593	1,560	14	19	37	65	47	18	45
1965		4,377	2,556	994	992	50	176	206	140	—	1,654	1,620	13	21	42	79	52	27	46
1966		4,668	2,640	1,012	986	68	208	213	153	—	1,842	1,804	14	24	48	91	57	34	47
1967		4,850	2,765	1,069	983	85	238	225	166	—	1,890	1,849	16	25	54	96	60	36	46
1968		5,141	2,815	1,112	956	91	250	221	186	—	2,125	2,081	16	28	55	101	62	39	46
1969		5,455	2,925	1,229	920	96	257	213	210	—	2,320	2,272	16	32	54	109	66	43	48
1970		5,737	3,085	1,334	952	82	280	213	225	—	2,429	2,378	18	33	56	117	70	47	51
1971		5,853	3,111	1,355	907	87	306	216	241	—	2,494	2,441	19	34	67	121	74	47	61
1972		6,148	3,244	1,434	845	109	391	224	243	—	2,618	2,562	21	35	82	131	79	52	74
1973		6,660	3,434	1,527	883	115	450	203	257	—	2,894	2,832	26	36	100	145	83	62	88
1974		7,354	3,644	1,652	905	130	477	191	290	—	3,333	3,263	32	39	118	163	91	72	96
1975		8,105	4,139	1,912	991	153	550	219	315	—	3,520	3,440	39	42	141	192	100	92	113
1976		8,999	4,486	2,068	1,033	190	596	263	338	—	4,001	3,912	45	45	166	218	109	109	127
1977		9,668	4,689	2,081	1,113	218	626	297	355	—	4,410	4,311	51	48	194	241	120	121	134
1978		10,708	5,084	2,242	1,195	239	676	324	409	—	4,982	4,870	61	52	232	259	132	128	151
1979		12,103	5,609	2,415	1,305	256	793	360	480	—	5,797	5,670	71	55	263	273	144	129	161
1980		13,751	6,273	2,546	1,625	281	912	421	489	—	6,698	6,550	88	60	308	298	158	140	174
1981		16,409	6,985	2,731	2,042	315	953	422	521	—	8,531	8,359	108	64	363	332	173	159	199
1982		18,291	7,763	2,802	2,593	379	1,007	433	550	—	9,553	9,363	121	69	402	367	189	178	207
1983		20,406	8,846	2,991	3,227	447	1,122	473	585	—	10,501	10,286	141	74	443	401	207	194	215
1984		22,526	9,574	2,961	3,677	568	1,226	548	594	—	11,788	11,541	168	79	491	438	226	212	234
1985		25,410	10,939	3,135	4,717	630	1,296	579	581	—	13,191	12,908	198	85	547	471	247	224	262
1986		27,257	10,427	3,204	4,049	628	1,393	554	600	—	15,402	15,082	229	91	620	510	270	240	298
1987		27,852	10,730	3,366	4,037	560	1,643	532	593	—	15,511	15,153	260	98	707	571	295	276	333
1988		29,528	10,749	3,362	3,846	372	1,957	547	599	66	16,938	16,531	302	105	818	647	322	325	377
1989		32,280	11,755	3,566	4,324	377	2,120	603	695	70	18,452	17,993	347	112	933	722	352	370	417
1990		34,907	13,705	3,652	5,967	398	2,139	689	780	81	18,930	18,432	377	120	1,031	788	384	404	453
1991		38,648	14,297	4,094	5,588	452	2,230	927	921	86	21,946	21,425	392	129	1,091	847	419	428	468
1992		37,915	13,670	4,337	4,476	489	2,413	940	933	81	21,736	21,184	414	138	1,120	911	456	454	479

U.S. applied research expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

Year	Funding sector:	Federal Government								Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1993		37,297	14,089	4,838	4,295	452	2,539	962	900	103	20,547	19,956	443	148	1,181	984	497	487	496
1994		36,623	13,805	4,985	3,616	511	2,640	982	960	111	19,995	19,372	464	158	1,256	1,049	541	508	517
1995		40,856	13,463	4,952	3,164	459	2,775	1,050	934	129	24,418	23,755	494	170	1,311	1,104	589	516	559
1996		43,160	13,949	4,872	3,640	227	2,859	1,270	960	122	26,076	25,370	524	182	1,390	1,162	640	522	584
1997		46,547	12,888	4,997	2,648	217	2,549	1,337	1,011	128	30,504	29,782	517	205	1,384	1,221	711	510	551
1998		46,364	12,860	5,146	2,632	241	2,286	1,372	1,060	123	30,317	29,576	518	223	1,375	1,287	777	511	524
1999		51,864	14,332	5,530	3,109	272	2,739	1,251	1,301	130	34,098	33,309	542	247	1,467	1,421	872	550	546
2000		56,511	15,773	6,105	2,688	263	3,342	1,329	1,837	209	36,972	36,130	563	279	1,603	1,584	983	601	579
2001 preliminary		63,609	18,724	7,164	3,603	267	3,706	1,473	2,209	302	40,755	39,883	591	281	1,780	1,731	1,077	654	620
2002 preliminary		64,802	20,507	8,083	3,643	304	4,105	1,645	2,456	271	39,833	38,947	611	275	1,946	1,871	1,171	701	645

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-14

U.S. inflation-adjusted applied research expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

Year	Funding sector:	Federal Government								Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1953		6,696	3,925	1,803	1,496	—	306	247	73	—	2,366	2,275	34	57	145	104	52	52	157
1954		7,088	4,038	1,695	1,656	—	306	298	82	—	2,636	2,531	39	67	144	108	57	51	162
1955		7,652	4,297	1,684	1,860	—	319	344	91	—	2,945	2,831	43	71	137	109	56	53	163
1956		9,425	5,010	1,890	2,318	—	318	384	100	—	4,000	3,883	49	68	132	122	68	54	162
1957		11,422	6,171	2,108	3,209	—	298	445	111	—	4,815	4,695	54	66	128	147	95	52	161
1958		12,745	6,913	2,384	3,577	—	303	511	139	—	5,374	5,254	55	65	126	169	116	53	163
1959		13,435	7,450	2,635	3,716	—	354	551	194	—	5,510	5,384	57	69	128	178	123	55	169
1960		13,813	7,803	2,769	3,754	—	419	579	282	—	5,525	5,390	59	77	130	180	126	54	174
1961		13,917	8,070	2,977	3,619	—	461	646	368	—	5,325	5,192	58	76	132	212	156	56	178
1962		16,260	9,226	3,116	4,446	—	521	715	429	—	6,467	6,324	59	84	134	255	198	57	178
1963		16,802	9,759	3,517	4,378	—	554	809	500	—	6,448	6,304	61	83	141	272	213	59	183
1964		17,965	10,512	4,055	4,190	231	608	870	557	—	6,823	6,684	58	81	160	276	201	75	194
1965		18,406	10,749	4,178	4,172	208	738	864	589	—	6,955	6,812	55	88	177	330	219	111	195
1966		19,082	10,791	4,137	4,031	278	850	871	623	—	7,531	7,375	57	98	198	370	233	137	192
1967		19,238	10,968	4,238	3,899	337	942	893	658	—	7,495	7,334	61	99	214	381	238	143	181
1968		19,548	10,702	4,226	3,635	346	949	838	707	—	8,080	7,913	61	106	209	382	236	146	175
1969		19,773	10,601	4,455	3,335	348	930	772	761	—	8,409	8,235	58	116	195	393	239	154	174
1970		19,744	10,618	4,590	3,276	282	962	733	774	—	8,357	8,183	60	114	192	401	241	160	176
1971		19,178	10,193	4,440	2,972	285	1,003	706	788	—	8,170	7,998	61	111	219	396	242	154	198
1972		19,323	10,196	4,506	2,656	341	1,227	704	762	—	8,226	8,052	64	110	257	410	248	162	233
1973		19,822	10,221	4,546	2,628	342	1,338	603	765	—	8,613	8,429	77	107	297	430	247	183	261
1974		20,081	9,950	4,512	2,471	354	1,301	520	792	—	9,102	8,910	86	106	322	444	249	195	262
1975		20,248	10,340	4,776	2,476	382	1,373	547	787	—	8,794	8,594	96	104	351	479	249	230	283
1976		21,274	10,606	4,890	2,442	448	1,408	621	798	—	9,459	9,248	105	106	391	517	259	258	301
1977		21,475	10,416	4,621	2,472	484	1,389	660	789	—	9,796	9,576	113	107	431	534	267	268	299
1978		22,202	10,541	4,648	2,478	495	1,401	672	848	—	10,330	10,097	125	107	481	537	273	264	314
1979		23,164	10,734	4,622	2,498	490	1,517	689	919	—	11,094	10,852	137	106	504	523	276	247	309
1980		24,108	10,998	4,463	2,849	492	1,599	738	857	—	11,742	11,483	155	104	540	523	277	246	304
1981		26,308	11,199	4,379	3,274	505	1,527	677	836	—	13,677	13,402	173	102	581	532	277	255	319
1982		27,610	11,717	4,229	3,914	572	1,519	653	830	—	14,419	14,133	183	104	607	554	285	268	313
1983		29,625	12,843	4,343	4,685	649	1,629	687	849	—	15,245	14,933	205	107	643	582	300	282	312
1984		31,531	13,402	4,145	5,147	795	1,716	768	831	—	16,500	16,155	235	111	688	614	317	297	328
1985		34,482	14,844	4,254	6,401	855	1,759	786	789	—	17,900	17,517	268	115	743	640	336	304	355
1986		36,193	13,845	4,254	5,376	833	1,849	735	797	—	20,451	20,027	304	121	824	677	359	318	396
1987		35,901	13,831	4,338	5,204	722	2,118	685	764	—	19,993	19,532	335	126	912	736	381	356	429
1988		36,814	13,401	4,191	4,795	463	2,440	682	746	82	21,117	20,610	377	131	1,020	807	402	405	470
1989		38,765	14,117	4,283	5,193	453	2,546	724	834	84	22,160	21,608	417	135	1,121	867	423	445	501
1990		40,351	15,843	4,222	6,897	460	2,473	796	901	94	21,881	21,306	436	139	1,192	911	444	467	523
1991		43,105	15,945	4,566	6,232	504	2,487	1,033	1,027	96	24,476	23,896	437	144	1,216	945	467	478	522
1992		41,284	14,885	4,722	4,874	532	2,627	1,024	1,016	89	23,668	23,066	451	150	1,219	991	497	495	521

U.S. inflation-adjusted applied research expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c
1993	39,656	14,980	5,144	4,567	481	2,700	1,023	957	109	21,847	21,219	471	157	1,256	1,047	528	518	527
1994	38,145	14,378	5,192	3,766	532	2,750	1,022	999	116	20,826	20,177	484	165	1,308	1,093	563	530	539
1995	41,647	13,724	5,048	3,225	468	2,829	1,070	952	131	24,891	24,215	503	173	1,337	1,126	600	526	569
1996	43,160	13,949	4,872	3,640	227	2,859	1,270	960	122	26,076	25,370	524	182	1,390	1,162	640	522	584
1997	45,656	12,641	4,901	2,597	213	2,500	1,312	992	126	29,920	29,212	507	201	1,357	1,197	697	501	540
1998	44,926	12,461	4,986	2,550	234	2,215	1,329	1,027	119	29,377	28,659	502	216	1,333	1,247	752	495	508
1999	49,559	13,695	5,284	2,971	260	2,618	1,196	1,243	124	32,583	31,829	517	236	1,402	1,358	833	525	522
2000	52,868	14,756	5,712	2,515	246	3,127	1,243	1,718	195	34,589	33,801	527	261	1,499	1,482	919	562	542
2001 preliminary	58,135	17,113	6,548	3,293	244	3,387	1,347	2,019	276	37,248	36,451	540	257	1,627	1,582	984	598	566
2002 preliminary	58,583	18,539	7,307	3,293	275	3,711	1,487	2,220	245	36,010	35,209	552	248	1,759	1,692	1,058	633	583

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-15

U.S. development expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:			Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^e	Total	Federal ^b	Industry	Non-profits	Federal ^b
1953		3,412	567	2,753	1,123	1,630	—	16	9	3	1	3	1	48	29	17	6	6	—
1954		3,734	537	3,090	1,405	1,685	—	17	9	3	1	3	1	59	32	18	7	7	—
1955		4,189	543	3,523	1,785	1,738	—	21	12	4	2	3	1	69	34	19	8	7	—
1956		5,855	631	5,084	2,817	2,267	—	25	14	4	2	4	2	81	35	20	8	7	—
1957		6,681	728	5,790	3,616	2,174	—	26	12	5	3	4	2	101	37	21	8	8	—
1958		7,214	842	6,183	3,942	2,241	—	28	13	6	3	4	2	120	42	25	8	9	—
1959		8,463	940	7,307	4,750	2,557	—	31	16	6	3	5	2	134	51	32	9	10	—
1960		9,360	1,003	8,104	5,169	2,935	—	35	19	6	3	5	2	151	69	49	10	10	—
1961		9,930	1,090	8,536	5,347	3,189	—	38	22	7	2	5	2	170	97	73	10	14	—
1962		10,116	1,227	8,527	5,281	3,246	—	40	23	8	2	6	2	190	132	103	11	18	—
1963		11,540	1,465	9,651	6,116	3,535	—	40	22	8	2	6	2	219	165	134	11	20	—
1964		12,476	1,680	10,004	6,156	3,848	329	49	30	8	2	7	3	227	188	159	11	18	—
1965		13,202	1,789	10,637	6,218	4,419	285	71	48	9	2	8	4	207	215	183	12	20	—
1966		14,505	1,886	11,810	6,849	4,961	287	87	61	9	2	10	5	200	236	199	14	23	—
1967		15,327	1,943	12,539	6,795	5,744	298	93	66	9	3	10	7	208	247	208	15	24	—
1968		16,173	1,904	13,370	7,044	6,326	313	102	72	8	4	9	9	226	259	217	16	26	—
1969		17,055	2,016	14,071	6,944	7,127	336	110	80	7	5	8	10	246	277	231	18	28	—
1970		16,950	2,258	13,698	6,232	7,466	366	112	84	6	5	7	10	249	268	220	18	30	—
1971		17,404	2,473	13,924	6,167	7,757	397	98	69	8	4	9	9	267	246	194	19	33	—
1972		18,742	2,639	15,043	6,533	8,510	401	101	63	12	4	14	9	291	267	213	19	35	—
1973		20,237	2,657	16,394	6,621	9,773	439	126	71	18	5	20	13	296	326	268	20	38	—
1974		21,532	2,765	17,421	6,553	10,868	507	141	75	20	7	25	15	321	377	314	22	42	—
1975		22,765	2,890	18,352	6,783	11,569	595	156	83	22	8	27	16	373	400	330	23	47	—
1976		25,096	2,972	20,412	7,522	12,890	665	182	100	24	12	31	16	447	418	341	25	52	—
1977		27,687	3,188	22,603	8,275	14,328	695	254	153	28	15	40	19	503	444	359	27	58	—
1978		31,070	3,676	25,216	8,756	16,460	767	373	254	32	15	49	24	542	496	403	30	64	—
1979		35,463	3,944	29,033	9,888	19,145	828	469	336	34	16	56	28	603	586	483	32	71	—
1980		40,695	4,072	33,848	10,957	22,891	899	518	362	38	19	68	31	719	639	525	35	79	—
1981		46,057	4,530	38,547	12,791	25,756	960	568	386	44	24	80	35	778	674	549	37	88	—
1982		51,696	5,178	43,434	14,215	29,219	1,005	597	397	46	27	88	39	745	737	599	40	98	—
1983		57,540	6,106	48,064	15,522	32,542	1,055	617	399	47	31	97	43	832	867	715	44	109	—
1984		66,273	7,078	55,371	17,640	37,731	1,068	677	435	51	37	108	47	986	1,093	925	47	120	—
1985		74,428	8,011	62,020	20,258	41,762	1,113	756	486	57	43	120	49	1,244	1,285	1,100	51	134	—
1986		75,775	8,275	62,871	21,517	41,354	1,166	818	513	65	50	136	53	1,504	1,141	938	55	149	—
1987		79,850	8,176	66,789	24,122	42,667	1,276	945	599	73	57	155	61	1,670	996	771	60	165	—
1988		84,569	8,864	70,353	23,719	46,634	1,416	1,098	698	83	66	180	71	1,762	655	407	65	183	420
1989		87,727	9,355	72,725	21,049	51,676	1,427	1,207	773	92	76	205	81	1,782	780	507	70	203	430
1990		94,053	9,700	78,376	18,966	59,410	1,424	1,407	909	99	83	226	89	1,735	920	619	75	226	490
1991		95,101	8,778	80,286	17,256	63,030	1,380	1,533	1,011	103	86	239	94	1,537	1,054	722	82	251	533
1992		99,726	9,098	84,569	17,181	67,388	1,289	1,595	1,054	105	91	246	100	1,452	1,125	758	88	279	599

U.S. development expenditures, by performing sector and source of funds: 1953–2002

(Millions of current dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:			Total	Federal ^b	Industry ^c		Federal ^b	Total	Federal	Non-Federal ^d	Industry		U&C	Non-profits	Federal ^b		Total	Federal ^b
1993		99,744	9,071	84,757	16,083	68,674	1,078	1,698	1,126	109	97	259	107	1,374	1,191	787	95	309	574
1994		102,939	8,823	87,890	16,209	71,681	1,199	1,815	1,212	114	102	276	112	1,378	1,261	815	103	343	573
1995		113,115	9,262	97,342	17,824	79,518	1,246	1,810	1,178	123	108	288	113	1,616	1,236	744	111	381	603
1996		121,359	9,033	105,863	17,066	88,797	1,342	1,790	1,127	128	115	305	115	1,520	1,241	698	120	423	571
1997		128,671	9,077	113,184	18,121	95,063	1,289	1,705	1,055	121	113	304	112	1,454	1,378	687	155	536	585
1998		144,689	9,214	129,041	18,452	110,589	1,257	1,628	985	115	114	302	112	1,527	1,515	760	168	586	507
1999		152,943	8,974	137,724	16,219	121,505	1,180	1,392	711	120	119	322	121	1,636	1,570	726	187	658	467
2000		165,847	8,047	151,826	13,552	138,274	1,143	1,186	451	127	124	352	132	1,539	1,466	513	211	742	640
2001 preliminary		163,233	9,567	147,108	12,542	134,566	1,160	1,299	499	136	130	391	144	1,571	1,606	581	212	813	922
2002 preliminary		161,816	11,088	144,088	12,680	131,409	1,320	1,334	477	142	134	427	154	1,452	1,699	608	207	884	835

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^dBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^eIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-16

U.S. inflation-adjusted development expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

(Page 1 of 2)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:			Total	Federal ^b	Industry ^c		Federal ^b	Total	Federal	Non-Federal ^d	Industry		U&C	Non-profits	Federal ^e		Total	Federal ^b
1953		17,722	2,943	14,301	5,834	8,468	—	83	44	15	5	14	5	247	148	86	31	31	—
1954		19,208	2,762	15,895	7,227	8,668	—	87	44	18	5	16	5	301	162	90	36	36	—
1955		21,178	2,743	17,811	9,024	8,787	—	106	58	19	8	16	5	349	169	94	40	35	—
1956		28,628	3,083	24,861	13,775	11,086	—	122	66	22	10	18	7	394	169	95	39	34	—
1957		31,619	3,443	27,402	17,113	10,289	—	123	57	25	12	20	9	478	173	97	38	38	—
1958		33,334	3,889	28,572	18,216	10,356	—	127	58	26	14	20	9	555	192	113	37	42	—
1959		38,679	4,296	33,396	21,709	11,686	—	142	71	27	14	21	9	612	233	146	41	46	—
1960		42,181	4,518	36,521	23,294	13,227	—	155	86	28	11	21	9	678	309	219	45	45	—
1961		44,249	4,855	38,039	23,828	14,211	—	167	96	31	9	23	9	755	432	325	45	62	—
1962		44,483	5,396	37,498	23,223	14,274	—	176	99	34	9	25	9	836	578	451	48	79	—
1963		50,172	6,370	41,961	26,591	15,370	—	174	96	34	9	26	9	950	717	583	48	87	—
1964		53,451	7,198	42,862	26,375	16,487	1,407	208	126	34	9	28	11	970	805	681	47	77	—
1965		55,515	7,521	44,731	26,148	18,583	1,196	296	202	36	8	33	17	868	902	767	50	84	—
1966		59,301	7,711	48,283	28,001	20,282	1,171	356	249	38	8	39	20	818	963	812	57	94	—
1967		60,797	7,707	49,738	26,954	22,785	1,180	369	260	34	10	40	26	825	978	823	60	95	—
1968		61,494	7,240	50,837	26,783	24,053	1,188	386	272	29	15	35	34	859	985	825	61	99	—
1969		61,815	7,306	51,000	25,169	25,832	1,218	397	288	26	18	29	36	892	1,002	835	65	101	—
1970		58,329	7,770	47,137	21,445	25,692	1,258	385	287	22	17	24	34	857	922	757	62	103	—
1971		57,025	8,101	45,623	20,206	25,416	1,299	321	226	26	13	28	28	875	806	636	62	108	—
1972		58,899	8,294	47,275	20,531	26,744	1,259	317	196	39	11	43	28	915	839	669	60	110	—
1973		60,228	7,908	48,792	19,705	29,086	1,307	374	210	52	15	59	37	879	969	796	60	113	—
1974		58,799	7,552	47,572	17,895	29,678	1,384	384	203	55	18	67	41	877	1,030	856	59	115	—
1975		56,870	7,219	45,846	16,945	28,901	1,485	390	206	55	20	69	40	931	1,000	824	58	117	—
1976		59,328	7,025	48,255	17,783	30,473	1,571	430	235	57	27	74	38	1,057	989	806	60	123	—
1977		61,499	7,081	50,207	18,381	31,826	1,543	564	340	62	32	89	41	1,118	987	797	61	128	—
1978		64,421	7,622	52,283	18,155	34,128	1,591	773	526	66	30	102	49	1,123	1,029	835	61	133	—
1979		67,873	7,548	55,566	18,924	36,641	1,585	899	644	65	30	107	53	1,155	1,121	923	61	137	—
1980		71,344	7,140	59,341	19,209	40,131	1,576	908	634	67	34	119	54	1,260	1,120	920	61	139	—
1981		73,844	7,264	61,804	20,508	41,295	1,539	910	619	70	38	128	56	1,247	1,081	880	60	141	—
1982		78,031	7,816	65,561	21,457	44,104	1,517	901	600	69	40	133	59	1,124	1,112	904	61	147	—
1983		83,537	8,864	69,779	22,535	47,244	1,531	896	580	69	45	141	62	1,207	1,259	1,038	63	158	—
1984		92,767	9,908	77,507	24,692	52,815	1,494	948	609	72	52	151	65	1,380	1,530	1,295	66	169	—
1985		101,002	10,871	84,163	27,491	56,673	1,510	1,026	660	78	59	163	67	1,688	1,744	1,493	69	182	—
1986		100,617	10,988	83,483	28,571	54,912	1,549	1,086	682	87	67	181	70	1,997	1,516	1,245	73	197	—
1987		102,926	10,538	86,090	31,093	54,997	1,645	1,218	772	94	74	200	78	2,152	1,283	994	77	213	—
1988		105,434	11,051	87,711	29,571	58,140	1,766	1,369	870	103	83	224	89	2,197	817	508	80	228	524
1989		105,352	11,235	87,336	25,278	62,058	1,713	1,473	928	110	91	246	98	2,140	937	609	84	244	517
1990		108,719	11,213	90,598	21,923	68,674	1,646	1,626	1,051	115	96	262	103	2,006	1,064	716	87	261	567
1991		106,069	9,790	89,545	19,246	70,299	1,539	1,710	1,128	115	96	267	105	1,714	1,176	805	91	280	594
1992		108,587	9,906	92,083	18,708	73,375	1,403	1,737	1,148	114	99	268	109	1,581	1,225	825	96	303	653

U.S. inflation-adjusted development expenditures, by performing sector and source of funds: 1953–2002

(Millions of constant 1996 dollars)

Year	Performing sector:	Total	Federal	Industry			Industry FFRDCs	U&C ^a					U&C FFRDCs	Other nonprofit institutions			Nonprofit FFRDCs		
	Funding sector:	Total	Federal	Total	Federal ^b	Industry ^c	Federal ^b	Total	Federal	Non-Federal ^d	Industry	U&C	Non-profits	Federal ^b	Total	Federal ^b	Industry	Non-profits	Federal ^b
1993		106,054	9,645	90,119	17,100	73,019	1,146	1,806	1,197	116	103	276	114	1,461	1,267	836	101	329	611
1994		107,217	9,190	91,543	16,883	74,660	1,249	1,890	1,262	118	106	287	116	1,436	1,314	849	107	358	596
1995		115,305	9,441	99,227	18,169	81,058	1,270	1,845	1,201	125	110	293	115	1,647	1,260	758	113	389	615
1996		121,359	9,033	105,863	17,066	88,797	1,342	1,790	1,127	128	115	305	115	1,520	1,241	698	120	423	571
1997		126,210	8,903	111,019	17,774	93,245	1,264	1,672	1,035	119	111	298	110	1,426	1,351	673	152	526	573
1998		140,203	8,928	125,040	17,880	107,160	1,218	1,578	955	112	110	293	109	1,480	1,468	736	163	568	491
1999		146,148	8,575	131,604	15,498	116,106	1,128	1,330	679	115	114	308	115	1,563	1,501	693	178	629	446
2000		155,158	7,529	142,041	12,679	129,362	1,069	1,109	422	119	116	329	123	1,440	1,371	480	197	694	599
2001 preliminary		149,187	8,744	134,449	11,463	122,986	1,061	1,187	456	124	118	357	131	1,436	1,468	531	194	743	843
2002 preliminary		146,285	10,024	130,259	11,463	118,796	1,193	1,206	431	128	121	386	139	1,313	1,536	549	187	799	755

FFRDC federally funded research and development center

U&C universities and colleges

^aAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

^dBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^eIncludes all R&D expenditures of FFRDCs administered by academic institutions.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-17

U.S. development expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

(Page 1 of 2)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1953		3,412	1,762	567	1,123	—	9	48	17	—	1,637	1,630	1	6	3	7	6	1	3
1954		3,734	2,027	537	1,405	—	9	59	18	—	1,693	1,685	1	7	3	8	7	1	3
1955		4,189	2,427	543	1,785	—	12	69	19	—	1,748	1,738	2	8	3	8	7	1	4
1956		5,855	3,561	631	2,817	—	14	81	20	—	2,277	2,267	2	8	4	9	7	2	4
1957		6,681	4,477	728	3,616	—	12	101	21	—	2,185	2,174	3	8	4	10	8	2	5
1958		7,214	4,941	842	3,942	—	13	120	25	—	2,252	2,241	3	8	4	11	9	2	6
1959		8,463	5,872	940	4,750	—	16	134	32	—	2,569	2,557	3	9	5	12	10	2	6
1960		9,360	6,390	1,003	5,169	—	19	151	49	—	2,948	2,935	3	10	5	12	10	2	6
1961		9,930	6,701	1,090	5,347	—	22	170	73	—	3,201	3,189	2	10	5	16	14	2	7
1962		10,116	6,823	1,227	5,281	—	23	190	103	—	3,259	3,246	2	11	6	20	18	2	8
1963		11,540	7,956	1,465	6,116	—	22	219	134	—	3,548	3,535	2	11	6	22	20	2	8
1964		12,476	8,580	1,680	6,156	329	30	227	159	—	3,861	3,848	2	11	7	21	18	3	8
1965		13,202	8,728	1,789	6,218	285	48	207	183	—	4,433	4,419	2	12	8	24	20	4	9
1966		14,505	9,481	1,886	6,849	287	61	200	199	—	4,977	4,961	2	14	10	28	23	5	9
1967		15,327	9,517	1,943	6,795	298	66	208	208	—	5,762	5,744	3	15	10	31	24	7	9
1968		16,173	9,775	1,904	7,044	313	72	226	217	—	6,346	6,326	4	16	9	35	26	9	8
1969		17,055	9,852	2,016	6,944	336	80	246	231	—	7,150	7,127	5	18	8	38	28	10	7
1970		16,950	9,408	2,258	6,232	366	84	249	220	—	7,489	7,466	5	18	7	40	30	10	6
1971		17,404	9,566	2,473	6,167	397	69	267	194	—	7,780	7,757	4	19	9	42	33	9	8
1972		18,742	10,139	2,639	6,533	401	63	291	213	—	8,533	8,510	4	19	14	44	35	9	12
1973		20,237	10,351	2,657	6,621	439	71	296	268	—	9,798	9,773	5	20	20	51	38	13	18
1974		21,532	10,534	2,765	6,553	507	75	321	314	—	10,896	10,868	7	22	25	57	42	15	20
1975		22,765	11,052	2,890	6,783	595	83	373	330	—	11,600	11,569	8	23	27	63	47	16	22
1976		25,096	12,046	2,972	7,522	665	100	447	341	—	12,927	12,890	12	25	31	68	52	16	24
1977		27,687	13,173	3,188	8,275	695	153	503	359	—	14,370	14,328	15	27	40	76	58	19	28
1978		31,070	14,397	3,676	8,756	767	254	542	403	—	16,504	16,460	15	30	49	88	64	24	32
1979		35,463	16,082	3,944	9,888	828	336	603	483	—	19,193	19,145	16	32	56	99	71	28	34
1980		40,695	17,534	4,072	10,957	899	362	719	525	—	22,945	22,891	19	35	68	110	79	31	38
1981		46,057	19,994	4,530	12,791	960	386	778	549	—	25,817	25,756	24	37	80	123	88	35	44
1982		51,696	22,139	5,178	14,215	1,005	397	745	599	—	29,286	29,219	27	40	88	137	98	39	46
1983		57,540	24,628	6,106	15,522	1,055	399	832	715	—	32,617	32,542	31	44	97	151	109	43	47
1984		66,273	28,131	7,078	17,640	1,068	435	986	925	—	37,815	37,731	37	47	108	167	120	47	51
1985		74,428	32,211	8,011	20,258	1,113	486	1,244	1,100	—	41,857	41,762	43	51	120	183	134	49	57
1986		75,775	33,913	8,275	21,517	1,166	513	1,504	938	—	41,460	41,354	50	55	136	201	149	53	65
1987		79,850	36,613	8,176	24,122	1,276	599	1,670	771	—	42,784	42,667	57	60	155	226	165	61	73
1988		84,569	37,287	8,864	23,719	1,416	698	1,762	407	420	46,765	46,634	66	65	180	255	183	71	83
1989		87,727	35,323	9,355	21,049	1,427	773	1,782	507	430	51,822	51,676	76	70	205	285	203	81	92
1990		94,053	33,844	9,700	18,966	1,424	909	1,735	619	490	59,568	59,410	83	75	226	315	226	89	99
1991		95,101	31,217	8,778	17,256	1,380	1,011	1,537	722	533	63,197	63,030	86	82	239	345	251	94	103
1992		99,726	31,430	9,098	17,181	1,289	1,054	1,452	758	599	67,567	67,388	91	88	246	378	279	100	105

U.S. development expenditures, by source of funds and performing sector: 1953–2002

(Millions of current dollars)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1993		99,744	30,093	9,071	16,083	1,078	1,126	1,374	787	574	68,866	68,674	97	95	259	416	309	107	109
1994		102,939	30,209	8,823	16,209	1,199	1,212	1,378	815	573	71,886	71,681	102	103	276	455	343	112	114
1995		113,115	32,472	9,262	17,824	1,246	1,178	1,616	744	603	79,738	79,518	108	111	288	495	381	113	123
1996		121,359	31,355	9,033	17,066	1,342	1,127	1,520	698	571	89,032	88,797	115	120	305	538	423	115	128
1997		128,671	32,267	9,077	18,121	1,289	1,055	1,454	687	585	95,331	95,063	113	155	304	648	536	112	121
1998		144,689	32,703	9,214	18,452	1,257	985	1,527	760	507	110,871	110,589	114	168	302	698	586	112	115
1999		152,943	29,912	8,974	16,219	1,180	711	1,636	726	467	121,810	121,505	119	187	322	779	658	121	120
2000		165,847	25,886	8,047	13,552	1,143	451	1,539	513	640	138,608	138,274	124	211	352	874	742	132	127
2001 preliminary		163,233	26,842	9,567	12,542	1,160	499	1,571	581	922	134,908	134,566	130	212	391	956	813	144	136
2002 preliminary		161,816	28,459	11,088	12,680	1,320	477	1,452	608	835	131,750	131,409	134	207	427	1,038	884	154	142

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-18

U.S. inflation-adjusted development expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

Year	Funding sector:	Federal Government									Industry				U&C	Nonprofits			Non-Federal ^a
	Performing sector:	Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c	U&C ^c
1953		17,722	9,153	2,943	5,834	—	44	247	86	—	8,504	8,468	5	31	14	36	31	5	15
1954		19,208	10,424	2,762	7,227	—	44	301	90	—	8,709	8,668	5	36	16	41	36	5	18
1955		21,178	12,267	2,743	9,024	—	58	349	94	—	8,835	8,787	8	40	16	40	35	5	19
1956		28,628	17,413	3,083	13,775	—	66	394	95	—	11,134	11,086	10	39	18	42	34	7	22
1957		31,619	21,188	3,443	17,113	—	57	478	97	—	10,338	10,289	12	38	20	47	38	9	25
1958		33,334	22,830	3,889	18,216	—	58	555	113	—	10,407	10,356	14	37	20	51	42	9	26
1959		38,679	26,835	4,296	21,709	—	71	612	146	—	11,741	11,686	14	41	21	55	46	9	27
1960		42,181	28,795	4,518	23,294	—	86	678	219	—	13,283	13,227	11	45	21	54	45	9	28
1961		44,249	29,860	4,855	23,828	—	96	755	325	—	14,265	14,211	9	45	23	71	62	9	31
1962		44,483	30,004	5,396	23,223	—	99	836	451	—	14,332	14,274	9	48	25	88	79	9	34
1963		50,172	34,589	6,370	26,591	—	96	950	583	—	15,426	15,370	9	48	26	96	87	9	34
1964		53,451	36,759	7,198	26,375	1,407	126	970	681	—	16,542	16,487	9	47	28	88	77	11	34
1965		55,515	36,703	7,521	26,148	1,196	202	868	767	—	18,642	18,583	8	50	33	101	84	17	36
1966		59,301	38,761	7,711	28,001	1,171	249	818	812	—	20,348	20,282	8	57	39	114	94	20	38
1967		60,797	37,749	7,707	26,954	1,180	260	825	823	—	22,854	22,785	10	60	40	121	95	26	34
1968		61,494	37,167	7,240	26,783	1,188	272	859	825	—	24,129	24,053	15	61	35	133	99	34	29
1969		61,815	35,708	7,306	25,169	1,218	288	892	835	—	25,915	25,832	18	65	29	138	101	36	26
1970		58,329	32,374	7,770	21,445	1,258	287	857	757	—	25,771	25,692	17	62	24	138	103	34	22
1971		57,025	31,344	8,101	20,206	1,299	226	875	636	—	25,491	25,416	13	62	28	136	108	28	26
1972		58,899	31,864	8,294	20,531	1,259	196	915	669	—	26,815	26,744	11	60	43	138	110	28	39
1973		60,228	30,806	7,908	19,705	1,307	210	879	796	—	29,161	29,086	15	60	59	150	113	37	52
1974		58,799	28,767	7,552	17,895	1,384	203	877	856	—	29,755	29,678	18	59	67	156	115	41	55
1975		56,870	27,610	7,219	16,945	1,485	206	931	824	—	28,979	28,901	20	58	69	157	117	40	55
1976		59,328	28,477	7,025	17,783	1,571	235	1,057	806	—	30,560	30,473	27	60	74	161	123	38	57
1977		61,499	29,260	7,081	18,381	1,543	340	1,118	797	—	31,919	31,826	32	61	89	170	128	41	62
1978		64,421	29,852	7,622	18,155	1,591	526	1,123	835	—	34,220	34,128	30	61	102	182	133	49	66
1979		67,873	30,779	7,548	18,924	1,585	644	1,155	923	—	36,732	36,641	30	61	107	189	137	53	65
1980		71,344	30,740	7,140	19,209	1,576	634	1,260	920	—	40,226	40,131	34	61	119	193	139	54	67
1981		73,844	32,056	7,264	20,508	1,539	619	1,247	880	—	41,393	41,295	38	60	128	197	141	56	70
1982		78,031	33,418	7,816	21,457	1,517	600	1,124	904	—	44,205	44,104	40	61	133	206	147	59	69
1983		83,537	35,755	8,864	22,535	1,531	580	1,207	1,038	—	47,353	47,244	45	63	141	219	158	62	69
1984		92,767	39,378	9,908	24,692	1,494	609	1,380	1,295	—	52,933	52,815	52	66	151	234	169	65	72
1985		101,002	43,712	10,871	27,491	1,510	660	1,688	1,493	—	56,801	56,673	59	69	163	248	182	67	78
1986		100,617	45,031	10,988	28,571	1,549	682	1,997	1,245	—	55,052	54,912	67	73	181	267	197	70	87
1987		102,926	47,193	10,538	31,093	1,645	772	2,152	994	—	55,148	54,997	74	77	200	291	213	78	94
1988		105,434	46,487	11,051	29,571	1,766	870	2,197	508	524	58,303	58,140	83	80	224	317	228	89	103
1989		105,352	42,420	11,235	25,278	1,713	928	2,140	609	517	62,234	62,058	91	84	246	342	244	98	110
1990		108,719	39,122	11,213	21,923	1,646	1,051	2,006	716	567	68,857	68,674	96	87	262	364	261	103	115
1991		106,069	34,817	9,790	19,246	1,539	1,128	1,714	805	594	70,486	70,299	96	91	267	385	280	105	115
1992		108,587	34,223	9,906	18,708	1,403	1,148	1,581	825	653	73,570	73,375	99	96	268	412	303	109	114

U.S. inflation-adjusted development expenditures, by source of funds and performing sector: 1953–2002

(Millions of constant 1996 dollars)

Year	Funding sector:	Total	Federal Government							Industry				U&C	Nonprofits			Non-Federal ^a	
	Performing sector:		Total	Total	Federal	Industry ^b	Industry FFRDCs ^b	U&C ^c	U&C FFRDCs ^d	Non-profits ^b	Nonprofit FFRDCs ^b	Total	Industry ^e	U&C ^c	Non-profits	U&C ^c	Total	Non-profits	U&C ^c
1993		106,054	31,997	9,645	17,100	1,146	1,197	1,461	836	611	73,223	73,019	103	101	276	443	329	114	116
1994		107,217	31,464	9,190	16,883	1,249	1,262	1,436	849	596	74,873	74,660	106	107	287	474	358	116	118
1995		115,305	33,101	9,441	18,169	1,270	1,201	1,647	758	615	81,282	81,058	110	113	293	504	389	115	125
1996		121,359	31,355	9,033	17,066	1,342	1,127	1,520	698	571	89,032	88,797	115	120	305	538	423	115	128
1997		126,210	31,650	8,903	17,774	1,264	1,035	1,426	673	573	93,508	93,245	111	152	298	636	526	110	119
1998		140,203	31,689	8,928	17,880	1,218	955	1,480	736	491	107,433	107,160	110	163	293	677	568	109	112
1999		146,148	28,583	8,575	15,498	1,128	679	1,563	693	446	116,398	116,106	114	178	308	744	629	115	115
2000		155,158	24,217	7,529	12,679	1,069	422	1,440	480	599	129,675	129,362	116	197	329	817	694	123	119
2001 preliminary		149,187	24,533	8,744	11,463	1,061	456	1,436	531	843	123,298	122,986	118	194	357	874	743	131	124
2002 preliminary		146,285	25,728	10,024	11,463	1,193	431	1,313	549	755	119,105	118,796	121	187	386	938	799	139	128

FFRDC federally funded research and development center

U&C universities and colleges

^aBecause of limitations in survey information, data on non-Federal Government funding to other performers are not available and are consequently included in other sectors' support for their own R&D performance. For example, non-Federal Government support to nonprofits is included in nonprofits' support for their own R&D.

^bExpenditures of industry FFRDCs for 1953–63 were not separated from total Federal support to the industrial sector. Thus, the figure for Federal support to industry includes support to FFRDCs for those years. The same is true for expenditures of nonprofit FFRDCs, which are included in Federal support for nonprofit institutions in 1953–87.

^cAdjustments have been made to university R&D for 1998 and later years to eliminate double counting of funds passed through from one academic institution to another. The character-of-work estimation procedure for university and college R&D also was revised for 1998 and later years; hence, these data are not directly comparable with data for 1997 and earlier years.

^dIncludes all R&D expenditures of FFRDCs administered by academic institutions.

^eIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.

NOTES: Expenditure levels for academic and Federal Government performers are also in reference to calendar years. These levels are approximations based on FY data. For Federal Government expenditures starting in 1977, the calendar-year approximation is 75 percent of the amount reported in the same FY plus 25 percent of the amount reported in the subsequent FY. Academic expenditures in all years and Federal Government expenditures prior to 1977 are 50 and 50 percent, respectively, because those FYs (for most academic institutions and the Federal Government before 1977) began on July 1 instead of October 1. Because of changes in estimation procedures, character-of-work data before 1998 for industry and for U&C are not comparable with data for later years. Technical notes explaining methodological issues of measurement will be provided in NSF, *The Methodology Underlying the Measurement of R&D Expenditures: 2002* (Arlington, VA, forthcoming). Data are based on annual reports by performers except for the nonprofit sector. Data are preliminary for 2001 and 2002. For trend comparisons, use only the historical data reported here. Do not use data published earlier.

SOURCES: Data were derived from National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources*, annual series.

Appendix table 4-19

(Page 1 of 2)

Total (Federal plus company and other) funds for industrial R&D performance in United States, by industry and size of company: 1999–2001

(Millions of dollars)

Industry and size of company	NAICS codes	Funds		
		1999 ^a	2000	2001 ^b
All industries.....	21–23, 31–33, 42, 44–81	182,711	199,539	198,505
Manufacturing.....	31–33	116,921	124,078	120,705
Food.....	311	1,132	D	1,819
Beverage and tobacco products.....	312	D	417	152
Textiles, apparel, and leather.....	313–16	334	D	D
Wood products.....	321	70	105	182
Paper, printing, and support activities.....	322, 323	D	D	D
Petroleum and coal products.....	324	615	D	D
Chemicals.....	325	20,246	20,918	17,892
Basic chemicals.....	3251	2,746	2,080	1,876
Resin, synthetic rubber, fibers, and filament.....	3252	D	2,852	D
Pharmaceuticals and medicines.....	3254	D	D	10,137
Other chemicals.....	325 minus (3251–52, 3254)	D	D	D
Plastics and rubber products.....	326	1,785	D	D
Nonmetallic mineral products.....	327	D	846	990
Primary metals.....	331	470	624	485
Fabricated metal products.....	332	1,655	1,672	1,599
Machinery.....	333	6,057	6,580	6,404
Computer and electronic products.....	334	35,932	45,097	47,079
Computers and peripheral equipment.....	3341	D	5,162	D
Communications equipment.....	3342	6,003	11,616	15,507
Semiconductor and other electronic components.....	3344	10,701	12,894	14,358
Navigational, measuring, electromedical, and control instruments.....	3345	14,337	15,116	12,947
Other computer and electronic products.....	334 minus (3341–42, 3344–45)	D	310	D
Electrical equipment, appliances, and components.....	335	D	D	4,980
Transportation equipment.....	336	33,965	30,085	25,965
Motor vehicles, trailers, and parts.....	3361–63	D	D	D
Aerospace products and parts.....	3364	14,425	10,319	7,868
Other transportation equipment.....	336 minus (3361–64)	D	D	D
Furniture and related products.....	337	248	284	301
Miscellaneous manufacturing.....	339	3,851	4,206	6,606
Medical equipment and supplies.....	3391	D	D	D
Other miscellaneous manufacturing.....	339 minus (3391)	D	D	D
Other manufacturing.....	31–33 minus (311–16, 321–27, 331–37, 339)	—	—	—
Nonmanufacturing.....	21–23, 42, 44–81	65,790	75,461	77,799
Mining, extraction, and support activities.....	21	D	823	D
Utilities.....	22	142	D	133
Construction.....	23	691	D	320
Trade.....	42, 44, 45	19,616	24,959	24,372
Transportation and warehousing.....	48, 49	460	D	1,848
Information.....	51	15,389	16,830	D
Publishing.....	511	11,302	13,004	13,760
Newspaper, periodical, book, and database.....	5111	371	365	649
Software.....	5112	10,931	12,639	13,111
Broadcasting and telecommunications.....	513	D	1,407 S	D
Radio and television broadcasting.....	5131	D	D	D
Telecommunications.....	5133	D	D	D
Other broadcasting and telecommunications.....	513 minus (5131, 5133)	31	59	D
Other information.....	51 minus (511, 513)	D	2,420	D
Finance, insurance, and real estate.....	52, 53	D	4,025	D
Professional, scientific, and technical services.....	54	18,994	22,577	27,704
Architectural, engineering, and related services.....	5413	3,580	3,381	3,386
Computer systems design and related services.....	5415	D	5,169	9,154
Scientific R&D services.....	5417	10,470	12,892	14,244
Other professional, scientific, and technical services.....	54 minus (5413, 5415, 5417)	D	1,135	920

Appendix table 4-19

(Page 2 of 2)

Total (Federal plus company and other) funds for industrial R&D performance in United States, by industry and size of company: 1999–2001

(Millions of dollars)

Industry and size of company	NAICS codes	Funds		
		1999 ^a	2000	2001 ^b
Management of companies and enterprises.....	55	D	49	381
Health care services.....	621–23	642	536	1,149
Other nonmanufacturing.....	56, 61, 624, 71, 72, 81	D	731	1,259
Company size (employees)				
All companies.....	na	182,711	199,539	198,505
5–24.....	na	7,004	6,862	4,828
25–49.....	na	4,750	5,008	3,750
50–99.....	na	7,225	7,259	8,202
100–249.....	na	7,213	9,020	12,916
250–499.....	na	7,892	7,479	8,702
500–999.....	na	7,032	9,074	10,564
1,000–4,999.....	na	24,840	30,636	26,748
5,000–9,999.....	na	16,376	16,768	17,487
10,000–24,999.....	na	24,922	28,653	27,065
25,000 or more.....	na	75,457	78,779	78,244

— data not collected; D data have been withheld to avoid disclosing operations of individual companies; NAICS North American Industry Classification System; S imputation of more than 50 percent
na not applicable

^aSome statistics for 1999 have been revised since originally published.

^bBeginning with 2001, statistics for total and federally funded industrial R&D exclude data for federally funded research and development centers.

NOTES: R&D in this table is the industrial R&D performed within company facilities funded from all sources. Funds are the company's own; funds from outside organizations, such as other companies, research institutions, universities and colleges, nonprofit organizations, and state governments; and funds from the Federal Government. Excluded from this table are R&D not performed within the company (e.g., R&D contracted out to other organizations) and R&D not performed in the United States (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

For 1999, 2000, and 2001, the frame from which statistical samples were selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with 50 or more employees were included in the large company partition. In the nonmanufacturing sector, companies with 15 or more employees were included in the large company partition. Companies in the respective sectors with employment below these values but with at least 5 employees were included in the small company partition. The purpose of partitioning the sample in this way was to reduce variability in industry estimates largely attributed to random year-to-year selection of small companies by industry and high sampling weights that sometimes were assigned to them. Because of this, in prior reports detailed industry statistics were published from only the large company partition. Statistics from the small company partition were included in the manufacturing, nonmanufacturing, and all industries totals but were aggregated into "small manufacturing" and "small nonmanufacturing" classifications instead of being included in their respective industry classifications. For this chapter, this practice was evaluated and discontinued because it was determined that data for small companies are more useful if they are included in their respective industries even given sampling concerns described above. Consequently, the "small manufacturing" and "small nonmanufacturing" entries are no longer used. For 1999 and 2000, statistics previously published for firms in the small company classifications are not shown separately but are included in the manufacturing, nonmanufacturing, and all industries totals. For more information, see the technical notes in National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development Methodology: 2001, <http://www.nsf.gov/sbe/srs/sird/start.htm>.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Research and Development in Industry: 2001* (Arlington, VA, forthcoming).

Appendix table 4-20

(Page 1 of 2)

Company and other non-Federal funds for industrial R&D performance in United States, by industry and size of company: 1999–2001

(Millions of dollars)

Industry and size of company	NAICS codes	Funds		
		1999 ^a	2000	2001
All industries.....	21–23, 31–33, 42, 44–81	160,176	180,421	181,606
Manufacturing.....	31–33	99,865	110,750	109,221
Food.....	311	1,132	1,145	1,818
Beverage and tobacco products.....	312	D	417	152
Textiles, apparel, and leather.....	313–16	334	266	255
Wood products.....	321	70	105	181
Paper, printing, and support activities.....	322, 323	2,474	2,700	2,664
Petroleum and coal products.....	324	D	1,172	1,057
Chemicals.....	325	20,051	20,768	17,713
Basic chemicals.....	3251	2,648	2,050	1,835
Resin, synthetic rubber, fibers, and filament.....	3252	2,216	2,842	2,745
Pharmaceuticals and medicines.....	3254	12,236	12,793	10,137
Other chemicals.....	325 minus (3251–52, 3254)	2,951	3,084	2,996
Plastics and rubber products.....	326	1,785	1,675	2,245
Nonmetallic mineral products.....	327	595	845	978
Primary metals.....	331	457	598	479
Fabricated metal products.....	332	1,608	1,631	1,545
Machinery.....	333	5,658	6,539	6,337
Computer and electronic products.....	334	29,939	39,553	41,232
Computers and peripheral equipment.....	3341	4,126	5,162	3,165
Communications equipment.....	3342	5,797	11,183	15,209
Semiconductor and other electronic components.....	3344	10,624	12,787	14,210
Navigational, measuring, electromedical, and control instruments.....	3345	8,632	10,114	7,565
Other computer and electronic products.....	334 minus (3341–42, 3344–45)	760	307	1,083
Electrical equipment, appliances, and components.....	335	3,820	3,390	4,680
Transportation equipment.....	336	23,928	22,917	21,004
Motor vehicles, trailers, and parts.....	3361–63	17,987	18,306	16,089
Aerospace products and parts.....	3364	5,309	3,895	4,083
Other transportation equipment.....	336 minus (3361–64)	632	716	825
Furniture and related products.....	337	248	284	301
Miscellaneous manufacturing.....	339	3,825	4,195	6,581
Medical equipment and supplies.....	3391	3,251	3,741	5,903
Other miscellaneous manufacturing.....	339 minus (3391)	574	453	678
Other manufacturing.....	31–33 minus (311–16, 321–27, 331–37, 339)	—	—	—
Nonmanufacturing.....	21–23, 42, 44–81	60,311	69,671	72,384
Mining, extraction, and support activities.....	21	2,352	822	846
Utilities.....	22	126	136	114
Construction.....	23	690	222	320
Trade.....	42, 44, 45	19,521	24,929	24,284
Transportation and warehousing.....	48, 49	460	277	1,776
Information.....	51	14,892	16,290	17,259
Publishing.....	511	11,253	12,926	13,716
Newspaper, periodical, book, and database.....	5111	371	365	649
Software.....	5112	10,882	12,561	13,067
Broadcasting and telecommunications.....	513	1,393	1,025	1,270
Radio and television broadcasting.....	5131	D	D	D
Telecommunications.....	5133	D	D	1,101
Other broadcasting and telecommunications.....	513 minus (5131, 5133)	18	59	D
Other information.....	51 minus (511, 513)	2,246	2,339	2,273
Finance, insurance, and real estate.....	52, 53	1,570	4,024	2,424
Professional, scientific, and technical services.....	54	14,379	17,949	22,640
Architectural, engineering, and related services.....	5413	2,402	2,232	2,365
Computer systems design and related services.....	5415	3,989	4,943	8,656
Scientific R&D services.....	5417	7,413	9,715	10,893
Other professional, scientific, and technical services.....	54 minus (5413, 5415, 5417)	575	1,059	726

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Company and other non-Federal funds for industrial R&D performance in United States, by industry and size of company: 1999–2001

(Millions of dollars)

Industry and size of company	NAICS codes	Funds		
		1999 ^a	2000	2001
Management of companies and enterprises	55	72	49	381
Health care services	621–23	631	477	1,120
Other nonmanufacturing	56, 61, 624, 71, 72, 81	640	713	1,221
Company size (employees)				
All companies	na	160,176	180,421	181,606
5–24	na	6,393	5,940	4,175
25–49	na	4,382	4,786	3,548
50–99	na	6,623	6,745	7,654
100–249	na	6,540	8,351	12,012
250–499	na	7,407	6,819	8,143
500–999	na	6,441	8,580	9,936
1,000–4,999	na	23,944	29,860	26,140
5,000–9,999	na	14,182	15,143	15,836
10,000–24,999	na	24,525	27,976	26,161
25,000 or more	na	59,740	66,221	68,001

— data not collected; D data have been withheld to avoid disclosing operations of individual companies; NAICS North American Industry Classification System; S imputation of more than 50 percent
na not applicable

^aSome statistics for 1999 have been revised since originally published.

NOTES: R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. Funds predominantly are the company's own but also include funds from outside organizations, such as other companies, research institutions, universities and colleges, nonprofit organizations, and state governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the United States (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

For 1999, 2000, and 2001, the frame from which statistical samples were selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with 50 or more employees were included in the large company partition. In the nonmanufacturing sector, companies with 15 or more employees were included in the large company partition. Companies in the respective sectors with employment below these values but with at least 5 employees were included in the small company partition. The purpose of partitioning the sample in this way was to reduce variability in industry estimates largely attributed to random year-to-year selection of small companies by industry and high sampling weights that sometimes were assigned to them. Because of this, in prior reports detailed industry statistics were published from only the large company partition. Statistics from the small company partition were included in the manufacturing, nonmanufacturing, and all industries totals but were aggregated into "small manufacturing" and "small nonmanufacturing" classifications instead of being included in their respective industry classifications. For this report, this practice was evaluated and discontinued because it was determined that data for small companies are more useful if they are included in their respective industries even given sampling concerns described above. Consequently, the "small manufacturing" and "small nonmanufacturing" stublines are no longer used. For 1999 and 2000, statistics previously published for firms in the small company classifications are not shown separately in this table but are included in the manufacturing, nonmanufacturing, and all industries totals. For more information, see the technical notes in National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development Methodology: 2001, <http://www.nsf.gov/sbe/srs/sird/start.htm>.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Research and Development in Industry: 2001* (Arlington, VA, forthcoming).

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Appendix table 4-21

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Federal funds for industrial R&D performance in United States, by industry and size of company: 1999–2001

(Millions of dollars)

Industry and size of company	NAICS codes	Funds		
		1999 ^a	2000	2001 ^b
All industries.....	21–23, 31–33, 42, 44–81	22,535	19,118	16,899
Manufacturing.....	31–33	17,055	13,328	11,484
Food.....	311	0	D	0
Beverage and tobacco products.....	312	0	0	0
Textiles, apparel, and leather.....	313–16	0	D	D
Wood products.....	321	0	0	0
Paper, printing, and support activities.....	322, 323	D	D	D
Petroleum and coal products.....	324	D	D	D
Chemicals.....	325	194	150	180
Basic chemicals.....	3251	98	31	42
Resin, synthetic rubber, fibers, and filament.....	3252	D	11	D
Pharmaceuticals and medicines.....	3254	D	D	0
Other chemicals.....	325 minus (3251–52, 3254)	D	D	D
Plastics and rubber products.....	326	0	D	D
Nonmetallic mineral products.....	327	D	1	11
Primary metals.....	331	12	26 S	6
Fabricated metal products.....	332	46	41	54
Machinery.....	333	399 S	41	67
Computer and electronic products.....	334	5,993	5,544	5,848
Computers and peripheral equipment.....	3341	D	0	D
Communications equipment.....	3342	206	432	298
Semiconductor and other electronic components.....	3344	77	107	148
Navigational, measuring, electromedical, and control instruments.....	3345	5,705	5,002	5,382
Other computer and electronic products.....	334 minus (3341–42, 3344–45)	D	3	D
Electrical equipment, appliances, and components.....	335	D	D	301S
Transportation equipment.....	336	10,037	7,168	4,961
Motor vehicles, trailers, and parts.....	3361–63	D	D	D
Aerospace products and parts.....	3364	9,117	6,424	3,785
Other transportation equipment.....	336 minus (3361–64)	D	D	D
Furniture and related products.....	337	0	0	0
Miscellaneous manufacturing.....	339	26	12	25
Medical equipment and supplies.....	3391	D	D	D
Other miscellaneous manufacturing.....	339 minus (3391)	D	D	D
Other manufacturing.....	31–33 minus (311–16, 321–27, 331–37, 339)	—	—	—
Nonmanufacturing.....	21–23, 42, 44–81	5,479	5,790	5,415
Mining, extraction, and support activities.....	21	D	1	D
Utilities.....	22	17	D	19
Construction.....	23	2	D	1
Trade.....	42, 44, 45	95	30	88
Transportation and warehousing.....	48, 49	0	D	72
Information.....	51	497	540 S	D
Publishing.....	511	49	78	44
Newspaper, periodical, book, and database.....	5111	0	0	0
Software.....	5112	49	78	44
Broadcasting and telecommunications.....	513	D	382 S	D
Radio and television broadcasting.....	5131	D	D	0
Telecommunications.....	5133	D	D	D
Other broadcasting and telecommunications.....	513 minus (5131, 5133)	13	0	0
Other information.....	51 minus (511, 513)	D	81	D
Finance, insurance, and real estate.....	52, 53	D	0	D
Professional, scientific, and technical services.....	54	4,615	4,628	5,065
Architectural, engineering, and related services.....	5413	1,177	1,149	1,021
Computer systems design and related services.....	5415	D	226	498
Scientific R&D services.....	5417	3,057	3,177	3,352
Other professional, scientific, and technical services.....	54 minus (5413, 5415, 5417)	D	77	194

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Federal funds for industrial R&D performance in United States, by industry and size of company: 1999–2001

(Millions of dollars)

Industry and size of company	NAICS codes	Funds		
		1999 ^a	2000	2001 ^b
Management of companies and enterprises	55	D	0	0
Health care services	621–23	10	59	29
Other nonmanufacturing	56, 61, 624, 71, 72, 81	D	18	38
Company size (employees)				
All companies	na	22,535	19,118	16,899
5 to 24	na	611	922	653
25 to 49	na	368	222	201
50 to 99	na	603	514	548
100 to 249	na	674	669	903
250 to 499	na	485	660	560
500 to 999	na	591	495	627
1,000 to 4,999	na	896	775	608
5,000 to 9,999	na	2,194	1,625	1,651
10,000 to 24,999	na	397	678	904
25,000 or more	na	15,717	12,559	10,243

— data not collected; D data have been withheld to avoid disclosing operations of individual companies; NAICS North American Industry Classification System; S imputation of more than 50 percent
na not applicable

^aSome statistics for 1999 have been revised since originally published.

^bBeginning with 2001, statistics for total and federally funded industrial R&D exclude data for federally funded research and development centers.

NOTES: R&D in this table is the industrial R&D performed within company facilities funded by the Federal Government. Excluded from this table are R&D not performed within the company (e.g., R&D contracted out to other organizations) and R&D not performed in the United States (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

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SOURCE: National Science Foundation, Division of Science Resources Statistics, *Research and Development in Industry: 2001* (Arlington, VA, forthcoming).

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Appendix table 4-22

R&D investment of U.S. corporations, by major and detailed sector: 1994–2000

(Millions of current dollars)

Major sector and industry	1994	1995	1996	1997	1998	1999	2000
Total	93,600	105,504	116,448	126,918	137,320	146,299	164,453
Aerospace.....	4,319	3,948	4,383	4,803	4,972	5,077	4,950
Basic industries and materials	8,510	8,564	8,961	9,182	9,274	8,878	8,628
Agriculture, forestry, fishing, and hunting.....	214	229	244	253	316	99	93
Fabricated metal product manufacture.....	611	633	762	797	846	793	729
Food, beverage, and tobacco manufacture	1,313	1,362	1,373	1,271	1,294	1,394	1,306
Furniture and laboratory apparatus manufacture.....	107	204	212	236	273	282	300
Oil and gas extraction, support industry, and mining.....	883	839	910	1,032	1,119	936	927
Other basic industries activity.....	751	848	921	984	995	1,049	969
Paper and wood manufacture.....	1,719	1,581	1,686	1,730	1,748	1,733	1,784
Petroleum and coal products manufacture	1,699	1,532	1,465	1,496	1,247	1,059	982
Plastics and rubber products manufacture	586	657	668	681	769	876	892
Primary metal manufacture.....	497	528	551	496	456	404	403
Textile, apparel, leather, and allied product manufacture.....	129	151	168	207	211	253	243
Chemical manufacture.....	7,526	7,452	7,606	7,549	7,777	8,115	8,883
All other chemical product manufacture	1,502	1,588	1,682	1,606	1,415	1,345	1,896
Basic chemical manufacture	901	949	1,079	1,081	998	1,036	927
Paint, coatings, adhesives, cleaning, surface agent manufacture	1,879	2,127	2,089	2,168	2,471	2,644	2,765
Resin, synthetic rubber, and fibers manufacture	—	—	—	—	—	—	—
Information and electronics manufacture and services.....	35,347	40,087	45,193	53,094	59,208	64,573	77,766
Audio-video and other							
communications equipment manufacture.....	154	202	241	277	311	313	351
Broadcasting and telecommunications	4,347	1,362	1,335	1,144	1,065	969	763
Computer peripheral equipment and terminal manufacture	6,134	6,806	7,836	8,590	8,121	7,437	9,250
Computer storage device manufacture.....	1,260	1,647	1,915	2,264	2,607	2,670	2,895
Computer systems design and related services.....	4,724	4,813	5,193	6,342	6,650	6,818	6,927
Data processing and miscellaneous information services	324	387	463	592	666	730	775
Electrical equipment, appliance and component manufacture	1,777	1,975	2,090	2,302	2,203	2,220	2,719
Electronic computer manufacture.....	2,482	2,641	2,829	3,024	3,357	4,068	4,410
Instrument manufacture.....	2,200	2,193	2,634	3,080	3,636	4,062	4,712
Online information services.....	219	186	292	408	567	1,007	1,959
Other electronic components manufacture	662	933	882	908	1,070	694	893
Motion picture and sound recording industries	10	18	66	72	109	304	339
Radio, TV broadcasting, and wireless communications equipment manufacture	2,495	3,198	3,584	4,215	4,723	5,055	6,891
Semiconductor and related device manufacture.....	3,612	4,636	5,704	7,064	8,208	9,414	12,900
Software publishers	4,190	5,338	6,976	8,407	10,772	12,580	15,609
Telephone apparatus manufacture	754	3,753	3,149	4,406	5,142	6,231	6,374
Machinery manufacture	3,682	4,485	5,405	5,970	6,522	6,174	6,908
Agricultural, construction, and mining machinery manufacture..	918	1,077	1,214	1,446	1,649	1,419	1,542
Commercial and service industry machinery manufacture.....	539	622	731	867	941	856	758
Engine, turbine, and power transmission equipment manufacture	336	411	419	433	410	437	298
Other industrial machinery manufacture.....	1,427	1,578	1,860	1,873	1,810	1,869	2,041
Semiconductor industrial machinery manufacture.....	462	796	1,181	1,350	1,712	1,592	2,269
Medical substances and devices.....	16,715	20,220	22,620	24,511	27,557	30,308	32,485
Invitro diagnostic substance manufacture	250	334	473	525	723	764	886
Medical instruments, equipment, and supplies manufacture.....	2,191	2,562	2,943	3,308	3,473	3,435	3,590
Nondiagnostic biological product manufacture	1,397	1,785	2,063	2,497	2,865	3,148	3,443
Pharmaceutical and medicine manufacture.....	12,877	15,539	17,141	18,181	20,496	22,962	24,567
Surface transport equipment manufacture	15,302	18,323	19,526	18,798	18,623	19,139	19,775
Unclassifiable and conglomerates	1,415	1,527	1,653	1,750	1,791	1,952	2,203
Various services.....	785	897	1,101	1,261	1,596	2,084	2,855
Administration, support, waste management, and remediation services	56	84	165	189	236	210	350
Electronic shopping and mail-order	6	4	17	25	87	348	495
Finance, insurance, real estate, and leasing.....	130	145	231	324	214	217	202
Other services.....	86	113	98	84	100	127	162
Professional, scientific, and technical services except computer..	276	318	326	322	520	650	980
Wholesale and retail, transport, and warehousing.....	231	232	265	317	439	532	667

NOTE: Data represent publicly held corporations with R&D expenses headquartered in the United States.

SOURCES: U.S. Department of Commerce, *U.S. Corporate R&D Investment, 1994–2000 Final Estimates* (Washington, DC, 2002); Standard & Poor's COMPUSTAT database (Englewood, CO); and corporate financial statements submitted to U.S. Securities and Exchange Commission.

Appendix table 4-23

R&D expenditure, by state, performing sector, and source of funds: 2000

(Thousands of current dollars)

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A4-42 ◆

State	Performing sector:		Industry						U&C						U&C	Other	Nonprofit
	Funding sector:	Rank	All R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	FFRDCs	nonprofit institutions	FFRDCs	
U.S. total	na		264,616,008	17,468,589	199,539,000	19,118,000	180,421,000	30,973,891	17,974,978	2,256,997	2,200,926	6,209,611	2,331,379	5,801,229	4,379,922	1,464,947	
Alabama	27		1,730,117	664,981	607,000	184,000	423,000	428,122	275,912	6,052	19,581	88,167	38,410	0	30,014	0	
Alaska	47		196,448	75,446	9,000	D	D	107,417	49,241	3,469	20,073	34,328	306	0	4,585	0	
Arizona	19		3,107,291	145,601	2,445,000	153,000	2,292,000	465,777	244,938	15,221	28,519	158,810	18,289	36,409	14,504	0	
Arkansas	42		454,401	45,489	273,000	D	D	130,894	58,302	35,076	8,121	22,110	7,285	0	5,018	0	
California	1		55,092,936	1,655,628	45,769,000	4,229,000	41,540,000	4,053,042	2,335,093	235,796	294,990	820,953	366,210	2,812,134	660,758	142,374	
Colorado	17		4,229,501	241,771	3,140,000	D	D	544,204	427,495	24,000	24,031	53,711	14,967	115,510	64,970	123,046	
Connecticut	14		4,888,469	19,373	4,371,000	127,000	4,244,000	468,435	304,155	15,539	28,327	74,534	45,880	0	29,661	0	
Delaware	28		1,532,130	7,598	1,444,000	7,000	1,437,000	78,126	40,768	4,142	3,878	19,562	9,776	0	2,406	0	
District of Columbia	24		2,296,233	1,722,640	112,000	46,000	67,000	245,828	186,632	3,826	16,286	15,480	23,604	0	210,844	4,921	
Florida	15		4,662,727	573,140	3,212,000	498,000	2,714,000	851,932	408,826	103,167	78,906	220,827	40,206	0	25,655	0	
Georgia	21		2,796,192	273,713	1,579,000	83,000	1,496,000	926,749	417,664	76,857	94,341	299,214	38,673	0	16,730	0	
Hawaii	46		291,409	58,658	44,000	17,000	27,000	161,300	95,419	35,474	11,158	19,249	0	0	27,451	0	
Idaho	30		1,433,567	21,722	1,338,000	D	D	73,726	28,888	18,545	5,338	17,505	3,450	0	119	0	
Illinois	6		12,767,496	85,344	10,661,000	37,000	10,624,000	1,170,625	681,006	73,042	56,085	279,759	80,733	759,002	91,525	0	
Indiana	18		3,252,494	71,630	2,668,000	75,000	2,593,000	509,141	228,768	34,377	42,343	178,613	25,040	0	3,723	0	
Iowa	34		1,017,300	34,586	538,000	D	D	418,263	203,437	56,351	32,473	104,472	21,530	23,281	3,170	0	
Kansas	31		1,420,089	20,162	1,140,000	D	D	258,336	105,610	44,396	23,410	69,872	15,048	0	1,591	0	
Kentucky	35		866,052	7,500	582,000	1,000	581,000	274,238	96,288	21,849	17,932	121,232	16,937	0	2,314	0	
Louisiana	38		626,793	99,196	126,000	1,000	125,000	399,411	169,895	75,626	25,670	95,601	32,619	0	2,186	0	
Maine	45		318,726	4,755	201,000	53,000	148,000	57,753	25,309	6,445	2,994	20,555	2,450	0	55,218	0	
Maryland	10		8,633,558	4,869,668	2,032,000	428,000	1,604,000	1,507,549	1,090,445	82,069	50,154	181,039	103,842	0	224,341	0	
Massachusetts	5		13,004,427	259,172	9,863,000	1,831,000	8,032,000	1,485,792	1,064,468	40,305	138,667	94,322	148,030	348,339	967,591	80,533	
Michigan	2		18,892,070	239,543	17,640,000	80,000	17,559,000	995,756	553,119	63,226	66,955	242,336	70,120	0	16,771	0	
Minnesota	16		4,298,967	32,014	3,722,000	173,000	3,550,000	416,411	233,018	52,659	26,859	71,236	32,639	0	128,542	0	
Mississippi	39		512,789	186,799	101,000	19,000	83,000	217,064	117,168	38,833	10,973	47,025	3,065	0	7,926	0	
Missouri	23		2,583,036	43,851	1,893,000	18,000	1,876,000	614,101	371,713	26,387	33,535	130,288	52,178	0	32,084	0	
Montana	48		169,856	35,344	28,000	D	D	99,069	51,686	17,873	10,298	15,658	3,554	0	7,443	0	
Nebraska	43		438,996	25,082	199,000	D	D	208,480	65,702	7,243	17,636	101,159	16,740	0	6,434	0	
Nevada	44		377,412	20,696	248,000	D	D	106,340	60,005	7,032	5,532	29,227	4,544	0	2,376	0	
New Hampshire	36		775,004	35,717	586,000	D	D	150,982	95,290	9,747	9,197	22,924	13,824	0	2,305	0	
New Jersey	4		13,133,222	417,685	12,062,000	253,000	11,809,000	567,666	257,445	46,071	29,817	160,412	73,921	65,305	20,566	0	
New Mexico	20		3,085,199	320,838	1,158,000	D	D	246,258	175,028	11,965	11,692	41,740	5,833	1,333,194	26,909	0	
New York	3		13,555,586	176,034	10,539,000	1,773,000	8,766,000	2,290,812	1,475,423	102,684	100,995	374,797	236,913	0	300,685	249,055	
North Carolina	13		5,045,250	262,003	3,672,000	30,000	3,641,000	1,040,017	577,437	113,764	169,979	147,364	31,473	0	71,230	0	
North Dakota	49		145,671	25,842	51,000	D	D	67,406	29,343	2,417	4,400	28,651	2,595	0	1,423	0	
Ohio	11		7,661,540	615,458	5,962,000	539,000	5,423,000	918,500	498,967	83,520	87,570	179,722	68,721	0	165,582	0	
Oklahoma	37		659,684	58,619	333,000	3,000	331,000	252,419	93,434	42,396	16,789	88,152	11,648	0	15,646	0	
Oregon	25		2,116,232	88,618	1,651,000	7,000	1,644,000	346,149	246,684	35,485	14,775	32,568	16,637	0	30,465	0	
Pennsylvania	9		9,841,912	151,955	7,873,000	460,000	7,412,000	1,549,050	1,032,963	44,433	159,669	202,535	109,450	55,955	211,952	0	

R&D expenditure, by state, performing sector, and source of funds: 2000

(Thousands of current dollars)

State	Performing sector:		All R&D	Federal	Industry			U&C						U&C	Other	Nonprofit
	Funding sector:	Rank			Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	FFRDCs	nonprofit institutions	Nonprofit FFRDCs
														Federal ^c	Federal ^d	Federal ^d
Rhode Island.....	29		1,500,828	240,862	1,090,000	D	D	129,697	88,510	4,564	2,735	30,289	3,599	0	40,269	0
South Carolina.....	33		1,126,164	45,754	781,000	D	D	294,184	131,043	31,743	15,478	102,793	13,127	0	5,226	0
South Dakota.....	50		84,801	13,232	44,000	16000	28,000	27,269	13,659	6,525	361	3,825	2,899	0	300	0
Tennessee.....	26		2,057,293	88,947	1,215,000	D	D	405,013	240,337	39,258	18,520	67,634	39,264	0	35,888	312,445
Texas.....	7		11,552,437	464,699	8,961,000	230,000	8,731,000	2,039,642	1,101,463	229,255	165,151	322,234	221,539	0	87,096	0
Utah.....	32		1,360,644	69,871	979,000	D	D	308,059	192,100	20,365	17,853	43,818	33,923	0	3,714	0
Vermont.....	40		465,349	3,599	396,000	D	D	64,762	41,232	3,262	5,713	10,239	4,316	0	988	0
Virginia.....	12		5,069,481	1,449,209	2,718,000	800,000	1,918,000	587,718	321,690	70,328	53,380	103,522	38,798	79,342	67,066	168,146
Washington.....	8		10,516,331	258,718	9,265,000	D	D	642,934	443,223	15,266	62,087	101,445	20,913	0	198,734	150,945
West Virginia.....	41		457,128	102,958	235,000	D	D	73,420	33,972	2,963	7,510	24,299	4,676	35,536	10,214	0
Wisconsin.....	22		2,692,876	37,816	1,981,000	18,000	1,963,000	661,470	348,779	45,576	21,554	176,467	69,094	0	12,590	0
Wyoming.....	51		60,969	7,298	7,000	0	7,000	43,094	16,556	1,470	2,941	20,103	2,024	0	3,577	0
Other and unknown.....	na		12,130,343	42,207	11,994,000	1,094,000	10,900,000	81,969	47,925	16,329	5,021	12,114	580	11,268	899	0
Adjustment.....	na		7,630,582	949,548	1,000	NA	NA	911,520	481,505	52,734	22,674	285,120	69,487	125,954	420,648	233,482

D data withheld to avoid disclosing operations of individual companies; FFRDC federally funded research and development center; NA not available; na not applicable; U&C universities and colleges

^aIncludes performance at industry FFRDCs.^bIndustry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.^cIncludes total R&D expenditures of FFRDCs administered by academic institutions.^dOther sources of support for nonprofit institutions were unavailable by state. For 2000, total nonprofit performance is estimated at \$9,368 million. Industry provided an estimated \$1,103 million to the nonprofit sector, and nonprofit institutions provided an estimated \$3,886 million. These non-Federal support amounts are included in the all R&D column for U.S. total and other and unknown. For these two columns, the amounts under all R&D are greater than the sum of the components to the right, because those components do not include non-Federal support to nonprofit organizations.

NOTES: Industry R&D data by state refer to calendar years; other R&D data by state refer to fiscal years but may serve as approximations to calendar-year data. The "other and unknown" category is the difference between the national aggregates and the sum of the individual state data that are reported here. Therefore, part of the other and unknown totals reflects the difference between state totals reported on an FY basis and the U.S. totals that have been adjusted to calendar-year estimates. For industry, the other and unknown totals include the survey data that were not assigned to individual states plus the amounts that were reported for individual states but are suppressed here to protect confidentiality of surveyed companies.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources: 2002 Data Update*, NSF 03-313 (Arlington, VA, 2003).

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

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State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Alabama															
1987		2,349,977	584,230	1,592,000	900,000	692,000	152,925	85,382	16,449	10,916	29,919	10,259	0	20,822	0
1989		1,232,429	568,243	428,000	213,000	215,000	215,836	119,693	18,339	16,242	45,106	16,456	0	20,350	0
1991		1,510,827	700,617	521,000	221,000	300,000	252,998	132,063	27,267	20,348	52,667	20,653	0	36,212	0
1993		1,967,533	833,137	833,000	406,000	427,000	281,209	161,331	26,991	23,729	48,358	20,800	0	20,187	0
1995		1,680,828	642,257	686,000	273,000	413,000	334,689	190,330	6,991	29,164	86,664	21,540	0	17,882	0
1997		1,636,645	660,047	589,000	189,000	399,000	368,602	230,894	5,251	29,685	84,747	18,025	0	18,996	0
1998		1,926,127	752,619	707,000	180,000	527,000	442,196	282,113	7,238	30,279	82,308	40,258	0	24,312	0
1999		1,761,474	771,923	556,000	190,000	365,000	416,594	261,752	8,923	22,287	79,251	44,381	0	16,957	0
2000		1,730,117	664,981	607,000	184,000	423,000	428,122	275,912	6,052	19,581	88,167	38,410	0	30,014	0
Alaska															
1987		90,429	32,840	10,000	D	D	47,432	21,523	2,999	3,024	17,960	1,926	0	157	0
1989		117,914	51,178	9,000	D	D	56,701	26,659	2,101	3,039	21,869	3,033	0	1,035	0
1991		146,091	58,705	18,000	D	D	67,432	34,335	1,926	1,547	28,246	1,378	0	1,954	0
1993		129,211	47,833	14,000	D	D	66,796	41,616	3,012	4,751	17,412	5	0	582	0
1995		163,396	60,545	30,000	D	D	72,216	37,285	5,607	5,470	23,850	4	0	635	0
1997		135,745	38,381	24,000	D	D	70,943	28,127	3,964	12,769	26,082	1	0	2,421	0
1998		NA	44,010	D	D	9,000	75,854	31,632	3,691	16,116	24,382	33	0	3,707	0
1999		151,979	53,287	D	D	3,000	93,687	37,241	4,109	19,720	32,299	318	0	2,005	0
2000		196,448	75,446	9,000	D	D	107,417	49,241	3,469	20,073	34,328	306	0	4,585	0
Arizona															
1987		1,144,281	83,236	845,000	178,000	667,000	181,263	80,955	8,965	17,456	61,644	12,243	26,000	8,782	0
1989		1,293,340	118,284	917,000	220,000	697,000	223,834	105,367	7,949	12,500	86,076	11,942	27,600	6,622	0
1991		1,398,709	132,341	944,000	199,000	745,000	284,128	131,627	7,945	19,519	109,028	16,009	27,400	10,840	0
1993		1,607,378	206,067	1,042,000	298,000	744,000	310,721	149,803	6,333	18,889	112,596	23,100	40,000	8,590	0
1995		1,957,119	169,700	1,356,000	620,000	736,000	380,216	210,475	8,080	23,238	126,380	12,043	45,005	6,198	0
1997		2,409,843	143,601	1,854,000	677,000	1,177,000	376,818	198,097	10,266	18,584	137,165	12,706	29,058	6,366	0
1998		2,317,552	138,493	1,727,000	490,000	1,237,000	405,999	210,170	11,812	22,125	146,586	15,306	38,283	7,777	0
1999		5,090,944	170,099	4,434,000	224,000	4,210,000	439,286	239,142	11,753	22,242	150,366	15,783	37,308	10,251	0
2000		3,107,291	145,601	2,445,000	153,000	2,292,000	465,777	244,938	15,221	28,519	158,810	18,289	36,409	14,504	0
Arkansas															
1987		195,660	24,196	135,000	D	D	35,529	12,257	9,352	2,829	8,028	3,063	0	935	0
1989		120,875	25,071	51,000	D	D	43,676	14,213	12,186	4,123	9,521	3,633	0	1,128	0
1991		198,271	35,180	106,000	D	D	55,081	20,178	13,958	4,514	12,945	3,486	0	2,010	0
1993		301,143	40,657	185,000	D	D	74,011	25,362	23,666	6,767	14,774	3,442	0	1,475	0
1995		329,500	57,563	181,000	D	D	87,799	33,348	23,779	7,693	19,717	3,262	0	3,138	0
1997		271,703	49,469	118,000	D	D	102,204	35,021	29,227	7,570	23,985	6,401	0	2,030	0
1998		283,161	45,895	118,000	D	D	116,778	41,204	33,154	8,246	26,994	7,180	0	2,488	0
1999		378,033	46,122	216,000	3,000	213,000	111,999	45,587	32,543	10,286	16,437	7,146	0	3,912	0
2000		454,401	45,489	273,000	D	D	130,894	58,302	35,076	8,121	22,110	7,285	0	5,018	0

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

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State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
California															
1987		25,520,939	2,011,033	19,475,000	10,963,000	8,512,000	1,554,787	1,066,099	36,570	72,260	289,604	90,254	2,097,000	383,119	0
1989		30,885,676	2,478,100	23,675,000	12,857,000	10,818,000	1,850,062	1,285,165	43,546	83,218	321,615	116,518	2,385,300	252,148	245,066
1991		28,346,287	1,885,275	21,279,000	8,911,000	12,368,000	2,146,235	1,436,542	84,176	86,265	389,156	150,096	2,562,800	326,127	146,850
1993		33,721,294	1,785,138	26,541,000	7,463,000	19,078,000	2,380,144	1,629,545	112,454	99,291	367,857	170,997	2,499,000	338,161	177,851
1995		36,035,609	1,843,729	28,710,000	6,925,000	21,785,000	2,594,280	1,796,691	107,055	120,080	372,941	197,513	2,377,815	361,960	147,825
1997		41,669,723	1,454,133	34,011,000	5,977,000	28,034,000	2,978,575	2,028,296	128,617	160,304	439,942	221,416	2,549,108	473,915	202,992
1998		43,919,295	1,595,270	35,568,000	3,803,000	31,764,000	3,344,740	2,008,924	146,021	213,137	702,175	274,483	2,770,950	519,452	120,883
1999		47,965,435	1,749,647	39,047,000	4,042,000	35,006,000	3,658,622	2,179,077	185,716	249,043	729,128	315,658	2,800,035	577,895	132,236
2000		55,092,936	1,655,628	45,769,000	4,229,000	41,540,000	4,053,042	2,335,093	235,796	294,990	820,953	366,210	2,812,134	660,758	142,374
Colorado															
1987		1,704,333	132,807	1,261,000	282,000	979,000	185,699	136,003	8,771	8,728	17,682	14,515	52,000	72,827	0
1989		1,648,885	116,787	1,162,000	251,000	911,000	226,555	167,043	10,679	14,381	17,735	16,717	63,300	29,354	50,889
1991		NA	275,312	D	D	1,751,000	260,587	187,819	12,905	16,481	23,078	20,304	78,300	33,718	72,558
1993		2,864,058	169,821	2,111,000	252,000	1,859,000	331,081	222,107	18,026	23,651	41,797	25,500	99,000	41,852	111,304
1995		2,700,684	167,869	1,865,000	274,000	1,591,000	393,809	260,247	21,998	24,470	51,690	35,404	125,310	46,418	102,278
1997		3,205,211	195,364	2,248,000	525,000	1,723,000	427,435	289,514	26,833	23,756	50,422	36,910	135,980	50,078	148,354
1998		4,565,357	202,224	3,565,000	1,237,000	2,329,000	489,419	332,402	26,136	26,818	68,164	35,899	130,865	54,822	123,027
1999		4,209,085	238,003	3,136,000	D	D	507,673	361,598	24,992	27,226	60,743	33,114	132,587	61,389	133,433
2000		4,229,501	241,771	3,140,000	D	D	544,204	427,495	24,000	24,031	53,711	14,967	115,510	64,970	123,046
Connecticut															
1987		2,471,219	17,719	2,216,000	632,000	1,584,000	230,790	155,717	2,495	9,298	39,761	23,519	0	6,710	0
1989		2,744,751	37,810	2,410,000	680,000	1,730,000	284,410	187,212	5,430	11,630	56,999	23,139	0	12,531	0
1991		1,917,105	46,602	1,535,000	504,000	1,031,000	320,935	197,120	5,996	16,121	73,778	27,920	0	14,568	0
1993		2,808,827	52,905	2,373,000	419,000	1,954,000	364,708	220,562	10,067	18,351	80,829	34,899	0	18,214	0
1995		4,310,652	17,690	3,906,000	389,000	3,517,000	377,225	227,915	18,732	20,327	78,243	32,008	0	9,737	0
1997		3,454,151	32,731	3,014,000	307,000	2,707,000	392,668	242,385	13,730	25,387	76,391	34,775	0	14,752	0
1998		3,558,775	18,257	3,113,000	179,000	2,935,000	403,961	262,488	13,289	25,926	67,005	35,253	0	23,557	0
1999		4,436,224	17,883	3,984,000	207,000	3,777,000	418,122	273,787	10,827	26,026	66,997	40,485	0	16,219	0
2000		4,888,469	19,373	4,371,000	127,000	4,244,000	468,435	304,155	15,539	28,327	74,534	45,880	0	29,661	0
Delaware															
1987		NA	2,874	D	D	D	31,681	13,662	1,995	3,659	10,117	2,248	0	2,647	0
1989		NA	3,133	D	D	D	37,194	17,083	2,603	4,073	11,125	2,310	0	2,110	0
1991		NA	8,605	D	D	D	44,696	20,053	4,024	4,732	12,724	3,163	0	2,883	0
1993		1,248,672	12,053	1,181,000	24,000	1,157,000	52,627	26,170	3,710	4,857	13,937	3,953	0	2,992	0
1995		1,148,632	15,477	1,077,000	12,000	1,065,000	53,161	27,352	2,144	3,681	14,560	5,424	0	2,994	0
1997		1,088,697	10,207	1,009,000	8,000	1,001,000	65,095	32,031	2,977	3,361	20,125	6,601	0	4,395	0
1998		2,555,543	3,722	2,476,000	13,000	2,463,000	72,779	36,422	4,701	3,867	19,244	8,545	0	3,042	0
1999		1,342,913	2,747	1,261,000	9,000	1,252,000	76,286	36,683	5,401	4,246	19,715	10,241	0	2,880	0
2000		1,532,130	7,598	1,444,000	7,000	1,437,000	78,126	40,768	4,142	3,878	19,562	9,776	0	2,406	0

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

State	Performing sector:		Industry				U&C						U&C	Other nonprofit	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
District of Columbia															
1987	NA	1,208,569		D	D	D	85,470	62,968	484	4,192	11,642	6,184	0	100,959	0
1989	NA	1,521,715		D	D	23,000	111,325	84,274	480	7,924	13,022	5,625	0	136,744	0
1991	1,736,670	1,432,998	40,000	16,000	24,000	118,398	86,793	463	7,279	12,718	11,145	0	145,274	0	
1993	2,543,172	1,712,811	540,000	21,000	519,000	145,218	100,345	1,038	10,313	18,346	15,176	0	144,543	600	
1995	3,128,187	2,106,208	672,000	17,000	656,000	181,461	132,770	814	13,297	19,937	14,643	0	168,518	0	
1997	2,767,902	1,732,539	645,000		D	214,019	153,846	1,267	18,381	24,092	16,433	0	175,954	390	
1998	2,606,128	1,717,704	503,000	90,000	413,000	232,922	165,715	2,042	19,481	26,442	19,242	0	150,383	2,119	
1999	2,509,737	1,912,131	171,000	52,000	119,000	223,786	173,466	3,117	14,349	13,110	19,744	0	202,661	159	
2000	2,296,233	1,722,640	112,000	46,000	67,000	245,828	186,632	3,826	16,286	15,480	23,604	0	210,844	4,921	
Florida															
1987	3,136,347	719,058	2,133,000	892,000	1,241,000	278,847	129,474	13,889	20,334	98,188	16,962	0	5,442	0	
1989	3,374,947	642,074	2,341,000	1,167,000	1,174,000	385,556	200,742	25,655	20,660	112,906	25,593	0	6,317	0	
1991	3,699,966	657,605	2,599,000	934,000	1,665,000	438,054	220,683	36,736	35,690	116,339	28,606	0	5,307	0	
1993	3,525,284	607,692	2,425,000	970,000	1,455,000	488,551	267,717	31,641	40,565	119,937	28,691	0	4,041	0	
1995	5,222,709	554,440	4,101,000	1,634,000	2,467,000	559,104	317,081	41,466	36,382	135,110	29,065	0	8,165	0	
1997	4,783,893	649,376	3,442,000	1,461,000	1,981,000	681,508	333,828	89,003	48,304	176,142	34,231	0	11,009	0	
1998	4,773,060	749,648	3,300,000	889,000	2,411,000	712,704	355,892	80,720	51,772	184,475	39,845	0	10,708	0	
1999	4,265,345	763,344	2,697,000	706,000	1,991,000	788,743	396,395	91,371	63,637	198,479	38,861	0	16,258	0	
2000	4,662,727	573,140	3,212,000	498,000	2,714,000	851,932	408,826	103,167	78,906	220,827	40,206	0	25,655	0	
Georgia															
1987	1,430,455	96,266	1,001,000		D	D	331,000	151,367	39,621	34,196	95,827	9,989	0	2,189	0
1989	1,309,760	157,925	719,000		D	D	424,424	210,248	40,141	35,635	126,231	12,169	0	8,411	0
1991	1,478,861	121,008	868,000	89,000	779,000	484,019	238,664	43,222	40,010	149,645	12,478	0	5,834	0	
1993	1,577,360	159,002	860,000	63,000	797,000	546,960	273,079	39,325	51,968	167,509	15,079	0	11,398	0	
1995	2,112,474	272,178	1,175,000	142,000	1,031,000	657,530	302,390	53,611	55,018	221,785	24,726	0	7,766	0	
1997	2,271,517	225,150	1,273,000	212,000	1,062,000	766,346	347,407	68,844	73,284	252,398	24,413	0	7,021	0	
1998	2,491,906	235,596	1,444,000	86,000	1,358,000	802,023	369,764	70,019	86,040	246,086	30,114	0	10,287	0	
1999	2,959,809	278,552	1,827,000	178,000	1,649,000	839,715	380,202	74,085	90,747	258,402	36,279	0	14,542	0	
2000	2,796,192	273,713	1,579,000	83,000	1,496,000	926,749	417,664	76,857	94,341	299,214	38,673	0	16,730	0	
Hawaii															
1987	158,274	23,218	73,000	54,000	19,000	57,345	34,472	19,317	261	2,591	704	0	4,711	0	
1989	123,204	36,400	9,000	2,000	7,000	70,733	40,574	24,759	799	3,686	915	0	7,071	0	
1991	144,656	44,537	11,000		D	D	78,166	44,857	27,321	856	3,391	0	10,953	0	
1993	380,150	41,703	255,000		D	D	73,961	41,362	27,099	151	3,109	0	9,486	0	
1995	169,252	62,303	14,000		D	D	78,429	44,238	26,789	299	3,738	0	14,520	0	
1997	274,632	54,318	87,000	55,000	32,000	120,107	72,421	28,440	5,944	13,297	5	0	13,207	0	
1998	241,560	54,776	17,000		D	D	148,007	86,886	37,002	10,949	13,170	0	21,777	0	
1999	270,239	64,534	27,000	1,000	26,000	156,810	93,418	35,111	13,021	15,260	0	0	21,895	0	
2000	291,409	58,658	44,000	17,000	27,000	161,300	95,419	35,474	11,158	19,249	0	0	27,451	0	

Appendix table 4-24
R&D expenditure, by state, performing sector, and source of funds: 1987–2000
 (Thousands of current dollars)

Performing sector:		Industry					U&C						U&C FFRDCs	Other nonprofit institutions	Nonprofit FFRDCs
State	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non- Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Idaho															
1987		528,396	15,342	488,000	386,000	102,000	24,779	8,988	8,314	2,899	4,436	142	0	275	0
1989	NA	18,785	D	D	D	161,000	33,191	12,585	8,112	4,199	8,148	147	0	531	0
1991	NA	36,666	D	D	D	D	41,437	15,681	8,604	5,050	11,697	405	0	777	0
1993		477,563	37,396	391,000	D	D	48,774	17,026	12,550	7,286	11,068	844	0	393	0
1995		913,961	27,792	827,000	D	D	58,621	19,710	13,615	7,408	16,350	1,538	0	548	0
1997		1,269,685	24,092	1,181,000	D	D	64,278	18,103	21,752	9,151	14,802	470	0	315	0
1998		1,126,774	25,042	1,028,000	D	D	72,395	25,444	21,760	8,059	16,334	798	0	1,337	0
1999		1,309,401	27,448	1,210,000	D	D	71,674	28,116	15,718	3,962	16,877	7,001	0	279	0
2000		1,433,567	21,722	1,338,000	D	D	73,726	28,888	18,545	5,338	17,505	3,450	0	119	0
Illinois															
1987		5,337,890	72,532	4,284,000	940,000	3,344,000	498,221	293,929	30,610	23,791	117,826	32,065	444,000	39,137	0
1989		5,305,752	59,321	4,050,000	D	D	602,558	338,082	33,881	38,990	150,694	40,911	528,400	65,473	0
1991		6,413,236	68,151	5,027,000	190,000	4,837,000	697,565	361,461	52,573	49,583	177,424	56,524	573,500	47,020	0
1993		6,777,207	83,136	5,242,000	236,000	5,006,000	757,508	424,745	45,716	44,745	178,026	64,276	649,000	45,563	0
1995		7,482,753	80,626	5,776,000	146,000	5,630,000	817,640	467,952	46,903	43,048	195,052	64,685	767,071	41,416	0
1997		8,033,737	77,224	6,248,000	163,000	6,085,000	929,639	529,803	53,968	50,156	220,259	75,453	724,565	54,309	0
1998		8,830,457	71,946	6,892,000	136,000	6,755,000	1,045,800	586,627	56,752	59,665	262,243	80,513	759,182	61,529	0
1999		9,719,210	77,055	7,715,000	41,000	7,674,000	1,101,056	626,648	62,687	56,748	272,193	82,780	758,090	68,009	0
2000		12,767,496	85,344	10,661,000	37,000	10,624,000	1,170,625	681,006	73,042	56,085	279,759	80,733	759,002	91,525	0
Indiana															
1987		2,197,318	64,245	1,944,000	353,000	1,591,000	188,086	111,413	15,772	17,203	37,627	6,071	0	987	0
1989		2,120,117	74,520	1,815,000	D	D	227,266	136,040	18,911	18,419	43,658	10,238	0	3,331	0
1991		2,346,791	92,036	1,988,000	226,000	1,762,000	262,508	143,761	20,347	19,726	61,425	17,249	0	4,247	0
1993		2,560,252	77,330	2,177,000	D	D	302,811	167,743	20,552	22,535	65,991	25,990	0	3,111	0
1995		3,162,376	62,061	2,721,000	382,000	2,339,000	375,719	197,095	22,463	34,542	101,283	20,336	0	3,596	0
1997		3,149,259	68,272	2,677,000	D	D	400,399	209,227	23,826	33,321	113,903	20,122	0	3,588	0
1998		3,088,634	38,023	2,622,000	D	D	425,293	213,547	25,517	40,336	126,410	19,483	0	3,318	0
1999		2,763,351	54,903	2,246,000	D	D	460,418	224,035	27,877	41,727	149,209	17,570	0	2,030	0
2000		3,252,494	71,630	2,668,000	75,000	2,593,000	509,141	228,768	34,377	42,343	178,613	25,040	0	3,723	0
Iowa															
1987		540,156	20,217	343,000	D	D	157,539	76,915	16,653	6,212	49,668	8,091	19,000	400	0
1989		616,408	20,447	363,000	D	D	209,394	103,360	24,839	14,711	60,863	5,621	21,800	1,767	0
1991		777,130	26,977	461,000	D	D	259,437	123,858	34,147	14,372	74,471	12,589	26,400	3,316	0
1993		902,050	30,424	533,000	D	D	298,745	145,006	38,218	17,907	80,919	16,695	37,000	2,881	0
1995		1,391,005	37,257	998,000	D	D	322,769	163,620	47,279	19,391	77,793	14,686	31,925	1,054	0
1997		979,747	29,043	578,000	D	D	341,772	162,060	52,713	24,226	83,880	18,893	27,680	3,252	0
1998		1,053,690	32,701	634,000	D	D	358,259	167,123	52,945	31,066	88,665	18,460	24,637	4,093	0
1999		1,002,839	39,213	559,000	6,000	553,000	375,300	177,847	53,415	35,940	91,684	16,414	25,438	3,888	0
2000		1,017,300	34,586	538,000	D	D	418,263	203,437	56,351	32,473	104,472	21,530	23,281	3,170	0

Appendix table 4-24
R&D expenditure, by state, performing sector, and source of funds: 1987–2000
 (Thousands of current dollars)

State	Performing sector:		Industry				U&C						U&C FFRDCs	Other nonprofit institutions	Nonprofit FFRDCs
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Kansas															
1987.....		1,282,752	9,073	1,179,000	D	D	93,931	37,386	20,031	5,433	27,607	3,474	0	748	0
1989.....		522,687	9,034	404,000	94,000	310,000	107,856	44,292	24,159	5,187	30,204	4,014	0	1,797	0
1991.....		NA	11,961	D	D	D	124,174	43,913	28,967	7,292	39,897	4,105	0	5,219	0
1993.....		463,570	12,198	292,000	47,000	245,000	154,103	59,635	36,640	7,527	44,215	6,086	0	5,269	0
1995.....		763,702	12,296	569,000	D	D	181,496	70,026	39,353	11,434	52,517	8,166	0	910	0
1997.....		1,350,536	15,622	1,136,000	D	D	197,586	75,116	45,002	11,907	56,752	8,809	0	1,328	0
1998.....		1,518,063	24,757	1,279,000	D	D	213,096	80,443	47,089	12,385	56,215	16,964	0	1,210	0
1999.....		1,555,578	35,743	1,284,000	D	D	234,501	88,728	50,445	19,525	58,212	17,591	0	1,334	0
2000.....		1,420,089	20,162	1,140,000	D	D	258,336	105,610	44,396	23,410	69,872	15,048	0	1,591	0
Kentucky															
1987.....		353,868	26,692	249,000	D	D	78,008	30,778	10,841	6,715	26,545	3,129	0	168	0
1989.....		343,099	31,159	226,000	D	226,000	83,998	32,963	7,113	7,516	30,593	5,813	0	1,942	0
1991.....		316,616	62,279	154,000	D	D	97,989	38,386	6,122	10,569	38,008	4,904	0	2,348	0
1993.....		428,684	15,728	289,000	7,000	282,000	122,409	55,698	6,198	13,575	42,013	4,925	0	1,547	0
1995.....		593,797	5,911	452,000	4,000	448,000	134,784	59,811	9,589	16,627	43,883	4,874	0	1,102	0
1997.....		525,613	7,289	359,000	3,000	356,000	158,238	75,649	7,394	20,016	53,122	2,057	0	1,086	0
1998.....		645,079	6,591	427,000	D	D	209,780	80,390	15,049	19,176	86,057	9,108	0	1,708	0
1999.....		967,676	9,146	684,000	1,000	683,000	273,903	92,572	42,066	21,714	108,568	8,983	0	627	0
2000.....		866,052	7,500	582,000	1,000	581,000	274,238	96,288	21,849	17,932	121,232	16,937	0	2,314	0
Louisiana															
1987.....		317,932	34,619	134,000	D	D	148,563	54,367	31,850	7,154	42,639	12,553	0	750	0
1989.....		385,930	36,410	168,000	D	D	180,032	69,219	40,758	8,193	47,129	14,733	0	1,488	0
1991.....		453,098	43,104	172,000	16,000	156,000	235,726	98,860	62,167	15,678	44,184	14,837	0	2,268	0
1993.....		469,705	42,557	170,000	D	D	255,171	95,891	64,306	16,508	61,267	17,199	0	1,977	0
1995.....		422,967	45,108	61,000	D	D	314,996	135,838	71,898	21,317	66,446	19,497	0	1,863	0
1997.....		554,255	47,910	172,000	D	D	330,131	128,017	74,861	32,231	78,094	16,928	0	4,214	0
1998.....		542,408	84,315	102,000	14,000	87,000	351,976	144,039	78,128	23,406	86,840	19,563	0	4,117	0
1999.....		626,132	58,976	187,000	53,000	134,000	376,098	154,341	79,834	32,879	89,100	19,944	0	4,058	0
2000.....		626,793	99,196	126,000	1,000	125,000	399,411	169,895	75,626	25,670	95,601	32,619	0	2,186	0
Maine															
1987.....		76,367	5,493	41,000	D	41,000	16,952	7,787	315	2,051	5,740	1,059	0	12,922	0
1989.....		72,733	4,394	33,000	D	33,000	19,974	8,288	584	4,002	6,567	533	0	15,365	0
1991.....		NA	13,862	D	D	D	27,082	10,062	2,197	4,719	9,504	600	0	16,456	0
1993.....		113,937	13,003	59,000	D	D	24,879	8,959	1,711	4,117	9,674	418	0	17,055	0
1995.....		345,449	4,238	286,000	D	D	31,901	15,789	2,005	4,158	9,357	592	0	23,310	0
1997.....		148,620	5,685	83,000	D	D	33,144	15,066	1,551	5,609	10,526	392	0	26,791	0
1998.....		159,268	10,953	82,000	D	D	35,265	13,981	1,809	7,252	11,194	1,029	0	31,050	0
1999.....		224,584	4,975	140,000	52,000	88,000	44,437	20,137	1,964	2,476	17,293	2,567	0	35,172	0
2000.....		318,726	4,755	201,000	53,000	148,000	57,753	25,309	6,445	2,994	20,555	2,450	0	55,218	0

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Maryland															
1987		4,623,170	2,507,828	1,350,000	608,000	742,000	723,915	576,698	50,425	25,803	59,733	11,256	0	41,427	0
1989		4,972,713	2,915,588	1,088,000	552,000	536,000	900,007	705,292	61,216	35,556	74,426	23,517	0	68,533	585
1991		5,736,048	3,332,276	1,203,000	666,000	537,000	1,050,023	787,317	79,047	39,832	113,214	30,613	0	149,107	1,642
1993		7,530,401	4,116,718	2,076,000	1,287,000	789,000	1,128,066	842,053	90,237	47,604	115,976	32,196	0	204,180	5,437
1995		6,865,287	4,472,415	1,075,000	287,000	788,000	1,159,866	894,585	75,759	55,111	84,508	49,903	0	156,442	1,564
1997		7,395,409	4,569,181	1,425,000	456,000	970,000	1,242,151	927,015	81,381	40,098	114,075	79,582	0	154,995	4,082
1998		8,018,944	4,766,005	1,744,000	655,000	1,089,000	1,330,170	1,014,239	62,950	41,752	142,710	68,519	0	178,769	0
1999		8,087,315	4,814,517	1,700,000	455,000	1,246,000	1,387,262	1,058,128	76,138	33,777	151,053	68,166	0	184,657	879
2000		8,633,558	4,869,668	2,032,000	428,000	1,604,000	1,507,549	1,090,445	82,069	50,154	181,039	103,842	0	224,341	0
Massachusetts															
1987		7,773,057	575,855	5,492,000	1,468,000	4,024,000	719,581	536,999	18,390	64,806	37,790	61,596	354,000	631,621	0
1989		7,948,303	401,091	5,825,000	1,691,000	4,134,000	867,521	621,789	18,529	78,727	58,681	89,795	364,100	419,725	70,866
1991		8,565,279	277,787	6,335,000	1,480,000	4,855,000	953,708	680,168	13,090	90,390	71,025	99,035	389,000	433,698	176,086
1993		9,497,975	383,885	6,952,000	1,878,000	5,074,000	1,105,791	771,864	15,462	98,270	91,877	128,318	355,000	525,805	175,494
1995		9,969,508	315,749	7,416,000	1,458,000	5,958,000	1,147,150	824,826	13,240	89,409	92,116	127,559	344,657	587,363	158,589
1997		11,096,958	361,118	8,300,000	1,397,000	6,903,000	1,268,356	915,187	29,248	102,848	124,784	96,289	352,591	652,158	162,735
1998		13,382,495	301,193	10,604,000	2,419,000	8,185,000	1,342,712	987,319	31,704	107,368	98,737	117,584	364,783	706,800	63,007
1999		12,189,891	240,059	9,314,000	2,374,000	6,940,000	1,402,522	1,018,574	32,905	125,874	88,441	136,728	353,321	804,838	75,151
2000		13,004,427	259,172	9,863,000	1,831,000	8,032,000	1,485,792	1,064,468	40,305	138,667	94,322	148,030	348,339	967,591	80,533
Michigan															
1987		7,919,304	87,364	7,415,000	115,000	7,300,000	396,580	207,729	30,320	25,146	103,830	29,555	0	20,360	0
1989		9,058,245	71,349	8,468,000	99,000	8,369,000	487,192	263,506	35,983	36,310	116,135	35,258	0	31,704	0
1991		8,850,565	91,833	8,116,000	89,000	8,027,000	601,189	309,592	42,539	43,684	152,841	52,533	0	41,543	0
1993		10,777,535	95,717	9,924,000	153,000	9,771,000	699,957	377,278	39,541	47,390	172,114	63,634	0	57,861	0
1995		13,274,875	82,008	12,388,000	148,000	12,240,000	755,089	417,755	48,961	50,629	180,866	56,878	0	49,778	0
1997		13,990,795	107,749	13,009,000	121,000	12,888,000	842,303	453,776	50,749	57,149	205,580	75,049	0	31,743	0
1998		13,655,250	111,457	12,648,000	D	D	877,804	472,416	56,146	59,400	221,186	68,656	0	17,989	0
1999		18,798,557	149,473	17,714,000	134,000	17,580,000	919,390	508,080	58,472	60,451	229,644	62,743	0	15,694	0
2000		18,892,070	239,543	17,640,000	80,000	17,559,000	995,756	553,119	63,226	66,955	242,336	70,120	0	16,771	0
Minnesota															
1987		2,529,453	26,388	2,242,000	D	D	222,381	109,003	37,287	11,056	39,371	25,664	0	38,684	0
1989		2,398,568	31,036	2,066,000	D	D	258,614	132,880	42,542	12,389	43,713	27,090	0	42,918	0
1991		2,227,672	40,468	1,810,000	150,000	1,660,000	331,471	164,887	53,614	19,270	60,904	32,796	0	45,733	0
1993		2,922,121	40,129	2,458,000	378,000	2,080,000	332,033	174,716	49,861	21,524	64,840	21,092	0	91,959	0
1995		3,087,438	30,139	2,636,000	315,000	2,321,000	336,524	194,819	49,543	23,427	46,235	22,500	0	84,775	0
1997		3,605,451	34,573	3,116,000	362,000	2,754,000	363,095	200,149	50,539	24,196	53,731	34,480	0	91,783	0
1998		3,817,731	38,437	3,321,000	334,000	2,986,000	364,503	206,258	47,696	25,173	55,925	29,451	0	93,791	0
1999		3,904,779	37,878	3,379,000	242,000	3,137,000	375,919	210,235	49,447	24,323	62,310	29,604	0	111,982	0
2000		4,298,967	32,014	3,722,000	173,000	3,550,000	416,411	233,018	52,659	26,859	71,236	32,639	0	128,542	0

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

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State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Mississippi															
1987		236,427	127,489	44,000	D	D	59,882	24,532	16,775	4,282	8,897	5,396	0	5,056	0
1989		268,090	130,448	56,000	D	D	78,922	35,747	20,493	5,439	9,670	7,573	0	2,720	0
1991		302,380	157,156	41,000	D	D	100,383	52,853	20,886	8,892	12,132	5,620	0	3,841	0
1993		324,189	162,622	52,000	D	D	105,739	54,715	21,836	9,824	10,960	8,404	0	3,828	0
1995		314,710	132,616	66,000	D	D	112,789	62,597	23,778	8,912	11,211	6,291	0	3,305	0
1997		369,557	165,297	73,000	D	D	124,601	62,350	29,324	9,169	13,623	10,135	0	6,659	0
1998		366,465	132,896	73,000	17,000	57,000	152,683	79,772	29,455	10,399	31,126	1,931	0	7,886	0
1999		476,292	196,245	114,000	43,000	71,000	160,287	85,128	31,138	9,570	33,732	719	0	5,760	0
2000		512,789	186,799	101,000	19,000	83,000	217,064	117,168	38,833	10,973	47,025	3,065	0	7,926	0
Missouri															
1987		2,171,482	46,007	1,905,000	D	D	205,597	113,146	11,753	19,325	49,579	11,794	0	14,878	0
1989		2,709,978	58,176	2,380,000	D	D	255,009	139,677	14,509	25,151	59,615	16,057	0	16,793	0
1991		NA	71,220	D	D	D	305,780	165,099	19,061	30,195	67,335	24,090	0	22,217	0
1993		1,788,896	51,288	1,375,000	D	D	344,566	190,959	18,959	31,492	78,490	24,666	0	18,042	0
1995		2,498,360	55,445	2,028,000	584,000	1,443,000	397,192	212,750	21,486	36,639	92,974	33,343	0	17,723	0
1997		1,826,338	50,526	1,290,000	30,000	1,260,000	464,809	260,668	24,101	36,669	111,305	32,066	0	21,003	0
1998		1,867,905	48,544	1,313,000	D	D	484,159	277,894	24,473	29,605	109,470	42,717	0	22,202	0
1999		2,009,472	48,097	1,387,000	21,000	1,367,000	549,876	321,115	25,591	30,380	127,617	45,173	0	24,499	0
2000		2,583,036	43,851	1,893,000	18,000	1,876,000	614,101	371,713	26,387	33,535	130,288	52,178	0	32,084	0
Montana															
1987		54,381	17,763	7,000	0	7,000	29,425	11,299	7,325	3,197	7,604	0	0	193	0
1989		NA	20,877	D	D	5,000	32,450	11,552	7,919	3,242	9,534	203	0	1,077	0
1991		NA	26,133	D	D	D	38,149	13,801	8,884	4,406	10,820	238	0	1,340	0
1993		90,438	27,075	14,000	D	D	48,080	21,399	9,029	3,234	14,011	407	0	1,283	0
1995		119,109	33,553	17,000	D	D	66,879	27,382	12,914	5,825	20,172	586	0	1,677	0
1997		199,351	33,199	92,000	D	D	70,591	31,261	14,368	8,470	15,684	808	0	3,561	0
1998		190,675	33,101	82,000	D	D	72,425	35,730	13,784	8,437	13,435	1,039	0	3,149	0
1999		168,611	42,816	33,000	D	D	84,460	43,872	14,639	8,967	15,566	1,416	0	8,335	0
2000		169,856	35,344	28,000	D	D	99,069	51,686	17,873	10,298	15,658	3,554	0	7,443	0
Nebraska															
1987		160,209	21,899	62,000	D	D	74,468	33,275	16,123	6,664	14,893	3,513	0	1,842	0
1989		181,706	22,074	64,000	D	D	93,506	36,761	22,926	9,098	20,676	4,045	0	2,126	0
1991		210,756	21,920	59,000	7,000	52,000	123,711	40,597	35,817	7,845	34,780	4,672	0	6,125	0
1993		294,531	24,730	128,000	14,000	114,000	135,737	38,023	39,576	8,891	36,406	12,841	0	6,064	0
1995		335,930	23,132	150,000	D	D	157,044	54,746	42,331	10,933	45,536	3,498	0	5,754	0
1997		275,359	23,741	71,000	D	D	175,592	60,388	47,089	13,686	49,290	5,139	0	5,026	0
1998		314,645	28,873	93,000	D	D	186,200	62,578	46,602	16,749	55,018	5,253	0	6,572	0
1999		417,342	28,769	178,000	6,000	172,000	205,363	61,226	10,648	17,231	102,726	13,532	0	5,210	0
2000		438,996	25,082	199,000	D	D	208,480	65,702	7,243	17,636	101,159	16,740	0	6,434	0

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	FFRDCs	nonprofit institutions	FFRDCs
Nevada															
1987		167,996	76,509	57,000	D	D	34,254	18,563	1,973	3,983	8,805	930	0	233	0
1989		152,642	77,198	29,000	D	D	45,555	26,587	2,682	4,296	10,396	1,594	0	889	0
1991		261,232	108,614	83,000	63,000	20,000	66,742	38,221	2,608	5,323	19,675	915	0	2,876	0
1993		218,503	71,044	67,000	D	D	79,124	43,196	4,361	5,245	25,193	1,129	0	1,335	0
1995		445,028	34,669	322,000	D	D	86,902	47,708	6,460	6,941	24,798	995	0	1,457	0
1997		516,544	46,025	380,000	D	D	88,331	43,934	4,411	5,464	30,749	3,773	0	2,188	0
1998		570,509	48,514	434,000	D	D	83,888	45,496	4,533	5,355	24,314	4,190	0	4,107	0
1999		457,765	27,843	337,000	D	D	91,485	51,387	5,442	5,196	25,484	3,976	0	1,437	0
2000		377,412	20,696	248,000	D	D	106,340	60,005	7,032	5,532	29,227	4,544	0	2,376	0
New Hampshire															
1987		164,130	19,006	94,000	D	D	50,928	34,633	2,045	2,081	8,114	4,055	0	196	0
1989		NA	21,510	D	D	95,000	62,172	41,816	2,646	2,951	9,333	5,426	0	97	0
1991		NA	88,342	D	D	102,000	78,975	52,833	4,375	3,997	10,225	7,545	0	330	0
1993		438,620	88,839	248,000	D	D	99,475	67,727	5,846	4,842	11,768	9,292	0	2,306	0
1995		597,697	30,902	472,000	36,000	436,000	93,073	60,131	3,963	3,919	12,948	12,112	0	1,722	0
1997		798,601	36,861	652,000	D	D	107,505	67,282	7,990	4,880	15,058	12,295	0	2,235	0
1998		1,339,951	33,959	1,187,000	D	D	117,323	70,966	8,300	6,209	17,439	14,409	0	1,669	0
1999		1,256,206	28,353	1,099,000	D	D	127,135	77,327	8,961	8,939	18,102	13,806	0	1,718	0
2000		775,004	35,717	586,000	D	D	150,982	95,290	9,747	9,197	22,924	13,824	0	2,305	0
New Jersey															
1987		6,724,917	255,275	6,141,000	457,000	5,684,000	214,696	95,294	37,489	11,780	55,142	14,991	107,000	6,946	0
1989		7,228,887	429,755	6,381,000	601,000	5,780,000	283,897	119,237	45,150	16,428	82,798	20,284	112,600	21,635	0
1991		8,777,671	512,928	7,810,000	855,000	6,955,000	352,310	150,044	43,361	19,502	114,157	25,246	90,800	11,528	105
1993		9,180,997	509,310	8,162,000	378,000	7,784,000	373,816	166,835	36,361	26,115	116,307	28,198	116,000	11,876	7,995
1995		9,128,185	343,667	8,200,000	197,000	8,002,000	443,371	208,934	39,535	25,861	135,607	33,434	125,685	11,332	4,130
1997		12,067,086	459,286	11,069,000	117,000	10,952,000	462,052	224,084	37,274	26,186	139,540	34,968	59,146	15,641	1,961
1998		11,368,389	392,554	10,415,000	134,000	10,282,000	484,642	227,954	39,773	27,236	150,483	39,196	53,005	17,106	6,082
1999		10,535,662	486,722	9,453,000	126,000	9,327,000	520,957	239,880	45,013	30,402	162,468	43,194	53,693	15,666	5,624
2000		13,133,222	417,685	12,062,000	253,000	11,809,000	567,666	257,445	46,071	29,817	160,412	73,921	65,305	20,566	0
New Mexico															
1987		2,392,370	420,821	993,000	906,000	87,000	132,145	75,923	17,908	20,123	14,187	4,004	835,000	11,404	0
1989		2,679,324	593,878	1,034,000	D	D	136,189	76,777	14,612	16,433	17,860	10,507	902,400	4,857	8,000
1991		2,589,385	392,967	1,064,000	1,001,000	63,000	170,139	94,309	15,467	19,530	28,762	12,071	947,600	7,241	7,438
1993		2,751,608	503,783	962,000	D	D	186,750	113,060	13,998	18,743	28,507	12,442	1,084,000	6,762	8,313
1995		3,295,475	481,047	1,461,000	1,380,000	81,000	230,393	156,554	17,298	10,696	38,562	7,283	1,109,400	6,218	7,417
1997		3,027,688	366,253	1,310,000	D	D	219,150	144,639	14,954	9,915	42,442	7,200	1,121,670	10,362	253
1998		3,031,678	395,908	1,205,000	D	D	228,623	152,137	12,667	12,559	45,780	5,480	1,187,000	15,147	0
1999		3,278,714	409,886	1,342,000	D	D	224,500	155,218	12,302	12,866	39,260	4,854	1,278,901	23,427	0
2000		3,085,199	320,838	1,158,000	D	D	246,258	175,028	11,965	11,692	41,740	5,833	1,333,194	26,909	0

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

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State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
New York															
1987		8,185,452	160,073	6,559,000	3,426,000	13,904,000	1,108,478	758,040	53,349	62,173	126,931	107,985	221,000	136,901	0
1989		9,877,995	89,334	8,071,000	1,480,000	6,591,000	1,311,643	854,137	68,474	70,598	170,970	147,464	255,200	150,818	0
1991		10,315,493	173,988	8,268,000	1,558,000	6,710,000	1,419,765	918,063	75,490	85,282	190,624	150,306	283,900	169,570	270
1993		10,973,876	131,440	8,820,000	1,392,000	7,428,000	1,544,702	1,052,171	75,571	87,804	180,217	148,939	293,000	184,734	0
1995		10,954,561	117,250	8,651,000	1,821,000	6,831,000	1,702,414	1,107,468	95,941	98,200	206,258	194,547	281,148	202,749	0
1997		12,306,752	136,215	9,939,000	2,078,000	7,861,000	1,783,810	1,151,542	80,142	95,778	245,093	211,255	239,052	208,675	0
1998		13,730,588	191,988	11,176,000	2,216,000	8,960,000	1,924,667	1,223,705	82,308	96,367	286,449	235,838	0	221,286	216,647
1999		14,110,375	132,848	11,388,000	2,105,000	9,284,000	2,065,882	1,334,210	84,437	101,656	322,852	222,727	0	274,887	248,758
2000		13,555,586	176,034	10,539,000	1,773,000	8,766,000	2,290,812	1,475,423	102,684	100,995	374,797	236,913	0	300,685	249,055
North Carolina															
1987		2,212,322	129,508	1,741,000	5,000	1,736,000	313,819	195,177	54,897	23,825	25,757	14,163	0	27,995	0
1989		1,820,827	59,738	1,305,000	5,000	1,300,000	419,848	261,896	61,259	41,375	41,222	14,096	0	36,241	0
1991		1,965,076	150,956	1,285,000	4,000	1,281,000	501,841	303,921	71,990	55,079	51,758	19,093	0	27,279	0
1993		2,745,087	174,294	1,929,000	16,000	1,913,000	604,581	377,983	74,041	69,950	63,862	18,745	0	37,212	0
1995		3,191,790	220,179	2,226,000	15,000	2,212,000	686,609	431,682	97,647	74,086	61,857	21,337	0	59,002	0
1997		4,667,017	229,610	3,590,000	111,000	3,478,000	785,980	439,124	115,804	96,116	105,767	29,169	0	61,427	0
1998		4,559,996	235,873	3,362,000	12,000	3,350,000	898,513	516,489	128,976	120,934	96,259	35,855	0	63,610	0
1999		5,268,108	230,780	3,953,000	19,000	3,934,000	1,012,576	538,102	121,787	179,830	145,060	27,797	0	71,752	0
2000		5,045,250	262,003	3,672,000	30,000	3,641,000	1,040,017	577,437	113,764	169,979	147,364	31,473	0	71,230	0
North Dakota															
1987		116,487	20,343	60,000	D	D	35,912	15,385	13,731	3,578	2,391	827	0	232	0
1989		75,833	20,217	27,000	D	27,000	27,951	19,396	918	2,521	4,113	1,003	0	665	0
1991		NA	23,938	D	D	D	48,930	21,570	1,327	2,308	22,336	1,389	0	1,231	0
1993		91,534	27,220	9,000	D	D	54,175	25,223	1,532	2,173	23,595	1,652	0	1,139	0
1995		97,606	25,042	12,000	D	D	59,617	27,841	1,534	3,346	25,043	1,853	0	947	0
1997		115,946	26,401	33,000	0	33,000	56,096	24,207	1,070	3,439	25,554	1,826	0	449	0
1998		119,450	27,360	34,000	0	34,000	56,945	23,191	1,123	3,806	26,091	3,806	0	1,145	0
1999		168,176	30,561	75,000	0	75,000	61,695	25,923	1,965	3,608	27,782	2,417	0	920	0
2000		145,671	25,842	51,000	D	D	67,406	29,343	2,417	4,400	28,651	2,595	0	1,423	0
Ohio															
1987		4,934,310	991,290	3,569,000	2,206,000	2,807,000	329,344	193,615	35,038	22,265	47,189	31,237	0	44,676	0
1989		5,474,881	1,055,523	3,946,000	681,000	3,265,000	427,345	242,559	48,072	37,591	62,068	37,055	0	46,013	0
1991		5,975,241	688,926	4,726,000	778,000	3,948,000	503,725	284,791	53,079	37,948	73,765	54,142	0	56,590	0
1993		6,397,650	583,033	5,144,000	1,030,000	4,114,000	593,542	348,166	46,038	47,781	89,146	62,411	0	77,075	0
1995		5,314,554	599,044	4,001,000	574,000	3,428,000	642,596	375,061	47,690	54,316	106,701	58,828	0	71,914	0
1997		7,144,779	681,170	5,608,000	604,000	5,004,000	763,827	417,921	70,078	82,653	143,890	49,285	0	91,782	0
1998		6,969,763	698,173	5,338,000	605,000	4,732,000	808,210	444,316	74,449	88,340	151,611	49,494	0	125,380	0
1999		8,082,147	604,957	6,514,000	1,148,000	5,366,000	830,701	475,054	68,051	80,705	149,023	57,868	0	132,489	0
2000		7,661,540	615,458	5,962,000	539,000	5,423,000	918,500	498,967	83,520	87,570	179,722	68,721	0	165,582	0

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Oklahoma															
1987		534,354	33,729	384,000	D	D	99,363	25,880	3,463	7,078	57,472	5,470	0	17,262	0
1989		507,700	46,083	332,000	D	D	113,279	33,067	5,062	5,667	60,063	9,420	0	16,338	0
1991		604,019	40,970	392,000	2,000	390,000	152,624	42,806	13,593	8,559	74,265	13,401	0	18,425	0
1993		533,398	34,311	311,000	2,000	309,000	172,968	56,475	22,399	10,320	67,338	16,436	0	15,119	0
1995		528,764	45,104	288,000	38,000	249,000	186,371	59,504	19,699	11,453	79,107	16,608	0	9,289	0
1997		643,755	44,238	428,000	45,000	383,000	162,871	71,421	18,944	14,036	45,309	13,161	0	8,646	0
1998		512,899	51,038	245,000	2,000	243,000	208,873	83,785	37,415	13,320	59,574	14,779	0	7,988	0
1999		664,408	45,912	365,000	2,000	363,000	238,799	88,507	41,736	14,802	76,192	17,562	0	14,697	0
2000		659,684	58,619	333,000	3,000	331,000	252,419	93,434	42,396	16,789	88,152	11,648	0	15,646	0
Oregon															
1987		475,890	31,517	294,000	D	D	135,326	81,932	18,645	4,059	16,007	14,683	0	15,047	0
1989		578,941	42,199	355,000	30,000	325,000	161,215	99,141	20,860	4,857	16,717	19,640	0	20,527	0
1991		600,175	47,486	349,000	21,000	321,000	179,384	108,849	25,727	6,850	21,519	16,439	0	24,305	0
1993		773,855	50,795	471,000	32,000	439,000	225,750	134,956	29,762	8,578	34,209	18,245	0	26,310	0
1995		1,088,654	55,959	741,000	35,000	706,000	258,575	158,076	30,312	11,693	37,453	21,041	0	33,120	0
1997		1,519,732	90,017	1,102,000	28,000	1,075,000	290,603	195,030	32,335	9,647	35,824	17,767	0	37,112	0
1998		1,910,443	87,846	1,492,000	26,000	1,467,000	309,748	203,119	32,963	10,201	38,121	25,344	0	20,849	0
1999		1,974,067	89,369	1,540,000	3,000	1,537,000	319,700	210,667	33,975	10,473	48,269	16,316	0	24,998	0
2000		2,116,232	88,618	1,651,000	7,000	1,644,000	346,149	246,684	35,485	14,775	32,568	16,637	0	30,465	0
Pennsylvania															
1987		5,633,446	284,237	4,630,000	1,380,000	3,250,000	611,935	385,912	23,559	66,246	85,399	50,819	14,000	93,274	0
1989		5,790,920	274,016	4,632,000	1,907,000	2,725,000	761,337	468,993	32,466	91,733	109,498	58,647	20,900	102,667	0
1991		7,620,947	315,003	6,262,000	2,060,000	4,202,000	878,826	552,239	26,532	100,210	141,865	57,980	27,100	137,865	153
1993		8,277,907	353,951	6,711,000	1,142,000	5,569,000	1,019,006	676,963	20,177	111,569	149,296	61,001	35,000	158,950	0
1995		6,918,955	227,520	5,331,000	376,000	4,955,000	1,139,531	754,444	34,954	120,303	164,296	65,534	31,525	189,379	0
1997		8,209,081	151,216	6,609,000	672,000	5,937,000	1,241,180	807,553	41,685	139,325	182,835	69,782	32,229	175,456	0
1998		8,761,617	132,927	7,083,000	485,000	6,598,000	1,341,607	872,722	43,633	156,179	199,139	69,934	30,113	173,970	0
1999		10,695,077	168,382	8,932,000	441,000	8,491,000	1,400,286	905,775	52,510	154,203	202,126	85,672	31,821	162,588	0
2000		9,841,912	151,955	7,873,000	460,000	7,412,000	1,549,050	1,032,963	44,433	159,669	202,535	109,450	55,955	211,952	0
Rhode Island															
1987		553,281	239,969	234,000	D	D	65,516	51,313	2,136	5,380	5,293	1,394	0	13,796	0
1989		428,168	195,920	139,000	D	D	79,801	56,446	3,276	6,305	11,646	2,128	0	13,447	0
1991		484,693	226,367	152,000	11,000	141,000	88,448	59,616	5,278	3,709	17,520	2,325	0	17,878	0
1993		484,236	184,784	176,000	12,000	164,000	103,194	71,515	2,812	3,212	23,481	2,174	0	20,258	0
1995		896,570	254,302	520,000	D	D	105,501	72,461	3,225	2,479	25,644	1,692	0	16,767	0
1997		1,040,290	202,192	704,000	D	D	111,977	79,417	1,161	1,995	26,545	2,859	0	22,121	0
1998		1,677,063	222,106	1,320,000	D	D	111,979	77,737	2,857	2,074	26,130	3,181	0	22,978	0
1999		1,651,139	232,701	1,264,000	D	D	120,868	81,512	4,485	2,901	28,474	3,496	0	33,570	0
2000		1,500,828	240,862	1,090,000	D	D	129,697	88,510	4,564	2,735	30,289	3,599	0	40,269	0

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

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State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
South Carolina															
1987		640,738	11,527	523,000	D	D	95,811	34,350	14,061	6,184	37,110	4,106	0	10,400	0
1989		575,597	59,660	386,000	D	D	120,137	41,627	17,421	7,906	44,864	8,319	0	9,800	0
1991		594,444	13,955	419,000	D	D	151,204	54,045	16,858	15,903	54,011	10,387	0	10,285	0
1993		713,450	38,208	495,000	D	D	178,174	73,020	16,057	14,242	52,850	22,005	0	2,068	0
1995		996,261	34,441	739,000	D	D	220,088	109,443	17,899	19,364	53,994	19,388	0	2,732	0
1997		1,039,818	34,019	783,000	83,000	700,000	219,000	102,887	20,697	8,682	65,914	20,820	0	3,799	0
1998		989,452	44,872	695,000	D	D	246,305	112,845	27,166	11,407	83,416	11,471	0	2,583	692
1999		979,065	45,050	665,000	D	D	267,549	111,092	26,670	12,826	101,890	15,071	0	1,461	5
2000		1,126,164	45,754	781,000	D	D	294,184	131,043	31,743	15,478	102,793	13,127	0	5,226	0
South Dakota															
1987		21,311	5,685	4,000	0	4,000	11,395	5,129	4,789	472	739	266	0	231	0
1989		22,274	5,563	4,000	0	4,000	12,449	6,166	4,905	316	840	222	0	262	0
1991		32,297	9,470	5,000	0	5,000	15,959	6,917	6,539	310	1,520	673	0	1,868	0
1993		58,634	13,236	22,000	D	D	22,196	9,100	9,686	486	2,140	784	0	1,202	0
1995		54,667	13,428	19,000	0	19,000	21,392	10,623	6,772	469	2,341	1,187	0	847	0
1997		71,365	19,307	26,000	0	26,000	24,558	10,879	8,341	811	3,043	1,484	0	1,500	0
1998		59,766	27,501	5,000	0	5,000	25,140	11,702	8,355	495	2,647	1,941	0	2,125	0
1999		59,601	20,709	13,000	0	13,000	25,522	12,759	7,798	306	2,397	2,262	0	370	0
2000		84,801	13,232	44,000	16,000	28,000	27,269	13,659	6,525	361	3,825	2,899	0	300	0
Tennessee															
1987		950,871	125,890	649,000	D	D	155,163	84,030	28,035	11,757	24,124	7,217	9,000	11,818	0
1989		1,294,796	135,383	930,000	D	D	207,471	127,627	31,365	10,367	28,221	9,891	7,800	14,142	0
1991		1,142,486	123,708	737,000	D	D	243,763	150,274	32,927	12,359	34,772	13,431	10,400	27,515	100
1993		1,212,807	86,547	792,000	D	D	277,686	180,177	31,255	15,743	34,150	16,361	11,000	45,574	0
1995		1,394,231	62,100	1,003,000	D	D	308,155	191,797	35,395	16,345	45,116	19,502	1,101	19,875	0
1997		1,566,151	77,836	1,089,000	D	D	329,710	198,805	37,911	17,430	52,844	22,720	44,022	25,583	0
1998		2,502,826	37,925	2,040,000	D	D	346,466	207,822	36,615	19,995	54,066	27,968	50,750	27,685	0
1999		2,290,201	64,783	1,768,000	D	D	371,439	217,970	39,045	21,530	59,489	33,405	51,943	34,036	0
2000		2,057,293	88,947	1,215,000	D	D	405,013	240,337	39,258	18,520	67,634	39,264	0	35,888	312,445
Texas															
1987		5,454,724	340,803	4,261,000	1,784,000	2,477,000	809,781	403,285	92,020	46,903	168,648	98,925	0	43,140	0
1989		6,581,710	464,111	5,028,000	1,848,000	3,180,000	1,014,305	488,137	123,805	63,575	210,128	128,660	0	75,294	0
1991		6,635,249	405,267	4,755,000	D	D	1,215,548	550,558	139,019	79,964	283,850	162,157	2,300	257,134	0
1993		6,965,939	467,760	4,882,000	640,000	4,242,000	1,387,088	682,785	157,954	89,554	292,807	163,988	5,000	224,091	0
1995		8,384,534	537,508	6,211,000	912,000	5,298,000	1,472,165	747,687	158,886	102,486	296,606	166,500	0	163,001	860
1997		9,487,282	559,634	7,265,000	784,000	6,481,000	1,581,200	844,746	170,457	132,352	269,793	163,852	0	80,394	1,054
1998		10,774,067	596,978	8,408,000	223,000	8,185,000	1,698,363	909,528	179,491	140,196	289,879	179,269	0	69,230	1,496
1999		12,429,172	584,149	9,935,000	118,000	9,817,000	1,829,967	975,753	183,149	160,032	301,326	209,707	0	77,689	2,367
2000		11,552,437	464,699	8,961,000	230,000	8,731,000	2,039,642	1,101,463	229,255	165,151	322,234	221,539	0	87,096	0

Appendix table 4-24

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

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State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
Utah															
1987		1,031,253	99,166	809,000	D	D	120,878	81,355	13,412	5,734	16,178	4,199	0	2,209	0
1989		620,604	66,414	387,000	D	D	164,828	109,053	17,183	5,503	27,822	5,267	0	2,362	0
1991		664,474	103,269	356,000	51,000	305,000	201,470	137,613	16,756	6,880	33,779	6,442	0	3,735	0
1993		751,165	140,556	411,000	51,000	360,000	194,685	136,630	13,075	9,303	27,825	7,852	0	4,924	0
1995		1,144,080	131,138	803,000	178,000	625,000	202,212	140,600	15,431	9,456	28,065	8,660	0	7,730	0
1997		1,381,073	117,231	1,027,000	199,000	829,000	234,151	158,237	17,876	14,452	35,822	7,764	0	2,691	0
1998		1,494,808	135,365	1,109,000	181,000	928,000	249,147	165,319	17,556	13,502	42,561	10,209	0	1,296	0
1999		1,474,191	74,129	1,123,000	D	D	273,192	177,563	19,852	15,730	46,220	13,827	0	3,870	0
2000		1,360,644	69,871	979,000	D	D	308,059	192,100	20,365	17,853	43,818	33,923	0	3,714	0
Vermont															
1987		282,584	3,710	247,000	0	247,000	31,547	22,289	1,805	2,877	3,330	1,246	0	327	0
1989		NA	4,404	D	D	D	42,743	28,535	2,500	3,486	5,485	2,737	0	2,639	0
1991		NA	5,122	D	D	D	46,541	30,860	2,859	4,181	6,395	2,246	0	4,543	0
1993		342,809	5,601	284,000	D	D	49,839	31,530	2,666	4,573	8,253	2,817	0	3,369	0
1995		308,180	4,702	248,000	D	D	54,065	32,932	2,454	5,467	9,519	3,693	0	1,413	0
1997		313,881	7,400	246,000	D	D	59,526	34,042	2,683	5,399	11,465	5,937	0	955	0
1998		175,486	4,171	112,000	32,000	80,000	57,832	31,460	2,648	5,513	11,920	6,291	0	1,483	0
1999		388,598	4,065	318,000	D	D	64,791	36,773	2,718	7,112	11,896	6,292	0	1,742	0
2000		465,349	3,599	396,000	D	D	64,762	41,232	3,262	5,713	10,239	4,316	0	988	0
Virginia															
1987		2,558,458	883,844	1,342,000	1,068,000	274,000	207,934	116,137	36,400	15,895	29,841	9,661	0	124,680	0
1989		2,555,475	1,017,754	1,126,000	687,000	439,000	278,065	146,712	49,501	21,953	45,348	14,551	13,200	45,489	74,967
1991		2,775,919	1,107,423	1,115,000	679,000	436,000	342,476	183,798	51,474	31,899	52,857	22,448	28,600	42,826	139,594
1993		2,938,617	1,226,598	1,087,000	595,000	492,000	403,201	226,130	46,108	35,822	69,479	25,662	35,000	53,272	133,546
1995		3,897,444	1,580,530	1,577,000	743,000	834,000	446,776	261,604	46,814	45,897	64,379	28,082	74,015	41,651	177,472
1997		4,136,004	1,654,696	1,767,000	851,000	916,000	454,525	269,821	46,804	39,826	73,777	24,297	79,647	36,922	143,214
1998		4,933,647	1,480,464	2,707,000	1,614,000	1,093,000	490,695	288,634	49,343	46,173	76,938	29,607	75,963	43,793	135,732
1999		5,100,161	1,793,639	2,488,000	1,096,000	1,391,000	531,286	303,018	55,121	49,589	90,982	32,576	74,604	54,641	157,991
2000		5,069,481	1,449,209	2,718,000	800,000	1,918,000	587,718	321,690	70,328	53,380	103,522	38,798	79,342	67,066	168,146
Washington															
1987		3,520,818	122,468	3,071,000	D	D	235,927	166,458	5,561	21,183	33,623	9,102	0	91,423	0
1989		3,224,988	111,220	2,716,000	D	D	276,885	205,150	6,063	21,393	36,126	8,153	0	60,549	60,334
1991		3,889,660	132,503	3,215,000	D	D	349,667	253,381	11,351	28,107	45,229	11,599	0	72,156	120,334
1993		5,421,959	113,263	4,689,000	891,000	3,798,000	427,763	312,497	13,693	33,506	52,301	15,766	0	75,104	116,829
1995		5,240,679	159,837	4,294,000	D	D	485,970	340,327	13,761	39,429	77,212	15,241	0	95,900	204,972
1997		7,543,329	167,356	6,610,000	D	D	507,659	365,814	14,845	40,882	69,433	16,685	0	114,787	143,527
1998		8,465,553	183,685	7,476,000	D	D	534,410	384,074	13,119	41,838	76,678	18,701	0	121,688	149,770
1999		8,336,432	191,104	7,231,000	D	D	588,075	417,330	16,340	54,656	78,902	20,847	0	175,105	151,148
2000		10,516,331	258,718	9,265,000	D	D	642,934	443,223	15,266	62,087	101,445	20,913	0	198,734	150,945

R&D expenditure, by state, performing sector, and source of funds: 1987–2000

(Thousands of current dollars)

State	Performing sector:		Industry				U&C						U&C	Other	Nonprofit
	Funding sector:	Total R&D	Federal	Total ^a	Federal ^a	Industry ^b	Total	Federal	Non-Federal	Industry	U&Cs	Nonprofit	Federal ^c	Federal ^d	Federal ^d
West Virginia															
1987		187,642	56,605	87,000	D	D	26,704	13,011	871	884	10,736	1,202	17,000	333	0
1989	NA	63,239	D	D	80,000	39,368	17,339	1,255	3,963	15,081	1,730	18,400	2,098	0	0
1991	NA	76,078	D	D	69,000	50,772	20,479	1,564	11,170	13,191	4,368	21,900	4,985	0	0
1993		279,583	93,059	100,000	D	D	55,021	31,662	2,004	3,973	14,132	3,250	28,000	3,503	0
1995		475,040	139,595	243,000	D	D	53,399	30,464	2,023	3,160	13,470	4,282	33,047	5,999	0
1997		427,415	86,663	233,000	D	D	63,638	29,623	2,413	3,719	23,190	4,693	33,172	10,942	0
1998		420,704	96,682	225,000	D	D	63,446	25,301	3,053	4,547	26,525	4,020	34,708	868	0
1999		438,558	116,330	216,000	D	D	64,340	26,589	3,204	5,532	24,752	4,263	37,162	4,726	0
2000		457,128	102,958	235,000	D	D	73,420	33,972	2,963	7,510	24,299	4,676	35,536	10,214	0
Wisconsin															
1987		1,538,985	21,745	1,217,000	36,000	1,181,000	297,411	170,235	49,800	11,446	42,017	23,913	0	2,829	0
1989		1,398,630	26,945	1,030,000	32,000	998,000	336,815	197,818	55,372	16,268	43,304	24,053	0	4,870	0
1991		1,573,365	32,321	1,140,000	24,000	1,116,000	387,621	217,590	64,386	18,715	52,522	34,408	0	13,423	0
1993		1,851,751	38,190	1,343,000	D	D	444,192	255,195	68,410	18,698	53,725	48,164	0	26,369	0
1995		2,226,046	40,344	1,706,000	33,000	1,673,000	472,982	270,622	42,549	16,873	92,115	50,823	0	6,720	0
1997		2,255,616	42,606	1,707,000	29,000	1,678,000	497,289	283,701	41,073	19,075	97,873	55,567	0	8,721	0
1998		2,501,029	38,021	1,919,000	D	D	535,775	300,185	44,177	20,210	110,606	60,597	0	8,233	0
1999		2,565,541	41,110	1,949,000	72,000	1,877,000	560,648	313,140	44,989	19,771	116,601	66,147	0	14,783	0
2000		2,692,876	37,816	1,981,000	18,000	1,963,000	661,470	348,779	45,576	21,554	176,467	69,094	0	12,590	0
Wyoming															
1987		35,803	8,146	4,000	0	4,000	17,316	8,701	1,129	1,216	6,176	94	0	6,341	0
1989	NA	8,519	D	D	D	23,310	13,804	1,539	1,535	6,226	206	0	20,858	0	0
1991		41,037	9,339	2,000	0	2,000	23,009	12,782	1,848	2,000	6,140	239	0	6,689	0
1993		62,907	10,068	15,000	D	D	32,556	14,575	4,111	2,268	10,637	965	0	5,283	0
1995		86,767	8,669	25,000	D	D	40,470	15,373	3,125	1,930	17,454	2,588	0	12,628	0
1997		86,942	8,720	28,000	0	28,000	47,753	15,003	5,990	2,226	23,743	791	0	2,469	0
1998		65,318	11,991	2,000	0	2,000	48,500	17,806	5,366	3,114	21,275	939	0	2,827	0
1999		65,923	15,508	D	0	D	47,197	19,109	2,730	3,206	20,648	1,504	0	3,218	0
2000		60,969	7,298	7,000	0	7,000	43,094	16,556	1,470	2,941	20,103	2,024	0	3,577	0

FFRDC federally funded research and development center; U&C universities and colleges; NA not available; D data withheld to avoid disclosing operations of individual companies or because of imputations of more than 50 percent

^aIncludes performance at industry FFRDCs.^bIndustry sources of industry R&D expenditures include all non-Federal sources of industry R&D expenditures.^cIncludes total R&D expenditures of FFRDCs administered by academic institutions.^dOther sources of support for nonprofit institutions were unavailable by state. For 1987, Federal R&D support to "other nonprofit institutions" and "nonprofit FFRDCs" are combined in the "other nonprofit institutions" totals.

NOTE: Industry R&D data refer to calendar years; other R&D data refer to fiscal years but may serve as approximations to calendar-year data.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources: 2000 Data Update*, NSF 01–309 (Arlington, VA, 2001).

Appendix table 4-25
Total R&D and GSP, by state: 2000

State rank	R&D (millions of current dollars)	GSP (millions of current dollars)	R&D/GSP (percent)	Rank in R&D/GSP	U.S. R&D (percent)	Cumulative percent
1 California.....	55,093	1,344,623	4.10	8	22.50	22.5
2 Michigan.....	18,892	325,384	5.81	1	7.72	30.2
3 New York.....	13,556	799,202	1.70	24	5.54	35.8
4 New Jersey.....	13,133	363,089	3.62	11	5.36	41.1
5 Massachusetts.....	13,004	284,934	4.56	5	5.31	46.4
6 Illinois.....	12,767	467,284	2.73	13	5.21	51.6
7 Texas.....	11,552	742,274	1.56	28	4.72	56.4
8 Washington.....	10,516	219,937	4.78	3	4.29	60.7
9 Pennsylvania.....	9,842	403,985	2.44	16	4.02	64.7
10 Maryland.....	8,634	186,108	4.64	4	3.53	68.2
11 Ohio.....	7,662	372,640	2.06	18	3.13	71.3
12 Virginia.....	5,069	261,355	1.94	21	2.07	73.4
13 North Carolina.....	5,045	281,741	1.79	22	2.06	75.5
14 Connecticut.....	4,888	159,288	3.07	12	2.00	77.5
15 Florida.....	4,663	472,105	0.99	36	1.90	79.4
16 Minnesota.....	4,299	184,766	2.33	17	1.76	81.1
17 Colorado.....	4,230	167,918	2.52	15	1.73	82.9
18 Indiana.....	3,252	192,195	1.69	25	1.33	84.2
19 Arizona.....	3,107	156,303	1.99	19	1.27	85.5
20 New Mexico.....	3,085	54,364	5.68	2	1.26	86.7
21 Georgia.....	2,796	296,142	0.94	37	1.14	87.9
22 Wisconsin.....	2,693	173,478	1.55	29	1.10	89.0
23 Missouri.....	2,583	178,845	1.44	30	1.05	90.0
24 District of Columbia.....	2,296	59,397	3.87	10	0.94	90.9
25 Oregon.....	2,116	118,637	1.78	23	0.86	91.8
26 Tennessee.....	2,057	178,362	1.15	32	0.84	92.6
27 Alabama.....	1,730	119,921	1.44	31	0.71	93.4
28 Delaware.....	1,532	36,336	4.22	6	0.63	94.0
29 Rhode Island.....	1,501	36,453	4.12	7	0.61	94.6
30 Idaho.....	1,434	37,031	3.87	9	0.59	95.2
31 Kansas.....	1,420	85,063	1.67	26	0.58	95.8
32 Utah.....	1,361	68,549	1.98	20	0.56	96.3
33 South Carolina.....	1,126	113,377	0.99	35	0.46	96.8
34 Iowa.....	1,017	89,600	1.14	33	0.42	97.2
35 Kentucky.....	866	118,508	0.73	43	0.35	97.6
36 New Hampshire.....	775	47,708	1.62	27	0.32	97.9
37 Oklahoma.....	660	91,773	0.72	44	0.27	98.1
38 Louisiana.....	627	137,700	0.46	49	0.26	98.4
39 Mississippi.....	513	67,315	0.76	42	0.21	98.6
40 Vermont.....	465	18,411	2.53	14	0.19	98.8
41 West Virginia.....	457	42,271	1.08	34	0.19	99.0
42 Arkansas.....	454	67,724	0.67	47	0.19	99.2
43 Nebraska.....	439	56,072	0.78	40	0.18	99.4
44 Nevada.....	377	74,745	0.50	48	0.15	99.5
45 Maine.....	319	35,981	0.89	38	0.13	99.6
46 Hawaii.....	291	42,364	0.69	46	0.12	99.8
47 Alaska.....	196	27,747	0.71	45	0.08	99.8
48 Montana.....	170	21,777	0.78	41	0.07	99.9
49 North Dakota.....	146	18,283	0.80	39	0.06	100.0
50 South Dakota.....	85	23,192	0.37	50	0.03	100.0
51 Wyoming.....	61	19,294	0.32	51	0.02	100.0
na Other and unknown.....	19,761	NA	NA	NA	NA	NA

GSP: gross state product; NA: not available; na: not applicable

NOTES: U.S. R&D total attributable to states equals \$244,852. "Other and unknown" includes R&D performed in the 50 states or District of Columbia, but the specific location of such performance was not provided by survey respondents. It also includes R&D conducted by organizations in the United States, but actual performance does not take place in a particular state or the District of Columbia (e.g., research conducted on marine vessels and research in Puerto Rico). Finally, it includes a small accounting difference because the total for the United States is based on calendar-year data, whereas data by state pertain to the fiscal year for nonindustrial performance. The U.S. total attributable to states excludes the other and unknown component. When state R&D is taken as a percentage of U.S. R&D, the denominator is U.S. total attributable to states.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Industrial Research and Development, various years; NSF/SRS, Survey of Research and Development Expenditures at Universities and Colleges, various years; NSF/SRS, Survey of Federal Funds for Research and Development, various years; and NSF/SRS, Survey of Research and Development Funding and Performance by Nonprofit Organizations, various years. GSP data are from U.S. Bureau of Economic Analysis, www.bea.gov/bea/newsrel/gspnewsrelease.htm, 2001.

FFRDC	Total	Federal	Administrator	Sponsoring agency	Location
All FFRDCs.....	9,997,231	9,615,716			
University-administered FFRDCs	5,944,110	5,771,399			
Ames Laboratory	22,916	22,916	Iowa State University of Science and Technology	Department of Energy	Ames, IA
Argonne National Laboratory	478,391	452,860	University of Chicago	Department of Energy	Argonne, IL
Ernest Orlando Lawrence Berkeley National Laboratory	408,487	337,757	University of California	Department of Energy	Berkeley, CA
Fermi National Accelerator Laboratory	310,928	310,928	Universities Research Association, Inc.	Department of Energy	Batavia, IL
Jet Propulsion Laboratory	1,355,461	1,355,461	California Institute of Technology	National Aeronautics and Space Administration	Pasadena, CA
Lawrence Livermore National Laboratory	1,090,875	1,049,675	University of California	Department of Energy	Livermore, CA
Lincoln Laboratory	380,200	370,616	Massachusetts Institute of Technology	DOD, Department of the Air Force	Lexington, MA
Los Alamos National Laboratory	1,333,194	1,312,974	University of California	Department of Energy	Los Alamos, NM
National Astronomy and Ionosphere Center	10,986	10,979	Cornell University	National Science Foundation	Arecibo, PR
National Center for Atmospheric Research	119,846	116,553	University Corporation of Atmospheric Research	National Science Foundation	Boulder, CO
National Optical Astronomy Observatory	37,364	37,364	Association of Universities for Research in Astronomy, Inc.	National Science Foundation	Tucson, AZ
National Radio Astronomy Observatory	34,208	34,043	Associated Universities, Inc.	National Science Foundation	Green Bank, WV
Princeton Plasma Physics Laboratory	76,021	75,387	Princeton University	Department of Energy	Princeton, NJ
Software Engineering Institute	37,052	37,052	Carnegie Mellon University	DOD, Office of the Secretary of Defense	Pittsburgh, PA
Stanford Linear Accel Center	145,979	145,979	Leland Stanford, Jr., University	Department of Energy	Stanford, CA
Thomas Jefferson National Accelerator Facility	102,202	100,855	Southeastern Universities Research Association, Inc.	Department of Energy	Newport News, VA
Industry-administered FFRDCs	1,887,833	1,805,952			
Idaho National Engineering and Environmental Laboratory	14,547	13,610	Bechtel BWXT Idaho, LLC	Department of Energy	Idaho Falls, ID
National Cancer Institute at Frederick	187,222	183,478	SAIC; Charles River Laboratories, Inc.; Data Management Services, Inc.	Department of Health and Human Services, National Institutes of Health	Frederick, MD
Sandia National Laboratory	1,598,900	1,521,700	Sandia Corporation, a subsidiary of Lockheed Martin Corporation	Department of Energy	Albuquerque, NM
Savannah River Technology	87,164	87,164	Westinghouse Savannah River Co.	Department of Energy	Aiken, SC
Nonprofit-administered FFRDC	2,165,288	2,038,365			
Aerospace FFRDC	17,600	5,600	Aerospace Corporation	DOD, Department of the Air Force	El Segundo, CA
Arroyo Center	24,317	24,317	RAND Corporation	DOD, Department of the Army	Santa Monica, CA
Brookhaven National Laboratory	454,500	435,400	Brookhaven Science Associates, Inc.	Department of Energy	Upton, NY
C3I FFRDC	29,458	29,458	MITRE Corporation	DOD, Office of the Secretary of Defense	Bedford, MA, and McLean, VA
Center for Advanced Aviation System Development	5,683	5,683	MITRE Corporation	Department of Transportation, Federal Aviation Administration	McLean, VA
Center for Naval Analyses	69,102	66,616	The CNA Corporation	DOD, Department of the Navy	Alexandria, VA
Center for Nuclear Waste Regulatory Analyses	14,977	14,135	Southwest Research Institute	Nuclear Regulatory Commission	San Antonio, TX
Institute for Defense Analyses Communications and Computing	43,100	43,100	Institute for Defense Analysis	National Security Agency	Alexandria, VA

Appendix table 4-26

FFRDC R&D expenditures: FY 2001

(Thousands of dollars)

(Page 2 of 2)

FFRDC	Total	Federal	Administrator	Sponsoring agency	Location
Institute for Defense Analysis Studies	92,930	92,930	Institute for Defense Analysis	DOD, Office of the Secretary of Defense	Alexandria, VA
Internal Revenue Service (IRS) FFRDC	1,161	1,161	MITRE Corporation	Department of Treasury, Internal Revenue Service	McLean, VA
National Defense Research Institute	25,512	25,512	RAND Corporation	DOD, Office of the Secretary of Defense	Santa Monica, CA
National Renewable Energy Laboratory	207,230	205,665	Midwest Research Institute	Department of Energy	Golden, CO
Oak Ridge National Laboratory	581,046	540,116	UT-Battelle, LLC	Department of Energy	Oak Ridge, TN
Pacific Northwest National Laboratory	562,000	512,000	Battelle Memorial Institute	Department of Energy	Richland, WA
Project Air Force	29,361	29,361	RAND Corporation	DOD, Department of the Air Force	Santa Monica, CA
Science and Technology Policy Institute	7,311	7,311	RAND Corporation	National Science Foundation	Washington, DC

DOD Department of Defense

FFRDC federally funded research and development center

NOTE: More information about the 36 FFRDCs can be found on the National Science Foundation website (<http://www.nsf.gov/sbe/srs/ffrdc/start.htm>).SOURCE: National Science Foundation, Division of Science Resources Statistics, *Academic Research and Development Expenditures: Fiscal Year 2001*, NSF 03-316 (Arlington, VA, 2003).*Science & Engineering Indicators – 2004*

Appendix table 4-27
Trends in Federal and non-Federal R&D expenditure shares: 1953–2002
 (Percent)

Year	Non-Federal	Total	Federal		
			Defense related	Space related	Civilian related
1953	46.1	53.9	48.0	1.0	4.9
1954	44.8	55.2	49.0	1.0	5.2
1955	41.9	58.1	49.3	1.0	7.8
1956	41.3	58.7	49.8	0.9	8.1
1957	37.3	62.7	52.6	1.0	9.1
1958	35.9	64.1	53.2	1.8	9.0
1959	34.5	65.5	53.6	2.9	8.9
1960	34.9	65.1	51.5	4.4	9.2
1961	35.0	65.0	48.0	7.3	9.7
1962	35.2	64.8	49.1	6.6	9.1
1963	33.5	66.5	41.9	13.6	11.0
1964	33.3	66.7	36.9	18.9	10.9
1965	34.9	65.1	33.2	20.8	11.1
1966	35.8	64.2	32.4	19.6	12.2
1967	37.6	62.4	35.3	14.4	12.7
1968	39.3	60.7	34.8	13.6	12.4
1969	41.4	58.6	34.7	11.5	12.4
1970	42.9	57.1	33.4	10.3	13.3
1971	43.5	56.5	32.8	9.6	14.1
1972	44.2	55.8	33.0	7.9	14.9
1973	46.3	53.7	32.1	6.7	14.9
1974	48.1	51.9	29.3	6.9	15.7
1975	47.9	52.1	27.7	7.5	16.8
1976	48.5	51.5	27.0	7.7	16.9
1977	49.0	51.0	27.1	6.6	17.2
1978	49.9	50.1	25.9	6.2	18.0
1979	50.8	49.2	24.8	5.6	18.8
1980	52.6	47.4	24.3	5.3	17.9
1981	53.3	46.7	24.4	5.2	17.0
1982	54.0	46.0	26.1	4.9	15.0
1983	53.9	46.1	27.7	4.2	14.2
1984	54.5	45.5	28.7	3.0	13.7
1985	54.1	45.9	29.9	3.1	12.9
1986	54.6	45.4	31.4	3.0	11.0
1987	53.7	46.3	31.7	3.2	11.4
1988	55.1	44.9	30.2	3.5	11.2
1989	57.4	42.6	27.6	3.9	11.1
1990	59.5	40.5	25.1	4.3	11.1
1991	62.2	37.8	22.4	4.5	10.9
1992	63.2	36.8	21.6	4.3	10.9
1993	63.5	36.5	21.2	4.4	10.9
1994	64.1	35.9	19.7	4.5	11.7
1995	65.7	34.3	18.6	4.5	11.2
1996	67.9	32.1	17.6	4.1	10.4
1998	70.7	29.3	15.8	3.8	9.7
2000	74.9	25.1	13.5	2.4	9.2
2001	73.5	26.5	13.9	2.4	10.2
2002	71.7	28.3	14.9	2.5	11.0

NOTE: Data are preliminary for 2001 and 2002.

SOURCE: National Science Foundation, Division of Science Resources Statistics, special tabulations (Arlington, VA, 2003).

Federal R&D budget authority, by budget function: FY 1980–2003

Year	Total	Total defense	Total nondefense	Health	Space research/technology	Energy	General science	Natural resources/environment	Transportation	Agriculture	Education, training, employment, and social services	International affairs	Veterans benefits/services	Commerce/housing credit	Community/regional development	Administration of justice	Income security	General government
Millions of current dollars																		
1980	29,739	14,946	14,792	3,694	2,738	3,603	1,233	999	887	585	468	125	126	101	119	45	47	22
1981	33,735	18,413	15,322	3,871	3,111	3,501	1,340	1,061	869	659	298	160	143	106	104	34	43	22
1982	36,115	22,070	14,045	3,869	2,584	3,012	1,359	965	791	693	228	165	139	104	63	31	32	10
1983	38,768	24,936	13,834	4,298	2,134	2,578	1,502	952	876	745	189	177	157	107	44	37	32	6
1984	44,214	29,287	14,925	4,779	2,300	2,581	1,676	963	1,040	762	200	192	218	110	46	24	26	8
1985	49,887	33,698	16,191	5,418	2,725	2,389	1,862	1,059	1,030	836	220	210	193	114	50	47	21	17
1986	53,249	36,926	16,322	5,565	2,894	2,286	1,873	1,062	917	815	248	211	183	111	88	41	14	14
1987	57,069	39,152	17,917	6,556	3,398	2,053	2,042	1,133	908	822	267	223	215	110	99	49	25	17
1988	59,106	40,099	19,008	7,076	3,683	2,126	2,160	1,160	896	882	285	224	195	122	108	51	23	17
1989	62,115	40,665	21,473	7,773	4,555	2,419	2,373	1,255	1,064	907	347	279	212	128	74	45	27	15
1990	63,781	39,925	23,856	8,308	5,765	2,726	2,410	1,386	1,045	950	374	375	216	140	67	44	33	17
1991	65,898	39,328	26,570	9,226	6,511	2,953	2,635	1,582	1,231	1,052	433	378	219	178	88	51	30	4
1992	68,398	40,061	28,337	10,055	6,744	3,153	2,659	1,688	1,523	1,155	365	371	245	192	95	51	37	4
1993	69,884	41,249	28,635	10,280	6,988	2,677	2,691	1,802	1,703	1,152	348	382	250	220	57	49	36	0
1994	68,331	37,764	30,566	10,993	7,414	2,873	2,712	2,062	1,888	1,193	373	254	265	380	68	46	45	0
1995	68,791	37,204	31,587	11,407	7,916	2,844	2,794	1,988	1,833	1,194	369	287	257	525	70	59	43	1
1996	69,049	37,801	31,248	11,867	7,844	2,521	2,846	1,802	1,795	1,176	331	252	259	432	50	56	16	2
1997	71,653	39,591	32,062	12,670	7,844	2,372	2,944	1,886	1,785	1,203	373	190	267	409	48	59	9	2
1998	73,569	39,823	33,746	13,576	8,198	948	4,360	1,855	1,833	1,249	444	163	587	398	42	72	18	2
1999	77,637	41,306	36,332	15,553	8,245	1,131	4,690	1,842	1,725	1,288	403	190	644	432	59	88	38	3
2000	78,664	42,580	36,084	17,869	5,363	996	4,977	1,999	1,636	1,426	418	200	645	406	46	73	25	6
2001	86,756	45,713	41,043	20,758	6,126	1,314	5,468	2,096	1,640	1,657	411	252	719	429	54	88	30	3
2002	98,029	52,922	45,107	23,654	6,556	1,547	5,717	2,159	1,696	1,703	417	268	761	444	48	98	37	3
2003	107,057	58,259	48,798	26,615	7,435	1,408	5,890	2,136	1,554	1,703	484	182	810	387	48	114	30	3
Millions of constant U.S. dollars																		
1980	53,115	26,694	26,419	6,598	4,890	6,435	2,202	1,784	1,584	1,045	836	223	225	180	213	80	84	39
1981	54,925	29,979	24,946	6,303	5,065	5,700	2,182	1,727	1,415	1,073	485	261	233	173	169	55	70	36
1982	54,953	33,582	21,371	5,887	3,932	4,583	2,068	1,468	1,204	1,054	347	251	212	158	96	47	49	15
1983	56,505	36,345	20,163	6,264	3,110	3,757	2,189	1,388	1,277	1,086	275	258	229	156	64	54	47	9
1984	62,151	41,168	20,980	6,718	3,233	3,628	2,356	1,354	1,462	1,071	281	270	306	155	65	34	37	11
1985	67,883	45,854	22,032	7,372	3,708	3,251	2,534	1,441	1,402	1,138	299	286	263	155	68	64	29	23
1986	70,753	49,065	21,687	7,394	3,845	3,037	2,489	1,411	1,218	1,083	330	280	243	147	117	54	19	19
1987	73,799	50,630	23,170	8,478	4,394	2,655	2,641	1,465	1,174	1,063	345	288	278	142	128	63	32	22
1988	74,012	50,212	23,802	8,861	4,612	2,662	2,705	1,453	1,122	1,104	357	280	244	153	135	64	29	21
1989	74,901	49,035	25,893	9,373	5,493	2,917	2,861	1,513	1,283	1,094	418	336	256	154	89	54	33	18
1990	74,121	46,397	27,723	9,655	6,700	3,168	2,801	1,611	1,214	1,104	435	436	251	163	78	51	38	20
1991	73,711	43,991	29,720	10,320	7,282	3,303	2,947	1,769	1,377	1,177	484	423	245	200	99	57	33	4
1992	74,556	43,668	30,888	10,960	7,351	3,437	2,898	1,840	1,660	1,259	398	404	267	209	104	55	40	4
1993	74,400	43,915	30,486	10,944	7,440	2,850	2,864	1,918	1,813	1,226	371	407	267	234	61	52	39	0
1994	71,207	39,354	31,853	11,456	7,726	2,994	2,826	2,149	1,968	1,244	389	265	276	396	70	48	47	0
1995	70,166	37,948	32,219	11,635	8,074	2,901	2,849	2,028	1,870	1,218	376	293	262	536	71	60	44	1

Federal R&D budget authority, by budget function: FY 1980–2003

Year	Total	Total defense	Total nondefense	Health	Space research/technology	Energy	General science	Natural resources/environment	Transportation	Agriculture	Education, training, employment, and social services	International affairs	Veterans benefits/services	Commerce/housing credit	Community/regional development	Administration of justice	Income security	General government
Millions of constant U.S. dollars																		
1996	69,049	37,801	31,248	11,867	7,844	2,521	2,846	1,802	1,795	1,176	331	252	259	432	50	56	16	2
1997	70,283	38,834	31,449	12,428	7,694	2,326	2,888	1,850	1,751	1,180	366	186	262	401	47	58	9	2
1998	71,157	38,517	32,639	13,131	7,929	917	4,217	1,794	1,773	1,208	429	158	568	385	41	70	17	2
1999	74,124	39,436	34,687	14,849	7,872	1,080	4,477	1,758	1,647	1,230	385	181	615	412	56	84	36	3
2000	73,586	39,832	33,755	16,715	5,017	931	4,655	1,870	1,531	1,334	391	187	603	380	43	68	23	6
2001	79,323	41,796	37,527	18,980	5,601	1,201	4,999	1,916	1,499	1,515	376	230	657	392	49	80	27	3
2002	87,706	47,349	40,357	21,163	5,865	1,384	5,115	1,932	1,517	1,524	373	240	681	397	43	88	33	3
2003	94,091	51,203	42,888	23,392	6,534	1,237	5,177	1,877	1,365	1,497	425	160	712	340	42	100	26	3

NOTES: Data for 1980–2001 are actual budget authority, data for 2002 are preliminary estimates, and data for 2003 are proposed based on FY 2003 budget. See appendix table 4-1 for FY gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars. Beginning in FY 1998, a number of Department of Energy programs were reclassified from energy to general science. In FY 2000, NASA reclassified the Space Station as an R&D plant; this explains part of the drop in space research and technology in that year.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Federal R&D Funding by Budget Function: Fiscal Years 2001–2003*, NSF 02-330 (Arlington, VA, 2002).

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Appendix table 4-29

Federal basic research budget authority, by budget function: FY 1996–2003

Budget function	1996	1997	1998	1999	2000	2001	2002	2003
Millions of current dollars								
Total	14,442	14,961	15,523	17,433	19,470	21,376	23,635	25,499
Health.....	6,395	6,852	7,356	8,634	10,099	11,642	13,193	14,379
General science.....	2,662	2,753	4,121	4,464	4,722	5,187	5,398	5,649
Space research and technology.....	1,685	1,653	1,610	1,667	1,616	1,695	1,967	2,361
Energy.....	1,182	1,288	34	36	36	40	68	57
National defense.....	1,165	1,090	1,067	1,110	1,184	1,303	1,392	1,383
Agriculture.....	547	548	571	602	651	749	808	831
Transportation	456	420	411	358	542	17	13	25
Natural resources and environment	147	153	145	142	146	215	220	208
Education, training, employment, and social services.....	140	142	133	99	107	112	115	117
Commerce and housing credit.....	37	34	35	41	39	50	52	73
Veterans benefits and services	13	14	23	263	266	289	329	351
Administration of justice	12	13	16	18	20	27	27	25
International affairs.....	2	2	1	0	42	50	53	39
Community and regional development.....	0	0	0	0	0	0	0	0
General government	0	0	0	0	0	0	0	0
Income security.....	0	0	0	0	0	0	0	0
Millions of constant FY 1996 dollars								
Total	14,442	14,675	15,014	16,644	18,213	19,544	21,146	22,411
Health.....	6,395	6,721	7,115	8,244	9,447	10,644	11,804	12,637
General science.....	2,662	2,700	3,985	4,262	4,417	4,743	4,830	4,965
Space research and technology.....	1,685	1,621	1,557	1,591	1,512	1,550	1,760	2,075
Energy.....	1,182	1,263	33	34	34	36	61	50
National defense.....	1,165	1,069	1,032	1,059	1,107	1,191	1,246	1,215
Agriculture.....	547	537	552	575	609	685	723	730
Transportation	456	412	398	342	507	16	12	22
Natural resources and environment	147	150	141	136	137	197	197	183
Education, training, employment, and social services.....	140	139	129	95	100	102	103	103
Commerce and housing credit.....	37	33	34	39	36	46	47	64
Veterans benefits and services	13	14	23	251	249	264	294	309
Administration of justice	12	13	15	17	19	25	24	22
International affairs.....	2	2	1	0	39	46	47	34
Community and regional development.....	0	0	0	0	0	0	0	0
General government	0	0	0	0	0	0	0	0
Income security.....	0	0	0	0	0	0	0	0

NOTES: Data for 1996–2001 are actual budget authority, data for 2002 are preliminary estimates, and data for 2003 are proposed based on FY 2003 budget. See appendix table 4-1 for FY gross domestic product implicit price deflators used to convert current dollars to constant 1996 dollars. Beginning in FY 1998, several Department of Energy programs were reclassified from energy to general science. Beginning FY 1999, the increase in the Department of Veterans Affairs basic research total was a result of data reclassification.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Federal Research and Development Funding by Budget Function: Fiscal Years 2001–03*, NSF 02-330 (Arlington, VA, 2002).

Appendix table 4-30
Trends in R&D and Federal outlays: FY 1970, 1980, 1990, 2000, 2002, and 2004

Composition of Federal outlays	1970	1980	1990	2000	2002	2004 (proposed)
Billions of current dollars						
Federal outlays	195.6	590.9	1,253.1	1,788.7	2,011.0	2,229.4
Mandatory programs ^a	60.8	262.1	568.2	951.0	1,105.7	1,234.2
Net interest	14.4	52.5	184.3	223.0	171.0	176.4
Total discretionary	120.3	276.3	500.6	614.8	734.4	818.8
Defense	81.9	134.6	300.1	295.0	348.9	389.7
R&D	8.0	14.6	41.1	41.1	48.2	62.9
International	4.0	12.8	19.1	21.3	26.2	28.1
R&D	NA	NA	NA	NA	NA	NA
Domestic	34.4	128.9	181.4	298.5	359.3	401.0
R&D	7.1	15.6	22.7	32.9	39.7	49.2
Total Federal R&D outlays	15.1	30.2	63.8	74.0	87.9	112.1
Percent						
Federal outlays	100	100	100	100	100	100
Mandatory programs ^a	31.1	44.4	45.3	53.2	55.0	55.4
Net interest	7.4	8.9	14.7	12.5	8.5	7.9
Total discretionary	61.5	46.8	39.9	34.4	36.5	36.7
Defense	41.9	22.8	23.9	16.5	17.3	17.5
R&D	4.1	2.5	3.3	2.3	2.4	2.8
International	2.0	2.2	1.5	1.2	1.3	1.3
R&D	NA	NA	NA	NA	NA	NA
Domestic	17.6	21.8	14.5	16.7	17.9	18.0
R&D	3.6	2.6	1.8	1.8	2.0	2.2
Total Federal R&D outlays	7.7	5.1	5.1	4.1	4.4	5.0
Federal R&D outlays as proportion of corresponding discretionary outlays (percent)						
Total Federal R&D/total discretionary outlays	12.6	10.9	12.7	12.0	12.0	13.7
Defense	9.8	10.8	13.7	13.9	13.8	16.1
Domestic	20.6	12.1	12.5	11.0	11.0	12.3

NA not available

^aIncludes Social Security, Medicare, Medicaid, and other programs.

SOURCE: U.S. Office of Management and Budget, *Historical Tables, Budget of the United States Government: Fiscal Year 2004*, (Washington, DC, 2003).

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Appendix table 4-31
Discrepancy between Federal R&D support, as reported by performers and Federal agencies: 1980–2001
 (Billions of dollars)

Year	All performers			Industrial performers ^a		
	Performer reported	Agency reported	Difference	Performer reported	Agency reported	Difference
1980	30.0	29.8	0.2	12.8	13.0	-0.2
1981	33.7	33.1	0.6	15.0	14.9	0.1
1982	37.2	36.4	0.8	17.1	17.2	-0.1
1983	41.5	38.7	2.8	19.1	17.0	2.1
1984	46.5	42.2	4.3	21.7	18.6	3.1
1985	52.7	48.4	4.3	25.3	21.7	3.6
1986	54.7	51.4	3.3	26.0	24.2	1.8
1987	58.5	55.3	3.2	28.8	26.8	2.0
1988	60.1	56.8	3.3	28.2	26.7	1.5
1989	60.5	61.4	-0.9	26.4	28.5	-2.1
1990	61.6	63.6	-2.0	25.8	29.4	-3.6
1991	60.8	61.3	-0.5	24.1	26.4	-2.3
1992	60.8	65.6	-4.8	22.4	29.7	-7.3
1993	60.6	67.3	-6.7	20.8	30.2	-9.4
1994	60.8	67.2	-6.4	20.3	30.5	-10.2
1995	63.0	68.2	-5.2	21.2	30.2	-9.0
1996	63.3	67.7	-4.4	21.4	30.4	-9.0
1997	64.5	69.8	-5.3	21.8	31.4	-9.6
1998	66.3	72.1	-5.8	22.1	32.0	-9.9
1999	67.0	75.3	-8.3	20.5	31.9	-11.4
2000	66.4	72.9	-6.5	17.2	27.7	-10.5
2001	72.6	79.9	-7.3	16.9	27.0	-10.1

^aExcludes industry-administered federally funded research and development centers.

NOTES: Performer-reported data are expenditures; agency-reported data are obligations.

SOURCES: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), unpublished tabulations (Arlington, VA, 2003); and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 2001, 2002, and 2003* (Arlington, VA, forthcoming).

Appendix table 4-32
Estimated Federal obligations for R&D and R&D plant, by selected agency, performer, and character of work: FY 2003
(Millions of current dollars)

Table with 11 columns: Agency, Total, Federal intramural, Industrial firms, FFRDCs administered by industry, U&C, FFRDCs administered by U&C, Other nonprofits, FFRDCs administered by nonprofits, State and local government, Foreign. Rows include Total R&D and R&D plant, R&D, and Basic research, each with sub-rows for various agencies.

Appendix table 4-32
Estimated Federal obligations for R&D and R&D plant, by selected agency, performer, and character of work: FY 2003
 (Millions of current dollars)

Agency	Total	Federal intramural	Industrial firms	FFRDCs administered by industry	U&C	FFRDCs administered by U&C	Other nonprofits	FFRDCs administered by nonprofits	State and local government	Foreign
Applied research										
All agencies	27,400	8,799	5,119	762	8,205	1,494	2,598	171	193	59
Department of Agriculture	861	545	13	0	290	0	9	0	2	2
Department of Commerce	866	714	61	1	72	2	10	0	6	0
Department of Defense	4,773	1,968	2,043	15	531	71	96	37	0	13
Department of Energy	2,833	399	271	608	137	1,295	25	98	0	0
Department of Health and Human Services	12,333	3,234	441	114	6,425	31	1,960	19	69	40
Department of the Interior	496	444	8	0	37	0	1	0	5	1
Department of Transportation	376	135	102	7	20	10	7	4	91	1
Environmental Protection Agency	415	173	76	0	117	0	43	0	7	0
National Aeronautics and Space Administration	3,310	828	1,965	0	228	76	209	0	3	1
National Science Foundation	199	0	50	0	139	0	9	0	0	0
All other agencies	938	360	90	18	210	9	228	12	10	2
Development										
All agencies	45,231	11,347	29,846	495	826	1,356	510	481	111	259
Department of Agriculture	169	159	0	0	8	0	1	0	0	0
Department of Commerce	101	41	58	0	0	0	2	0	0	0
Department of Defense	38,501	9,780	27,144	109	500	228	128	366	0	246
Department of Energy	2,165	312	931	386	43	346	35	110	0	1
Department of Health and Human Services	762	20	543	0	63	0	91	0	44	0
Department of the Interior	40	38	0	0	1	0	0	0	0	0
Department of Transportation	220	52	93	0	9	2	5	0	59	0
Environmental Protection Agency	96	47	9	0	27	0	12	0	2	0
National Aeronautics and Space Administration	2,829	707	1,016	0	130	780	179	4	1	11
National Science Foundation	0	0	0	0	0	0	0	0	0	0
All other agencies	348	189	51	1	44	0	58	0	4	0
R&D plant										
All agencies	4,506	788	2,258	109	370	556	46	345	3	30
Department of Agriculture	152	152	0	0	0	0	0	0	0	0
Department of Commerce	55	55	0	0	0	0	0	0	0	0
Department of Defense	175	14	159	0	1	0	0	1	0	0
Department of Energy	997	1	40	109	10	502	0	335	0	0
Department of Health and Human Services	726	506	0	0	186	0	31	0	3	0
Department of the Interior	2	0	1	0	0	0	0	0	0	0
Department of Transportation	19	0	19	0	0	0	0	0	0	0
Environmental Protection Agency	21	21	0	0	0	0	0	0	0	0
National Aeronautics and Space Administration	2,107	30	2,004	0	0	22	12	9	0	30
National Science Foundation	247	6	33	0	173	33	3	0	0	0
All other agencies	4	4	0	0	0	0	0	0	0	0

FFRDC federally funded research and development center
 U&C universities and colleges

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development: Fiscal Years 2001, 2002, and 2003* (Arlington, VA, forthcoming).

Appendix table 4-33

Estimated Federal obligations for research, by agency and S&E field: FY 2003

(Thousands of current dollars)

Agency	Total	Life sciences	Psychology	Physical sciences	Environmental sciences	Math/computer sciences	Engineering	Social sciences	Other sciences NEC
All agencies	53,376,884	28,672,784	955,171	5,200,445	3,878,793	2,866,091	9,160,639	1,050,327	1,592,634
Appalachian Regional	675	0	0	0	0	0	0	675	0
Department of Agriculture.....	1,815,760	1,469,228	433	107,272	11,819	15,538	70,196	137,914	3,360
Department of Commerce.....	963,529	159,356	0	142,213	391,361	73,526	190,002	7,071	0
Department of Defense.....	6,510,444	861,910	80,819	573,426	272,500	1,083,064	3,257,074	16,138	365,513
Department of Education	218,426	16,073	2,856	0	0	0	19,370	180,127	0
Department of Energy.....	5,375,579	345,820	0	2,049,034	319,650	837,429	1,817,905	0	5,741
Department of Health and Human Services.....	26,788,878	24,036,813	759,941	432,672	412,321	72,905	225,043	287,625	561,558
Department of Housing and Urban Development.....	16,711	0	0	0	1,156	594	3,068	11,010	883
Department of Justice	50,813	0	500	0	0	500	0	36,400	13,413
Department of Labor.....	51,999	102	0	0	0	1,694	1,420	48,783	0
Department of State	2,549	0	0	0	0	0	0	2,549	0
Department of the Interior.....	554,102	163,000	0	20	364,408	9,227	12,300	5,147	0
Department of the Treasury	72,338	0	1,004	6,133	0	0	0	168	65,033
Department of Transportation	401,524	12,990	21,806	1,006	37,530	10,356	174,438	13,915	129,483
Department of Veterans Affairs	356,665	279,560	55,140	0	0	0	21,965	0	0
Environmental Protection Agency.....	531,006	234,990	0	16,115	175,129	16,193	45,257	8,968	34,354
Federal Communications Commission	2,193	0	0	630	0	50	715	798	0
Federal Trade Commission.....	1,381	0	0	0	0	0	0	1,381	0
International Development Cooperation Agency	258,775	155,000	0	0	7,855	0	0	95,000	920
Library of Congress	1,743	0	0	146	0	1500	0	0	97
National Aeronautics and Space Administration	5,769,460	379,960	28,055	1,179,469	1,292,650	107,213	2,656,812	571	124,730
National Archives and Records Administration	120	0	0	120	0	0	0	0	0
National Science Foundation.....	3,403,614	513,071	4,617	643,877	587,916	636,302	596,974	134,224	286,633
Nuclear Regulatory Commission.....	68,000	0	0	0	0	0	68,000	0	0
Smithsonian Institution	115,000	44,911	0	48,312	4,498	0	0	16,363	916
Social Security Administration	45,500	0	0	0	0	0	0	45,500	0

NEC not elsewhere classified

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development: Fiscal Years 2001, 2002, and 2003* (Arlington, VA, forthcoming).

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Federal obligations for total research, by detailed S&E field: FY 1982–2003

Field	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
	Millions of constant 1996 dollars											
All fields	19,814.7	20,774.7	21,055.4	21,953.2	21,926.9	23,199.9	23,353.5	25,039.8	25,127.7	26,810.3	26,695.7	28,628.2
Life sciences, total	7,220.8	7,546.9	7,922.3	8,657.6	8,589.3	9,493.6	9,672.6	10,243.7	10,261.2	10,762.9	10,802.8	11,468.2
Biology and agricultural, total	4,278.5	4,466.4	4,673.9	5,109.9	5,130.6	5,636.2	5,726.8	6,053.3	6,017.9	6,261.6	6,140.8	6,450.9
Biology (excluding environmental)	3,163.9	3,360.3	3,602.9	3,926.7	3,977.4	4,528.6	4,610.2	4,803.1	4,816.5	4,986.4	4,834.4	5,099.4
Environmental biology	279.2	282.2	351.4	354.2	350.9	374.5	376.9	443.5	397.8	514.2	557.0	592.5
Agricultural	835.4	823.8	719.7	829.1	802.3	733.1	739.7	806.7	803.5	761.0	749.4	759.0
Medical sciences, total	2,697.8	2,809.4	2,969.9	3,222.9	3,136.3	3,446.0	3,682.7	3,885.8	3,930.7	3,870.6	4,261.9	4,689.0
Life sciences, NEC	244.5	271.2	278.5	324.8	322.3	411.5	263.1	304.6	312.7	630.6	400.0	328.2
Psychology, total	332.3	351.1	374.9	445.1	443.8	477.8	488.1	508.5	521.3	539.6	324.9	586.3
Biological aspects	90.7	92.1	113.6	124.1	119.7	127.1	131.9	146.9	151.8	156.8	37.7	39.6
Social aspects	149.3	152.6	151.5	194.4	190.7	199.8	187.1	180.8	206.3	220.9	110.0	143.4
Psychological sciences, NEC	92.4	106.4	109.8	126.7	133.4	150.9	169.3	180.8	163.3	162.0	177.2	403.2
Physical sciences, total	3,804.6	4,214.3	4,173.5	4,144.8	4,078.0	4,206.1	4,153.9	4,467.9	4,426.1	4,737.5	4,838.9	4,713.1
Astronomy	419.7	520.9	537.4	564.3	622.1	675.3	589.5	653.4	694.0	706.6	805.6	730.7
Chemistry	732.2	758.3	852.4	885.0	880.1	879.7	880.4	943.7	885.2	926.6	976.9	897.7
Physics	2,450.5	2,703.1	2,581.4	2,471.1	2,399.5	2,397.0	2,473.5	2,641.7	2,620.5	2,752.7	2,810.3	2,808.9
Physical sciences, NEC	202.2	232.0	202.3	224.2	176.2	254.2	210.5	229.0	226.6	351.6	246.0	276.0
Environmental sciences, total	1,747.3	1,823.6	1,793.5	1,910.1	1,968.8	1,954.7	2,012.3	2,138.2	2,526.6	2,404.7	2,406.4	2,777.1
Atmospheric sciences	647.9	671.5	610.2	661.3	692.7	715.0	736.0	709.0	898.8	897.9	836.4	1,047.7
Geological sciences	544.1	486.1	504.6	583.8	589.8	571.2	553.0	654.5	768.3	815.1	801.9	849.5
Oceanography	397.6	500.7	511.0	542.3	571.0	552.7	576.5	593.2	604.4	445.9	500.2	497.6
Environmental sciences, NEC	157.6	165.4	167.7	122.7	115.3	115.7	146.6	181.5	255.1	245.9	267.9	382.4
Mathematics and computer sciences, total	532.7	611.3	618.9	782.3	817.7	828.4	805.0	886.8	977.0	1,010.9	1,264.8	1,304.6
Mathematics	194.9	194.6	212.3	249.8	245.2	264.5	272.9	284.7	280.4	254.6	347.4	309.6
Computer sciences	260.0	312.8	301.5	381.4	401.8	385.1	366.5	439.6	653.2	654.3	841.3	879.5
Mathematics and computer sciences, NEC	77.6	104.1	105.1	151.0	170.7	178.8	165.7	162.5	43.3	101.9	76.2	115.5
Engineering, total	5,152.9	5,126.1	5,094.3	4,922.6	4,968.0	5,051.5	4,954.2	5,356.6	4,911.8	5,530.8	5,425.1	5,854.8
Aeronautical	1,127.8	1,196.0	1,209.4	1,004.2	1,030.6	1,048.0	1,004.0	1,189.9	1,077.4	1,136.7	953.3	1,270.1
Astronautical	442.3	468.6	557.8	577.9	700.1	807.7	720.5	816.8	675.0	730.5	687.2	525.9
Chemical	144.7	211.3	203.1	346.0	326.6	279.1	323.2	171.5	281.1	340.4	324.3	261.4
Civil	307.2	274.7	285.1	294.7	269.6	264.3	269.1	277.1	369.2	341.2	359.9	268.3
Electrical	931.5	896.2	885.6	852.9	896.1	1,016.8	915.5	1,016.6	743.8	816.4	827.3	938.5
Mechanical	306.1	388.3	267.8	363.3	314.2	302.0	301.5	310.4	311.8	375.3	367.6	497.1
Metallurgy and materials	470.3	484.6	479.5	597.6	591.3	468.1	571.9	628.2	644.4	795.0	792.7	740.7
Engineering, NEC	1,422.9	1,206.2	1,206.1	885.8	839.4	865.5	848.7	946.0	809.2	995.3	1,112.7	1,353.0
Social sciences, total	587.2	634.5	613.3	625.9	552.1	620.7	608.3	664.4	732.1	813.5	751.8	718.5
Anthropology	22.2	18.7	26.1	24.5	18.1	19.7	17.9	16.8	16.7	17.9	15.4	14.6
Economics	239.0	241.4	207.1	217.3	174.5	192.0	199.7	201.1	229.2	209.6	230.7	217.9
Political science	11.4	16.2	15.2	19.9	15.4	14.6	15.3	16.3	15.2	19.0	24.6	31.1
Sociology	79.1	98.8	98.7	90.5	89.0	95.7	102.4	113.5	135.0	205.8	88.0	81.7
Social sciences, NEC	235.4	259.4	266.4	273.9	255.1	298.7	273.0	316.9	336.0	361.2	393.3	373.2
Other sciences, NEC	436.7	467.0	464.6	464.8	509.3	566.8	659.3	773.7	771.3	1,010.5	881.1	1,205.7

Federal obligations for total research, by detailed S&E field: FY 1982–2003

Field	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Average growth rate	
									(preliminary)	(preliminary)	1982–2003	1982–2001
Millions of constant 1996 dollars											Percent	
All fields	28,565.2	29,002.9	28,259.8	28,803.6	29,908.4	31,979.3	36,001.6	40,844.9	45,161.2	47,782.1	4.3	3.9
Life sciences, total	11,759.4	12,047.1	12,064.3	12,419.1	13,113.1	14,710.3	16,811.7	21,062.3	23,454.6	25,667.4	6.2	5.8
Biology and agricultural, total	6,359.9	6,530.5	6,629.9	6,418.8	6,841.9	7,676.1	11,580.8	12,895.0	NA	NA	NA	6.0
Biology (excluding environmental)	4,945.6	5,023.9	5,309.9	5,218.4	5,519.5	6,178.5	10,050.7	11,308.8	NA	NA	NA	6.9
Environmental biology	656.4	823.0	704.0	571.4	584.7	687.3	692.5	665.7	NA	NA	NA	4.7
Agricultural	757.8	683.7	616.0	629.0	737.8	810.2	837.6	920.5	NA	NA	NA	0.5
Medical sciences, total	5,066.8	5,071.6	4,973.4	5,426.9	5,799.7	6,487.1	4,177.3	6,015.4	NA	NA	NA	4.3
Life sciences, NEC	332.7	445.0	461.1	573.4	471.4	547.1	1,053.6	2,151.9	NA	NA	NA	12.1
Psychology, total	571.5	635.0	525.0	535.0	571.6	603.4	1,522.3	677.7	760.4	855.1	4.6	3.8
Biological aspects	50.1	60.0	62.8	56.7	40.2	17.2	7.7	12.4	NA	NA	NA	9.9
Social aspects	121.7	159.4	83.4	94.9	94.3	63.5	52.4	54.6	NA	NA	NA	-5.2
Psychological sciences, NEC	399.5	415.6	378.8	383.4	437.1	522.6	1,462.2	610.7	NA	NA	NA	10.5
Physical sciences, total	4,432.6	4,363.8	3,923.0	4,069.8	4,071.7	3,878.4	4,480.7	4,202.7	4,665.1	4,655.3	1.0	0.5
Astronomy	779.1	779.8	729.0	759.9	708.2	722.9	823.8	693.5	NA	NA	NA	2.7
Chemistry	911.2	880.8	881.1	829.6	792.1	777.3	1,146.9	936.2	NA	NA	NA	1.3
Physics	2,546.0	2,500.2	1,991.3	2,028.1	2,061.9	2,119.3	2,251.0	2,248.7	NA	NA	NA	-0.5
Physical sciences, NEC	196.2	203.2	321.6	452.2	509.4	258.9	258.9	324.2	NA	NA	NA	2.5
Environmental sciences, total	2,957.7	2,911.5	3,019.7	2,987.4	2,961.6	2,952.4	3,115.2	2,970.3	3,325.3	3,472.2	3.3	2.8
Atmospheric sciences	1,141.1	1,158.3	1,085.7	1,142.0	1,135.9	1,122.2	1,033.4	1,017.2	NA	NA	NA	2.4
Geological sciences	873.3	865.3	784.3	678.6	583.5	629.7	598.2	615.5	NA	NA	NA	0.7
Oceanography	517.7	415.4	574.3	586.3	541.4	626.3	629.8	622.2	NA	NA	NA	2.4
Environmental sciences, NEC	425.7	472.6	575.4	580.5	700.6	574.2	853.7	715.5	NA	NA	NA	8.3
Mathematics and computer sciences, total	1,356.4	1,610.7	1,571.6	1,639.8	1,776.6	1,889.1	2,064.0	2,384.7	2,494.6	2,565.7	7.8	8.2
Mathematics	356.7	263.8	254.5	295.8	323.1	329.4	405.1	362.1	NA	NA	NA	3.3
Computer sciences	865.2	1,034.2	1,119.8	1,240.5	1,352.8	1,446.1	1,553.1	1,847.8	NA	NA	NA	10.9
Mathematics and computer sciences, NEC	134.5	312.7	197.3	103.5	100.6	113.7	105.8	174.8	NA	NA	NA	4.4
Engineering, total	5,710.1	5,822.5	5,680.9	5,581.5	5,702.1	5,974.2	5,939.1	7,487.8	8,116.2	8,200.4	2.2	2.0
Aeronautical	1,274.2	1,273.3	1,249.4	1,326.8	1,544.1	1,535.4	1,369.9	2,219.8	NA	NA	NA	3.6
Astronautical	520.1	557.4	526.6	584.9	610.4	591.9	481.9	687.6	NA	NA	NA	2.3
Chemical	248.2	251.0	215.1	230.5	183.9	193.8	183.9	181.8	NA	NA	NA	1.2
Civil	289.6	346.2	300.2	270.3	236.1	313.3	223.8	263.4	NA	NA	NA	-0.8
Electrical	773.0	771.4	669.7	610.3	618.3	666.4	697.0	812.7	NA	NA	NA	-0.7
Mechanical	394.0	420.7	294.0	249.7	241.4	229.3	270.7	291.6	NA	NA	NA	-0.3
Metallurgy and materials	887.2	831.6	989.0	844.2	763.2	751.6	859.2	987.3	NA	NA	NA	4.0
Engineering, NEC	1,323.7	1,370.9	1,437.0	1,464.6	1,504.6	1,692.4	1,852.6	2,043.4	NA	NA	NA	1.9
Social sciences, total	674.7	692.3	654.6	683.0	779.7	815.4	983.0	921.3	931.4	940.2	2.3	2.4
Anthropology	16.9	22.1	18.3	20.6	17.6	17.5	14.9	14.3	NA	NA	NA	-2.3
Economics	201.4	210.6	194.2	201.3	222.9	206.6	233.5	213.8	NA	NA	NA	-0.6
Political science	26.5	22.7	16.7	13.8	19.5	19.3	21.1	17.8	NA	NA	NA	2.4
Sociology	71.0	48.8	41.2	25.4	97.5	79.9	84.8	87.2	NA	NA	NA	0.5
Social sciences, NEC	358.9	387.9	384.2	422.0	422.1	492.2	628.7	588.3	NA	NA	NA	4.9
Other sciences, NEC	1,103.0	919.8	820.7	888.0	932.1	1,156.1	1,085.7	1,138.0	1,413.7	1,425.7	5.8	5.2

NA not available

NEC not elsewhere classified

NOTE: Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development: Fiscal Years 2001, 2002, and 2003* (Arlington, VA, forthcoming).

Appendix table 4-35

Budgetary impact of the Federal research and experimentation tax credit: FY 1981–2000

(Millions of dollars)

Year	Outlay equivalent cost of credit (current dollars)	Total Federal R&D outlays (current dollars)	Ratio of credit outlays/R&D outlays (percent)	Outlay equivalent cost of credit (constant 1996 dollars) ^a
1981	205	34,168	0.6	334
1982	640	34,660	1.8	974
1983	1,010	35,900	2.8	1,472
1984	3,360	40,986	8.2	4,723
1985	2,430	47,216	5.1	3,307
1986	2,295	52,141	4.4	3,049
1987	2,715	53,256	5.1	3,511
1988	1,240	56,100	2.2	1,553
1989	1,590	60,760	2.6	1,917
1990	1,625	63,810	2.5	1,888
1991	1,070	62,183	1.7	1,197
1992	1,850	64,728	2.9	2,017
1993	1,900	68,378	2.8	2,023
1994	2,110	66,453	3.2	2,199
1995	1,820	68,432	2.7	1,856
1996	1,245	68,439	1.8	1,245
1997	1,360	71,073	1.9	1,334
1998	3,270	72,803	4.5	3,163
1999	2,625	74,136	3.5	2,504
2000	2,510	73,947	3.4	2,349

^aFigures in constant dollars were obtained using FY gross domestic product implicit price deflators (1996 = 100). See appendix table 4-1.

NOTES: Outlay equivalent estimates are comparable to taxable outlay figures reported in the budget. This allows for a comparison of resource cost of the tax credit with cost of direct Federal R&D expenditure support. Tax expenditure estimates are prepared by the U.S. Treasury Department, based on income tax law enacted as of December 31 of the year for which expenditures are reported.

SOURCES: U.S. Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government* (Washington, DC, annual series) and U.S. Office of Management and Budget, *Historical Tables, Budget of the United States Government, Fiscal Year 2004* (Washington, DC, 2003).

Appendix table 4-36
**Company-funded R&D expenditures within companies and contract R&D expenditures in United States,
 selected historical data: 1993–2001**

Sector	R&D within companies	Contract R&D	Ratio of contract R&D to R&D within companies
	Millions of current dollars		Percent
All industries			
1993	94,591	3,462	3.7
1994	97,131	3,618	3.7
1995	108,652	5,177	4.8
1996	121,015	5,833	4.8
1997	133,611	6,000	4.5
1998	145,016	6,710	4.6
1999	160,176	9,240	5.8
2000	180,421	14,785	8.2
2001	181,606	8,723	4.8
Manufacturing			
1993	69,901	2,339	3.3
1994	73,375	2,450	3.3
1995	81,236	3,812	4.7
1996	91,845	4,293	4.7
1997	101,202	4,143	4.1
1998	102,211	4,641	4.5
1999	99,865	4,080	4.1
2000	110,750	4,794	4.3
2001	109,221	3,957	3.6

NOTES: Data are company and other non-Federal funds for industrial R&D performance in the United States within the company and contracted to external organizations. Starting with the 1999 survey, estimates are based on North American Industry Classification System. In prior years, estimates were based on the Standard Industrial Classification System.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development, annual series, <http://www.nsf.gov/sbe/srs/indus/start.htm>.

Appendix table 4-37
Contract R&D expenditures in United States, by selected NAICS industry: 1999–2001

Industry/sector	NAICS code	1999	2000	2001	Ratio of contract R&D to R&D within companies		
					1999	2000	2001
		Millions of current dollars			Percent		
All industries.....	na	9,240	14,785	8,723	5.8	8.2	4.8
Manufacturing.....	31–33	4,080	4,794	3,957	4.1	4.3	3.6
Chemicals.....	325	2,386	2,783	2,065	11.9	13.4	11.7
Machinery.....	333	151	355	115	2.7	5.4	1.8
Computer and electronic products.....	334	101	168	565	0.3	0.4	1.4
Electrical equipment and components.....	335	D	84	60	D	2.5	1.3
Transportation equipment.....	336	812	771	708	3.4	3.4	3.4
Information.....	51	504	597	577	3.4	3.7	3.3
Professional, technical, and scientific services.....	54	957	1,200	1,676	6.7	6.7	7.4
Scientific R&D services.....	5417	832	907	1,310	11.2	9.3	12.0

D data withheld to avoid disclosing operations of individual companies

NAICS North American Industry Classification System

na not applicable

NOTE: Data are company and other non-Federal funds for contract R&D expenditures.

Source: National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development, annual series, <http://www.nsf.gov/sbe/srs/indus/start.htm>.

Federal technology transfer indicators, by selected U.S. agencies: FY 1987–2001

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Invention disclosures and patenting															
All 10 agencies															
Inventions disclosed	2,662	3,047	3,168	3,772	4,213	3,901	3,538	3,753	4,001	4,153	3,842	3,503	3,646	3,564	3,909
Patent applications filed	848	1,131	1,466	1,727	1,940	1,867	1,838	1,724	1,803	1,723	1,850	1,894	2,089	2,083	2,172
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,265	1,466	1,448	1,391	1,608
USDA															
Inventions disclosed	83	144	127	158	127	83	110	111	133	129	260	208	162	109	118
Patent applications filed	44	50	71	76	110	70	68	40	80	91	56	64	84	78	83
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	45	75	74	64	64
DOC															
Inventions disclosed	43	31	49	46	30	55	66	51	65	71	58	40	35	32	26
Patent applications filed	8	15	28	28	18	53	43	41	35	60	49	66	27	18	12
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23	19	26	14	22
DOD															
Inventions disclosed	953	1,147	1,153	1,383	1,524	1,283	1,189	1,172	1,168	1,115	1,150	1,028	1,060	991	1,005
Patent applications filed	343	447	616	807	919	850	835	732	759	716	735	755	703	774	809
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	554	579	547	553	619
DOE															
Inventions disclosed	857	1,003	1,053	1,335	1,666	1,698	1,443	1,588	1,758	1,886	1,500	1,313	1,474	1,371	1,527
Patent applications filed	252	336	382	366	397	432	497	543	571	564	705	751	850	788	792
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	384	512	525	515	605
EPA															
Inventions disclosed	0	0	0	12	20	9	22	19	15	20	9	14	5	11	17
Patent applications filed	4	5	5	6	8	12	15	15	24	18	13	11	15	10	7
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12	1	8	6	12
HHS															
Inventions disclosed	194	226	209	215	215	311	282	307	307	305	268	287	328	375	434
Patent applications filed	98	145	225	239	261	224	193	171	166	147	148	132	241	263	255
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	152	171	180	132	119
DOI															
Inventions disclosed	3	6	3	26	26	1	2	2	2	2	5	5	8	16	6
Patent applications filed	5	4	11	15	21	1	2	2	2	2	2	5	3	5	22
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	3	1	4	4
NASA															
Inventions disclosed	496	462	532	538	570	416	384	457	517	550	550	554	525	574	696
Patent applications filed	94	129	125	181	205	225	185	179	164	123	140	105	129	109	151
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	94	105	87	99	159
DOT															
Inventions disclosed	0	0	0	1	2	1	1	1	0	4	2	4	1	0	2
Patent applications filed	0	0	0	1	1	0	0	1	2	2	1	3	0	3	3
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	1	0	3	0
VA															
Inventions disclosed	33	28	42	58	33	44	39	45	36	71	40	50	48	85	78
Patent applications filed	NA	NA	3	8	NA	0	0	0	0	0	1	2	37	35	38
Patents issued	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	1	4

Federal technology transfer indicators, by selected U.S. agencies: FY 1987–2001

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Invention licences															
All 10 agencies															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,736	3,009	3,142
New invention licences	128	129	150	164	206	239	260	337	408	462	487	492	596	511	578
USDA															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	218	225	255
New invention licences	30	24	23	33	29	31	28	9	21	26	22	23	29	24	32
DOC															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	41	41	39
New invention licences	0	0	1	0	2	5	3	3	4	10	11	17	7	4	5
DOD															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	177	189	283
New invention licences	10	10	14	15	25	19	20	28	34	41	34	34	61	67	49
DOE															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	981	1,094	1,162
New invention licences	37	43	57	62	75	81	96	118	140	154	175	162	202	169	226
EPA															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17	18	19
New invention licences	0	0	0	1	2	2	2	9	1	2	1	0	2	3	4
HHS															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,041	1,222	1,007
New invention licences	35	42	48	47	69	96	99	151	176	193	208	215	208	192	212
DOI															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12	6	8
New invention licences	3	3	0	0	0	NA	NA	8	3	NA	0	0	0	2	2
NASA															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	249	214	292
New invention licences	13	7	7	6	4	5	12	11	29	36	36	40	40	47	42
DOT															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	1
New invention licences	0	0	0	0	0	NA	NA	NA	NA	NA	0	1	0	0	1
VA															
Active invention licences	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	76
New invention licences	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	47	3	5

Federal technology transfer indicators, by selected U.S. agencies: FY 1987–2001

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Cooperative research and development agreements (CRADAs)															
All 10 agencies															
Total active CRADAs	34	98	271	460	731	1,078	1,628	2,471	3,121	3,530	3,078	3,038	3,227	3,133	3,603
New CRADAs.....	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,058	1,034	1,023	874	926
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	0	231	194	555
New nontraditional CRADAs.....	NA	NA	NA	NA	NA	NA	NA	NA	NA	43	121	106	78	75	166
USDA															
Total active CRADAs	9	51	98	128	177	172	172	208	229	244	273	288	298	257	219
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93	102	101	69	49
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
DOC															
Total active CRADAs	0	9	44	82	115	177	292	368	407	406	377	337	275	221	188
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	90	77	67	46	26
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
DOD															
Total active CRADAs	3	10	36	113	193	277	365	563	845	1,086	1,360	1,424	1,350	1,364	1,965
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	408	399	449	425	459
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	330
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82
DOE															
Total active CRADAs	0	0	0	1	43	250	582	1,094	1,392	1,677	963	868	715	687	558
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	274	266	240	151	204
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
EPA															
Total active CRADAs	0	0	2	11	31	30	28	35	30	35	34	37	38	44	48
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11	12	13	10	19
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1
HHS															
Total active CRADAs	22	28	89	110	144	146	149	147	152	NA	NA	NA	468	438	490
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	87	153	149	136	125	137
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	231	194	209
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	43	121	106	78	75	76
DOI															
Total active CRADAs	0	0	1	12	11	1	3	9	15	22	23	30	30	40	50
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9	7	10	8	21
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7

Federal technology transfer indicators, by selected U.S. agencies: FY 1987–2001

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
NASA															
Total active CRADAs	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	1	0	0
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
DOT															
Total active CRADAs	0	0	0	1	9	17	30	38	37	43	36	39	51	79	82
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14	13	5	38	11
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
VA															
Total active CRADAs	0	0	1	2	8	8	7	9	14	17	12	15	1	2	2
New CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	9	1	2	0
Nontraditional CRADAs, active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
New nontraditional CRADAs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0

NA data not requested or not available; CRADA Cooperative Research and Development Agreement; DOC Department of Commerce; DOD Department of Defense; DOE Department of Energy; DOI Department of the Interior; DOT Department of Transportation; EPA Environmental Protection Agency; HHS Department of Health and Human Services; NASA National Aeronautics and Space Administration; USDA Department of Agriculture; VA Department of Veterans Affairs

NOTE: Data for CRADAs are for agreements established under the authority of 15 U.S.C. Sec. 3710a. Nontraditional CRADAs are agreements for special purposes, such as material transfer or technical assistance. Before 1999, NASA performed all of its technology transfer activities under the authority of the 1958 Space Act.

SOURCE: U.S. Department of Commerce, Office of the Secretary, *Summary Report on Federal Laboratory Technology Transfer: 2002 Report to the President and the Congress Under the Technology Transfer and Commercialization Act* (Washington, DC, 2002).

Science & Engineering Indicators – 2004

Appendix table 4-39

Small business innovation research award funding, by type of award and Federal agency: FY 1983–2001

(Millions of current dollars)

FY	All agencies			DOD	HHS	NASA	DOE	NSF	USDA	DOT	EPA	ED	DOC
	Total	Phase I	Phase II										
1983	45	45	0	20	7	5	5	5	1	—	—	—	0
1984	108	48	60	45	23	13	16	7	2	2	1	1	0
1985	199	69	130	78	45	29	26	10	3	3	2	1	0
1986	298	99	199	151	57	36	29	15	4	4	3	2	1
1987	351	110	241	194	67	32	28	17	4	3	3	2	2
1988	389	102	285	208	73	47	30	17	4	3	3	2	1
1989	432	108	322	233	79	52	33	19	4	4	3	2	1
1990	461	118	342	241	84	62	39	20	4	4	3	2	1
1991	483	128	336	241	93	69	39	22	5	6	4	3	1
1992	508	128	371	242	102	79	43	23	6	3	4	2	2
1993	698	154	491	385	126	86	50	29	7	4	5	3	2
1994	718	220	474	354	133	116	53	34	7	7	5	3	4
1995	835	232	602	414	181	118	70	42	9	10	7	3	8
1996	916	229	646	479	189	114	62	41	9	7	5	3	6
1997	1,107	278	789	569	252	121	75	54	10	8	6	4	7
1998	1,067	262	804	540	267	96	76	53	13	6	5	5	7
1999	1,097	300	797	514	314	89	81	60	13	6	5	5	7
2000	1,190	302	888	549	355	93	86	65	15	6	8	6	7
2001	1,294	317	977	576	412	106	87	72	16	6	6	7	7

— less than \$500,000; DOC Department of Commerce; DOD Department of Defense; DOE Department of Energy; DOT Department of Transportation; ED Department of Education; EPA Environmental Protection Agency; HHS Department of Health and Human Services; NASA National Aeronautics and Space Administration; NSF National Science Foundation; USDA Department of Agriculture

NOTES: Data are agency obligations. Data do not necessarily contain subsequent year revisions and may not add to totals. Phase I awards are initial grants up to \$100,000. Phase II awards are subsequent grants for up to \$750,000.

SOURCE: U.S. Small Business Administration, *Small Business Innovation Research Program Annual Report* (Washington, DC, annual series).

Science & Engineering Indicators – 2004

Appendix table 4-40

Small business technology transfer program award funding, by type of award and Federal agency: FY 1994–2001

(Millions of current dollars)

FY	All agencies			DOD	HHS	NASA	DOE	NSF
	Total	Phase I	Phase II					
1994	19	19	0	9	5	2	2	1
1995	33	23	10	15	9	3	5	2
1996	65	23	42	29	18	9	5	3
1997	69	24	45	37	13	12	4	3
1998	65	20	45	33	17	6	5	3
1999	65	24	41	31	20	6	5	3
2000	70	24	46	33	22	6	5	5
2001	71	25	46	27	25	6	5	8

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

NOTES: Data are agency obligations. Data do not necessarily contain subsequent year revisions and may not add to totals. Phase I awards are initial grants up to \$100,000. Phase II awards are subsequent grants for up to \$500,000.

SOURCE: U.S. Small Business Administration, *Small Business Technology Transfer Program Annual Report* (Washington, DC, annual series).

Appendix table 4-41
Advanced Technology Program projects, number of participants, and funding: FY 1990–2002

Year	Projects	SA	JV	Participants	Total project funding	ATP share			Industry share		
						Total	To JV	To SA	Total	From JV	From SA
					Number						
					Millions of current dollars						
1990	11	6	5	35	98	46	38	8	52	45	7
1991	28	18	10	83	202	93	65	28	109	83	26
1992	21	18	3	32	97	48	19	29	49	19	30
1993	29	24	5	50	118	60	19	41	58	20	38
1994	88	50	38	211	640	309	216	93	331	233	98
1995	103	62	41	318	827	414	304	110	413	340	73
1996	8	6	2	12	37	19	9	10	18	10	8
1997	64	49	15	101	304	162	75	87	142	81	61
1998	79	52	27	168	460	235	143	92	225	157	68
1999	37	26	11	57	212	110	61	49	102	64	38
2000	54	39	15	95	274	144	70	74	130	74	56
2001	59	46	13	88	286	164	79	85	122	81	41
2002	61	51	10	79	289	156	59	97	133	61	72

ATP Advanced Technology Program; SA single applicants; JV joint ventures

NOTES: For multiyear projects, total funding is attributed to the year the award was made. Participants include single applicants, joint venture leaders, and joint venture members; exclude subcontractors and informal collaborators.

SOURCE: Advanced Technology Program, National Institute of Standards and Technology, U.S. Department of Commerce, special tabulations.

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total																						
All technologies	185	189	249	246	330	415	466	467	516	525	394	339	480	527	564	674	615	559	545	504	483	602
Equity.....	81	102	108	117	113	160	151	155	194	274	107	74	102	134	77	81	86	69	57	70	50	57
Nonequity.....	104	87	141	129	217	255	315	312	322	251	287	265	378	393	487	593	529	490	488	434	433	545
Information technology.....	47	53	85	98	145	153	173	171	192	186	197	184	223	214	240	306	270	223	256	218	169	168
Equity.....	19	27	39	42	47	46	57	51	48	68	28	33	28	33	17	18	30	18	19	23	16	22
Nonequity.....	28	26	46	56	98	107	116	120	144	118	169	151	195	181	223	288	240	205	237	195	153	146
Biotechnology ^a	31	38	53	42	65	111	103	110	98	66	45	36	98	124	161	164	177	182	147	190	200	350
Equity.....	4	11	9	12	12	34	14	24	16	17	20	8	18	25	22	13	18	18	10	16	12	13
Nonequity.....	27	27	44	30	53	77	89	86	82	49	25	28	80	99	139	151	159	164	137	174	188	337
New materials.....	8	23	24	32	28	50	87	62	61	46	35	21	35	59	33	43	37	29	36	23	22	23
Equity.....	6	17	19	17	15	19	37	17	30	25	19	8	16	28	3	11	8	5	3	7	2	7
Nonequity.....	2	6	5	15	13	31	50	45	31	21	16	13	19	31	30	32	29	24	33	16	20	16
Aerospace/defense.....	23	6	11	9	30	14	27	25	26	42	55	41	52	34	38	51	46	42	38	12	13	26
Equity.....	1	0	4	2	4	1	3	1	4	14	16	8	14	6	13	17	9	9	9	2	1	4
Nonequity.....	22	6	7	7	26	13	24	24	22	28	39	33	38	28	25	34	37	33	29	10	12	22
Automotive.....	15	7	9	8	8	20	22	22	45	49	12	3	4	15	25	25	37	43	32	39	50	22
Equity.....	6	1	5	5	2	10	11	14	32	38	6	1	0	2	4	4	12	11	14	14	10	12
Nonequity.....	9	6	4	3	6	10	11	8	13	11	6	2	4	13	21	21	25	32	18	25	40	10
Chemistry ^b	34	25	24	27	25	35	18	33	48	64	44	35	38	63	46	60	29	59	73	35	40	24
Equity.....	31	21	14	23	20	31	14	30	38	55	22	13	21	28	17	15	10	11	7	8	7	3
Nonequity.....	3	4	10	4	5	4	4	3	10	9	22	22	17	35	29	45	19	48	66	27	33	21
U.S.-owned worldwide																						
All technologies	118	120	177	160	226	224	268	302	351	329	282	271	367	413	449	526	488	448	444	413	386	441
Equity.....	52	70	78	85	77	86	93	91	121	137	57	56	63	79	45	33	51	45	33	42	38	26
Nonequity.....	66	50	99	75	149	138	175	211	230	192	225	215	304	334	404	493	437	403	411	371	348	415
Information technology.....	29	34	62	68	97	86	100	128	140	130	156	152	181	184	214	269	229	183	222	183	133	117
Equity.....	13	17	30	34	29	26	32	34	27	37	17	26	17	21	11	8	19	15	14	11	10	5
Nonequity.....	16	17	32	34	68	60	68	94	113	93	139	126	164	163	203	261	210	168	208	172	123	112
Biotechnology ^a	24	27	45	27	51	64	75	78	64	46	28	33	77	108	125	127	141	162	120	165	165	268
Equity.....	2	9	7	7	8	17	9	16	12	7	8	7	13	18	16	6	10	13	5	11	10	7
Nonequity.....	22	18	38	20	43	47	66	62	52	39	20	26	64	90	109	121	131	149	115	154	155	261
New materials.....	4	14	14	18	14	17	38	30	37	27	27	16	25	40	27	31	27	22	22	17	18	14
Equity.....	4	12	12	12	11	10	23	9	20	13	13	6	11	15	3	7	4	3	2	4	2	2
Nonequity.....	0	2	2	6	3	7	15	21	17	14	14	10	14	25	24	24	23	19	20	13	16	12
Aerospace/defense.....	15	3	8	4	19	7	10	14	18	23	36	25	34	17	16	28	30	21	29	10	9	18
Equity.....	0	0	3	1	2	0	2	1	2	6	8	5	7	2	4	6	5	1	3	1	0	2
Nonequity.....	15	3	5	3	17	7	8	13	16	17	28	20	27	15	12	22	25	20	26	9	9	16
Automotive.....	6	3	4	5	4	11	12	16	35	32	8	2	1	10	17	15	25	29	19	22	38	16
Equity.....	4	1	3	3	1	7	8	11	27	22	4	1	0	1	3	2	7	8	7	10	6	7
Nonequity.....	2	2	1	2	3	4	4	5	8	10	4	1	1	9	14	13	18	21	12	12	32	9
Chemistry ^b	21	17	14	15	17	19	9	12	26	37	24	26	24	46	32	42	15	51	55	24	30	17
Equity.....	20	16	8	14	13	16	7	10	18	29	10	9	13	17	9	5	4	8	5	4	7	1
Nonequity.....	1	1	6	1	4	3	2	2	8	8	14	17	11	29	23	37	11	43	50	20	23	16

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Europe-owned worldwide																						
All technologies.....	95	89	126	107	161	227	229	232	249	289	185	153	226	224	255	302	250	233	252	194	231	284
Equity.....	42	47	58	46	55	80	83	93	107	169	68	39	61	84	51	52	45	40	39	42	26	37
Nonequity.....	53	42	68	61	106	147	146	139	142	120	117	114	165	140	204	250	205	193	213	152	205	247
Information technology.....	18	27	50	31	70	89	95	81	86	90	72	65	84	67	64	89	70	83	87	59	79	68
Equity.....	8	15	23	11	25	23	33	32	32	40	16	14	15	17	8	11	13	9	11	10	5	13
Nonequity.....	10	12	27	20	45	66	62	49	54	50	56	51	69	50	56	78	57	74	76	49	74	55
Biotechnology ^a	15	14	15	21	25	61	35	52	51	36	26	18	61	53	95	94	101	73	81	80	91	171
Equity.....	3	5	4	6	4	20	6	10	7	12	13	5	13	15	14	7	12	12	7	11	5	11
Nonequity.....	12	9	11	15	21	41	29	42	44	24	13	13	48	38	81	87	89	61	74	69	86	160
New materials.....	8	13	15	20	15	20	34	22	23	28	21	8	14	37	14	23	13	14	22	8	7	12
Equity.....	6	9	13	12	7	10	21	11	15	18	11	4	8	22	0	7	3	2	3	2	0	4
Nonequity.....	2	4	2	8	8	10	13	11	8	10	10	4	6	15	14	16	10	12	19	6	7	8
Aerospace/defense.....	13	2	7	6	19	10	18	15	15	28	31	26	30	20	29	31	23	28	23	5	5	17
Equity.....	1	0	2	1	4	1	1	0	3	9	12	6	10	4	12	11	6	6	6	1	0	2
Nonequity.....	12	2	5	5	15	9	17	15	12	19	19	20	20	16	17	20	17	22	17	4	5	15
Automotive.....	12	5	6	4	6	10	12	8	16	20	4	0	0	5	13	13	18	19	17	28	27	12
Equity.....	4	0	2	2	2	3	5	4	10	15	2	0	0	2	2	3	6	6	8	11	7	9
Nonequity.....	8	5	4	2	4	7	7	4	6	5	2	0	0	3	11	10	12	13	9	17	20	3
Chemistry ^b	16	12	14	13	12	18	12	23	29	36	29	23	21	33	26	43	23	29	47	22	30	10
Equity.....	13	8	10	11	9	14	9	22	23	32	15	8	11	19	13	11	9	7	7	5	5	1
Nonequity.....	3	4	4	2	3	4	3	1	6	4	14	15	10	14	13	32	14	22	40	17	25	9
Japan-owned worldwide																						
All technologies.....	42	61	79	81	91	121	145	121	100	105	67	70	69	80	72	86	90	54	59	72	54	73
Equity.....	20	37	31	37	31	56	55	46	44	78	27	18	19	17	6	9	14	5	6	16	10	16
Nonequity.....	22	24	48	44	60	65	90	75	56	27	40	52	50	63	66	77	76	49	53	56	44	57
Information technology.....	15	15	29	37	48	31	43	31	31	31	35	46	34	43	40	44	47	28	32	43	31	42
Equity.....	7	8	8	13	12	16	19	10	7	19	9	11	5	6	4	3	5	3	1	10	6	10
Nonequity.....	8	7	21	24	36	15	24	21	24	12	26	35	29	37	36	41	42	25	31	33	25	32
Biotechnology ^a	7	11	16	10	11	29	31	25	10	11	6	3	8	15	11	15	20	13	11	18	9	16
Equity.....	1	1	1	4	2	6	6	8	1	4	3	0	4	4	0	0	2	1	0	2	2	0
Nonequity.....	6	10	15	6	9	23	25	17	9	7	3	3	4	11	11	15	18	12	11	16	7	16
New materials.....	0	6	6	11	14	30	45	32	22	12	9	6	8	6	5	10	6	4	10	6	6	6
Equity.....	0	5	5	6	7	9	17	6	9	7	7	2	4	2	0	2	3	0	1	3	0	3
Nonequity.....	0	1	1	5	7	21	28	26	13	5	2	4	4	4	5	8	3	4	9	3	6	3
Aerospace/defense.....	6	1	0	1	1	0	4	1	0	2	3	6	0	0	0	1	2	2	1	1	3	2
Equity.....	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Nonequity.....	6	1	0	1	1	0	3	1	0	2	3	6	0	0	0	1	2	2	1	1	2	1
Automotive.....	2	3	3	3	2	10	10	11	18	24	2	2	3	7	6	5	7	2	6	5	9	4
Equity.....	1	1	3	2	0	5	5	8	13	23	1	1	0	1	1	1	3	0	3	2	2	4
Nonequity.....	1	2	0	1	2	5	5	3	5	1	1	1	3	6	5	4	4	2	3	3	7	0
Chemistry ^b	8	8	9	12	8	14	5	14	11	15	11	5	9	8	5	6	6	8	4	3	2	5
Equity.....	8	7	5	9	7	14	5	12	8	15	6	3	5	4	0	3	3	1	0	1	0	2
Nonequity.....	0	1	4	3	1	0	0	2	3	0	5	2	4	4	5	3	3	7	4	2	2	3

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
NT-owned worldwide																						
All technologies.....	19	26	24	20	25	40	30	43	77	98	43	14	47	69	58	77	82	70	39	56	72	85
Equity.....	12	20	12	16	17	33	18	32	51	79	19	5	23	29	19	17	22	12	10	7	6	10
Nonequity.....	7	6	12	4	8	7	12	11	26	19	24	9	24	40	39	60	60	58	29	49	66	75
Information technology.....	1	3	9	7	8	10	11	9	24	30	16	6	15	17	19	35	42	30	19	26	27	32
Equity.....	0	3	6	6	5	6	6	6	13	23	3	1	7	6	5	4	11	1	2	2	3	4
Nonequity.....	1	0	3	1	3	4	5	3	11	7	13	5	8	11	14	31	31	29	17	24	24	28
Biotechnology ^a	3	5	4	1	3	6	2	7	9	5	11	1	11	9	12	12	20	14	6	18	22	46
Equity.....	0	3	0	0	3	6	0	3	3	2	7	1	3	4	4	1	7	2	2	1	2	2
Nonequity.....	3	2	4	1	0	0	2	4	6	3	4	0	8	5	8	11	13	12	4	17	20	44
New materials.....	0	5	3	0	1	2	4	5	11	4	4	2	4	8	3	3	6	2	3	2	4	3
Equity.....	0	4	2	0	0	2	2	4	6	3	2	1	4	5	2	2	2	2	0	0	0	1
Nonequity.....	0	1	1	0	1	0	2	1	5	1	2	1	0	3	1	1	4	0	3	2	4	2
Aerospace/defense.....	1	1	1	1	1	3	2	1	2	5	2	5	11	19	12	15	9	12	6	1	2	5
Equity.....	0	0	0	0	0	0	0	0	0	3	1	0	5	5	4	6	2	3	1	1	0	2
Nonequity.....	1	1	1	1	1	3	2	1	2	2	1	5	6	14	8	9	7	9	5	0	2	3
Automotive.....	1	0	1	1	1	3	1	2	10	12	0	0	0	1	3	2	3	7	5	3	9	3
Equity.....	1	0	1	1	0	3	1	2	9	12	0	0	0	0	0	1	1	1	4	1	0	3
Nonequity.....	0	0	0	0	1	0	0	0	1	0	0	0	0	1	3	1	2	6	1	2	9	0
Chemistry ^b	10	9	3	4	5	10	1	9	15	19	6	3	7	11	8	7	2	3	3	7	4	0
Equity.....	10	8	1	4	4	10	1	9	14	18	5	3	5	7	6	5	1	2	1	2	1	0
Nonequity.....	0	1	2	0	1	0	0	0	1	1	1	0	2	4	2	2	1	1	2	5	3	0
U.S.-only owned																						
All technologies.....	43	39	45	59	84	77	108	124	146	118	139	124	175	211	224	263	242	244	231	207	167	209
Equity.....	16	14	17	25	25	22	18	20	24	21	17	21	21	25	14	16	21	19	11	11	12	8
Nonequity.....	27	25	28	34	59	55	90	104	122	97	122	103	154	186	210	247	221	225	220	196	155	201
Information technology.....	18	16	8	30	34	35	43	58	68	59	86	78	102	104	130	156	134	99	133	98	49	50
Equity.....	6	6	6	14	10	8	6	7	4	5	5	10	7	8	4	3	8	5	7	4	4	3
Nonequity.....	12	10	2	16	24	27	37	51	64	54	81	68	95	96	126	153	126	94	126	94	45	47
Biotechnology ^a	6	11	21	11	27	25	38	33	34	20	11	16	27	53	52	55	51	87	56	82	87	133
Equity.....	0	4	4	2	4	8	2	6	5	3	3	3	2	3	4	5	2	4	2	3	4	2
Nonequity.....	6	7	17	9	23	17	36	27	29	17	8	13	25	50	48	50	49	83	54	79	83	131
New materials.....	0	2	4	4	4	4	12	10	12	7	7	7	13	17	11	13	14	12	10	8	8	5
Equity.....	0	1	2	0	4	2	4	1	4	2	4	3	4	4	1	3	2	3	0	2	2	0
Nonequity.....	0	1	2	4	0	2	8	9	8	5	3	4	9	13	10	10	12	9	10	6	6	5
Aerospace/defense.....	4	2	3	1	9	4	5	9	11	9	19	7	13	6	5	10	13	8	10	5	4	4
Equity.....	0	0	2	1	0	0	1	1	1	3	3	2	1	0	1	2	1	1	2	0	0	0
Nonequity.....	4	2	1	0	9	4	4	8	10	6	16	5	12	6	4	8	12	7	8	5	4	4
Automotive.....	1	1	0	1	0	1	3	5	6	6	6	1	1	4	8	6	12	18	9	6	12	8
Equity.....	1	0	0	0	0	0	2	3	3	1	3	0	0	0	2	0	3	4	2	1	2	1
Nonequity.....	0	1	0	1	0	1	1	2	3	5	3	1	1	4	6	6	9	14	7	5	10	7
Chemistry ^b	4	1	1	4	6	2	4	3	5	11	9	9	10	21	14	13	3	23	24	9	9	11
Equity.....	4	1	0	3	5	2	3	2	4	6	3	3	6	4	1	2	0	3	0	1	1	1
Nonequity.....	0	0	1	1	1	0	1	1	1	5	6	6	4	17	13	11	3	20	24	8	8	10

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
U.S.-Europe owned																						
All technologies.....	38	35	67	44	78	82	100	114	111	115	87	92	125	129	158	174	151	135	165	132	151	150
Equity.....	16	21	31	20	27	25	43	41	45	51	23	22	26	34	22	9	17	18	19	25	18	14
Nonequity.....	22	14	36	24	51	57	57	73	66	64	64	70	99	95	136	165	134	117	146	107	133	136
Information technology.....	5	12	31	12	31	29	37	46	43	39	38	38	48	45	49	60	39	49	62	40	51	35
Equity.....	3	7	16	4	11	6	16	18	16	13	6	8	6	8	5	3	5	6	7	4	2	2
Nonequity.....	2	5	15	8	20	23	21	28	27	26	32	30	42	37	44	57	34	43	55	36	49	33
Biotechnology ^a	9	6	10	9	15	22	23	31	20	16	11	15	40	38	60	60	71	54	55	61	60	95
Equity.....	1	3	2	2	2	6	4	6	3	2	2	4	8	9	8	0	4	7	3	7	4	5
Nonequity.....	8	3	8	7	13	16	19	25	17	14	9	11	32	29	52	60	67	47	52	54	56	90
New materials.....	4	5	6	8	5	6	14	10	9	11	13	4	5	19	10	14	7	7	10	6	5	6
Equity.....	4	4	6	7	3	3	12	4	7	6	5	2	4	9	0	4	1	0	2	1	0	2
Nonequity.....	0	1	0	1	2	3	2	6	2	5	8	2	1	10	10	10	6	7	8	5	5	4
Aerospace/defense.....	6	1	4	3	9	3	4	5	7	9	15	11	14	6	8	10	9	10	14	4	2	10
Equity.....	0	0	1	0	2	0	0	0	1	1	5	3	4	0	3	1	3	0	0	1	0	1
Nonequity.....	6	1	3	3	7	3	4	5	6	8	10	8	10	6	5	9	6	10	14	3	2	9
Automotive.....	3	1	1	2	3	6	5	4	9	8	1	0	0	3	7	6	9	7	7	12	16	6
Equity.....	2	0	0	1	1	3	3	3	6	4	1	0	0	1	1	1	2	3	3	7	3	4
Nonequity.....	1	1	1	1	2	3	2	1	3	4	0	0	0	2	6	5	7	4	4	5	13	2
Chemistry ^b	4	5	6	3	6	7	3	3	10	13	10	14	7	18	13	25	10	21	29	12	20	5
Equity.....	3	4	4	3	4	4	2	3	6	10	4	4	3	9	5	1	3	4	5	2	5	0
Nonequity.....	1	1	2	0	2	3	1	0	4	3	6	10	4	9	8	24	7	17	24	10	15	5
U.S.-Japan owned																						
All technologies.....	25	31	51	47	51	51	49	50	60	66	35	46	41	45	40	47	50	38	31	41	27	33
Equity.....	12	21	22	30	16	28	24	20	30	45	10	9	7	7	1	2	2	5	0	3	4	1
Nonequity.....	13	10	29	17	35	23	25	30	30	21	25	37	34	38	39	45	48	33	31	38	23	32
Information technology.....	6	5	18	22	30	17	18	20	19	22	23	32	22	29	23	29	31	19	17	26	15	16
Equity.....	4	3	5	12	7	10	9	6	2	13	5	7	2	4	0	0	1	3	0	2	2	0
Nonequity.....	2	2	13	10	23	7	9	14	17	9	18	25	20	25	23	29	30	16	17	24	13	16
Biotechnology ^a	6	8	12	7	7	15	14	10	6	6	2	2	5	10	7	6	12	13	7	12	7	12
Equity.....	1	1	1	3	0	1	3	3	1	0	1	0	2	3	0	0	0	1	0	0	1	0
Nonequity.....	5	7	11	4	7	14	11	7	5	6	1	2	3	7	7	6	12	12	7	12	6	12
New materials.....	0	3	2	6	4	6	9	8	9	8	4	3	6	1	3	4	1	3	2	2	3	2
Equity.....	0	3	2	5	4	4	6	2	6	5	2	0	2	0	0	0	0	0	0	1	0	0
Nonequity.....	0	0	0	1	0	2	3	6	3	3	2	3	4	1	3	4	1	3	2	1	3	2
Aerospace/defense.....	5	0	0	0	0	0	1	0	0	2	1	5	0	0	0	1	1	1	1	1	2	1
Equity.....	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nonequity.....	5	0	0	0	0	0	0	0	0	2	1	5	0	0	0	1	1	1	1	1	2	1
Automotive.....	1	1	2	1	1	2	4	7	13	16	1	1	0	2	2	2	3	0	1	2	4	0
Equity.....	0	1	2	1	0	2	3	5	12	15	0	1	0	0	0	1	1	0	0	1	1	0
Nonequity.....	1	0	0	0	1	0	1	2	1	1	1	0	0	2	2	1	2	0	1	1	3	0
Chemistry ^b	7	5	5	6	4	7	2	5	7	8	4	1	2	2	0	3	1	6	2	2	0	1
Equity.....	7	5	3	6	3	7	2	4	5	8	2	0	0	0	0	1	0	1	0	1	0	0
Nonequity.....	0	0	2	0	1	0	0	1	2	0	2	1	2	2	0	2	1	5	2	1	0	1

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
U.S.-NT owned																						
All technologies.....	12	15	14	10	13	14	11	14	34	30	21	9	26	28	27	42	45	31	17	33	41	49
Equity.....	8	14	8	10	9	11	8	10	22	20	7	4	9	13	8	6	11	3	3	3	4	3
Nonequity.....	4	1	6	0	4	3	3	4	12	10	14	5	17	15	19	36	34	28	14	30	37	46
Information technology.....	0	1	5	4	2	5	2	4	10	10	9	4	9	6	12	24	25	16	10	19	18	16
Equity.....	0	1	3	4	1	2	1	3	5	6	1	1	2	1	2	2	5	1	0	1	2	0
Nonequity.....	0	0	2	0	1	3	1	1	5	4	8	3	7	5	10	22	20	15	10	18	16	16
Biotechnology ^a	3	2	2	0	2	2	0	4	4	4	4	0	5	7	6	6	7	8	2	10	11	28
Equity.....	0	1	0	0	2	2	0	1	3	2	2	0	1	3	4	1	4	1	0	1	1	0
Nonequity.....	3	1	2	0	0	0	0	3	1	2	2	0	4	4	2	5	3	7	2	9	10	28
New materials.....	0	4	2	0	1	1	3	2	7	1	3	2	1	3	3	0	5	0	0	1	2	1
Equity.....	0	4	2	0	0	1	1	2	3	0	2	1	1	2	2	0	1	0	0	0	0	0
Nonequity.....	0	0	0	0	1	0	2	0	4	1	1	1	0	1	1	0	4	0	0	1	2	1
Aerospace/defense.....	0	0	1	0	1	0	0	0	0	3	1	2	7	5	3	7	7	2	4	0	1	3
Equity.....	0	0	0	0	0	0	0	0	0	2	0	0	2	2	0	3	1	0	1	0	0	1
Nonequity.....	0	0	1	0	1	0	0	0	0	1	1	2	5	3	3	4	6	2	3	0	1	2
Automotive.....	1	0	1	1	0	2	0	0	7	2	0	0	0	1	0	1	1	4	2	2	6	2
Equity.....	1	0	1	1	0	2	0	0	6	2	0	0	0	0	0	0	1	1	2	1	0	2
Nonequity.....	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	3	0	1	6	0
Chemistry ^b	6	6	2	2	1	3	0	1	4	5	1	2	5	5	5	1	1	1	0	1	1	0
Equity.....	6	6	1	2	1	3	0	1	3	5	1	2	4	4	3	1	1	0	0	0	1	0
Nonequity.....	0	0	1	0	0	0	0	0	1	0	0	0	1	1	2	0	0	1	0	1	0	0
Europe-only owned																						
All technologies.....	44	30	36	42	55	97	87	72	86	104	59	40	66	43	58	79	60	60	55	42	45	89
Equity.....	17	12	18	19	16	26	20	22	32	60	21	8	15	30	18	31	13	15	13	11	5	10
Nonequity.....	27	18	18	23	39	71	67	50	54	44	38	32	51	13	40	48	47	45	42	31	40	79
Information technology.....	9	8	9	12	25	48	40	27	27	29	22	17	25	8	6	14	12	20	11	13	15	13
Equity.....	3	4	4	5	10	10	11	10	8	10	5	3	4	5	1	6	1	3	2	3	2	4
Nonequity.....	6	4	5	7	15	38	29	17	19	19	17	14	21	3	5	8	11	17	9	10	13	9
Biotechnology ^a	6	5	3	11	10	29	10	17	26	14	7	1	12	9	26	24	17	14	19	13	22	60
Equity.....	2	0	2	4	2	8	2	3	4	6	5	0	1	5	6	7	3	4	3	3	0	4
Nonequity.....	4	5	1	7	8	21	8	14	22	8	2	1	11	4	20	17	14	10	16	10	22	56
New materials.....	4	5	5	9	4	8	13	5	7	12	2	2	6	9	4	3	5	4	4	2	0	4
Equity.....	2	3	4	4	1	3	3	2	4	7	1	0	1	8	0	0	1	0	0	1	0	2
Nonequity.....	2	2	1	5	3	5	10	3	3	5	1	2	5	1	4	3	4	4	4	1	0	2
Aerospace/defense.....	6	1	3	3	10	4	12	9	6	17	16	13	14	3	13	15	13	10	7	1	2	5
Equity.....	1	0	1	1	2	1	1	0	2	7	7	3	4	1	5	8	3	5	6	0	0	0
Nonequity.....	5	1	2	2	8	3	11	9	4	10	9	10	10	2	8	7	10	5	1	1	2	5
Automotive.....	8	2	4	1	2	1	3	2	3	4	3	0	0	0	3	6	7	10	8	13	5	1
Equity.....	1	0	1	1	1	0	0	0	2	3	1	0	0	0	0	1	3	3	4	3	3	0
Nonequity.....	7	2	3	0	1	1	3	2	1	1	2	0	0	0	3	5	4	7	4	10	2	1
Chemistry ^b	8	3	5	4	1	3	5	5	8	9	8	4	5	7	6	9	8	4	13	4	5	3
Equity.....	6	2	4	4	1	2	3	5	7	9	4	0	2	5	5	4	3	1	1	2	0	0
Nonequity.....	2	1	1	0	0	1	2	0	1	0	4	4	3	2	1	5	5	3	12	2	5	3

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Europe-Japan owned																						
All technologies.....	9	17	17	17	19	29	31	25	18	21	20	17	19	23	16	23	18	9	19	10	15	23
Equity.....	6	10	8	3	7	14	14	14	6	17	13	8	9	8	2	3	6	0	4	4	2	8
Nonequity.....	3	7	9	14	12	15	17	11	12	4	7	9	10	15	14	20	12	9	15	6	13	15
Information technology.....	4	6	8	5	9	7	14	4	7	6	6	9	7	9	7	8	7	4	9	4	8	14
Equity.....	2	3	2	0	1	3	3	1	2	3	3	3	1	2	1	1	1	0	1	2	1	5
Nonequity.....	2	3	6	5	8	4	11	3	5	3	3	6	6	7	6	7	6	4	8	2	7	9
Biotechnology ^a	0	1	1	1	0	7	1	4	1	5	2	1	3	4	3	6	6	0	4	2	1	2
Equity.....	0	0	0	0	0	3	0	1	0	4	1	0	2	0	0	0	2	0	0	1	0	0
Nonequity.....	0	1	1	1	0	4	1	3	1	1	1	1	1	4	3	6	4	0	4	1	1	2
New materials.....	0	2	3	3	6	5	7	4	3	2	5	2	1	4	0	3	1	1	6	0	1	1
Equity.....	0	2	3	1	3	3	6	3	1	2	5	2	1	2	0	1	1	0	1	0	0	0
Nonequity.....	0	0	0	2	3	2	1	1	2	0	0	0	0	2	0	2	0	1	5	0	1	1
Aerospace/defense.....	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Equity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nonequity.....	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Automotive.....	1	2	1	1	0	3	3	2	2	3	0	0	0	2	2	0	1	1	2	3	4	4
Equity.....	1	0	1	0	0	0	1	1	0	3	0	0	0	0	1	1	0	1	0	1	1	4
Nonequity.....	0	2	0	1	0	3	2	1	2	0	0	0	0	1	1	0	0	1	1	2	3	0
Chemistry ^b	1	2	2	4	2	5	3	8	2	4	6	4	7	4	4	3	5	2	2	1	2	2
Equity.....	1	1	2	2	2	5	3	7	1	4	3	3	5	3	0	2	3	0	0	0	0	1
Nonequity.....	0	1	0	2	0	0	0	1	1	0	3	1	2	1	4	1	2	2	2	1	2	1
Europe-NT owned																						
All technologies.....	4	7	6	4	9	19	11	21	34	49	19	4	16	29	23	26	21	29	13	10	20	22
Equity.....	3	4	1	4	5	15	6	16	24	41	11	1	11	12	9	9	9	7	3	2	1	5
Nonequity.....	1	3	5	0	4	4	5	5	10	8	8	3	5	17	14	17	12	22	10	8	19	17
Information technology.....	0	1	2	2	5	5	4	4	9	16	6	1	4	5	2	7	12	10	5	2	5	6
Equity.....	0	1	1	2	3	4	3	3	6	14	2	0	4	2	1	1	6	0	1	1	0	2
Nonequity.....	0	0	1	0	2	1	1	1	3	2	4	1	0	3	1	6	6	10	4	1	5	4
Biotechnology ^a	0	2	1	0	0	3	1	0	4	1	6	1	6	2	6	4	7	5	3	4	8	14
Equity.....	0	2	0	0	0	3	0	0	0	0	5	1	2	1	0	0	3	1	1	0	1	2
Nonequity.....	0	0	1	0	0	0	1	0	4	1	1	0	4	1	6	4	4	4	2	4	7	12
New materials.....	0	1	1	0	0	1	0	3	4	3	1	0	2	5	0	3	0	2	2	0	1	1
Equity.....	0	0	0	0	0	1	0	2	3	3	0	0	2	3	0	2	0	2	0	0	0	0
Nonequity.....	0	1	1	0	0	0	0	1	1	0	1	0	0	2	0	1	0	0	2	0	1	1
Aerospace/defense.....	0	0	0	0	0	3	2	1	2	2	0	2	2	11	8	6	1	7	2	0	1	2
Equity.....	0	0	0	0	0	0	0	0	0	1	0	0	2	3	4	2	0	1	0	0	0	1
Nonequity.....	0	0	0	0	0	3	2	1	2	1	0	2	0	8	4	4	1	6	2	0	1	1
Automotive.....	0	0	0	0	1	0	1	0	2	5	0	0	0	0	1	1	1	1	0	0	2	1
Equity.....	0	0	0	0	0	0	1	0	2	5	0	0	0	0	0	1	0	0	0	0	0	1
Nonequity.....	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	2	0
Chemistry ^b	3	2	1	2	3	3	1	7	9	10	5	1	2	4	3	6	0	2	3	5	3	0
Equity.....	3	1	0	2	2	3	1	7	9	9	4	1	1	2	3	4	0	2	1	1	0	0
Nonequity.....	0	1	1	0	1	0	0	0	0	1	1	0	1	2	0	2	0	0	2	4	3	0

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Japan-only owned																						
All technologies.....	7	11	9	17	18	39	61	39	18	3	11	6	7	7	10	11	12	3	5	16	6	13
Equity.....	2	4	0	4	5	12	14	6	6	1	4	1	1	1	1	3	5	0	0	9	3	6
Nonequity.....	5	7	9	13	13	27	47	33	12	2	7	5	6	6	9	8	7	3	5	7	3	7
Information technology.....	4	3	2	10	8	7	10	7	4	1	6	4	4	2	6	4	5	2	5	11	4	8
Equity.....	1	1	0	1	3	3	6	3	3	1	1	1	1	0	1	1	3	0	0	6	2	4
Nonequity.....	3	2	2	9	5	4	4	4	1	0	5	3	3	2	5	3	2	2	5	5	2	4
Biotechnology ^a	1	2	2	2	3	7	15	8	2	0	1	0	0	1	1	1	0	0	0	2	1	2
Equity.....	0	0	0	1	1	2	3	2	0	0	1	0	0	1	0	0	0	0	0	1	1	0
Nonequity.....	1	2	2	1	2	5	12	6	2	0	0	0	0	0	1	1	0	0	0	1	0	2
New materials.....	0	1	1	2	4	19	28	20	10	2	0	1	0	1	2	3	3	0	1	3	1	2
Equity.....	0	0	0	0	0	2	4	1	2	0	0	0	0	0	0	1	1	0	0	2	0	2
Nonequity.....	0	1	1	2	4	17	24	19	8	2	0	1	0	1	2	2	2	0	1	1	1	0
Aerospace/defense.....	0	1	0	1	1	0	3	1	0	0	2	0	0	0	0	0	1	0	0	0	1	1
Equity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Nonequity.....	0	1	0	1	1	0	3	1	0	0	2	0	0	0	0	0	1	0	0	0	0	0
Automotive.....	0	0	0	1	1	4	3	0	2	0	1	1	3	3	0	3	2	0	0	0	0	0
Equity.....	0	0	0	1	0	2	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
Nonequity.....	0	0	0	0	1	2	2	0	2	0	0	1	3	3	0	3	1	0	0	0	0	0
Chemistry ^b	0	0	2	2	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	2
Equity.....	0	0	0	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
Nonequity.....	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Japan-NT owned																						
All technologies.....	1	2	2	0	3	2	4	7	4	15	1	1	2	5	6	5	10	4	4	5	6	4
Equity.....	0	2	1	0	3	2	3	6	2	15	0	0	2	1	2	1	1	0	2	0	1	1
Nonequity.....	1	0	1	0	0	0	1	1	2	0	1	1	0	4	4	4	9	4	2	5	5	3
Information technology.....	1	1	1	0	1	0	1	0	1	2	0	1	1	3	4	3	4	3	1	2	4	4
Equity.....	0	1	1	0	1	0	1	0	0	2	0	0	1	0	2	1	0	0	0	1	1	1
Nonequity.....	1	0	0	0	0	0	0	0	1	0	0	1	0	3	2	2	4	3	1	2	3	3
Biotechnology ^a	0	0	1	0	1	0	1	3	1	0	1	0	0	0	0	2	2	0	0	2	0	0
Equity.....	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nonequity.....	0	0	1	0	0	0	1	1	1	0	1	0	0	0	0	2	2	0	0	2	0	0
New materials.....	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1
Equity.....	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
Aerospace/defense.....	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Equity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Automotive.....	0	0	0	0	0	1	0	2	1	5	0	0	0	0	2	0	1	1	3	0	1	0
Equity.....	0	0	0	0	0	1	0	2	1	5	0	0	0	0	0	0	0	0	2	0	0	0
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	1	0	
Chemistry ^b	0	1	0	0	1	1	0	1	1	3	0	0	0	2	0	0	0	0	0	0	0	0
Equity.....	0	1	0	0	1	1	0	1	1	3	0	0	0	1	0	0	0	0	0	0	0	0
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

International technology alliances, by regional ownership category, technology, and type (equity/nonequity): 1980–2001

International technology alliances	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
NT-only owned																							
All technologies.....	2	2	2	6	0	5	4	1	5	4	2	0	3	7	2	4	6	6	5	8	5	10	
Equity.....	1	0	2	2	0	5	1	0	3	3	1	0	1	3	0	1	1	2	2	2	0	1	
Nonequity.....	1	2	0	4	0	0	3	1	2	1	1	0	2	4	2	3	5	4	3	6	5	9	
Information technology.....	0	0	1	1	0	0	4	1	4	2	1	0	1	3	1	1	1	1	1	3	3	0	6
Equity.....	0	0	1	0	0	0	1	0	2	1	0	0	0	3	0	0	0	0	0	1	0	0	1
Nonequity.....	0	0	0	1	0	0	3	1	2	1	1	0	1	0	1	1	1	1	2	3	0	5	
Biotechnology ^a	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	4	1	1	2	3	4	
Equity.....	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Nonequity.....	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	2	3	4	
New materials.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Equity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Aerospace/defense.....	1	1	0	1	0	0	0	0	0	0	1	0	2	3	1	2	1	3	0	1	0	0	
Equity.....	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	2	0	1	0	0	
Nonequity.....	1	1	0	1	0	0	0	0	0	0	0	0	1	3	1	1	0	1	0	0	0	0	
Automotive.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	
Equity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	
Chemistry ^b	1	0	0	0	0	3	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	
Equity.....	1	0	0	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	
Nonequity.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	

NT non-Triad (country or region other than United States, Europe, or Japan)

^aIncludes biotechnology pharmaceuticals.

^bExcludes biotechnology; includes nonbiotechnological pharmaceuticals.

NOTES: Data are annual counts of new technology alliances formed by domestic and multinational corporations worldwide. Alliances may be classified in more than one technology. Total number of alliances at the top of the table is the sum of the following exclusive ownership categories: U.S.-only, U.S.-Europe, U.S.-Japan, U.S.-NT, Europe-only, Europe-Japan, Europe-NT, Japan-only, Japan-NT, and NT-only. The country assignment is based on the headquarters of the ultimate parent company of the alliance members, not on the location of the members. Data were revised from previous editions to include exclusively joint research or development agreements, contract R&D, equity joint ventures, and research corporations. Previous counts included cross holdings (where two companies take a minority interest in each other), mutual second sourcing, and cross-licensing agreements. This change, however, had little effect on overall trends. The data now provide detail on the structure of the alliances in terms of equity versus nonequity alliances.

SOURCE: Maastricht Economic Research Institute on Innovation and Technology, Cooperative Agreements and Technology Indicators database, special tabulations.

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Appendix table 4-43

(Page 1 of 2)

International R&D expenditures and R&D as percentage of GDP, by selected country and for all OECD countries: 1981–2001

Year	United States	Japan ^a	Germany ^b	France	United Kingdom	Italy	Canada	Russian Federation	Total OECD
Billions of constant 1995 U.S. dollars ^c									
1981	114.5	39.7	27.8	17.4	18.2	7.7	6.0	NA	254.9
1982	120.5	42.6	28.4	18.7	NA	7.9	6.6	NA	267.4
1983	129.1	46.0	28.8	19.4	17.8	8.5	6.6	NA	281.9
1984	141.6	49.4	29.7	20.6	NA	9.2	7.2	NA	303.6
1985	153.7	54.6	32.5	21.5	19.2	10.5	7.8	NA	329.7
1986	157.3	55.6	33.5	21.9	20.1	10.9	8.2	NA	339.6
1987	160.2	59.6	35.3	22.8	20.5	11.8	8.2	NA	351.9
1988	164.2	64.1	36.5	23.8	21.0	12.5	8.5	NA	365.7
1989	167.6	70.1	37.9	25.4	21.5	13.1	9.1	NA	381.3
1990	172.9	75.9	38.3	27.0	21.7	13.9	9.5	28.4	397.6
1991	176.6	77.6	42.0	27.2	20.6	13.4	9.7	20.5	415.7
1992	177.1	76.8	40.9	27.7	20.2	13.1	10.1	8.6	417.1
1993	173.3	74.7	39.5	27.8	21.0	12.3	10.7	7.8	412.7
1994	173.3	74.0	38.8	27.6	21.5	11.8	11.6	7.4	415.7
1995	184.1	78.7	39.5	27.7	21.5	11.5	11.7	6.6	439.7
1996	194.0	84.0	39.7	27.9	21.2	11.7	11.6	7.4	459.4
1997	204.6	87.5	40.9	27.4	21.1	12.5	12.2	8.0	480.1
1998	215.5	89.7	42.1	27.7	21.6	12.9	13.3	7.2	497.9
1999	228.6	90.2	45.3	28.8	23.1	12.8	14.0	8.3	522.8
2000	243.3	93.7	47.7	29.9	23.4	13.5	15.0	9.4	553.5
2001	252.9	NA	48.6	30.7	NA	NA	16.2	10.9	NA
Percent of GDP									
1981	2.34	2.11	2.43	1.93	2.38	0.88	1.24	NA	1.95
1982	2.52	2.19	2.50	2.02	NA	0.90	1.39	NA	2.05
1983	2.59	2.32	2.50	2.06	2.20	0.95	1.36	NA	2.10
1984	2.64	2.40	2.50	2.16	NA	1.01	1.40	NA	2.16
1985	2.76	2.54	2.68	2.22	2.24	1.12	1.44	NA	2.26
1986	2.73	2.51	2.70	2.21	2.26	1.13	1.48	NA	2.26
1987	2.69	2.57	2.80	2.24	2.20	1.19	1.43	NA	2.26
1988	2.65	2.60	2.79	2.24	2.14	1.22	1.40	NA	2.25
1989	2.62	2.70	2.79	2.29	2.15	1.24	1.47	NA	2.26
1990	2.65	2.78	2.67	2.37	2.15	1.29	1.53	2.03	2.29
1991	2.72	2.75	2.53	2.37	2.07	1.23	1.60	1.43	2.23
1992	2.65	2.70	2.41	2.38	2.02	1.18	1.66	0.74	2.19
1993	2.52	2.62	2.35	2.40	2.05	1.13	1.71	0.77	2.14
1994	2.43	2.57	2.26	2.34	2.01	1.05	1.76	0.84	2.09
1995	2.51	2.69	2.26	2.31	1.95	1.00	1.73	0.79	2.10
1996	2.55	2.77	2.26	2.30	1.88	1.01	1.69	0.90	2.13
1997	2.58	2.83	2.29	2.22	1.81	1.05	1.71	0.97	2.15
1998	2.60	2.94	2.31	2.17	1.80	1.07	1.79	0.92	2.17
1999	2.65	2.94	2.44	2.18	1.88	1.04	1.79	1.01	2.20
2000	2.72	2.98	2.49	2.18	1.85	1.07	1.82	1.05	2.24
2001	2.82	NA	2.53	2.20	NA	NA	1.94	1.16	NA
Billions of constant 1995 units of national currency ^d									
1981	114.5	6,739	28.6	17.1	11.9	6.1	7.1	NA	NA
1982	120.5	7,237	29.3	18.4	NA	6.4	7.7	NA	NA
1983	129.1	7,818	29.7	19.1	11.6	6.8	7.8	NA	NA
1984	141.6	8,387	30.6	20.3	NA	7.4	8.5	NA	NA
1985	153.7	9,281	33.5	21.2	12.6	8.4	9.2	NA	NA
1986	157.3	9,450	34.6	21.6	13.2	8.7	9.6	NA	NA
1987	160.2	10,121	36.4	22.5	13.4	9.4	9.7	NA	NA
1988	164.2	10,897	37.6	23.5	13.7	10.0	10.0	NA	NA
1989	167.6	11,918	39.0	25.0	14.1	10.5	10.8	NA	NA
1990	172.9	12,899	39.5	26.6	14.2	11.2	11.2	51.9	NA
1991	176.6	13,186	43.3	26.8	13.5	10.8	11.5	37.5	NA
1992	177.1	13,045	42.1	27.3	13.2	10.5	12.0	15.8	NA
1993	173.3	12,703	40.7	27.4	13.7	9.9	12.6	14.3	NA

Appendix table 4-43

(Page 2 of 2)

International R&D expenditures and R&D as percentage of GDP, by selected country and for all OECD countries: 1981–2001

Year	United States	Japan ^a	Germany ^b	France	United Kingdom	Italy	Canada	Russian Federation	Total OECD
Billions of constant 1995 units of national currency ^d									
1994	173.3	12,581	40.0	27.2	14.0	9.4	13.7	13.5	NA
1995	184.1	13,369	40.7	27.3	14.0	9.2	13.8	12.1	NA
1996	194.0	14,272	40.9	27.4	13.9	9.4	13.7	13.4	NA
1997	204.6	14,863	42.1	27.0	13.8	10.0	14.4	14.6	NA
1998	215.5	15,248	43.4	27.3	14.1	10.3	15.8	13.1	NA
1999	228.6	15,331	46.6	28.3	15.1	10.2	16.6	15.2	NA
2000	243.3	15,924	49.1	29.5	15.3	10.8	17.7	17.1	NA
2001	252.9	NA	50.1	30.2	NA	NA	19.1	19.9	NA

GDP gross domestic product

NA not available or not applicable

OECD Organisation for Economic Co-operation and Development

^aData on Japanese R&D in 1996 and later years may not be consistent with data in earlier years because of changes in methodology.^bData for 1981–90 are for West Germany.^cConversions of foreign currencies to U.S. dollars are calculated with each country's GDP implicit price deflator and with OECD purchasing power parity exchange rates.^dConstant foreign currencies are based on deflation with each country's GDP implicit price deflator. Figures for Germany, France, and Italy are in euros.SOURCE: OECD, *Main Science and Technology Indicators* (Paris, 2002).

Appendix table 4-44

International nondefense R&D expenditures and nondefense R&D as percentage of GDP, by selected country: 1981–2001

Year	United States	Japan ^a	Germany ^b	France	United Kingdom	Italy	Canada
Total nondefense expenditures							
Billions of constant 1995 U.S. dollars ^c							
1981	85	39	27	14	14	7	6
1982	86	42	27	15	NA	8	6
1983	90	46	28	16	14	8	6
1984	99	49	29	17	NA	9	7
1985	106	54	31	18	16	10	7
1986	108	55	32	18	16	10	8
1987	109	59	34	19	17	12	8
1988	114	64	35	19	18	12	8
1989	120	70	36	21	17	13	9
1990	128	75	37	22	17	14	9
1991	136	77	41	22	17	13	9
1992	138	76	39	23	17	13	10
1993	136	74	38	24	18	12	10
1994	138	73	37	23	18	12	11
1995	150	84	38	24	18	11	12
1996	160	83	38	24	18	12	11
1997	170	87	40	25	18	13	12
1998	182	89	41	25	18	13	13
1999	195	89	44	26	20	13	14
2000	210	93	47	28	20	14	NA
2001	218	NA	48	28	NA	NA	NA
Nondefense R&D expenditures							
Percent of GDP							
1981	1.7	2.1	2.3	1.6	1.9	0.9	1.2
1982	1.8	2.2	2.4	1.6	NA	0.9	1.3
1983	1.8	2.3	2.4	1.7	1.7	0.9	1.3
1984	1.8	2.4	2.4	1.8	NA	1.0	1.3
1985	1.9	2.5	2.6	1.8	1.8	1.1	1.4
1986	1.9	2.5	2.6	1.8	1.8	1.1	1.4
1987	1.8	2.6	2.7	1.8	1.8	1.2	1.4
1988	1.8	2.6	2.7	1.8	1.8	1.2	1.3
1989	1.9	2.7	2.7	1.9	1.7	1.2	1.4
1990	2.0	2.8	2.5	1.9	1.7	1.3	1.5
1991	2.1	2.7	2.4	1.9	1.7	1.2	1.6
1992	2.1	2.7	2.3	2.0	1.7	1.2	1.6
1993	2.0	2.6	2.3	2.0	1.7	1.1	1.7
1994	1.9	2.5	2.2	2.0	1.7	1.0	1.7
1995	2.0	2.8	2.2	2.0	1.7	1.0	1.7
1996	2.1	2.7	2.2	2.0	1.6	1.0	1.7
1997	2.1	2.8	2.2	2.0	1.5	1.1	1.7
1998	2.2	2.9	2.3	2.0	1.5	1.1	1.8
1999	2.3	2.9	2.4	2.0	1.6	1.0	1.8
2000	2.4	3.0	2.4	2.0	1.6	1.1	NA
2001	2.4	NA	2.5	2.0	NA	NA	NA

GDP gross domestic product

NA not available

^aData on Japanese R&D in 1996 and later years may not be consistent with data in earlier years because of changes in methodology.^bData for 1981–90 are for West Germany.^cNondefense R&D data are estimates. Nondefense R&D/GDP ratios are obtained directly from Organisation for Economic Co-operation and Development (OECD) reports or, for the following countries and years, are estimated by the National Science Foundation from OECD data: United States for all years; Japan for 1995 and later years; Germany for 1990 and earlier years; United Kingdom for 1981–84 and 1986–88; Italy for 1986 and earlier years; and Canada for 1990 and later years. Conversions of foreign currencies to U.S. dollars are calculated with OECD purchasing power parity exchange rates.

NOTE: The nondefense R&D/GDP ratio for the Russian Federation was 1.2 in 1990, 0.6 in 1995, and 0.9 in 2001.

SOURCES: OECD, *Main Science and Technology Indicators* (Paris, 2002); and National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources* (Arlington, VA, annual series).

Appendix table 4-45

(Page 1 of 2)

International R&D expenditures for selected countries, by performing sector and source of funds: 2000 or 2001

Country and R&D performer	Source of R&D funds						Percent distribution, performers
	Total	Industry	Government	Higher education	Private nonprofit	Abroad	
Billions of yen							
Japan (2000)	15,304	11,083	2,997	1,049	111	64	100.0
Industry	10,860	10,606	184	—	8	62	71.0
Government	1,514	15	1,498	—	—	—	9.9
Higher education	2,224	56	1,115	1,048	4	1	14.5
Private nonprofit	707	407	199	—	99	2	4.6
Percent distribution, sources.....	100.0	72.4	19.6	6.9	0.7	0.4	na
Millions of euros							
Germany (2001).....	51,539	34,011	16,250	0	212	1,066	100.0
Industry	36,350	32,924	2,570	—	74	781	70.5
Government.....	6,923	152	6,492	—	138	142	13.4
Higher education	8,266	935	7,188	—	—	143	16.0
Private nonprofit	—	—	—	—	—	—	0.0
Percent distribution, sources.....	100.0	66.0	31.5	0.0	0.4	2.1	na
France (2000)	30,954	16,255	11,967	237	270	2,224	100.00
Industry	19,348	15,671	1,918	4	6	1,749	62.50
Government.....	5,361	359	4,673	10	9	311	17.30
Higher education	5,804	157	5,311	199	17	120	18.80
Private nonprofit	439	69	65	24	239	44	1.40
Percent distribution, sources.....	100.0	52.5	38.7	0.8	0.9	7.2	na
Italy (2000)	12,460	—	—	—	—	—	100.0
Industry	6,239	5,023	686	5	16	510	50.1
Government.....	2,356	40	2,199	3	25	91	18.9
Higher education	3,865	—	—	—	—	—	31.0
Private nonprofit	0	—	—	—	—	—	0.0
Percent distribution, sources.....	100.0	—	—	—	—	—	na
Millions of pounds							
United Kingdom (2000)	17,544	8,648	5,069	158	815	2,854	100.00
Industry	11,510	8,023	1,014	—	3	2,470	65.60
Government.....	2,134	322	1,656	9	69	80	12.20
Higher education	3,645	259	2,358	147	598	283	20.80
Private nonprofit	255	44	42	2	146	21	1.50
Percent distribution, sources.....	100.0	49.3	28.9	0.9	4.6	16.3	na
Millions of Canadian dollars							
Canada (2001)	20,828	8,726	6,513	1,386	489	3,714	100.0
Industry	11,973	8,030	291	—	—	3,652	57.5
Government.....	2,474	75	2,393	—	—	6	11.9
Higher education	6,313	609	3,803	1,386	460	55	30.3
Private nonprofit	68	12	26	—	29	1	0.3
Percent distribution, sources.....	100.0	41.9	31.3	6.7	2.3	17.8	na

Appendix table 4-45

(Page 2 of 2)

International R&D expenditures for selected countries, by performing sector and source of funds: 2000 or 2001

Country and R&D performer	Source of R&D funds						Percent distribution, performers
	Total	Industry	Government	Higher education	Private nonprofit	Abroad	
Billions of rubles							
Russian Federation (2001)	105,261	35,394	60,229	360	206	9,072	100.0
Industry	73,976	30,729	36,275	46	149	6,777	70.3
Government	25,580	3,167	20,398	17	8	1991	24.3
Higher education	5,488	1,454	3,444	297	8	285	5.2
Private nonprofit	217	44	112	—	40	20	0.2
Percent distribution, sources	100.0	33.6	57.2	0.3	0.2	8.6	na
Billions of won							
Korea (2001)	16,111	11,673	4,023	278	61	76	100.0
Industry	12,274	11,196	989	3	17	69	76.2
Government	1,991	160	1,819	1	9	2	12.4
Higher education	1,677	239	1,148	273	12	5	10.4
Private nonprofit	169	78	67	—	24	—	1.0
Percent distribution, sources	100.0	72.5	25.0	1.7	0.4	0.5	na
Millions of U.S. dollars							
United States (2001)	273,565	184,978	75,012	6,819	6,756	—	100.0
Industry	198,505	181,606	16,899	—	—	—	72.6
Government	31,099	—	31,099	—	—	—	11.4
Higher education	33,295	2,263	21,707	6,819	2,507	—	12.2
Private nonprofit	10,667	1110	5,309	—	4,248	—	3.9
Percent distribution, sources	100.0	67.6	27.4	2.5	2.5	—	na

— assumed negligible or not available

na not applicable

SOURCES: Organisation for Economic Co-operation and Development, special tabulations (Paris, 2003); and National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources* (Arlington, VA, annual series).

Appendix table 4-46

Proportion of industry R&D expenditures financed by foreign sources, by selected country or region: 1981–2001

(Percent)

Year	Canada	France	Germany ^a	Italy	United Kingdom	Japan	Russian Federation	European Union
1981	7.4	7.1	1.2	4.3	8.7	0.1	NA	4.7
1982	10.7	4.8	1.3	4.7	NA	0.1	NA	NA
1983	16.6	4.6	1.4	4.3	6.8	0.1	NA	3.7
1984	17.1	6.5	1.5	6.2	NA	0.1	NA	NA
1985	14.3	6.9	1.4	6.1	11.1	0.1	NA	5.1
1986	13.6	8.0	1.4	7.3	12.2	0.1	NA	5.6
1987	16.8	8.7	1.5	6.9	12.0	0.1	NA	5.6
1988	18.0	9.2	2.1	6.6	12.0	0.1	NA	5.9
1989	17.1	10.9	2.7	6.5	13.4	0.1	NA	6.9
1990	17.9	11.1	2.7	7.3	15.5	0.1	NA	7.6
1991	18.5	11.4	2.6	9.6	16.0	0.1	NA	7.6
1992	17.8	12.0	2.5	6.3	14.9	0.1	NA	7.5
1993	17.7	11.3	1.9	6.9	15.4	0.1	NA	7.6
1994	19.4	11.2	2.0	9.5	16.0	0.1	1.9	8.2
1995	19.4	11.1	2.2	8.2	19.1	0.1	5.1	8.7
1996	20.7	11.4	2.2	9.6	21.7	0.1	6.1	9.2
1997	19.9	10.6	2.8	9.0	18.8	0.4	8.5	9.1
1998	26.0	9.4	2.7	8.1	22.1	0.4	11.1	9.1
1999	27.0	8.8	2.1	8.1	22.7	0.5	19.8	8.9
2000	27.0	9.0	2.1	8.2	21.5	0.6	13.6	8.4
2001	27.0	NA	2.1	7.4	NA	NA	9.2	NA

NA not available

^aData for 1981–90 are for West Germany.SOURCES: Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 2002).

Appendix table 4-47

Sources of total and industry R&D expenditures for OECD countries combined: 1981–2000

(Percent distribution)

Year	Industry R&D			Total R&D	
	Government	Industry	Other	Government	All other sources
1981	44.4	51.4	4.2	22.6	77.4
1982	43.9	52.0	4.1	22.8	77.2
1983	43.4	52.6	4.0	22.4	77.6
1984	42.4	53.4	4.2	22.0	78.0
1985	41.7	54.1	4.2	22.1	77.9
1986	41.3	54.3	4.4	21.8	78.2
1987	41.2	54.2	4.6	21.9	78.1
1988	39.6	55.5	4.9	20.1	79.9
1989	38.0	56.9	5.1	17.9	82.1
1990	36.9	57.7	5.4	16.7	83.3
1991	35.6	58.8	5.6	14.8	85.2
1992	34.9	59.3	5.8	13.3	86.7
1993	35.1	58.8	6.1	12.6	87.4
1994	34.4	59.1	6.5	11.9	88.1
1995	33.8	59.7	6.5	11.5	88.5
1996	32.1	61.0	6.9	10.7	89.3
1997	31.1	62.0	6.9	10.1	89.9
1998	30.7	62.1	7.2	9.8	90.2
1999	29.7	62.9	7.4	8.9	91.1
2000	28.5	64.2	7.3	7.5	92.5

OECD Organisation for Economic Co-operation and Development

SOURCES: OECD, *Main Science and Technology Indicators* (Paris, 2002).

Appendix table 4-48

Distribution of government R&D budget appropriations in selected countries, by socioeconomic objective: 2000 or 2001

(Percent)

Socioeconomic objective	United States (2001)	Japan (2001)	Germany (2001)	France (2000)	United Kingdom (2000)	Italy (2001)	Russian Federation (2001)	Canada (2000)	South Korea (2001)
Total (millions of U.S. dollars)	86,756	23,153	17,946	14,605	10,030	10,694	5,889	4,652	6,195
Exploration and exploitation of the Earth	1.2	1.9	1.8	0.8	1.3	1.9	1.5	4.5	1.5
Infrastructure and general planning of land use	2.0	4.4	1.7	0.6	1.2	0.4	1.2	3.0	4.2
Control and care of the environment	0.7	0.8	3.1	2.9	1.6	2.3	1.6	4.5	4.5
Protection and improvement of human health	24.8	3.9	4.0	5.8	14.6	7.0	2.0	11.3	7.1
Production, distribution, and rational use of energy	1.5	17.4	3.4	3.9	0.5	3.6	2.0	4.5	4.7
Agricultural production and technology	2.5	3.5	2.4	2.1	4.1	1.9	9.9	10.3	8.4
Industrial production and technology	0.5	7.5	12.1	6.3	1.7	10.2	11.4	12.1	29.5
Social structures and relationships	0.9	0.9	4.5	0.8	4.1	4.4	2.0	2.8	2.6
Exploration and exploitation of space	7.1	6.7	4.7	9.8	2.2	7.3	10.1	6.6	3.2
Research financed from GUF ^a	NA	34.8	39.0	21.6	19.6	43.7	NA	28.5	NA
Nonoriented research	6.3	13.8	16.1	19.8	12.1	13.3	14.0	6.0	18.5
Other civil research	0.0	0.0	0.1	2.3	0.3	0.0	0.9	1.2	0.0
Defense	52.7	4.3	7.1	23.2	36.6	4.0	43.5	4.8	15.8

GUF general university funds

NA not available separately

^aUnited States, Russian Federation, and Korea do not have a category equivalent to GUF.

NOTES: Conversions of foreign currencies to U.S. dollars are calculated with Organisation for Economic Co-operation and Development (OECD) purchasing power parity exchange rates. Percents may not sum to 100 because of rounding. U.S. data are based on budget authority. Because of GUF and slight differences in accounting practices, the distribution of government budgets among socioeconomic objectives may not completely reflect actual distribution of government-funded research in particular objectives. Japanese data are based on science and technology budget data, which include items other than R&D. Such items are a small proportion of the budget; therefore, data may still be used as an approximate indicator of relative government emphasis on R&D by objective.

SOURCES: OECD, unpublished tabulations (Paris, 2003); and OECD, *Main Science and Technology Indicators* (Paris, 2002).*Science & Engineering Indicators – 2004*

Appendix table 4-49

R&D expenditures by majority-owned affiliates of foreign companies in United States, by region/country of ultimate beneficial owner: 1980 and 1987–2000

(Millions of current U.S. dollars)

R&D expenditures	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total	1,517	4,497	5,485	6,720	8,511	9,127	10,745	11,262	12,671	14,846	15,641	17,216	22,375	24,027	26,089
Manufacturing	1,245	3,809	4,773	5,915	7,282	7,839	9,056	9,560	10,855	12,828	13,090	14,270	18,788	19,991	20,554
Total expenditures by region/country															
Canada	113	D	D	D	D	D	D	D	D	1,337	1,452	1,668	2,352	2,385	3,664
Europe	1,217	3,458	4,241	5,414	6,762	7,275	8,325	8,628	9,487	11,442	11,535	12,327	16,425	18,055	18,610
France	39	332	402	510	766	913	1,230	1,190	1,383	1,529	1,680	1,783	1,881	2,434	2,135
Germany	281	824	963	1,216	1,435	1,596	1,855	2,003	2,147	3,563	2,747	2,923	5,381	6,135	5,610
Italy	D	D	73	93	151	143	91	132	157	172	D	D	D	294	D
Netherlands	D	540	615	690	757	642	685	674	719	786	937	990	964	1,296	1,366
Sweden	D	124	160	205	271	225	322	180	263	D	D	687	713	428	374
Switzerland	329	D	D	1,060	1,455	1,637	1,873	2,117	2,127	2,490	2,699	2,369	3,076	3,008	3,013
United Kingdom	247	790	1,085	1,568	1,809	1,987	2,090	2,139	2,428	2,316	2,575	2,984	3,720	3,678	5,018
Asia and Pacific	D	179	345	412	796	834	1,080	1,232	1,397	1,611	2,116	2,642	2,961	2,820	2,840
Japan	D	133	282	369	709	741	938	1,112	1,200	1,259	1,531	2,036	2,584	2,535	2,617
Other Asian and Pacific countries	D	46	63	43	87	93	142	120	197	352	585	606	377	285	223
Latin America and other															
Western Hemisphere	155	329	302	352	314	330	534	D	610	317	364	373	396	564	735
Middle East	2	14	9	10	9	9	20	38	62	72	100	103	132	D	D
Africa	D	D	D	D	D	D	4	5	2	D	D	D	D	D	D

D data withheld to avoid disclosing operations of individual companies

NOTES: Data are for majority-owned (more than 50 percent) nonbank U.S. affiliates of foreign parent companies. Data for 1980 and 1987–96 are for R&D funded by affiliates; 1997 to latest data are for R&D performed by affiliates. Manufacturing data exclude petroleum manufacturing before 1997. Estimates for 2000 are preliminary. Total R&D funded is based on R&D spending according to the funding source. Total R&D performed refers to R&D expenditures according to who conducts the R&D activity, whether for the performer itself or for others under contract, and excludes R&D expenditures conducted by others under contract. Ultimate beneficial owner (UBO) refers to the person proceeding up the U.S. affiliate's ownership chain beginning with and including the foreign parent that is not owned more than 50 percent by another person.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Foreign Direct Investment in the United States, annual series, <http://www.bea.gov/ea/di/di1fdiop.htm>.

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Appendix table 4-50

R&D performed by majority-owned affiliates of foreign companies in United States, by NAICS industry of affiliate: 1997–2000

(Millions of current U.S. dollars)

Industry/sector	NAICS code	1997	1998	1999	2000
Total		17,216	22,375	24,027	26,089
Manufacturing	31–33	14,270	18,788	19,991	20,554
Food	311	239	224	205	203
Printing and related support activities	323	34	42	76	52
Petroleum and coal products	324	272	479	D	D
Chemicals	325	6,754	7,770	7,679	7,023
Basic chemicals	3251	617	623	832	688
Pharmaceuticals and medicines	3254	5,304	6,381	6,191	5,646
Other chemicals	325 (minus 3251, 3254)	833	766	656	689
Plastics and rubber products	326	331	349	372	305
Nonmetallic mineral products	327	214	146	172	195
Primary metals	331	60	65	61	67
Fabricated metal products	332	203	181	149	207
Machinery	333	721	677	898	868
Agriculture, construction, and mining machinery	3331	103	69	290	243
Industrial machinery	3332	83	90	D	132
Other machinery	333 (minus 3331, 3332)	535	518	D	494
Computer and electronic products	334	3,413	4,487	5,031	6,182
Computers and peripheral equipment	3341	120	324	D	D
Communications equipment	3342	2,243	3,045	3,431	4,617
Semiconductors and other electronic components	3344	586	635	917	1,004
Other electronic products	334 (minus 3341, 3342, 3344)	464	483	D	D
Electrical equipment, appliances, and components	335	781	885	1,195	1,714
Transportation equipment	336	641	2,762	3,204	3,206
Motor vehicles, bodies, and trailers	3361, 3362, 3363	500	2,555	D	2,959
Other transportation equipment	336 (minus 3361, 3362, 3363)	141	207	D	247
Other manufacturing		607	721	D	D
Wholesale trade	42	D	D	D	D
Information	51	260	329	548	790
Publishing industries	511	D	D	D	D
Motion picture and sound recording industries ...	512	5	1	—	—
Broadcasting and telecommunications	513	7	6	D	D
Information services and data processing services	514	D	D	D	D
Finance and insurance (except depository institutions)	52	12	D	D	D
Professional, scientific, and technical services	54	597	685	836	818
Architectural, engineering, and related services	5413	12	13	36	22
Computer systems design and related services	5415	281	333	315	297
Management, scientific, and technical consulting	5416	—	—	0	0
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5416)	303	339	485	498

— less than \$500,000

D data withheld to avoid disclosing operations of individual companies

NAICS North American Industry Classification System

NOTES: Data are for majority-owned (more than 50 percent ownership) nonbank U.S. affiliates of foreign parent companies. Data exclude expenditures for R&D conducted by others under contract. Estimates for 2000 are preliminary.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Foreign Direct Investment in the United States, annual series, <http://www.bea.gov/bea/di/di1fdiop.htm>.

Appendix table 4-51

R&D performed abroad by majority-owned foreign affiliates of U.S. parent companies, by region/country: 1982, 1989, and 1994–2000

(Millions of current U.S. dollars)

	1982	1989	1994	1995	1996	1997	1998	1999	2000
Total	3,851	7,922	11,877	12,582	14,039	14,593	14,664	18,144	19,758
Manufacturing	3,247	6,446	10,053	10,791	12,205	12,505	12,819	16,388	17,822
Total expenditures by region/country									
Canada	505	975	836	1,068	1,563	1,823	1,750	1,681	1,874
Europe	2,892	5,475	8,676	9,144	9,662	10,003	10,387	12,217	12,938
Belgium	223	313	469	292	356	310	320	375	410
France	332	521	1,372	1,271	1,315	1,281	1,328	1,452	1,445
Germany	1,079	1,726	2,849	3,068	3,073	2,940	3,022	3,377	3,105
Ireland	9	156	396	171	193	320	363	251	518
Italy	150	393	365	346	554	569	584	504	575
Netherlands	65	367	415	495	547	480	384	374	369
Spain	40	58	D	288	327	181	184	D	196
Sweden	28	31	72	691	443	405	445	1,036	1,335
Switzerland	60	59	191	242	190	230	223	231	220
United Kingdom	824	1,718	2,158	1,935	2,139	2,843	3,065	4,000	D
Other European countries	82	133	D	345	525	444	469	D	D
Asia and Pacific	238	1,272	1,775	1,865	2,076	1,869	1,603	3,226	3,727
Japan	112	1,000	1,130	1,286	1,333	1,089	962	1,523	1,433
Australia	114	190	230	287	409	369	290	294	330
Singapore	D	24	167	63	88	73	62	426	548
Other Asian and Pacific countries	D	58	248	229	246	338	289	983	1,416
Latin America and other									
Western Hemisphere	169	155	477	389	546	663	748	613	665
Brazil	97	92	238	249	346	437	446	288	250
Mexico	30	37	183	58	121	126	191	238	305
Other	42	26	56	82	79	100	111	87	110
Middle East	11	33	98	97	170	208	141	389	527
Israel	11	29	96	97	169	208	141	389	527
Other	—	4	2	—	1	—	—	0	0
Africa	25	11	15	19	21	26	35	18	27
South Africa	23	9	14	17	18	22	30	14	22
Other	2	2	1	2	3	4	5	4	5

— less than \$500,000

D data withheld to avoid disclosing operations of individual companies

NOTES: Data are for majority-owned (more than 50 percent ownership) nonbank foreign affiliates of nonbank U.S. parents. Data include R&D expenditures made by affiliates, whether for themselves or for others, under contract. Data exclude R&D expenditures made by others for affiliates under contract. Manufacturing data exclude petroleum manufacturing before 1999. Estimates for 2000 are preliminary.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of U.S. Direct Investment Abroad, annual series, <http://www.bea.gov/bea/di/di1usdop.htm>.

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Appendix table 4-52
R&D expenditures in United States by U.S. MNC-parent companies: 1994–2000
(Millions of current U.S. dollars)

Type of R&D expenditure and sector	1994	1995	1996	1997	1998	1999	2000
All industries							
Performed	91,574	97,667	100,551	106,800	113,777	126,291	131,576
For themselves.....	75,673	NA	NA	NA	NA	111,008	NA
For Federal Government	13,267	NA	NA	NA	NA	7,810	NA
For others.....	2,633	NA	NA	NA	NA	7,473	NA
Funded.....	81,234	NA	NA	NA	NA	121,352	NA
Performed by themselves	75,673	NA	NA	NA	NA	NA	NA
Performed by others.....	5,561	NA	NA	NA	NA	NA	NA
Manufacturing							
Performed	79,035	86,414	89,973	94,791	100,770	104,842	107,189
For themselves.....	64,762	NA	NA	NA	NA	91,575	NA
For Federal Government	12,039	NA	NA	NA	NA	7,658	NA
For others.....	2,233	NA	NA	NA	NA	5,609	NA
Funded.....	69,552	NA	NA	NA	NA	101,085	NA
Performed by themselves..	64,762	NA	NA	NA	NA	NA	NA
Performed by others.....	4,790	NA	NA	NA	NA	NA	NA

NA not available

MNC multinational corporation

NOTES: A U.S. MNC-parent company is a company, resident in the United States, that owns or controls at least 10 percent of the voting securities, or equivalent, of a foreign business enterprise. Funded R&D is based on R&D funded by the MNC-parent company itself, regardless of the performer. R&D performed includes R&D performed by U.S. MNC-parent companies, regardless of funding source, whether for the performer itself or for others, including R&D performed for the Federal Government; excludes R&D conducted by others under contract. Estimates for 2000 are preliminary. Estimates for 1999 forward are based on the North American Industry Classification System, and data for manufacturing include the petroleum industry. In prior years, estimates were based on the Standard Industrial Classification System, and manufacturing data excluded the petroleum industry. Full methodology notes are available at the original source (see below).

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of U.S. Direct Investment Abroad, annual series, <http://www.bea.gov/beat/di/di1usdop.htm>.

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Appendix table 4-53

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R&D performed in United States by U.S. MNC-parent companies, by NAICS industry: 1999–2000

(Millions of current U.S. dollars)

Industry/sector	NAICS code	1999	2000
All industries.....	na	126,291	131,576
Mining.....	21	212	297
Oil and gas extraction.....	211	53	49
Other mining.....	na	159	248
Utilities.....	22	81	121
Manufacturing.....	31–33	104,842	107,189
Food.....	311	934	911
Beverages and tobacco products.....	312	501	520
Textiles, apparel, and leather products.....	313	275	266
Wood products.....	321	31	D
Paper.....	322	1,478	1,519
Printing and related support activities.....	323	129	147
Petroleum and coal products.....	324	990	1,206
Chemicals.....	325	28,198	28,480
Basic chemicals.....	3251	1,627	1,524
Resins and synthetic rubber, fibers and filaments.....	3252	2,784	2,940
Pharmaceuticals and medicines.....	3254	18,382	19,961
Soap, cleaning compounds, and toilet preparations.....	3256	1,957	2,239
Other chemicals.....	na	3,449	1,816
Plastics and rubber products.....	326	1,031	939
Nonmetallic mineral products.....	327	371	415
Primary and fabricated metals.....	na	1,320	1,334
Primary metals.....	331	760	816
Fabricated metal products.....	332	560	517
Machinery.....	333	5,252	5,839
Agriculture, construction, and mining machinery.....	3331	1,340	1,318
Industrial machinery.....	3332	1,250	1,589
Other machinery.....	na	2,662	2,932
Computers and electronic products.....	334	30,298	34,104
Computers and peripheral equipment.....	3341	5,659	5,766
Communications equipment.....	3342	13,276	14,314
Audio and video equipment.....	3343	407	579
Semiconductors and other electronic components.....	3344	8,997	9,788
Navigational, measuring, and other instruments.....	3345	1,579	3,201
Magnetic and optical media.....	3346	381	455
Electrical equipment, appliances, and components.....	335	2,958	2,517
Transportation equipment.....	336	29,162	26,714
Motor vehicles, bodies and trailers, and parts.....	3361, 3362, 3363	17,513	16,219
Other transportation equipment.....	na	11,649	10,495
Furniture and related products.....	337	90	D
Miscellaneous manufacturing.....	339	1,826	2,124
Wholesale trade: durable and nondurable goods.....	42	4,000	4,100
Professional and commercial equipment and supplies.....	4214	2,635	D
Other durable goods wholesalers.....	na	774	586
Petroleum and petroleum products.....	4227	D	27
Other nondurable goods wholesalers.....	na	D	D
Information.....	51	6,763	8,114
Publishing industries.....	511	4,050	4,989
Motion picture and sound recording industries.....	512	D	12
Broadcasting and telecommunications.....	513	869	1,191
Broadcasting, cable networks, and program distribution.....	5131, 5132	D	12
Telecommunications.....	5133	D	1,179
Information services and data processing services.....	514	D	1,921

Appendix table 4-53

(Page 2 of 2)

R&D performed in United States by U.S. MNC-parent companies, by NAICS industry: 1999–2000

(Millions of current U.S. dollars)

Industry/sector	NAICS code	1999	2000
Finance (except depository institutions) and insurance	52	315	264
Finance (except depository institutions)	na	240	217
Securities, commodity contracts, and other intermediation and related activities	523	D	16
Other finance (except depository institutions)	na	D	201
Insurance carriers and related activities	524	75	47
Professional, scientific, and technical services	54	8,522	9,934
Architectural, engineering, and related services	5413	49	29
Computer systems design and related services	5415	7,453	8,268
Management, scientific, and technical consulting	5416	D	D
Advertising and related services	5418	D	D
Other professional, scientific, and technical services	na	716	853
Other industries	na	1,556	1,557
Agriculture, forestry, fishing and hunting	11	2	2
Construction	23	D	D
Retail trade	44-45	D	D
Transportation and warehousing	48-49	26	23
Real estate and rental and leasing	53	D	6
Real estate	531	0	0
Rental and leasing (except real estate)	532	D	6
Management of companies and enterprises (except bank companies)	55	0	0
Administration, support, and waste management	56	6	5
Health care and social assistance	62	D	26
Accommodation and food services	72	25	31
Accommodation	721	0	0
Food services and drinking places	722	25	31
Miscellaneous services	na	15	14

D data withheld to avoid disclosing operations of individual companies

MNC multinational corporation

NAICS North American Industry Classification System

na not applicable

NOTES: A U.S. MNC-parent company is a company, resident in the United States, that owns or controls at least 10 percent of the voting securities, or equivalent, of a foreign business enterprise. Data include R&D performed by U.S. MNC-parent companies, regardless of funding source, whether for the performer itself or for others, including R&D performed for the Federal Government; data exclude R&D conducted by others under contract. Estimates for 2000 are preliminary.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of U.S. Direct Investment Abroad, annual series, <http://www.bea.gov/bea/di/di1usdop.htm>.

Appendix table 4-54

Company and other non-Federal funds for industrial R&D performed abroad: 1985–2001

(Millions of current U.S. dollars)

Year	Total	Manufacturing	Nonmanufacturing
1985	3,650	3,632	18
1986	4,624	4,597	27
1987	5,226	5,162	64
1988	6,208	6,062	146
1989	6,706	6,450	256
1990	7,952	7,537	415
1991	9,147	8,369	778
1992	10,063	9,228	835
1993	9,565	7,795	1,770
1994	9,395	7,895	1,500
1995	13,052	10,846	2,206
1996	14,050	11,540	2,510
1997	13,107	11,743	1,364
1998	16,008	12,658	3,350
1999	16,765	12,354	4,411
2000	17,463	12,252	5,211
2001	17,869	10,998	6,871

NAICS North American Industry Classification System

NOTES: Data are for industrial R&D performed outside the United States by a company's foreign subsidiaries or other organizations funded from all sources except the Federal Government. Starting with the 1999 survey, estimates are based on NAICS. In prior years, estimates were based on the Standard Industrial Classification System.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development, annual series, <http://www.nsf.gov/sbe/srs/indus/start.htm>.

Appendix table 4-55

Company and other non-Federal funds for industrial R&D performed abroad, by NAICS industry: 1999–2001

(Millions of current U.S. dollars)

Industry/sector	NAICS code	1999	2000	2001
Total	na	16,765	17,463	17,869
Manufacturing	31–33	12,354	12,252	10,998
Food	311	87	95	210
Petroleum and coal products	324	D	9	D
Chemicals	325	3,243	3,578	2,328
Pharmaceuticals and medicines	3254	2,832	3,030	1,720
Other chemicals	na	411	548	608
Plastics and rubber products	326	172	168	181
Nonmetallic mineral products	327	40	40	15
Primary metals	331	7	D	12
Fabricated metal products	332	75	65	61
Machinery	333	707	736	527
Computer and electronic products	334	1,902	1,705	2,562
Computers and peripheral equipment	3341	289	D	478
Communications equipment	3342	D	377	633
Semiconductors and other electronic components	3344	302	327	852
Navigation, measuring, electromedical, and control instruments	3345	1,112	679	586
Electrical equipment, appliances, and components	335	433	455	418
Transportation equipment	336	3,933	3,640	2,832
Information	51	1,379	1,564	1,672
Professional, scientific, and technical services	54	523	904	881
Architectural, engineering, and related services	5413	D	371	78
Computer systems design and related services	5415	146	D	302
Scientific R&D services	5417	287	292	488
Other professional, scientific, and technical services	na	D	D	12

D data withheld to avoid disclosing operations of individual companies

NAICS North American Industry Classification System

na not applicable

NOTES: Data are for industrial R&D performed outside the United States by a company's foreign subsidiaries or other organizations funded from all sources except the Federal Government. Starting with the 1999 survey, estimates are based on NAICS. In prior years, estimates were based on the Standard Industrial Classification System.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development, annual series, <http://www.nsf.gov/sbe/srs/indus/start.htm>.