

U.S. BUSINESS R&D EXPENDITURES INCREASE IN 2006; COMPANIES' OWN AND FEDERAL CONTRIBUTIONS RISE

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Companies spent \$248 billion in current-year dollars on research and development (R&D) performed in the United States during 2006 compared with \$226 billion in 2005 (table 1), according to estimates from the Survey of Industrial Research and Development.² In inflation-adjusted (2000) dollars, 2006 R&D expenditures increased \$12.7 billion, or 6.4%, from 2005 levels. Funding from both the company's own and other nonfederal sources (hereafter, company or company and other funding) and from federal sources for R&D were higher in 2006 than in 2005. Company funding during 2006 amounted to \$223 billion in current-year dollars compared with \$204 billion during 2005, and federal funding amounted to \$24 billion during 2006 compared with \$22 billion during 2005. After adjusting for inflation, company-funded R&D increased 6.2%, and federally funded R&D increased 7.7%.

R&D Performance by Industrial Sector

In 2006, companies in manufacturing industries performed \$172 billion of R&D, which accounted for 69% of all industrial R&D performed in the United States; companies in nonmanufacturing industries performed \$76 billion of R&D (table 2). Manufacturers performed \$155 billion of company-funded R&D and \$17 billion of federally funded industrial R&D; companies in the nonmanufacturing industries performed \$68 billion and \$8 billion, respectively. Other company and federally funded R&D costs by detailed industry are given in table 2 (see Data Notes for information on industry classification).

Sales and Employment of R&D Performers

Domestic net sales (see table 1 for definition) of companies that performed R&D in the United States were \$6.1 trillion in 2005 and \$6.6 trillion in 2006. The R&D-to-sales ratio remained 3.7% in 2006, as it was in the two previous years. Domestic employment in R&D-performing companies during 2006 was 16.3 million (table 3), compared with 16.0 million reported in 2005 (National Science Foundation 2008). The number of full-time equivalent scientists and engineers who performed industrial R&D remained 1.1 million, as it was in 2004 and 2005. Other sales and employment estimates by detailed industry are given in table 3. Sales, employment, and R&D performance estimates by size of company are given in table 4.

R&D Performance by State

During 2006, the following 10 states accounted for two-thirds of the industrial R&D performed in the United States. Companies in California, Connecticut, Illinois, Massachusetts, Michigan, New Jersey, New York, Pennsylvania, Texas, and Washington reported aggregate R&D expenditures of \$168 billion (table 5). Focusing on the top 5 states, California alone accounted for 23.6% of the U.S. industrial R&D total; Michigan, 6.7%; Massachusetts, 6.3%; New Jersey, 5.9%; and Texas, 5.4%.

Data Notes

Estimates in this InfoBrief were derived from the annual Survey of Industrial Research and Development.



TABLE 1. Funds expended for industrial R&D performance, by source of funds and size of company, and sales: 2005 and 2006

Selected characteristic	2005	2006	2005	2006
	Current \$millions		2000 constant \$millions	
Total industrial R&D performance	226,159	247,669	200,602	213,342
Source of funds				
Company and other nonfederal	204,250	223,365	181,169	192,407
Federal	21,909	24,304	19,433	20,935
Size of company (number of employees)				
5–24	7,373	7,207	6,540	6,208
25–49	7,488	D	6,642	D
50–99	7,144	9,064	6,337	7,808
100–249	10,327	13,306	9,160	11,462
250–499	8,149	D	7,228	D
500–999	13,992	13,360	12,411	11,508
1,000–4,999	34,969	37,866	31,017	32,618
5,000–9,999	18,170	20,434	16,117	17,602
10,000–24,999	33,564	37,865	29,770	32,617
25,000 or more	84,983	92,925	75,380	80,046
Domestic net sales ^a	6,119,133	6,642,500	5,427,650	5,721,854

D = suppressed to avoid disclosure of confidential information.

^a Dollar values for goods sold or services rendered by R&D-performing companies to customers outside the company, including the federal government, less such items as returns, allowances, freight charges, and excise taxes. Excludes domestic intracompany transfers and sales by foreign subsidiaries but includes transfers to foreign subsidiaries and export sales to foreign companies.

NOTES: Detail may not add to total because of rounding. Excludes data for federally funded research and development centers. 2000 gross domestic product implicit price deflators were used to convert current to constant dollars.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2005 and 2006.

The survey is cosponsored by the National Science Foundation and the U.S. Census Bureau, and Census is the collection and tabulation agent for the survey. The survey is a nationally representative sample of all for-profit companies, publicly or privately held and with five or more employees that performed R&D within the 50 United States and the District of Columbia. Approximately 32,000 companies are surveyed each year and the overall response rate is approximately 80%.³ The primary focus of the survey is U.S. industry as a performer of research and development rather than as a source of funds. Beginning in 1989, the amount of federally funded R&D reported by performers began to diverge from the amount reported by federal agencies. For 2006, federal agencies reported obligations of \$108.4 billion and outlays of \$103.7 billion in total R&D to all R&D performers and obligations of \$44.3 billion to industrial R&D performers (National Science

Foundation 2007a). These totals compare with \$96.8 billion in federal funding reported by all performers of R&D (National Science Foundation 2007b) and with \$24.3 billion reported by industrial R&D performers. Although NSF has not found a definitive explanation for this divergence, the National Research Council notes that comparing federal outlays (as opposed to obligations) for R&D to performer expenditures results in a smaller discrepancy (National Research Council 2005).

Beginning in the late 1990s, increasingly large amounts of R&D were attributed to the wholesale trade industries, resulting from the payroll-based methodology used to assign industry classifications and the change from the standard industrial classification (SIC) system to the North American Industrial Classification System (NAICS) in 1999. Such classification artifacts were of

TABLE 2. Funds expended for industrial R&D performed in the United States, by source, by industry: 2006

(Millions of dollars)

Industry	NAICS codes	All R&D	Federal	Company and other
All industries	21-23, 31-33, 42, 44-81	247,669	24,304	223,365
Manufacturing industries	31-33	171,814	16,584	155,230
Food	311	2,720	4	2,716
Textiles, apparel, and leather	313-16	547 i	0	547 i
Paper, printing, and support activities	322, 323	D	D	2,793
Petroleum and coal products	324	1,432	1	1,431
Chemicals	325	46,329	211	46,119
Basic chemicals	3251	2,152	98	2,054
Resin, synthetic rubber, fibers, and filament	3252	1,975	13	1,963
Pharmaceuticals and medicines	3254	38,901	88	38,813
Other chemicals	other 325	3,300	12	3,288
Plastics and rubber products	326	2,245	27	2,217
Fabricated metal products	332	1,499	67 i	1,432
Machinery	333	9,848	106	9,743
Computer and electronic products	334	56,773	8,522	48,251
Computers and peripheral equipment	3341	D	D	7,289
Communications equipment	3342	D	D	10,911
Semiconductor and other electronic components	3344	18,888	354	18,534
Navigational, measuring, electromedical, and control instruments	3345	18,300	7,860	10,440
Other computer and electronic products	other 334	D	D	1,076
Electrical equipment, appliances, and components	335	2,281	66	2,215
Transportation equipment	336	D	D	30,010
Motor vehicles, trailers, and parts	3361-63	D	D	16,562
Aerospace products and parts	3364	16,367	4,372	11,995
Other transportation equipment	other 336	D	D	1,453
Miscellaneous manufacturing	339	5,150	114	5,036
Medical equipment and supplies	3391	4,098	101	3,998
Other miscellaneous manufacturing	other 339	1,052	14	1,038
Other manufacturing	312, 321, 327, 331, 337	D	D	70,855
Nonmanufacturing industries	21-23, 42, 44-81	75,855	7,719	68,135
Wholesale trade	42	2,072	18	2,054
Retail trade	44, 45	D	D	1,372
Information	51	26,883	136	26,748
Publishing, including software	511	D	D	19,946
Telecommunications	517	D	D	2,135
Internet service and data processing providers	518	4,029	93	3,936
Other information	other 51	732	*	731
Finance, insurance, and real estate	52, 53	1,969	0	1,969
Professional, scientific, and technical services	54	38,049	7,438	30,611
Architectural, engineering, and related services	5413	6,579	1,714	4,866
Computer systems design and related services	5415	14,841	1,011	13,830
Scientific R&D services	5417	14,525	4,495	10,030
Other professional, scientific, and technical services	other 54	2,105	219	1,885
Health care services	621-23	992	37	955
Other nonmanufacturing	21-2, 48-9, 55-6, 61, 624, 71-2, 81	D	D	4,426

* = amount < \$500,000; D = suppressed to avoid disclosure of confidential information; i = more than 50% of the value is imputed; NAICS = North American Industry Classification System.

NOTES: Detail may not add to total because of rounding. Excludes data for federally funded research and development centers.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2006.

TABLE 3. Sales and employment for companies performing industrial R&D in the United States, by industry: 2006

Industry	NAICS codes	Domestic net sales	Domestic employment ^a	R&D scientists and engineers ^b
		\$millions	Thousands	
All industries	21–23, 31–33, 42, 44–81	6,642,500	16,298	1,135.5
Manufacturing industries	31–33	4,264,583	9,415	696.1
Food	311	414,425	1,021	11.6
Textiles, apparel, and leather	313–16	41,672	176	5.7
Paper, printing, and support activities	322, 323	223,644	455	9.7 i
Petroleum and coal products	324	446,821	145	D
Chemicals	325	612,885	1,083	128.3
Basic chemicals	3251	121,434	153	9.6
Resin, synthetic rubber, fibers, and filament	3252	90,226	101	8.5
Pharmaceuticals and medicines	3254	286,981	509	90.5
Other chemicals	other 325	114,244	320	19.8
Plastics and rubber products	326	114,989	435	13.5
Fabricated metal products	332	103,567	409	22.1
Machinery	333	272,687	871	65.0
Computer and electronic products	334	524,160	1,325	241.0
Computers and peripheral equipment	3341	116,094	162	32.6
Communications equipment	3342	80,092	152	49.8
Semiconductor and other electronic components	3344	168,585	456	77.7
Navigational, measuring, electromedical, and control instruments	3345	139,871	495	75.6 i
Other computer and electronic products	other 334	19,519	60	5.3 i
Electrical equipment, appliances, and components	335	88,519	289	15.9
Transportation equipment	336	1,019,882	1,981	134.7
Motor vehicles, trailers, and parts	3361–63	686,841	1,030	D
Aerospace products and parts	3364	243,110	620	37.5
Other transportation equipment	other 336	89,931	331	D
Miscellaneous manufacturing	339	101,926	385	24.1
Medical equipment and supplies	3391	71,882	267	17.1
Other miscellaneous manufacturing	other 339	30,044	118	7.0
Other manufacturing	312, 321, 327, 331, 337	299,406	840	D
Nonmanufacturing industries	21–23, 42, 44–81	2,377,917	6,883	439.4
Wholesale trade	42	101,302	203	18.4
Retail trade	44, 45	247,853	653 i	D
Information	51	511,749	1,651	144.5
Publishing, including software	511	118,956	410	105.3
Telecommunications	517	303,954	895	D
Internet service and data processing providers	518	41,940	155	22.7
Other information	other 51	46,899	191	D
Finance, insurance, and real estate	52, 53	522,683	1,037	23.4
Professional, scientific, and technical services	54	401,512	1,088	208.9
Architectural, engineering, and related services	5413	45,535	210	52.2
Computer systems design and related services	5415	281,633	551	95.8
Scientific R&D services	5417	41,410	162	45.9
Other professional, scientific, and technical services	other 54	32,935	165	14.9
Health care services	621–23	28,707	132	7.4
Other nonmanufacturing	21-2, 48-9, 55-6, 61, 624, 71-2, 81	564,111	2,119	9.6

D = suppressed to avoid disclosure of confidential information; i = more than 50% of the value is imputed; NAICS = North American Industry Classification System.

^a Data recorded on March 12, 2006 represent employment figures for the current year.

^b Data recorded in January 2007 represent employment figures for the previous year.

NOTES: Detail may not add to total because of rounding. Excludes data for federally funded research and development centers.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2006.

TABLE 4. Funds expended for industrial R&D, sales, and employment for companies performing industrial R&D in the United States, by company size: 2006

Company size (employees)	Funds			Domestic net sales	Domestic employment ^a	R&D scientists and engineers ^b
	All R&D	Federal	Company and other			
	\$millions				Thousands	
All companies	247,669	24,304	223,365	6,642,500	16,298	1,135.5
5–24	7,207	1,121	6,087	51,371	243	67.6
25–49	D	D	6,465	56,748	241	44.4
50–99	9,064	704	8,360	90,817	482	61.8
100–249	13,306	1,206	12,101	171,854	689	78.8
250–499	D	D	7,944	158,493	665	47.9
500–999	13,360	878	12,482	301,337	1,087	64.3
1,000–4,999	37,866	1,847	36,019	1,044,304	2,393	178.1
5,000–9,999	20,434	657	19,776	604,787	1,393	101.6
10,000–24,999	37,865	1,816	36,049	1,332,843	2,270	177.1
25,000 or more	92,925	14,843	78,082	2,829,945	6,835	313.8

D = suppressed to avoid disclosure of confidential information.

^a Data recorded on March 12, 2006 represent employment figures for the current year.

^b Data recorded in January 2007 represent employment figures for the previous year.

NOTES: Detail may not add to total because of rounding. Excludes data for federally funded research and development centers.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2006.

particular concern for companies traditionally thought of as pharmaceutical or computer-manufacturing firms. As these firms increasingly marketed their own products and more of their payroll involved employees engaged in selling and distribution activities, the potential for the companies to be classified among the wholesale trade industries increased. To improve the relevance and usefulness of the industrial R&D statistics, NSF evaluated ways to ameliorate the negative effects of the industry classification methodology and classification system change. Beginning in 2004, in addition to firms originally assigned NAICS codes among the wholesale trade (NAICS 42) industries, firms in the information (NAICS 51); professional, scientific, and technical services (NAICS 54); and management of companies and enterprises (NAICS 55) industries using the payroll-based methodology were manually reviewed by NSF and Census. These firms were reclassified based on primary R&D activity, which in most cases corresponded to their primary products or service activities. The result was that most of the R&D previously attributed to

NAICS 42 and 55 industries was redistributed. (For detailed information, see National Science Foundation 2007c.)

The full set of detailed tables from this survey will be available in the report *Survey of Industrial Research and Development, 2006* at <http://www.nsf.gov/statistics/industry/>. Individual detailed tables from the 2006 survey are available in advance of publication of the full report. For further information, contact the author.

Notes

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2. *Company* is defined as a business organization of one or more establishments under common ownership

TABLE 5. Funds expended for industrial R&D performed in the United States, by state, by source of funds: 2006
(Millions of dollars)

State	All R&D	Federal	Company and other	State	All R&D	Federal	Company and other
United States	247,669	24,304	223,365	Montana	103 i	14 i	89
Alabama	1,835	976	859	Nebraska	447	25	421
Alaska	49 e	9	40 e	Nevada	535	31	504
Arizona	3,590	182	3,407	New Hampshire	1,774 i	D	D
Arkansas	285	D	D	New Jersey	14,606	348	14,258
California	58,424	5,221	53,203	New Mexico	676	294	382 i
Colorado	4,657	169	4,487	New York	9,518	536	8,982
Connecticut	8,273	1,581	6,693	North Carolina	5,486	160	5,326
Delaware	1,446	23	1,423	North Dakota	120	D	D
District of Columbia	276	120	156 e	Ohio	6,852	549	6,303
Florida	4,139	1,113	3,026	Oklahoma	474	22	452
Georgia	2,786	147	2,639	Oregon	3,419	26 e	3,394
Hawaii	155	46	109	Pennsylvania	9,819	254	9,565
Idaho	625	9	616	Rhode Island	1,330 i	D	D
Illinois	10,765	201	10,564	South Carolina	1,396	59	1,337
Indiana	4,858	365	4,493	South Dakota	95	D	D
Iowa	1,055	11 e	1,044	Tennessee	1,428	107	1,321
Kansas	2,064 i	D	D	Texas	13,334	1,056	12,278
Kentucky	839	12 e	827	Utah	1,274	238	1,036
Louisiana	367	14 e	353	Vermont	360	26	334
Maine	253	18	235	Virginia	4,816	2,061	2,754
Maryland	3,421	930	2,491	Washington	11,320	176	11,143
Massachusetts	15,562	3,372 i	12,190	West Virginia	221	44	178
Michigan	16,477	210	16,266	Wisconsin	3,020	119	2,901
Minnesota	6,296	235	6,061	Wyoming	27 e	2 e	25 e
Mississippi	231	49	182	Undistributed funds ^a	3,814 i	369	3,445 i
Missouri	2,675	82	2,593				

D = data withheld to avoid disclosing operations of individual companies; e = more than 50% of the cell value is imputed due to raking of state data; i = more than 50% of the cell value is imputed.

^a Includes data reported on Form RD-1 not allocated to a specific state. Data reported on the Form RD-1A, the questionnaire sent to small companies or companies new to the survey, were allocated to the state in the address on the company's survey form, which is usually the company's headquarters.

NOTES: Detail may not add to totals because of rounding. Excludes data for federally funded research and development centers.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2006.

or control. All estimates from the survey are subject to both sampling and nonsampling errors (see technical notes in the annual reports at <http://www.nsf.gov/statistics/industry/>).

3. For more detailed information about the survey sample and methodology, see survey description at <http://www.nsf.gov/statistics/survey.cfm>.

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