



Business R&D Performance in the United States Tops \$300 Billion in 2012

by Raymond M. Wolfe¹

Companies spent \$302 billion on research and development performed in the United States during 2012, 2.8% more than the \$294 billion spent during 2011 (table 1). Funding from the companies' own sources was \$239 billion during 2011 and \$247 billion during 2012, a 3.6% increase; funding from other sources was \$55 billion in both years (table 1). Data for this InfoBrief are from the Business R&D and Innovation Survey (BRDIS), which was developed and cosponsored by the National Science Foundation and the U.S. Census Bureau.

R&D Performance, by Industrial Sector and Source of Funding

During 2012, companies in manufacturing industries performed \$208 billion (69%) of *domestic R&D*, defined as R&D performed in the 50 states and Washington, D.C. (table 2). Most of the funding was from companies' own funds (82%). Companies in nonmanufacturing industries performed \$94 billion of domestic R&D (31% of total domestic R&D performance), 82% of which was paid for from companies' own funds. The U.S. federal government was the chief source of *outside funding* (also referred to as *R&D paid for by others*) for R&D across all industries. Of the \$55 billion paid

TABLE 1. Funds spent for business R&D performed in the United States, by source of funds and size of company: 2011–12
(Millions of U.S. dollars)

Selected characteristic	2011	2012
Domestic R&D performance ^a	294,093	302,250
Source of funds		
Paid for by the company	238,768	247,280
Paid for by others	55,324	54,970
Federal	31,309 ⁱ	30,621 ⁱ
Other ^b	24,015	24,349
Size of company (number of domestic employees)		
5–24	10,981	9,841
25–49	10,861	7,195
50–99	9,468	9,182
100–249	12,528	12,480
250–499	12,955	11,264
500–999	10,027	11,484
1,000–4,999	50,485	50,691
5,000–9,999	24,951	30,483
10,000–24,999	49,214	49,493
25,000 or more	102,623	110,138

ⁱ = more than 50% of value imputed.

^a For companies located in the United States that performed or funded R&D.

^b Includes companies located inside and outside the United States, U.S. state government agencies and laboratories, foreign government agencies and laboratories, and all other organizations located inside and outside the United States.

NOTES: Detail may not add to total because of rounding. Excludes data for federally funded research and development centers. The Business R&D and Innovation Survey does not include companies with fewer than five employees.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Business R&D and Innovation Survey.

for by others, the federal government contributed \$31 billion, most of which came from the Department of

Defense (\$25 billion) (data not shown). Aerospace products and parts (North American Industry Classification

TABLE 2. Funds spent for business R&D performed in the United States, by source of funds and selected industry: 2011 and 2012
(Millions of U.S. dollars)

Industry and NAICS code	All R&D	Paid for by the company	Paid for by others					All other organizations ^b
			Total	Federal	Companies		All other organizations ^b	
					Domestic	Foreign ^a		
2011								
All industries, 21–33, 42–81 ^c	294,093	238,768	55,324	31,309 i	11,124	12,007	884	
Manufacturing industries, 31–33	201,361	163,340	38,021	24,698 i	4,196	8,870	257	
Chemicals, 325	55,324	49,988	5,337	110	1,320	3,867	40	
Pharmaceuticals and medicines, 3254	45,949	41,111	4,838	52	1,285	3,474	27	
Other 325	9,375	8,877	499	58	35	393	13	
Machinery, 333	14,709	13,578	1,131	522	423	D	D	
Computer and electronic products, 334	62,704	53,664	9,040	5,161	1,087	2,726	66	
Electrical equipment, appliance, and components, 335	3,595	3,417	178	76	24	74	4	
Transportation equipment, 336	40,880	20,275	20,605 i	D	1,086	D	D	
Automobiles, trailers, and parts, 3361–63	D	11,737	D	D	D	D	D	
Aerospace products and parts, 3364	26,054	7,585	18,469 i	17,806 i	592	D	D	
Other 336	D	D	D	D	D	D	D	
Manufacturing nec, other 31–33	24,149	22,418	1,730	D	256	D	D	
Nonmanufacturing industries, 21–23, 42–81	92,731	75,428	17,303	6,611	6,928	3,138	626	
Information, 51	41,865	41,014	851	D	321	D	D	
Software publishers, 5112	27,965	27,280	685	136	D	D	D	
Other 51	13,900	13,734	166	D	D	D	D	
Finance and insurance, 52	3,457	3,310	146	0	145	1	0	
Professional, scientific, and technical services, 54	38,219	23,368	14,851	5,848	6,227	2,213	563	
Computer systems design and related services, 5415	13,259	11,706	1,553	598	626	209	120	
Scientific R&D services, 5417	15,301	6,170	9,131	3,226	3,834	1,833	238	
Other 54	9,659	5,492	4,167	2,024	1,767	171	205	
Nonmanufacturing nec, other 21–23, 42–81	9,190	7,736	1,455	D	235	D	D	
2012								
All industries, 21–33, 42–81 ^c	302,250	247,280	54,970	30,621 i	11,624	12,093	632	
Manufacturing industries, 31–33	208,415	170,197	38,218	24,059 i	4,553	9,320	286	
Chemicals, 325	57,225	50,867	6,359	369 i	1,374	4,605	11	
Pharmaceuticals and medicines, 3254	48,146	42,594	5,552	57	1,337	4,153	5	
Other 325	9,079	8,273	807	312	37	452	6	
Machinery, 333	14,254	13,294	960	385	278	192	105	
Computer and electronic products, 334	65,068	56,677	8,391	4,852	1,248	2,167	124	
Electrical equipment, appliance, and components, 335	3,087	2,900	187	44 i	10 i	132	1	
Transportation equipment, 336	42,305	21,344	20,961 i	18,268 i	1,312	1,359	22	
Automobiles, trailers, and parts, 3361–63	D	13,191	D	D	558 i	D	D	
Aerospace products and parts, 3364	24,817	7,140	17,677 i	16,895 i	749	D	D	
Other 336	D	1,013	D	D	5	D	D	
Manufacturing nec, other 31–33	26,476	25,115	1,360	141	331	865	23	
Nonmanufacturing industries, 21–23, 42–81	93,835	77,083	16,752	6,562	7,071	2,773	346	
Information, 51	46,805	45,851	954	142	351	419	42	
Software publishers, 5112	28,745	28,012	733	103	256	367	7	
Other 51	18,060	17,839	221	39	95	52	35	
Finance and insurance, 52	3,519	3,507	12	0	11	2	0	
Professional, scientific, and technical services, 54	34,309	20,166	14,143	5,606	6,333	1,947	257	
Computer systems design and related services, 5415	11,251 i	9,163 i	2,088	1,449	435 i	180	24	
Scientific R&D services, 5417	16,544	6,788	9,756	2,596	5,512	1,540	108	
Other 54	6,514	4,215	2,299	1,561	386	227	125	
Nonmanufacturing nec, other 21–23, 42–81	9,202	7,559	1,643	814	376	405	48	

D = suppressed to avoid disclosure of confidential information; i = more than 50% of value imputed.

NAICS = North American Industry Classification System; nec = not elsewhere classified.

^a Includes foreign parent companies of U.S. subsidiaries.

^b Includes U.S. state government agencies and laboratories, foreign agencies and laboratories, and all other organizations located inside and outside the United States.

^c Includes companies located in the United States that performed or funded R&D.

NOTES: Detail may not add to total because of rounding. Industry classification was based on dominant business code for domestic R&D performance, where available. For companies that did not report business codes, the classification used for sampling was assigned. Excludes data for federally funded research and development centers.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Business R&D and Innovation Survey.

System [NAICS] code 3364), professional, scientific, and technical services (NAICS 54), and computer and electronic products (NAICS 334) received 89% of federal government R&D funding. Next among outside funders were foreign companies (\$12 billion), including foreign parent companies of U.S. subsidiaries, and other U.S. companies (\$11 billion) (table 2) (see “Survey Information and Data Availability” for information on industry classification).

Sales, R&D Intensity, and Employment of R&D Performers

U.S. companies that performed or funded R&D reported domestic net sales of \$9 trillion in 2012 (table 3).² For all industries, the *R&D intensity* (ratio of domestic R&D performance to domestic net sales) was 3.3%; for manufacturers, 3.8%; and for nonmanufacturers, 2.5%. Manufacturing industries with high levels of R&D intensity in 2012 were pharmaceuticals and medicines (NAICS 3254) (12.7%), aerospace products and parts (NAICS 3364) (10.1%), and computer and electronic products (NAICS 334) (9.8%). Among the nonmanufacturing industries, industries with high levels of R&D intensity were scientific R&D services (NAICS 5417) (23.2%), software publishers (NAICS 5112) (9.9%), and computer systems design and related services (NAICS 5415) (9.3%).

Businesses that performed or funded R&D employed 18.3 million people in the United States during 2012. Some 1.5 million (8.0%) were R&D employees.³ Not surprisingly, industries with high levels of R&D intensity also had high numbers of R&D employees in 2012: computer and electronic products (NAICS 334) (267,000 R&D employees), pharmaceuticals and medicines (NAICS 3254) (114,000), and

aerospace products and parts (NAICS 3364) (73,000). Nonmanufacturing industries with high numbers of R&D employees were software publishers (NAICS 5112) (146,000), computer systems design and related services (NAICS 5415) (101,000), and scientific R&D services (NAICS 5417) (75,000) (table 3).

R&D Performance, by Company Size

Small companies (from 5 to 499 domestic employees) performed 17% of the nation’s total business R&D in 2012 (table 1). In these companies, the R&D intensity was 4.7%, compared with 3.1% for all other companies (tables 1 and 3). Small companies accounted for 11% of sales and employed 17% of 18.3 million who worked for R&D-performing or R&D-funding companies. Of the 1.5 million R&D employees engaged in business R&D in the United States, 30% worked for small companies. By contrast, mid-size companies (from 500 to 24,999 domestic employees) performed 47% of the nation’s total business R&D in 2012, and their R&D intensity was 3.2%. They accounted for 49% of sales and employed 41% of those who worked for R&D-performing or R&D-funding companies, including 43% of R&D employees in the United States. The largest companies (25,000 or more domestic employees) performed 36% of the nation’s total business R&D in 2012, and their R&D intensity was 3.0%. The largest companies employed 42% of those who worked for R&D-performing or R&D-funding companies, including 27% of R&D employees in the United States.

R&D Performance, by State

Business R&D is concentrated in a relatively small number of states. During 2012, companies reported \$247 billion of domestic R&D paid for by

the company. Businesses in California alone accounted for 28.1% of this amount in 2012 (table 4). Other states with large amounts of company-funded business R&D, as reflected by the percentages of the national total they accounted for in 2012, were Illinois (4.8%), Massachusetts (5.7%), Michigan (5.4%), New Jersey (5.6%), New York (3.6%), Pennsylvania (3.5%), Texas (5.2%), and Washington (5.5%).

Survey Information and Data Availability

The sample for BRDIS was selected to represent all for-profit, nonfarm companies that are publicly or privately held and have five or more employees in the United States. Estimates produced from the survey and presented in this InfoBrief are restricted to companies that perform or fund R&D, either domestically or abroad. Because the statistics from the survey are based on a sample, they are subject to both sampling and nonsampling errors (see technical notes in the detailed statistical tables at <http://www.nsf.gov/statistics/industry/>).

In this InfoBrief, money amounts are expressed in current U.S. dollars and are not adjusted for inflation. Company is defined as a business organization located in the United States, either U.S. owned or a U.S. affiliate of a foreign parent, of one or more establishments under common ownership or control that performs or funds R&D.

For 2011, a total of 43,108 companies were sampled, representing 1,964,799 companies; for 2012, a total of 43,655 companies were sampled, representing 1,971,731 companies. The actual numbers of companies in the sample that remained within the scope of the survey between sample selection and tabulation were 39,624 for 2011 and 39,744 for 2012. These lower counts represent the number of companies

TABLE 3. Sales and employment for companies that performed or funded business R&D, by selected industry and company size: 2012

Industry and NAICS code	Domestic net sales (US\$millions) ^a	R&D intensity (%) ^b	Domestic employment (thousands) ^c	
			Total	R&D ^d
All industries, 21–33, 42–81 ^e	9,233,431	3.3	18,294	1,469
Manufacturing industries, 31–33	5,529,851	3.8	9,988	886
Chemicals, 325	1,345,922	4.3	1,473	162
Pharmaceuticals and medicines, 3254	380,151	12.7	539	114
Other 325	965,771	0.9	934	48
Machinery, 333	388,468	3.7	922	89
Computer and electronic products, 334	661,029	9.8	1,439	267
Electrical equipment, appliance, and components, 335	111,858	2.8	325	25
Transportation equipment, 336	910,357	4.6	1,611	147
Automobiles, trailers, and parts, 3361–63	598,284	D	794	64
Aerospace products and parts, 3364	246,598	10.1	615	73
Other 336	65,475	D	202	10
Manufacturing nec, other 31–33	2,112,217	1.3	4,218	196
Nonmanufacturing industries, 21–23, 42–81	3,703,580	2.5	8,306	583
Information, 51	1,054,016	4.4	2,050	225
Software publishers, 5112	291,711	9.9	470	146
Other 51	762,305	2.4	1,580	79
Finance and insurance, 52	939,993	0.4	1,323	26
Professional, scientific, and technical services, 54	341,527	10.0	1,269	248
Computer systems design and related services, 5415	120,944	9.3	509	101
Scientific R&D services, 5417	71,332	23.2	208	75
Other 54	149,251	4.4	552	72
Nonmanufacturing nec, other 21–23, 42–81	1,368,044	0.7	3,664	84
Size of company (number of domestic employees)				
5–24	134,492	7.3	472	111
25–49	146,110	4.9	455	70
50–99	154,149	6.0	542	77
100–249	352,975	3.5	993	101
250–499	271,839	4.1	738	79
500–999	330,036	3.5	755	67
1,000–4,999	1,231,026	4.1	2,583	226
5,000–9,999	1,176,198	2.6	1,557	138
10,000–24,999	1,742,153	2.8	2,590	198
25,000 or more	3,694,455	3.0	7,608	401

D = suppressed to avoid disclosure of confidential information; i = more than 50% of value imputed.

NAICS = North American Industry Classification System; nec = not elsewhere classified.

^a Includes domestic net sales of companies that perform or fund R&D, transfers to foreign subsidiaries, and export sales to foreign companies; excludes intracompany transfers and sales by foreign subsidiaries.

^b R&D intensity is domestic R&D paid for by the company and others and performed by the company divided by domestic net sales.

^c Data recorded on 12 March represent employment figures for the year.

^d Includes scientists and engineers and their managers and also technicians, technologists, and support staff.

^e Includes companies located in the United States that performed or funded R&D.

NOTES: Detail may not add to total because of rounding. Industry classification was based on dominant business code for domestic R&D performance, where available. For companies that did not report business codes, classification used for sampling was assigned. Excludes data for federally funded research and development centers. The Business R&D and Innovation Survey does not include companies with fewer than five employees.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Business R&D and Innovation Survey, 2012.

TABLE 4. Funds spent for business R&D performed in the United States, by source of funds and state: 2012
(Millions of U.S. dollars)

State	All R&D	Paid for by the company	Paid for by others	State	All R&D	Paid for by the company	Paid for by others
United States ^a	302,250	247,280	54,970	Montana	105 i	81	24 i
Alabama	1,284	779	505	Nebraska	578	539	39
Alaska	39 e	23 e	16 e	Nevada	634	552	83
Arizona	4,962	3,864	1,098	New Hampshire	1,857	796	1,060
Arkansas	305	275	30	New Jersey	15,810	13,854	1,956
California	81,689	69,493	12,196	New Mexico	445	242	203
Colorado	4,105	3,462	643	New York	11,732	8,831	2,900 i
Connecticut	7,343	5,527	1,815	North Carolina	6,254	5,143	1,111
Delaware	2,415	1,866	549	North Dakota	222	202	20
District of Columbia	260	153 i	107	Ohio	7,755	5,402	2,353 i
Florida	5,211	3,353	1,858 i	Oklahoma	463	406	57 i
Georgia	3,875	3,295	580 i	Oregon	5,156 i	4,873 i	282
Hawaii	188	130	58	Pennsylvania	9,318	8,683	635
Idaho	1,079	833	246	Rhode Island	450	408	42
Illinois	13,001	11,769	1,232	South Carolina	1,615	1,206	409 i
Indiana	6,044	5,223	821	South Dakota	112	94	18
Iowa	1,763	1,186	577	Tennessee	1,437	1,118	320
Kansas	2,072	1,446	626	Texas	15,163	12,859	2,305 i
Kentucky	1,074	772	302	Utah	2,134	1,546	588 i
Louisiana	363 i	282	80 i	Vermont	466 i	425 i	41
Maine	275	236	39	Virginia	4,756	2,356	2,400 i
Maryland	4,028	1,929	2,099	Washington	14,494	13,678	815 i
Massachusetts	17,491	14,157	3,334	West Virginia	305	257	48
Michigan	14,912	13,460	1,452	Wisconsin	4,135	3,654	481
Minnesota	6,216	5,616	600	Wyoming	30 e	23 e	7 e
Mississippi	273	219	54	Undistributed funds ^b	9,580	7,423	2,157
Missouri	6,982 i	3,282	3,700 i				

e = more than 50% of the cell value is imputed due to raking of state data; i = more than 50% of value is imputed due to reasons other than ranking of state data.

^a Includes companies located in the United States that performed or funded R&D.

^b Includes data reported on Form BRDI-1 not allocated to a specific state. Data reported on Form BRD-1(S), 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, National Center for Science and Engineering Statistics, Business R&D and Innovation Survey, 2012.

that were determined to be within the scope of the survey after all data collected were processed. Reasons for the reduced counts include mergers, acquisitions, and instances where companies had gone out of business in the interim. Of these in-scope companies, 71.5% were considered to have met the criteria for a complete response to the 2011 survey; 77.1% met the 2012 survey response criteria. Industry classification was based on the domi-

nant business activity for domestic R&D performance, where available. For reporting units that did not report business activity codes for R&D, the classification used for sampling was assigned.

The full set of detailed tables from this survey will be available in the report *Business R&D and Innovation: 2012* (<http://www.nsf.gov/statistics/industry/>). Individual detailed tables

and tables with relative standard errors and imputation rates from the 2012 survey may be available in advance of the full report. For further information, contact Raymond M. Wolfe.

Notes

1. Raymond M. Wolfe, Research and Development Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 4201 Wilson Boulevard,

Suite 965, Arlington, VA 22230
(rwolfe@nsf.gov; 703-292-7789).

2. Determining the amount of *domestic net sales and operating revenues* was left to the reporting company; however, guidance was given to exclude intra-

company transfers and sales by foreign subsidiaries but to include transfers to foreign subsidiaries and export sales to foreign companies.

3. Employment statistics in this Info-Brief are head counts. Full-time equiva-

lent statistics are available in the detailed statistical tables. R&D employees include scientists and engineers, their managers, and the technicians, technologists, and support staff members who work on R&D or who provide direct support to R&D activities.

NSF 15-303

RETURN THIS COVER SHEET TO ROOM P35 IF YOU
DO NOT WISH TO RECEIVE THIS MATERIAL OR
IF CHANGE OF ADDRESS IS NEEDED INDICATE
CHANGE INCLUDING ZIP CODE ON THE LABEL (DO
NOT REMOVE LABEL).

National Science Foundation
ARLINGTON, VA 22230
OFFICIAL BUSINESS