



Businesses Spent \$341 Billion on R&D Performed in the United States in 2014

by Raymond M. Wolfe¹

Business research and development performance in the United States reached \$341 billion in 2014, a 5.6% increase over the \$323 billion spent in 2013 (table 1). Funding from the companies' own sources was \$283 billion in 2014, a 6.7% increase from the \$265 billion spent in 2013. Funding from other sources was \$58 billion in both years (table 1). Data for this InfoBrief are from the Business R&D and Innovation Survey (BRDIS), which was developed and is cosponsored by the National Science Foundation and the Census Bureau.

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

In 2014, of the \$341 billion companies spent on R&D, \$22 billion (6%) was spent on basic research, \$53 billion (16%) on applied research, and \$265 billion (78%) on development. The distribution was unchanged from 2013 (table 1). In 2014, companies in manufacturing industries performed \$233 billion (68%) 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 these companies' own funds (83%). Companies in nonmanufacturing industries performed \$108 billion of domestic

R&D (32% of total domestic R&D performance), 84% of which was paid for from companies' own funds.

The U.S. federal government was the chief source of *external funding for R&D* (also referred to as *R&D paid for by others*) across all industries. Of the \$58 billion paid for by others, the federal government accounted for \$27 billion, most of which came from the Department of Defense (\$19 billion) (data available in full set of detailed tables). Ninety-two percent of federal government funding went toward aerospace products and parts (North American Industry Classification System [NAICS] code 3364), professional, scientific, and technical services (NAICS 54), and computer and electronic products (NAICS 334). Next among external funders were foreign companies (\$17 billion)—including foreign parent companies of U.S. subsidiaries—and other U.S. companies (\$13 billion) (table 2). (See “Survey Information and Data Availability” for information on industry classification.)

R&D Performance, by Company Size

Small- and medium-sized companies (5 to 499 domestic employees) performed 16% of the nation's total business R&D

in 2014 (table 1). In these companies, the R&D-to-sales ratio (or R&D intensity) was 5.0%, compared with 3.5% for all companies overall (tables 1 and 3). These companies accounted for 11% of sales, employed 14% of the 21.5 million who worked for R&D-performing or R&D-funding companies, and employed 28% of the 1.5 million R&D employees engaged in business R&D in the United States.

By contrast, companies with 500 to 24,999 domestic employees performed 48% of the nation's total business R&D in 2014, and their R&D intensity was 3.6%. They accounted for 47% of sales, employed 41% of those who worked for R&D-performing or R&D-funding companies, and employed 46% 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 2014, and their R&D intensity was 3.0%. They accounted for 42% of sales, employed 45% of those who worked for R&D-performing or R&D-funding companies, and employed 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.

TABLE 1. Funds spent for business R&D performed in the United States, by type of R&D, source of funds, and size of company: 2013–14
(Millions of U.S. dollars)

Selected characteristic and company size	2013	2014
Domestic R&D performance	322,528	340,728
Type of R&D ^a		
Basic research	19,508	21,936
Applied research	51,014	53,415
Development	252,007	265,377
Paid for by the company ^b	264,913	282,570
Basic research	15,275	16,107
Applied research	38,105	39,012
Development	211,532	227,451
Paid for by others	57,615	58,158
Basic research	4,233	5,829
Applied research	12,908	14,403
Development	40,475	37,927 i
Source of funds		
Federal	29,362 i	26,554 i
Other ^c	28,253	31,604
Size of company (number of domestic employees)		
5–9	3,402 i	3,295 i
10–24	6,895	7,177 i
25–49	7,941	8,428 i
50–99	8,910	10,178 i
100–249	13,666	13,492
250–499	12,189	12,203
500–999	12,002	13,262
1,000–4,999	55,517	57,551
5,000–9,999	31,514	38,202
10,000–24,999	51,218	54,445
25,000 or more	119,275	122,495

i = more than 50% of value imputed.

^a R&D is planned, creative work aimed at discovering new knowledge or developing new or significantly improved goods and services. This includes (1) activities aimed at acquiring new knowledge or understanding without specific immediate commercial applications or uses (basic research), (2) activities aimed at solving a specific problem or meeting a specific commercial objective (applied research), and (3) systematic use of research and practical experience to produce new or significantly improved goods, services, or processes (development).

^b Includes foreign subsidiaries of U.S. companies.

^c 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. Statistics are representative of companies located in the United States that performed or funded R&D. 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.

In 2014, companies reported \$283 billion of domestic R&D paid for by the company. Businesses in California alone accounted for 30% of this amount (table 4). Other states with large amounts of business R&D paid for by companies' own funds in 2014, as reflected by the percentages of the national total they accounted for, were Massachusetts (6%), Michigan (5%), Washington (5%), Texas (5%), Illinois (4%), New Jersey (4%), New York (4%), and Pennsylvania (3%).

Sales, R&D Intensity, and Employment of Companies that Performed or Funded R&D

U.S. companies that performed or funded R&D reported domestic net sales of \$10 trillion in 2014 (table 3).² For all industries, the R&D intensity was 3.5%; for manufacturers, 4.1%; and for nonmanufacturers, 2.7%. Manufacturing industries with high levels of R&D intensity in 2014 were pharmaceuticals and medicines (NAICS 3254) (13.4%), computer and electronic products (NAICS 334) (10.2%), and aerospace products and parts (NAICS 3364) (7.1%). Among the nonmanufacturing industries, industries with high levels of R&D intensity were scientific R&D services (NAICS 5417) (22.7%), computer systems design and related services (NAICS 5415) (9.2%), and information (NAICS 51) (5.8%).

Businesses that performed or funded R&D employed 21.5 million people in the United States in 2014. Approximately 1.5 million (7.0%) were R&D employees.³ Not surprisingly, industries with high levels of R&D intensity also had high numbers of R&D employees in 2014: computer and electronic

TABLE 2. Funds spent for business R&D performed in the United States, by source of funds and selected industry: 2014
(Millions of U.S. dollars)

Industry, NAICS code, and company size	All R&D	Paid for by the company ^a	Paid for by others				
			Total	Federal	Companies		All other organizations ^c
					Domestic	Foreign ^b	
All industries, 21–33, 42–81	340,728	282,570	58,158	26,554	13,227	17,246	1,131
Manufacturing industries, 31–33	232,815	192,160	40,655	21,303	5,062	13,573	717
Chemicals, 325	66,301	56,488	9,813	404	1,660	7,674	75
Pharmaceuticals and medicines, 3254	56,612	47,646	8,966	272	1,600	7,022	72
Other 325	9,689	8,842	847	132	60	652	3
Machinery, 333	12,128	11,458	670	78	199 i	385 i	8 i
Computer and electronic products, 334	73,891	64,695	9,195	4,456	1,467	3,028	244
Electrical equipment, appliance, and components, 335	4,365	4,178	187 i	48 i	15 i	117 i	7 i
Transportation equipment, 336	46,746	27,261	19,485 i	16,153 i	1,398	1,666	268 i
Automobiles, trailers, and parts, 3361–63	18,404	15,900	2,504	254 i	625	1,619	6
Aerospace products and parts, 3364	26,181 i	10,300	15,881 i	14,826 i	747	47	261 i
Other 336	2,161	1,061	1,100	1,073	26	0	1
Manufacturing nec, other 31–33	29,384	28,080	1,305	164	323	703	115
Nonmanufacturing industries, 21–23, 42–81	107,913	90,409	17,504	5,251	8,165	3,673 i	415 i
Information, 51	63,773	62,296	1,477	162	517	775	23
Software publishers, 5112	36,052	34,781	1,270	99	463	707	1
Other 51	27,721	27,515	207	63	54	68	22
Finance and insurance, 52	4,122	4,090	32	0	D	0	D
Professional, scientific, and technical services, 54	30,975 i	16,061 i	14,914	5,016	7,189	2,391 i	318 i
Computer systems design and related services, 5415	11,019 i	8,644 i	2,375 i	471 i	690 i	1,095 i	119 i
Scientific R&D services, 5417	12,807	2,668	10,139	2,954	6,105	941	139
Other 54	7,149	4,749	2,400	1,591	394	355	60
Nonmanufacturing nec, other 21–23, 42–81	9,043	7,962	1,081	73	D	507	D
Size of company (number of domestic employees)							
5–9	3,295 i	2,426 i	868 i	318 i	353 i	103 i	94 i
10–24	7,177 i	5,506 i	1,671 i	617 i	752 i	244	58 i
25–49	8,428 i	6,237 i	2,191 i	528	394 i	1,244 i	25 i
50–99	10,178 i	7,526	2,652 i	480	753 i	1,339 i	80 i
100–249	13,492	11,006	2,486	950	726	699	111
250–499	12,203	10,188	2,015	507	568	863	77
500–999	13,262	11,736	1,525	247	364 i	887	27
1,000–4,999	57,551	47,807	9,744	1,336	2,430 i	5,914	64
5,000–9,999	38,202	30,680	7,522	992 i	3,692	2,773	65
10,000–24,999	54,445	46,904	7,542	3,724	1,187	2,593	38
25,000 or more	122,495	102,555	19,941 i	16,858 i	2,008	588	487 i

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 subsidiaries of U.S. companies (\$5.3 billion).

^b Includes foreign parent companies of U.S. subsidiaries (\$13.4 billion) and unaffiliated companies (\$3.8 billion).

^c Includes U.S. state government agencies and laboratories (\$0.1 billion), foreign government agencies and laboratories (\$0.4 billion), and all other organizations located inside (\$0.5 billion) and outside the United States (\$0.1 billion).

NOTES: Detail may not add to total because of rounding. Statistics are representative of companies located in the United States that performed or funded R&D. 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. 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, 2014.

TABLE 3. Sales, R&D intensity, and employment for companies that performed or funded business R&D, by selected industry and company size: 2014

Industry, NAICS code, and company size	Domestic net sales (US\$millions) ^a	R&D intensity (%) ^b	Domestic employment (thousands) ^c	
			Total	R&D ^d
All industries, 21–33, 42–81	9,754,470	3.5	21,540	1,514
Manufacturing industries, 31–33	5,743,154	4.1	10,645	914
Chemicals, 325	1,355,762	4.9	1,753	172
Pharmaceuticals and medicines, 3254	423,380	13.4	543	122
Other 325	932,382	1.0	1,210	50
Machinery, 333	D	D	899	75
Computer and electronic products, 334	727,065	10.2	1,488	273
Electrical equipment, appliance, and components, 335	155,531	2.8	369	33
Transportation equipment, 336	1,143,014	4.1	1,858	167
Automobiles, trailers, and parts, 3361–63	711,564	2.6	933	94
Aerospace products and parts, 3364	371,259	7.1	753	61
Other 336	60,191	3.6	172	12
Manufacturing nec, other 31–33	D	D	4,278	194
Nonmanufacturing industries, 21–23, 42–81	4,011,316	2.7	10,896	600
Information, 51	1,103,940	5.8	2,236	296
Software publishers, 5112	D	D	613	163
Other 51	D	D	1,623	133
Finance and insurance, 52	609,972	0.7	1,216	24
Professional, scientific, and technical services, 54	435,030	7.1	1,713	223
Computer systems design and related services, 5415	120,189	9.2	441	77
Scientific R&D services, 5417	56,382	22.7	225	71
Other 54	258,459	2.8	1,047	75
Nonmanufacturing nec, other 21–23, 42–81	1,862,374	0.5	5,731	57
Size of company (number of domestic employees)				
5–9	32,734	10.1	118	27
10–24	81,680	8.8	309	66
25–49	141,781	5.9	431	69
50–99	189,422	5.4	573	81
100–249	362,909	3.7	953	100
250–499	289,020	4.2	710	76
500–999	378,580	3.5	822	70
1,000–4,999	1,274,714	4.5	2,593	254
5,000–9,999	895,882	4.3	1,524	150
10,000–24,999	2,047,688	2.7	3,848	219
25,000 or more	4,060,062	3.0	9,659	403

D = suppressed to avoid disclosure of confidential information.

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

^a Includes domestic net sales of companies that performed or funded R&D. Includes 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 of companies that performed or funded R&D.

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

^d Includes researchers, R&D managers, technicians, clerical staff, and others assigned to R&D groups.

NOTES: Detail may not add to total because of rounding. Sales, R&D intensity, and total domestic employment statistics are representative of companies located in the United States that performed or funded R&D; R&D employment statistics are representative of companies located in the United States that performed R&D. 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. 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, 2014.

TABLE 4. Funds spent for business R&D performed in the United States, by state and source of funds: 2014
(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	340,728	282,570	58,158	Montana	205	188	17 e
Alabama	1,961	1,299	662	Nebraska	590	543	46 e
Alaska	57 e	37 e	20	Nevada	631	576	55 e
Arizona	5,499	4,307	1,191	New Hampshire	2,041	869	1,171
Arkansas	317	277	41	New Jersey	13,743	11,027	2,716
California	98,488	85,750	12,738 i	New Mexico	499	270	228
Colorado	4,551	3,829	723	New York	13,818	10,794	3,024 i
Connecticut	9,093	6,819	2,274	North Carolina	8,091	6,125	1,966 i
Delaware	2,520	1,839 i	681	North Dakota	271	247	24
District of Columbia	338	183	154	Ohio	8,945	6,137	2,808
Florida	5,783	3,877	1,906 i	Oklahoma	607	543	64 e
Georgia	4,635	3,843	791 i	Oregon	6,434	6,160	275
Hawaii	196	138 i	58	Pennsylvania	10,816	9,635	1,181 i
Idaho	1,448	1,223	225	Rhode Island	542	479	63
Illinois	12,371	11,196	1,175	South Carolina	1,089	936	153
Indiana	5,901	5,015	887	South Dakota	135	121	14 e
Iowa	2,098	1,513	585	Tennessee	1,586	1,365	221
Kansas	1,934	1,325	609	Texas	16,373	13,674	2,700
Kentucky	1,158	768	391	Utah	2,809	2,275	533 i
Louisiana	386	299	87 i	Vermont	302	259	43
Maine	373	308	65	Virginia	4,994 i	2,877	2,116 i
Maryland	5,124	3,445	1,679	Washington	15,699	15,195	504
Massachusetts	21,105	17,101	4,004	West Virginia	279	252	28 i
Michigan	17,077	15,421	1,656	Wisconsin	4,287	3,677	610
Minnesota	6,975	6,403	571	Wyoming	59	44	15
Mississippi	269	198	71	Undistributed funds ^a	9,506	7,852	1,654
Missouri	6,720 i	4,037	2,683 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 raking of state data.

^a Includes data reported on Form BRDI-1 not allocated to a specific state, as well as data reported on Form BRD-1(S) by multi-establishment companies. For single-establishment companies, data reported on Form BRD-1(S) were allocated to the state in the address used to mail the survey form.

NOTES: Detail may not add to totals because of rounding. Statistics are representative of companies located in the United States that performed or funded R&D. 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, 2014.

products (NAICS 334) (273,000 R&D employees), pharmaceuticals and medicines (NAICS 3254) (122,000), and aerospace products and parts (NAICS 3364) (61,000). Nonmanufacturing industry groups with high numbers of R&D employees were software publishers (NAICS 5112) (163,000), computer systems design and related services (NAICS 5415) (77,000), and

scientific R&D services (NAICS 5417) (71,000) (table 3).

Capital Expenditures

Companies that performed R&D in the United States in 2014 spent \$638 billion on assets with expected useful lives of more than 1 year (table 5). Of this amount, \$28 billion (4.4%) was spent on structures, equipment, soft-

ware, and other assets used for R&D: \$17 billion by manufacturers and \$10 billion by companies in nonmanufacturing industries. Manufacturing industry groups with high levels of capital expenditures on assets used for R&D in 2014 were semiconductor and other electronic products (NAICS 3344) (\$3.5 billion), pharmaceuticals and medicines (NAICS 3254) (\$2.8

TABLE 5. Capital expenditures in the United States and for domestic R&D paid for and performed by the company, by type of expenditure, by industry and company size: 2014
(Millions of U.S. dollars)

Selected industry, NAICS code, and company size	Total ^a	Used for domestic R&D				
		Total ^{a,b}	Structures ^c	Equipment	Capitalized software	All other and undistributed ^d
All industries, 21–33, 42–81	638,268	27,775	2,599	11,564	6,094 i	7,518
Manufacturing industries, 31–33	261,798	17,465	2,049	8,833	1,602 i	4,981
Pharmaceuticals and medicines, 3254	16,560	2,801	700	1,371	247 i	483
Communication equipment, 3342	7,196 i	1,097 i	205	469	63 i	360 i
Semiconductor and other electronic products, 3344	13,632 i	3,461 i	75 i	1,914 i	353 i	1,119 i
Automobiles, bodies, trailers, and parts, 3361–63	34,055 i	1,192	112	452	173 i	455
Aerospace products and parts, 3364	19,912	1,181	297	765	37 i	82
Manufacturing nec, other 31–33	170,443	7,733	660	3,862	729 i	2,482
Nonmanufacturing industries, 21–23, 42–81	376,470	10,310	550	2,731	4,492 i	2,537
Software publishers, 5112	11,327	1,794	250	1,098	210 i	236
Telecommunications services, 517	73,536	1,508	*	390 i	843 i	274
Computer systems design and related services, 5415	7,773 i	1,227 i	10	128	302 i	787 i
Nonmanufacturing nec, other 21–23, 42–81	283,834	5,781	290	1,115	3,137 i	1,239
Size of company (number of domestic employees)						
5–499	78,069 i	5,396 i	329	1,642	449 i	2,976 i
500–999	16,090	1,097	70	451	193 i	383
1,000–4,999	77,535 i	4,254	588	1,658	1,034 i	974
5,000–9,999	56,588	2,839	354	1,472	486 i	527
10,000–24,999	166,934 i	4,875	495	1,518	1,372 i	1,490
25,000 or more	243,052	9,313	764	4,823	2,559 i	1,167

* = amount < \$500,000; i = more than 50% of value imputed.

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

^a Capital expenditures are payments by a business for assets that usually have a useful life of more than 1 year. The value of assets acquired or improved through capital expenditures is recorded on a company's balance sheet. BRDIS statistics exclude the cost of purchased land and assets acquired through mergers and acquisitions.

^b Capital expenditures for long-lived assets used in a company's R&D operations are not included in its R&D expense, but any depreciation recorded for those assets is included in its R&D expense. For 2014, depreciation associated with domestic R&D performed and paid for by the company was \$10.9 billion and with domestic R&D performed by the company and paid for by others was \$1.2 billion.

^c Includes the cost of purchased or improved buildings and other facilities that are fixed to the land.

^d Includes the cost of other capital expenditures, including purchased patents and other intangible assets, and expenditures not distributed among the categories shown.

NOTES: Detail may not add to total because of rounding. Statistics are representative of companies located in the United States that performed R&D. 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. 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, 2014.

billion), automobiles, bodies, trailers, and parts (NAICS 3361–63) (\$1.2 billion), and aerospace products and parts (NAICS 3364) (\$1.2 billion). Among the nonmanufacturing industries were software publishers (NAICS 5112) (\$1.8 billion), telecommunications services (NAICS 517) (\$1.5 billion), and computer systems design and related services (NAICS 5415) (\$1.2 billion).

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 domesti-

cally 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 2013, a total of 45,089 companies were sampled to represent the population of 1,971,959 companies; for 2014, a total of 44,162 companies were sampled, representing 1,998,858 companies. The actual numbers of reporting units in the sample that remained within the scope of the survey between sample selection and tabulation were 41,588 for 2013 and 40,953 for 2014. These lower counts represent the number of reporting units 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 fewer than five paid employees in the United States or had gone out of busi-

ness in the interim. Of these in-scope reporting units, 73.6% were considered to have met the criteria for a complete response to the 2013 survey; 72.5% met the 2014 survey response criteria. Industry classification was based on the dominant 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: 2014* (<http://www.nsf.gov/statistics/industry/>). Individual detailed tables and tables with relative standard errors and imputation rates from the 2014 survey will 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,

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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 InfoBrief are head counts. Full-time equivalent 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.

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