



Business R&D Performance in the United States Reached \$400 Billion in 2017, a 6.8% Increase from 2016

by Raymond M. Wolfe¹

Businesses spent \$400 billion on research and development performance in the United States in 2017, a 6.8% increase from 2016 (table 1). Funding from the companies' own sources was \$339 billion in 2017, a 6.7% increase from 2016. Funding from other sources was \$61 billion in 2017 and \$57 billion in 2016. Data for this InfoBrief are from the 2016 Business R&D and Innovation Survey (BRDIS) and the 2017 Business Research and Development Survey (BRDS), both developed and cosponsored by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation and by the U.S. Census Bureau.²

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

In 2017, of the \$400 billion companies spent on R&D, \$25 billion (6%) was spent on basic research, \$62 billion (16%) on applied research, and \$313 billion (78%) on development. The distribution was similar to the 2016 distribution (7%, 16%, and 77%, respectively) (table 1). In 2017, companies in manufacturing industries performed \$257 billion (64%) of *domestic R&D*, defined as R&D performed in the 50 states and Washington, DC (table 2).

Most of the funding was from these companies' own funds (84%). Companies in nonmanufacturing industries performed \$143 billion of domestic R&D (36% of total domestic R&D performance), 86% 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 \$61 billion paid for by others, the federal government accounted for \$24 billion, most of which came from the Department of Defense (\$17 billion) (data available in the full set of data tables). Ninety-seven percent of federal government funding went toward transportation equipment (North American Industry Classification System [NAICS] code 336) (\$14 billion), professional, scientific, and technical services (NAICS 54) (\$5 billion), and computer and electronic products (NAICS 334) (\$4 billion). Next among external funders were foreign companies (\$18 billion)—including foreign parent companies of U.S. subsidiaries—and other U.S. companies (\$17 billion) (table 2). (See “Survey Information and Data Availability” for information on the availability of data tables with full industry detail.)

R&D Performance, by Company Size

Small- and medium-sized companies (10 to 249 domestic employees) performed 10% of the nation's total business R&D in 2017 (table 1).³ In these companies, the R&D-to-sales ratio (or R&D intensity) was 8.3% (table 1 and table 3). These companies accounted for 5% of sales and employed 7% of the 19.9 million employees who worked for R&D-performing or R&D-funding companies. They employed 18% of the 1.6 million employees engaged in business R&D in the United States.

Large companies with 250 to 24,999 domestic employees performed 53% of the nation's total business R&D in 2017, and their R&D intensity was 4.5%. They accounted for 48% of sales, employed 45% of those who worked for R&D-performing or R&D-funding companies, and employed 55% of R&D employees in the United States.

The largest companies (25,000 or more domestic employees) performed 37% of the nation's total business R&D in 2017, and their R&D intensity was 3.3%. They accounted for 47% of sales, employed 48% of those who worked for R&D-performing or R&D-funding

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: 2016–17
(Millions of U.S. dollars)

Selected characteristic and company size	2016	2017
Domestic R&D performance ^a	374,685	400,100
Type of R&D ^b		
Basic research	24,644	24,829
Applied research	61,020	62,132
Development	289,021	313,139
Paid for by the company ^c	317,731	339,036
Basic research	19,143	18,732
Applied research	48,806	49,149
Development	249,782	271,155
Paid for by others	56,954	61,065
Basic research	5,501	6,097
Applied research	12,213	12,984
Development	39,239	41,984
Source of funds		
Federal	23,772	24,277 ⁱ
Other ^d	33,182	36,788
Size of company (number of domestic employees)		
Micro companies ^e		
5–9	1,581 ⁱ	NA
Small companies ^f		
10–19	4,958 ⁱ	3,311
20–49	9,662 ⁱ	9,435
Medium companies		
50–99	9,298	10,141
100–249	14,875	17,216
Large companies		
250–499	13,092	14,103
500–999	14,450	17,871
1,000–4,999	63,971	65,112
5,000–9,999	40,633	40,198
10,000–24,999	65,594	73,485
25,000 or more	136,571	149,227

ⁱ = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NA = not available.

^a Domestic R&D performance is the cost of R&D paid for by the respondent company and others outside of the company and performed by the company.

^b R&D is planned, creative work aimed at discovering new knowledge or devising new applications of available knowledge. 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 and resulting in additional knowledge, which is directed to producing new or improved goods, services, or processes (development).

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

^d Includes companies located inside and outside the United States; U.S. state government agencies and laboratories; U.S. universities, colleges, and academic researchers; and all other organizations located inside and outside the United States.

^e The Business R&D and Innovation Survey did not include companies with fewer than five domestic employees.

^f The Business Research and Development Survey does not include companies with fewer than ten domestic employees.

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.

SOURCE: National Center for Science and Engineering Statistics, National Science Foundation, and U.S. Census Bureau, Business R&D and Innovation Survey and Business Research and Development Survey.

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. In 2017, companies reported \$339 billion of domestic R&D paid for by the company. Businesses in California alone accounted for 35% of this amount (table 4). Other states with large amounts of business R&D paid for by companies' own funds in 2017 were Washington (6% of the national total), Massachusetts (6%), Michigan (6%), Texas (5%), New York (4%), New Jersey (4%), Illinois (4%), and Pennsylvania (3%).⁴

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 2017 (table 3).⁵ For all industries, the R&D intensity was 4.1%; for manufacturers, 4.7%; and for nonmanufacturers, 3.4%. Manufacturing industries with high levels of R&D intensity in 2017 were pharmaceuticals and medicines (NAICS 3254) (14.2%), computer and electronic products (NAICS 334) (11.3%), and aerospace products and parts (NAICS 3364) (7.5%). Among the nonmanufacturing industries, industries with high levels of R&D intensity were scientific R&D services (NAICS 5417) (25.1%), software publishers (NAICS 5112) (14.9%), and computer systems design and related services (NAICS 5415) (8.8%).

Businesses that performed or funded R&D employed 19.9 million people in the United States in 2017. Approximately 1.6 million (8%) were R&D employees.⁶ Not surprisingly, industries with high levels of R&D intensity also had high numbers of R&D employees: computer and electronic products (NAICS 334) (258,000 R&D employees), pharmaceuticals and medicines (NAICS 3254)

TABLE 2. Funds spent for business R&D performed in the United States, by source of funds, selected industry, and company size: 2017
(Millions of U.S. dollars)

Industry, NAICS code, and company size	All R&D ^a	Paid for by others					
		Paid by the company ^b	Total	Federal	Companies		All other organizations ^d
					Domestic	Foreign ^c	
All industries, 21–33, 42–81	400,100	339,036	61,065	24,277 i	17,494	18,404	890 i
Manufacturing industries, 31–33	257,227	216,155	41,072	18,889 i	6,229	15,434	520 i
Chemicals, 325	74,977	63,285	11,692	205	2,696	8,707	84
Pharmaceuticals and medicines, 3254	66,202	55,229	10,973	186	2,685	8,019	83
Other 325	8,775	8,056	719	19	11	688	1
Machinery, 333	13,197	12,257	940	170	130 i	640	0
Computer and electronic products, 334	78,575	69,942	8,633	3,937	D	D	D
Electrical equipment, appliance, and components, 335	4,291	4,110	181	38	65	77 i	1 i
Transportation equipment, 336	53,292	34,629	18,663 i	14,433 i	D	2,219	D
Automobiles, bodies, trailers, and parts, 3361–63	23,881	21,137	2,745	D	D	D	D
Aerospace products and parts, 3364	26,383	11,903	14,480 i	D	1,209 i	D	D
Other 336	3,028	1,589	1,438	D	D	D	D
Manufacturing nec, other 31–33	32,895	31,932	963 i	106 i	D	D	D
Nonmanufacturing industries, 21–23, 42–81	142,874	122,881	19,993	5,388	11,265 i	2,970	370 i
Information, 51	80,252	78,898	1,354	98	117	1,138	1
Software publishers, 5112	34,264	33,201	1,062	62	66	933	1
Other 51	45,988	45,697	292	36	51	205	0
Finance and insurance, 52	7,616	7,565	51	0	* i	0	51
Professional, scientific, and technical services, 54	36,922	18,972	17,951	5,256	10,874 i	1,530	291 i
Computer systems design and related services, 5415	13,327	11,669	1,658	995	339	201	123
Scientific R&D services, 5417	17,321	2,817	14,504	3,200	10,024 i	1,160	120 i
Other 54	6,274	4,486	1,789	1,061	511 i	169	48 i
Nonmanufacturing nec, other 21–23, 42–81	18,084	17,446	637	34	274	302	27
Size of company (number of domestic employees)							
Small companies							
10–19 ^e	3,311	2,402	909	485	D	D	D
20–49	9,435	7,593	1,842	605	632	531	74 i
Medium companies							
50–99	10,141	8,070	2,071	659	668	599	145
100–249	17,216	13,514	3,703	1,241	866	1,524	72
Large companies							
250–499	14,103	11,773	2,331	592	834	863	42
500–999	17,871	16,295	1,576	221	311	1,038	6
1,000–4,999	65,112	52,341	12,771	1,461	2,724	8,531	55
5,000–9,999	40,198	32,701	7,497	1,525	4,938 i	1,011	23
10,000–24,999	73,485	63,415	10,070	3,514	2,627 i	3,917	12 i
25,000 or more	149,227	130,931	18,295 i	13,976 i	D	D	D

* = amount is less than \$500,000; D = suppressed to avoid disclosure of confidential information; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

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

^a All R&D is the cost of domestic R&D paid for by the respondent company and others outside of the company and performed by the company.

^b Includes foreign subsidiaries of U.S. companies (\$19.2 billion).

^c Includes foreign parent companies of U.S. subsidiaries (\$15.4 billion) and unaffiliated companies (\$3.0 billion). Excludes funds from foreign subsidiaries to U.S. companies paid for through inter-company transactions (\$19.2 billion).

^d Includes U.S. state government agencies and laboratories (\$0.1 billion); U.S. universities, colleges, and academic researchers (\$0.1 billion); and all other organizations located inside (\$0.5 billion) and outside the United States (\$0.2 billion).

^e The Business Research and Development Survey does not include companies with fewer than 10 employees.

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.

SOURCE: National Center for Science and Engineering Statistics, National Science Foundation, and U.S. Census Bureau, Business Research and Development Survey, 2017.

TABLE 3. Sales, R&D intensity, and employment for companies that performed or funded business R&D, by selected industry and company size: 2017

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	9,682,692	4.1	19,893	1,609
Manufacturing industries, 31–33	5,423,997	4.7	9,919	916
Chemicals, 325	901,859	8.3	1,234	174
Pharmaceuticals and medicines, 3254	466,391	14.2	518	127
Other 325	435,468	2.0	716	47
Machinery, 333	323,082	4.1	839	85
Computer and electronic products, 334	697,118	11.3	1,200	258
Electrical equipment, appliance, and components, 335	113,434	3.8	291	29
Transportation equipment, 336	1,173,095	4.5	1,771	172
Automobiles, bodies, trailers, and parts, 3361–63	756,472	3.2	852	92
Aerospace products and parts, 3364	350,201	7.5	710	67
Other 336	66,422	4.6	209	13
Manufacturing nec, other 31–33	2,215,409	1.5	4,584	198
Nonmanufacturing industries, 21–23, 42–81	4,258,695	3.4	9,974	693
Information, 51	1,192,143	6.7	1,945	305
Software publishers, 5112	230,197	14.9	572	134
Other 51	961,946	4.8	1,373	171
Finance and insurance, 52	736,468	1.0	1,211	36
Professional, scientific, and technical services, 54	400,375	9.2	1,330	235
Computer systems design and related services, 5415	152,271	8.8	456	78
Scientific R&D services, 5417	69,134	25.1	283	86
Other 54	178,970	3.5	591	71
Nonmanufacturing nec, other 21–23, 42–81	1,929,709	0.9	5,488	117
Size of company (number of domestic employees)				
Small companies ^e				
10–19	24,126	13.7	73	26
20–49	86,131	11.0	285	78
Medium companies				
50–99	116,967	8.7	366	74
100–249	258,031	6.7	669	111
Large companies				
250–499	280,138	5.0	686	87
500–999	368,694	4.8	849	90
1,000–4,999	1,249,905	5.2	2,668	275
5,000–9,999	939,230	4.3	1,710	185
10,000–24,999	1,851,278	4.0	3,007	248
25,000 or more	4,508,191	3.3	9,581	437

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

^a Dollar values for goods sold or services rendered by R&D-performing or R&D-funding companies located in the United States to customers outside of the company, including the U.S. federal government, foreign customers, and the company's foreign subsidiaries. Included are revenues from a company's foreign operations and subsidiaries and from discontinued operations. If a respondent company is owned by a foreign parent company, sales to the parent company and to affiliates not owned by the respondent company are included. Excluded are intracompany transfers, returns, allowances, freight charges, and excise, sales, and other revenue-based taxes.

^b R&D intensity is the cost of domestic R&D paid for by the respondent company and others outside of the company 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.

^e The Business Research and Development Survey does not include companies with fewer than 10 employees.

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.

SOURCE: National Center for Science and Engineering Statistics, National Science Foundation, and U.S. Census Bureau, Business Research and Development Survey, 2017.

TABLE 4. Funds spent for business R&D performed in the United States, by state and source of funds: 2017
(Millions of U.S. dollars)

State	All R&D ^a	Paid for by the company	Paid for by others	State	All R&D ^a	Paid for by the company	Paid for by others
United States	400,100	339,036	61,065	Montana	133	114	18
Alabama	1,896	968	928	Nebraska	592	470	122 i
Alaska	912	905	7	Nevada	624	439	186
Arizona	6,338	4,476	1,862	New Hampshire	1,361	754	607 i
Arkansas	466	442	24	New Jersey	16,405	13,228	3,177
California	132,473	120,111	12,362	New Mexico	802	298	503 i
Colorado	4,703	3,828	875	New York	15,671	13,430	2,241
Connecticut	8,694	6,423	2,272	North Carolina	10,246	7,502	2,744 i
Delaware	2,048	1,445 i	603	North Dakota	304	276	28
District of Columbia	406	279	127	Ohio	9,769	6,697	3,071
Florida	6,463	4,496	1,966 i	Oklahoma	833	775	58
Georgia	6,450	5,085	1,365 i	Oregon	7,691	7,426	265
Hawaii	169	105	64	Pennsylvania	10,986	9,576	1,410
Idaho	1,747	1,527	220	Rhode Island	730	657	73
Illinois	14,399	12,743	1,655 i	South Carolina	1,370	1,212	158
Indiana	6,283	5,394	889	South Dakota	199	189	10
Iowa	2,938	2,195	743	Tennessee	1,407	1,172	235
Kansas	2,212	1,486	726 i	Texas	21,002	17,752	3,250
Kentucky	983	758	225	Utah	2,846	2,171	675
Louisiana	297	243	53	Vermont	253	241	11
Maine	292	257	35	Virginia	4,332	2,659	1,674 i
Maryland	5,595	3,106	2,488 i	Washington	21,462	20,820	642
Massachusetts	23,655	18,912	4,743	West Virginia	212	182	30
Michigan	21,042	19,101	1,941	Wisconsin	5,436	4,777	659
Minnesota	7,146	6,633	513	Wyoming	87 i	82 i	5
Mississippi	266	221	45	Undistributed funds ^b	2,181	1,561	620
Missouri	5,299 i	3,433	1,866 i				

i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

^a All R&D is the cost of domestic R&D paid for by the respondent company and others outside of the company and performed by the company.

^b Includes data reported that were not allocated to a specific state by multi-establishment companies. For single-establishment companies, data reported 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 Center for Science and Engineering Statistics, National Science Foundation, and U.S. Census Bureau, Business Research and Development Survey, 2017.

(127,000), and aerospace products and parts (NAICS 3364) (67,000). Nonmanufacturing industry groups with high numbers of R&D employees were software publishers (NAICS 5112) (134,000 R&D employees), scientific R&D services (NAICS 5417) (86,000), and computer systems design and related services (NAICS 5415) (78,000) (table 3).

Capital Expenditures

Companies that performed or funded R&D in the United States in 2017 spent

\$587 billion on assets with expected useful lives of more than 1 year (table 5). Of this amount, \$32 billion (5%) was spent on structures, equipment, software, and other assets used for R&D: \$16 billion by manufacturing industries and \$16 billion by nonmanufacturing industries. Manufacturing industries with high levels of capital expenditures on assets used for R&D in 2017 were pharmaceuticals and medicines (NAICS 3254) (\$4.4 billion, 14% of capital expenditures on assets used for

R&D), semiconductor and other electronic products (NAICS 3344) (\$2.2 billion, 7%), and automobiles, bodies, trailers, and parts (NAICS 3361–63) (\$1.2 billion, 4%). Among the nonmanufacturing industries with high levels of capital assets used for R&D were telecommunications services (NAICS 517) (\$3.2 billion, 10%), computer systems design and related services (NAICS 5415) (\$2.0 billion, 6%), and software publishers (NAICS 5112) (\$1.1 billion, 4%).

TABLE 5. Capital expenditures in the United States and for domestic R&D paid for and performed by the company, by type of expenditure, industry, and company size: 2017
(Millions of U.S. dollars)

Selected industry, NAICS code, and company size	Total ^b	Used for domestic R&D ^a				All other and undistributed ^e
		Total ^{b,c}	Structures ^d	Equipment	Capitalized software	
All industries, 21–33, 42–81	587,332	31,885	3,541	14,898	8,539	4,907
Manufacturing industries, 31–33	237,691	15,659	2,662	9,265	1,611	2,122
Chemicals, 325	41,932	5,394	1,788	2,250	469	887
Pharmaceuticals and medicines, 3254	16,211	4,394	1,565	1,641	399	789
Other 325	25,721	1,000	223	609	70	98
Machinery, 333	11,707	866	90	548	101	127
Computer and electronic products, 334	30,411	4,590	224	3,529	527	310
Communication equipment, 3342	2,920	843	32	653	59	99
Semiconductor and other electronic products, 3344	13,312 i	2,173 i	126 i	1,763 i	212 i	73 i
Other 334	14,179	1,574	66	1,113	256	138
Electrical equipment, appliance, and components, 335	3,067 i	227	7 i	130 i	15 i	76 i
Transportation equipment, 336	60,636	1,791	158	1,141	222	271
Automobiles, bodies, trailers, and parts, 3361–63	46,164	1,177	103	759	143	173
Aerospace products and parts, 3364	11,396	522	39	340	77	67
Other 336	3,076	92	16	42	2	31
Manufacturing nec, other 31–33	89,938	2,791	395	1,667	277	451
Nonmanufacturing industries, 21–23, 42–81	349,640	16,226	879	5,633	6,928	2,785
Information, 51	117,469	7,730	555	3,637	2,739	800
Software publishers, 5112	18,215	1,128	113	714	209	92
Telecommunications services, 517	71,766	3,189	D	850	1,443	D
Other 51	27,488	3,413	D	2,073	1,087	D
Finance and insurance, 52	20,670	2,753	25 i	426	1,758	544
Professional, scientific, and technical services, 54	13,853	3,072	187	881	1,402	602
Computer systems design and related services, 5415	6,156	2,020	97	552	1,128	243
Scientific R&D services, 5417	2,593	717	79	260	60	318
Other 54	5,104	335	11	69	214	41
Nonmanufacturing nec, other 21–23, 42–81	197,648	2,671	112	689	1,029	839
Size of company (number of domestic employees)						
Small companies ^f						
10–19	1,642	319	13	133	64	109
20–49	6,837	924	43	413	104	364
Medium companies						
50–99	7,618	855	200	391	180	84
100–249	12,045	1,989	136	1,265	237	351
Large companies						
250–499	10,452	1,109	78	549	252	231
500–999	21,640	1,705	207	572	428	497
1,000–4,999	61,271	4,733	589	2,021	1,376	747
5,000–9,999	68,790	4,019	667	1,371	1,157	823
10,000–24,999	124,057	5,790	688	2,553	1,558	991
25,000 or more	272,980	10,442	919	5,630	3,182	710

D = data withheld to avoid disclosing operations of individual companies; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

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

^a Domestic R&D is the R&D paid for by the respondent company and others outside of the company and performed by the company.

^b 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 assets acquired through mergers and acquisitions and purchased land.

^c 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 2017, depreciation associated with domestic R&D paid for and performed by the company was \$13.5 billion and with domestic R&D performed by the company and paid for by others was \$1.6 billion.

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

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

^f The Business Research and Development Survey does not include companies with fewer than 10 employees.

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.

SOURCE: National Center for Science and Engineering Statistics, National Science Foundation, and U.S. Census Bureau, Business Research and Development Survey, 2017.

Survey Information and Data Availability

The 2016 cycle of BRDIS was the last cycle that collected R&D data for companies with five to nine employees and on business innovation activities. The Annual Business Survey, also co-sponsored by NCSES and the U.S. Census Bureau, will collect R&D data from companies with fewer than 10 employees and more comprehensive data on innovation from all companies for 2017 and beyond. Beginning with the 2017 data collection, BRDIS—the Business R&D and Innovation Survey—became the Business Research and Development Survey (BRDS).

In this InfoBrief, money amounts are expressed in current U.S. dollars and are not adjusted for inflation. A *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 company, of one or more establishments under common ownership or control.

The samples for BRDIS and BRDS were selected to represent all for-profit, nonfarm companies that were publicly or privately held and had five or more employees (BRDIS) or 10 or more employees (BRDS) in the United States. Estimates produced from the surveys and presented in this InfoBrief are restricted to companies that performed or funded R&D, either domestically or abroad. Because the statistics from the surveys are based on samples, they are subject to both sampling and nonsampling errors (see technical notes in the data tables reports at <https://www.nsf.gov/statistics/srvyindustry/>).

For 2016, a total of 44,861 companies were sampled to represent the population of 1,485,151 companies; for 2017, a total of 45,075 companies were sampled, representing 1,097,607

companies. The representative population decreased primarily because the criteria for inclusion in the sample was changed for 2017. Previously, companies with fewer than 5 employees, or less than 10 employees if classified in other nonmanufacturing (ONM), were deemed out of scope. For 2017, companies with fewer than 10 employees, regardless of industry, were deemed out of scope because these companies are now covered in the Annual Business Survey. This change accounted for a decrease in population of approximately 400,000 companies.

The actual numbers of reporting units in the sample that remained within the scope of the survey between sample selection and tabulation were 42,122 for 2016 and 41,998 for 2017. 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 (BRDIS) or ten employees (BRDS) in the United States or had gone out of business in the interim. Of these in-scope reporting units, 80.2% were considered to have met the criteria for a complete response to the 2016 survey; 74.5% met the 2017 complete response criteria. Coverage of the previous year's known positive R&D stratum for 2016 was 84.0%; the coverage rate for 2017 was 84.9%. 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 data tables from this survey will be available in the report *Business Research and Development: 2017* (<https://www.nsf.gov/statistics/>

[srvybrds/](https://www.nsf.gov/statistics/srvybrds/)). Individual data tables and tables with relative standard errors and imputation rates from the 2017 survey are available in advance of the full report. Statistics for new items added to the survey for 2017 are available in the full set of tables, including for R&D paid for by foreign government agencies and by foreign universities, colleges and academic researchers.

References

- Anderson G and Kindlon A. 2019. *Indicators of R&D in Small Businesses: Data from the 2009-15 Business R&D and Innovation Survey*. InfoBrief NSF 19-316. Alexandria, VA: National Science Foundation, National Center for Science and Engineering Statistics. Available at <https://www.nsf.gov/statistics/2019/nsf19316/>.
- Organization for Economic Cooperation and Development (OECD). 2015. *Frascati Manual: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological, and Innovation Activities*. Paris. OECD Publishing. Available at https://www.oecd-ilibrary.org/science-and-technology/frascati-manual-2015_9789264239012-en.
- Shackelford B and Wolfe R. 2016. *Five States Account for Half of U.S. Business R&D Performance in 2013: New Data for Metropolitan Areas Available*. InfoBrief NSF 16-317. Arlington, VA: National Science Foundation, National Center for Science and Engineering Statistics. Available at <http://www.nsf.gov/statistics/2016/nsf16317/>.
- Shackelford B and Wolfe R. 2019. *Over Half of U.S. Business R&D Performed in 10 Metropolitan Areas in 2015*. InfoBrief NSF 19-322. Alexandria, VA: National Science Foundation, National Center for Science and Engineering Statistics. Available at <http://www.nsf.gov/statistics/2019/nsf19322/>.

Notes

1. Raymond M. Wolfe, Research and Development Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 2415 Eisenhower Avenue, Suite W14200, Alexandria, VA 22314 (rwolfe@nsf.gov; 703-292-7789).

2. The National Science Foundation has co-sponsored an annual business R&D survey since 1953. The Survey of Industrial Research and Development (SIRD) collected data for 1953–2007, and its successor, the Business R&D and Innovation Survey, collected data for 2008–16. Beginning with 2017, the collection of innovation data was moved to the Annual Business Survey, another survey co-sponsored with the

U.S. Census Bureau, and the business R&D data collection reported here was renamed the Business Research and Development Survey.

3. Company size classifications changed for 2017 in response to the revised Frascati Manual (OECD 2015). Anderson and Kindlon (2019) provide estimates of R&D performance and employment using these new classifications over the 2008–15 time period. The authors also compare the trends to those observed in SIRD for the time prior to 2008.

4. In addition to statistics for all states, below-state level statistics are available in the full set of tables and also in other InfoBriefs; see Shackelford and Wolfe (2016) and (2019).

5. Determining the amount of domestic net sales and operating revenues was left to the reporting company. However, guidance was given to include revenues from foreign operations and subsidiaries and from discontinued operations and to exclude intracompany transfers, returns, allowances, freight charges, and excise, sales, and other revenue-based taxes.

6. Employment statistics in this InfoBrief are head counts. Full-time equivalent statistics are available in the data tables. R&D employees include researchers (defined as R&D scientists and engineers and their managers) and the technicians, technologists, and support staff members who work on R&D or who provide direct support to R&D activities.