



## Businesses Spent \$375 Billion on R&D Performance in the United States in 2016

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**B**usinesses spent \$375 billion on research and development performance in the United States in 2016, a 5.3% increase from 2015 (table 1). Funding from the companies' own sources was \$318 billion in 2016, a 7.1% increase from 2015. Funding from other sources was \$57 billion in 2016 and \$59 billion in 2015. Data for this InfoBrief are from the Business R&D and Innovation Survey (BRDIS), developed and cosponsored by the National Center for Science and Engineering Statistics within the National Science Foundation and by the U.S. Census Bureau.

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

In 2016, of the \$375 billion companies spent on R&D, \$25 billion (7%) was spent on basic research, \$61 billion (16%) on applied research, and \$289 billion (77%) on development. The distribution was similar to the 2015 distribution (6%, 16%, and 78%, respectively) (table 1). In 2016, companies in manufacturing industries performed \$251 billion (67%) 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 \$124 billion of domestic

R&D (33% of total domestic R&D performance), 85% 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 \$57 billion paid for by others, the federal government accounted for \$24 billion, most of which came from the Department of Defense (\$16 billion) (data available in full set of data tables). Ninety-two percent of federal government funding went toward aerospace products and parts (North American Industry Classification System [NAICS] code 3364) (\$13 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 (\$14 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

Micro-, small-, and medium-sized companies (5 to 249 domestic employees)

performed 11% of the nation's total business R&D in 2016 (table 1). In these companies, the R&D-to-sales ratio (or R&D intensity) was 7.8% (table 1 and table 3). These companies accounted for 6% of sales and employed 9% of the 19.3 million employees who worked for R&D-performing or R&D-funding companies. They employed 20% of the 1.5 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 2016, and their R&D intensity was 4.4%. They accounted for 49% of sales, employed 46% of those who worked for R&D-performing or R&D-funding companies, and employed 54% 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 2016, and their R&D intensity was 3.3%. They accounted for 45% of sales, employed 46% of those who worked for R&D-performing or R&D-funding companies, and employed 26% 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: 2015–16

(Millions of U.S. dollars)

Selected characteristic and company size	2015	2016
Domestic R&D performance <sup>a</sup>	355,821	374,685
Type of R&D <sup>b</sup>		
Basic research	21,792	24,644
Applied research	56,472	61,020
Development	277,558	289,021
Paid for by the company <sup>c</sup>	296,677	317,731
Basic research	16,306	19,143
Applied research	44,344	48,806
Development	236,027	249,782
Paid for by others	59,144	56,954
Basic research	5,486	5,501 i
Applied research	12,128	12,213
Development	41,530	39,239
Source of funds		
Federal	26,990	23,772
Other <sup>d</sup>	32,154	33,182
Size of company (number of domestic employees)		
Micro companies <sup>e</sup>		
5–9	2,988 i	1,581 i
Small companies		
10–19	5,680 i	4,958 i
20–49	10,249 i	9,662 i
Medium companies		
50–99	11,509	9,298
100–249	13,602	14,875
Large companies		
250–499	13,553	13,092
500–999	15,217	14,450
1,000–4,999	58,094	63,971
5,000–9,999	38,838	40,633
10,000–24,999	59,328	65,594
25,000 or more	126,763	136,571

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

<sup>a</sup> 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.

<sup>b</sup> 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).

<sup>c</sup> Includes foreign subsidiaries of U.S. companies.

<sup>d</sup> 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.

<sup>e</sup> The Business R&D and Innovation Survey does not include companies with fewer than five 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.

In 2016, companies reported \$318 billion of domestic R&D paid for by the company. Businesses in California alone accounted for 33% of this amount (table 4). Other states with large amounts of business R&D paid for by companies' own funds in 2016 were Washington (6% of the national total), Massachusetts (6%), Michigan (5%), Texas (5%), New York (4%), New Jersey (4%), Illinois (4%), and Pennsylvania (4%).<sup>2</sup>

### 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 \$9 trillion in 2016 (table 3).<sup>3</sup> For all industries, the R&D intensity was 4.1%; for manufacturers, 4.6%; and for nonmanufacturers, 3.3%. Manufacturing industries with high levels of R&D intensity in 2016 were pharmaceuticals and medicines (NAICS 3254) (11.2%), computer and electronic products (NAICS 334) (9.8%), and aerospace products and parts (NAICS 3364) (7.9%). Among the nonmanufacturing industries, industries with high levels of R&D intensity were scientific R&D services (NAICS 5417) (22.3%), computer systems design and related services (NAICS 5415) (9.0%), and software publishers (NAICS 5112) (8.5%).

Businesses that performed or funded R&D employed 19.3 million people in the United States in 2016. Approximately 1.5 million (8%) were R&D employees.<sup>4</sup> Not surprisingly, industries with high levels of R&D intensity also had high numbers of R&D employees: computer and electronic products (NAICS 334) (264,000 R&D employees), pharmaceuticals and medicines (NAICS 3254) (123,000), and aerospace products and parts (NAICS 3364) (61,000). Nonmanufacturing

TABLE 2. Funds spent for business R&D performed in the United States, by source of funds, selected industry, and company size: 2016  
(Millions of U.S. dollars)

Industry, NAICS code, and company size	All R&D <sup>a</sup>	Paid for by the company <sup>b</sup>	Paid for by others				
			Total	Federal	Companies		All other organizations <sup>d</sup>
					Domestic	Foreign <sup>c</sup>	
All industries, 21–33, 42–81	374,685	317,731	56,954	23,772	14,239	17,692	1,251
Manufacturing industries, 31–33	250,553	211,660	38,893	19,217	4,812	14,194	670
Chemicals, 325	73,575	64,165	9,410	212	1,484 i	7,605	109 i
Pharmaceuticals and medicines, 3254	64,628	55,983	8,644	147	1,414 i	6,976	107 i
Other 325	8,947	8,182	766	65	70	629	2
Machinery, 333	12,585	11,699	886	152	159	545 i	30
Computer and electronic products, 334	77,385	68,515	8,869	4,410	1,272	3,059	128
Electrical equipment, appliance, and components, 335	4,771	4,302	469 i	46 i	9 i	393 i	21 i
Transportation equipment, 336	51,275	32,905	18,371	14,325	1,587	2,104	355
Automobiles, bodies, trailers, and parts, 3361–63	22,042	19,293	2,749	D	D	2,031 i	D
Aerospace products and parts, 3364	26,645	12,272	14,373	12,904	1,110	D	D
Other 336	2,588	1,340	1,249	D	D	D	D
Manufacturing nec, other 31–33	30,962	30,074	888 i	72 i	301 i	488 i	27 i
Nonmanufacturing industries, 21–23, 42–81	124,132	106,071	18,061	4,555	9,427 i	3,498	581 i
Information, 51	70,748	70,075	674	25	142	503	4
Software publishers, 5112	33,495	33,098	397	7	50	341	0
Other 51	37,253	36,977	277	18	92	162	4
Finance and insurance, 52	7,331	7,237	94	0	*	8 i	86
Professional, scientific, and technical services, 54	37,595	20,845	16,750	4,496	9,174 i	2,619	461 i
Computer systems design and related services, 5415	15,747	13,255	2,492 i	583	432	1,434	43
Scientific R&D services, 5417	14,842	2,811	12,031	2,675	8,374 i	863	119 i
Other 54	7,006	4,779	2,227 i	1,238	368 i	322	299 i
Nonmanufacturing nec, other 21–23, 42–81	8,458	7,914	543	34	111	368 i	30
Size of company (number of domestic employees)							
Micro companies <sup>e</sup>							
5–9	1,581 i	1,044 i	536 i	263 i	D	D	D
Small companies							
10–19	4,958 i	3,887 i	1,071 i	393 i	394 i	235 i	49 i
20–49	9,662 i	7,473 i	2,189	899	598 i	490 i	202 i
Medium companies							
50–99	9,298	7,728	1,570	451	427	667	25
100–249	14,875	11,722	3,153	839	716	1,481	117
Large companies							
250–499	13,092	11,438	1,654	462	390	766	36
500–999	14,450	13,525	924	258	100	564	2
1,000–4,999	63,971	53,305	10,666	1,134	3,076	6,347	109
5,000–9,999	40,633	35,887	4,746	1,132 i	D	D	D
10,000–24,999	65,594	53,384	12,210	3,994	3,767 i	4,315	134 i
25,000 or more	136,571	118,339	18,232	13,948 i	3,570	325 i	389 i

\* = 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.

<sup>a</sup> 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.

<sup>b</sup> Includes foreign subsidiaries of U.S. companies (\$11.1 billion).

<sup>c</sup> Includes foreign parent companies of U.S. subsidiaries (\$14.8 billion) and unaffiliated companies (\$3.0 billion). Excludes funds from foreign subsidiaries to U.S. companies paid for through inter-company transactions (\$11.1 billion).

<sup>d</sup> Includes U.S. state government agencies and laboratories (\$0.2 billion); U.S. universities, colleges, and academic researchers (\$0.1 billion); and all other organizations located inside (\$0.9 billion) and outside the United States (\$0.1 billion).

<sup>e</sup> The Business R&D and Innovation Survey does not include companies with fewer than five 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 Science Foundation, National Center for Science and Engineering Statistics, and U.S. Census Bureau, Business R&D and Innovation Survey, 2016.

TABLE 3. Sales, R&amp;D intensity, and employment for companies that performed or funded business R&amp;D, by selected industry and company size: 2016

Industry, NAICS code, and company size	Domestic net sales (US\$millions) <sup>a</sup>	R&D intensity (%) <sup>b</sup>	Domestic employment (thousands) <sup>c</sup>	
			Total	R&D <sup>d</sup>
All industries, 21–33, 42–81	9,191,871	4.1	19,293	1,522
Manufacturing industries, 31–33	5,396,816	4.6	9,879	912
Chemicals, 325	1,039,760	7.1	1,257	173
Pharmaceuticals and medicines, 3254	579,390	11.2	562	123
Other 325	460,370	1.9	695	50
Machinery, 333	296,633	4.2	824	78
Computer and electronic products, 334	786,351	9.8	1,336	264
Electrical equipment, appliance, and components, 335	148,671	3.2	306	28
Transportation equipment, 336	1,289,540	4.0	1,953	168
Automobiles, bodies, trailers, and parts, 3361–63	886,881	2.5	1,088	92
Aerospace products and parts, 3364	336,565	7.9	643	61
Other 336	66,094	3.9	222	15
Manufacturing nec, other 31–33	1,835,861	1.7	4,203	201
Nonmanufacturing industries, 21–23, 42–81	3,795,055	3.3	9,414	610
Information, 51	1,064,822	6.6	1,832	277
Software publishers, 5112	396,108	8.5	630	142
Other 51	668,714	5.6	1,202	135
Finance and insurance, 52	713,192	1.0	1,114	37
Professional, scientific, and technical services, 54	421,882	8.9	1,373	240
Computer systems design and related services, 5415	175,787	9.0	480	92
Scientific R&D services, 5417	66,620	22.3	264	79
Other 54	179,475	3.9	629	69
Nonmanufacturing nec, other 21–23, 42–81	1,595,159	0.5	5,095	56
Size of company (number of domestic employees)				
Micro companies <sup>e</sup>				
5–9	6,778	23.3	34	15
Small companies				
10–19	25,795	19.2	111	37
20–49	100,067	9.7	323	75
Medium companies				
50–99	113,696	8.2	413	69
100–249	271,388	5.5	764	101
Large companies				
250–499	276,513	4.7	700	75
500–999	326,260	4.4	739	74
1,000–4,999	1,238,059	5.2	2,583	278
5,000–9,999	994,329	4.1	1,859	159
10,000–24,999	1,677,581	3.9	2,898	243
25,000 or more	4,161,406	3.3	8,869	395

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

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> Data recorded on 12 March represent employment figures for the year.

<sup>d</sup> Includes researchers, R&D managers, technicians, clerical staff, and others assigned to R&D groups.

<sup>e</sup> The Business R&D and Innovation Survey does not include companies with fewer than five 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 Science Foundation, National Center for Science and Engineering Statistics, and U.S. Census Bureau, Business R&D and Innovation Survey, 2016.

TABLE 4. Funds spent for business R&D performed in the United States, by state and source of funds: 2016  
(Millions of U.S. dollars)

State	All R&D <sup>a</sup>	Paid for by the company	Paid for by others	State	All R&D <sup>a</sup>	Paid for by the company	Paid for by others
United States	374,685	317,731	56,954	Montana	140	121	19
Alabama	1,694	868	826	Nebraska	604	491	114
Alaska	34 <sup>e</sup>	27 <sup>e</sup>	7 <sup>e</sup>	Nevada	574	412	162
Arizona	6,472	4,743	1,730	New Hampshire	1,919	767	1,151
Arkansas	366	340	27	New Jersey	15,715	12,902	2,813
California	117,569	105,769	11,800	New Mexico	487	323	164
Colorado	4,355	3,542	813	New York	15,714	13,454	2,260
Connecticut	7,987	6,101	1,886 <sup>i</sup>	North Carolina	10,064	7,226	2,838 <sup>i</sup>
Delaware	2,069	1,463	605	North Dakota	254	237	17
District of Columbia	328	230	98	Ohio	8,892	6,366	2,526
Florida	6,273	4,441	1,832 <sup>i</sup>	Oklahoma	692	642	50 <sup>i</sup>
Georgia	5,245	4,273	972 <sup>i</sup>	Oregon	6,523	6,316	207
Hawaii	164	114 <sup>i</sup>	49	Pennsylvania	12,300	11,161	1,138
Idaho	1,590	1,398	192	Rhode Island	875 <sup>i</sup>	822 <sup>i</sup>	53
Illinois	13,733	11,822	1,911	South Carolina	1,301	1,146	155
Indiana	5,949	4,988	961	South Dakota	151	135	16 <sup>i</sup>
Iowa	2,862	2,225	636	Tennessee	1,610	1,383	226
Kansas	2,204	1,469	735 <sup>i</sup>	Texas	17,353	14,913	2,440
Kentucky	1,070	752	317	Utah	3,453	2,876	577
Louisiana	274	228	45 <sup>i</sup>	Vermont	248	230	17
Maine	290	261	29	Virginia	3,773	2,240	1,532
Maryland	5,676	3,335	2,341	Washington	19,673	19,001	671
Massachusetts	21,560	18,084	3,476	West Virginia	182	157	25
Michigan	18,847	17,454	1,393	Wisconsin	4,972	4,387	585
Minnesota	7,084	6,601	483	Wyoming	172	164	8 <sup>i</sup>
Mississippi	222	198	24	Undistributed funds <sup>b</sup>	7,173	5,664	1,509
Missouri	5,958 <sup>i</sup>	3,466	2,492 <sup>i</sup>				

e = more than 50% of the cell value is imputed due to raking of state data; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

<sup>a</sup> 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.

<sup>b</sup> Includes data reported on Form BRDI-1 not allocated to a specific state, as well as data reported on Form BRDI-1(S) by multi-establishment companies. For single-establishment companies, data reported on Form BRDI-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, and U.S. Census Bureau, Business R&D and Innovation Survey, 2016.

industry groups with high numbers of R&D employees were software publishers (NAICS 5112) (142,000 R&D employees), computer systems design and related services (NAICS 5415) (92,000), and scientific R&D services (NAICS 5417) (79,000) (table 3).

### Capital Expenditures

Companies that performed or funded R&D in the United States in 2016 spent \$561 billion on assets with expected

useful lives of more than 1 year (table 5). Of this amount, \$25 billion (5%) was spent on structures, equipment, software, and other assets used for R&D: \$15 billion by manufacturing industries and \$10 billion by nonmanufacturing industries. Manufacturing industries with high levels of capital expenditures on assets used for R&D in 2016 were pharmaceuticals and medicines (NAICS 3254) (\$3.5 billion, 14% of capital expenditures on assets used for R&D),

semiconductor and other electronic products (NAICS 3344) (\$2.0 billion, 8%), automobiles, bodies, trailers, and parts (NAICS 3361–63) (\$1.4 billion, 6%), and aerospace products and parts (NAICS 3364) (\$0.9 billion, 4%). Among the nonmanufacturing industries with high levels of capital assets used for R&D were software publishers (NAICS 5112) (\$1.6 billion, 7%), telecommunications services (NAICS 517) (\$1.6 billion, 6%), and computer

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: 2016  
(Millions of U.S. dollars)

Selected industry, NAICS code, and company size	Used for domestic R&D <sup>a</sup>					
	Total <sup>b</sup>	Total <sup>b,c</sup>	Structures <sup>d</sup>	Equipment	Capitalized software	All other and undistributed <sup>e</sup>
All industries, 21–33, 42–81	560,900	25,248	3,072	11,839	6,793	3,543
Manufacturing industries, 31–33	235,923	14,948	2,471	8,376	1,850	2,251 i
Chemicals, 325	40,570	4,336	1,364	1,982	629	361
Pharmaceuticals and medicines, 3254	16,577	3,511	1,242	1,410	545	314
Other 325	23,993	825	122	572	84	47
Machinery, 333	11,037	1,096	85	825	101	85
Computer and electronic products, 334	35,960	4,441	149	2,812	528	953 i
Communication equipment, 3342	3,711	427 i	30 i	343 i	29 i	26 i
Semiconductor and other electronic products, 3344	16,786 i	1,965 i	47 i	1,087 i	100 i	731 i
Other 334	15,463	2,049	72	1,382	399	196
Electrical equipment, appliance, and components, 335	3,260	179	18	103	7	51
Transportation equipment, 336	66,588	2,513	600	1,235	250	427
Automobiles, bodies, trailers, and parts, 3361–63	45,894	1,444	103	884	181	275
Aerospace products and parts, 3364	17,904	890	494	277	63	55
Other 336	2,790	179	3	74	6	97
Manufacturing nec, other 31–33	78,508	2,383	255	1,419	335	374
Nonmanufacturing industries, 21–23, 42–81	324,977	10,299	602	3,463 i	4,943	1,292
Information, 51	95,151	4,807	288	1,843	2,027	649
Software publishers, 5112	13,541	1,642	176	907	185	374
Telecommunications services, 517	58,713	1,559	1	450 i	1,073	36 i
Other 51	22,897	1,606	111	486	769	239
Finance and insurance, 52	14,385 i	2,187	36	189	1,696	265
Professional, scientific, and technical services, 54	19,514	2,152 i	114 i	934 i	809 i	296 i
Computer systems design and related services, 5415	7,215 i	1,464 i	66 i	670 i	586 i	143 i
Scientific R&D services, 5417	1,552	348	39	186	16	107
Other 54	10,747	340	9	78	207	46
Nonmanufacturing nec, other 21–23, 42–81	195,927	1,153	164	497	411	82
Size of company (number of domestic employees)						
Micro companies <sup>f</sup>						
5–9	556 i	75	9	44	6 i	16
Small companies						
10–19	2,967 i	315	20	186	26 i	83
20–49	8,005 i	542 i	41 i	283 i	119 i	99
Medium companies						
50–99	13,984 i	520	60	254	102	104
100–249	20,113 i	1,212	86	489	170 i	468
Large companies						
250–499	26,216 i	1,337	116	597	371	253
500–999	17,807	1,110	66 i	546	279	218
1,000–4,999	64,733	4,208	606	1,967	1,136	499
5,000–9,999	53,985	2,849	445	1,466	587 i	351
10,000–24,999	105,334	5,326	804	1,928	1,532	1,062 i
25,000 or more	247,200	7,754	820	4,079	2,465	390 i

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.

<sup>a</sup> Domestic R&D is the R&D paid for by the respondent company and others outside of the company and performed by the company.

<sup>b</sup> 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.

<sup>c</sup> 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 2016, depreciation associated with domestic R&D paid for and performed by the company was \$12.5 billion and with domestic R&D performed by the company and paid for by others was \$1.2 billion.

<sup>d</sup> Includes the cost of purchased or improved buildings and other facilities that are fixed to the land.

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

<sup>f</sup> The Business R&D and Innovation Survey does not include companies with fewer than five 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 Science Foundation, National Center for Science and Engineering Statistics, and U.S. Census Bureau, Business R&D and Innovation Survey, 2016.

systems design and related services (NAICS 5415) (\$1.5 billion, 6%).

## Survey Information and Data Availability

In this InfoBrief, money amounts are expressed in current U.S. dollars and are not adjusted for inflation. A *company* for BRDIS 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 sample for BRDIS was selected to represent all for-profit, nonfarm companies that were publicly or privately held and had five or more employees in the United States. Estimates produced from the survey and presented in this InfoBrief are restricted to companies that performed or funded 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 data tables reports at <https://www.nsf.gov/statistics/srvyindustry/>).

For 2015, a total of 44,824 companies were sampled to represent the population of 2,029,436 companies; for 2016, a total of 44,861 companies were sampled, representing 1,485,151 companies. The representative population decreased primarily because the criteria for inclusion in the BRDIS sample was changed for 2016 in two ways. First, companies classified in

the other nonmanufacturing (ONM) category with fewer than 10 employees, compared with fewer than 5 employees previously, were deemed out of scope because these companies account for negligible R&D. Second, regardless of employment size, a payroll threshold of \$250,000 was previously used to identify in-scope companies. For 2016 the payroll threshold was removed except for companies for which employment was missing at the time of sampling. Combined, these two changes accounted for a decrease in population of approximately 459,000 companies; the rest of the decrease, approximately 85,000 companies, may have been due to various factors such as timing of updates to the U.S. Census Bureau's Business Register.

The actual numbers of reporting units in the sample that remained within the scope of the survey between sample selection and tabulation were 40,806 for 2015 and 42,122 for 2016. 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 business in the interim. Of these in-scope reporting units, 79.6% were considered to have met the criteria for a complete response to the 2015 survey; 80.2% met the 2016 complete response criteria. Coverage of the previous year's known positive R&D stratum for 2015 was 84.5%;

the coverage rate for 2016 was 84.0%. 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 R&D and Innovation: 2016* (<https://www.nsf.gov/statistics/srvyindustry/>). Individual data tables and tables with relative standard errors and imputation rates from the 2016 survey are available in advance of the full report. Statistics for new items added to the survey for 2016 are available in the full set of tables, including for royalty and licensing fees relating to R&D; R&D performed by U.S. universities, colleges, and academic researchers; R&D paid for by U.S. federal government agencies or laboratories and performed by others outside the respondent company; and revenue for the sale and licensing of utility patents.

Note that the 2016 cycle of BRDIS is the last cycle that collected data for business innovation activities. A separate, more comprehensive collection of innovation data, as part of the Annual Business Survey co-sponsored by NCSES and Census, has been undertaken and will produce statistics for 2017 and beyond. Beginning with the 2017 data collection, BRDIS—the Business R&D and Innovation Survey—will be the Business Research and Development Survey (BRDS).

## 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. Below-state level data have been collected annually beginning with the 2008 cycle of BRDIS. The 2008 and 2009 cycles included the question “At what domestic location did your company perform the largest dollar

amount of R&D” for R&D paid for and performed by the company. For 2010, the question was repeated and a new question covering R&D paid for by others was added. For 2011 and subsequent years, those questions were repeated and two questions covering the “second-largest dollar amount of R&D” were added.

3. 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 subsid-

iaries and from discontinued operations and to exclude intracompany transfers, returns, allowances, freight charges, and excise, sales, and other revenue-based taxes.

4. Employment statistics in this InfoBrief are head counts. Full-time equivalent statistics are available in the data tables. R&D employees include R&D 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.