



InfoBrief

Business R&D Performance in the United States Nears \$700 Billion in 2022

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Businesses continued to increase their research and development (R&D) performance in 2022, spending \$692 billion on R&D in the United States, a 14.8% increase from 2021 ([table 1](#)). Funding from the companies' own sources accounted for \$608 billion of this spending in 2022, a 15.2% increase from 2021. Funding from other sources accounted for \$83 billion, an 11.8% increase from 2021. Data for this InfoBrief are from the 2022 Business Enterprise Research and Development (BERD) Survey, developed and cosponsored by the National Center for Science and Engineering Statistics (NCSES) within the U.S. National Science Foundation (NSF) and by the Census Bureau, which collected and tabulated data for the survey.¹

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: 2019–22

(Millions of dollars)

Selected characteristic and company size	2019	2020	2021	2022
Domestic R&D performance ^a	492,956	537,619	602,499	691,547
Type of R&D ^b				
Basic research	32,239	36,017	40,130	42,957
Applied research	74,031	76,088	86,485	100,654
Development	386,686	425,514	475,884	547,935
Paid for by the company ^c	428,968	466,162	527,804	608,058
Basic research	25,916	29,330	32,763	35,918
Applied research	59,697	60,620	69,130	80,834
Development	343,355	376,213	425,912	491,307
Paid for by others	63,989	71,457	74,695	83,489
Basic research	6,324	6,688	7,367	7,040
Applied research	14,333	15,468	17,355	19,821
Development	43,332	49,301	49,972	56,629
Source of funds				

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: 2019–22**

(Millions of dollars)

Selected characteristic and company size	2019	2020	2021	2022
Federal	21,941	28,905	23,582	31,626
Other ^d	42,048	42,552	51,113	51,863
Size of company (number of domestic employees)				
Small companies				
10–19 ^e	5,501	5,047	5,477	5,277
20–49	12,418	12,994	15,061	14,695
Medium companies				
50–99	14,021	12,993	14,540	15,265
100–249	19,793	25,411	24,023	27,847
Large companies				
250–499	18,883	20,878	23,932	29,549
500–999	23,969	21,264	27,432	31,802
1,000–4,999	75,671	88,238	94,615	104,505
5,000–9,999	50,811	48,397	62,817	58,709
10,000–24,999	88,263	88,567	104,607	121,142
25,000 or more	183,626	213,829	229,995	282,756

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

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

^b R&D comprises creative and systematic work undertaken in order to increase the stock of knowledge and to devise 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 work, drawing on research and practical experience and resulting in additional knowledge, which is directed to producing new processes or to improving existing products—goods or services—or processes (development).

^c Paid for by the company includes foreign subsidiaries of U.S. companies.

^d Other 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 Enterprise Research and Development Survey does not include companies with fewer than 10 domestic employees.

Note(s):

Detail may not add to total because of rounding.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey.

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

In 2022, of the \$692 billion that companies spent on R&D, \$43 billion (6%) was for basic research, \$101 billion (15%) was for applied research, and \$548 billion (79%) was for development ([table 1](#)). In 2022, companies in manufacturing industries performed \$372 billion (54%) of domestic R&D, defined as R&D performed in the 50 states and the District of Columbia ([table 2](#)). Most of the funding came from these companies' own funds (88%). Companies in nonmanufacturing industries performed \$319 billion of domestic R&D (46% of total domestic R&D performance), 88% of which was paid for from companies' own funds.

Table 2**Funds spent for business R&D performed in the United States, by source of funds, selected industry, and company size: 2022**

(Millions of dollars)

Industry, NAICS code, and company size	All R&D ^a	Paid for by the company ^b	Paid for by others								
			Total	Federal	Companies		All other organizations ^d				
					Domestic	Foreign ^c					
All industries, 21–23, 31–33, 42–81	691,547	608,058	83,489	31,626	27,125	i	23,604	1,134			
Manufacturing industries, 31–33	372,459	326,998	45,461	24,082	6,623		14,360	396			
Chemicals, 325	125,728	113,518	12,210	766	2,426		8,946	72			
Pharmaceuticals and medicines, 3254	116,073	104,720	11,353	703	2,388		8,195	67			
Other 325	9,655	8,798	857	63	38		751	5			
Machinery, 333	19,464	18,246	1,218	673	165		358	22			
Computer and electronic products, 334	104,718	99,234	5,483	2,560	537	i	2,263	123			
Communication equipment, 3342	11,665	10,870	795	i	205		D	3	i		
Semiconductor and other electronic products, 3344	49,330	47,380	1,950	71	23		1,777	78	r		
Other 334	43,723	40,984	2,738	2,284	D		D	42			
Electrical equipment, appliance, and components, 335	7,086	6,657	429	i	21		35	369	4		
Transportation equipment, 336	71,259	46,468	24,790	19,934	3,060		1,676	120			
Motor vehicles, bodies, trailers, and parts, 3361–63	32,881	30,722	2,087	D	528		1,559	D			
Aerospace products and parts, 3364	35,356	13,786	21,570	i	18,855	i	2,529	103	83		
Other 336	3,022	1,960	1,133	D	3		14	37			
Manufacturing nec, other 31–33	44,204	42,875	1,331	128	400		748	55			
Nonmanufacturing industries, 21–23, 42–81	319,088	281,060	38,028	i	7,544		20,502	i	9,245	737	
Information, 51	182,340	181,392	947	176	332		413	26			
Software publishers, 5112	50,295	49,602	693	102	r	308	260	23			
Other 51	132,045	131,790	254	74	24		153	3			
Finance and insurance, 52	17,222	17,173	49	0	49		0	0			
Professional, scientific, and technical services, 54	74,773	38,633	36,139	i	7,273		19,452	i	8,748	666	i
Computer systems design and related services, 5415	22,534	18,878	3,656	897	408		2,278	73			
Scientific research and development services, 5417	39,625	i	9,297	30,328	i	5,084	18,562	i	6,170	512	i
Other 54	12,614	10,458	2,155	1,292	482		300	81			
Nonmanufacturing nec, other 21–23, 42–81	44,753	43,862	893	95	669		84	45			
Size of company (number of domestic employees)											
Small companies											
10–19 ^e	5,277	4,009	1,269	495	433		242	97			
20–49	14,695	12,788	1,907	741	553		475	D			
Medium companies											
50–99	15,265	13,274	1,990	746	358		814	72	r		
100–249	27,847	24,844	3,003	1,402	554		946	99			
Large companies											
250–499	29,549	26,469	3,080	687	607		1,588	194			
500–999	31,802	29,007	2,795	679	980		1,088	48			
1,000–4,999	104,505	94,615	9,890	1,672	2,346		5,778	95	i		
5,000–9,999	58,709	54,018	4,692	2,573	1,299		713	103	i		
10,000–24,999	121,142	96,071	25,072	i	1,960		11,010	i	D		
25,000 or more	282,756	252,964	29,792	20,670	8,985		82	D			

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; r = relative standard error is more than 50%.

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

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

^b Paid for by the company includes foreign subsidiaries of U.S. companies (\$30.2 billion).

^c Foreign includes foreign parent companies of U.S. subsidiaries (\$21.0 billion) and unaffiliated companies (\$2.6 billion). Excludes funds from foreign subsidiaries to U.S. companies paid for through intercompany transactions (\$30.2 billion).

^d All other organizations includes U.S. state government agencies and laboratories (\$0.3 billion); U.S. universities, colleges, and academic researchers (< \$0.01 billion); and all other organizations located inside (\$0.7 billion) and outside the United States (< \$0.01 billion).

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

Note(s):

Detail may not add to total because of rounding. Industry classification was based on the 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. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2022.

The U.S. federal government was a large source of external funding for R&D (also referred to as R&D paid for by others) across most industries. Of the \$83 billion in domestic R&D performance paid for by others, the federal government accounted for \$32 billion. Eighty-four percent of this federal government funding went to three industry groups: aerospace products and parts (North American Industry Classification System [NAICS] code 3364) (\$19 billion), scientific research and development services (NAICS 5417) (\$5 billion), and computer and electronic products (NAICS 334) (\$3 billion). Business R&D was also funded by other U.S. companies (\$27 billion) and by foreign companies, including foreign parent companies of U.S. subsidiaries (\$24 billion). Nineteen billion dollars (68%) of all business R&D funded by other U.S. companies was within scientific research and development services (NAICS 5417). Seventy-eight percent of foreign company R&D funding went to four industry groups: pharmaceuticals and medicine (NAICS 3254) (\$8 billion), scientific research and development services (NAICS 5417) (\$6 billion), computer systems design and related services (NAICS 5415) (\$2 billion), and semiconductor and other electronic products (NAICS 3344) (\$2 billion) ([table 2](#)). (See "[Survey Information and Data Availability](#)" for information on the availability of data tables with full industry detail.)

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 \$14 trillion in 2022 ([table 3](#)).² For all industries, the R&D intensity (R&D-to-sales ratio)³ was 4.9%; for manufacturers, 5.1%; and for nonmanufacturers, 4.7%. Manufacturing industries with high levels of R&D intensity in 2022 were semiconductor and other electronic products (NAICS 3344) (23.5%) and pharmaceuticals and medicines (NAICS 3254) (16.9%). Among the nonmanufacturing industries, industries with high levels of R&D intensity were scientific research and development services (NAICS 5417) (29.0%), software publishers (NAICS 5112) (13.7%), and computer systems design and related services (NAICS 5415) (12.1%).

Table 3**Sales, R&D, R&D intensity, and employment for companies that performed or funded business R&D in the United States, by selected industry and company size: 2022**

(Millions of dollars, percent R&D intensity, and thousands of employees)

Industry, NAICS code, and company size	Domestic net sales (\$millions) ^a	All R&D (\$millions) ^b	R&D intensity (%) ^c	Domestic employment (headcounts in thousands) ^d	
				Total	R&D ^e
All industries, 21–33, 42–81	14,184,308	691,547	4.9	24,092	2,110
Manufacturing industries, 31–33	7,322,263	372,459	5.1	10,251	1,008
Chemicals, 325	1,493,442	125,728	8.4	1,446	217
Pharmaceuticals and medicines, 3254	685,744	116,073	16.9	664	172
Other 325	807,698	9,655	1.2	782	45
Machinery, 333	520,724	19,464	3.7	941	105
Computer and electronic products, 334	734,451	104,718	14.3	1,033	245
Communication equipment, 3342	94,162	11,665	12.4	131	36
Semiconductor and other electronic products, 3344	209,620	49,330	23.5	311	93
Other 334	430,669	43,723	10.2	591	116
Electrical equipment, appliance, and components, 335	190,989	7,086	3.7	373	27
Transportation equipment, 336	1,377,381	71,259	5.2	1,856	195
Motor vehicles, bodies, trailers, and parts, 3361–63	934,230	32,881	3.5	896	110
Aerospace products and parts, 3364	356,684	35,356	9.9	766	71
Other 336	86,467	3,022	3.5	194	14
Manufacturing nec, other 31–33	3,005,276	44,204	1.5	4,602	219
Nonmanufacturing industries, 21–23, 42–81	6,862,045	319,088	4.7	13,840	1,102
Information, 51	1,852,965	182,340	9.8	2,394	489
Software publishers, 5112	367,970	50,295	13.7	475	144
Other 51	1,484,995	132,045	8.9	1,919	345
Finance and insurance, 52	1,250,350	17,222	1.4	1,310	52
Professional, scientific, and technical services, 54	561,046	74,773	13.3	1,646	376
Computer systems design and related services, 5415	186,067	22,534	12.1	525	111
Scientific research and development services, 5417	136,566	39,625	29.0	406	149
Other 54	238,413	12,614	5.3	715	116
Nonmanufacturing nec, other 21–23, 42–81	3,197,684	44,753	1.4	8,490	185
Size of company (number of domestic employees)					
Small companies					
10–19 ^f	41,616	5,277	12.7	86	34
20–49	113,186	14,695	13.0	267	89
Medium companies					
50–99	179,757	15,265	8.5	366	87
100–249	384,889	27,847	7.2	808	143
Large companies					
250–499	366,007	29,549	8.1	768	123
500–999	573,879	31,802	5.5	993	131
1,000–4,999	2,052,262	104,505	5.1	3,159	348
5,000–9,999	1,590,874	58,709	3.7	1,909	181
10,000–24,999	2,883,419	121,142	4.2	3,373	338
25,000 or more	5,998,417	282,756	4.7	12,363	636
Size of company by group (number of domestic employees)					
Small ^f and medium companies					
10–249	719,448	63,084	8.8	1,527	353

Table 3**Sales, R&D, R&D intensity, and employment for companies that performed or funded business R&D in the United States, by selected industry and company size: 2022**

(Millions of dollars, percent R&D intensity, and thousands of employees)

Industry, NAICS code, and company size	Domestic net sales (\$millions) ^a	All R&D (\$millions) ^b	R&D intensity (%) ^c	Domestic employment (headcounts in thousands) ^d	
				Total	R&D ^e
Larger companies					
250–24,999	7,466,441	345,707	4.6	10,202	1,121
Largest companies					
25,000 or more	5,998,417	282,756	4.7	12,363	636

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 Dollar values are 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 All R&D is the cost of R&D paid for and performed by the respondent company and paid for by others outside of the company and performed by the respondent company.

^c 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.

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

^e Headcounts of researchers, R&D managers, technicians, clerical staff, and others assigned to R&D groups.

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

Note(s):

Detail may not add to total because of rounding. Industry classification was based on the 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.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2022.

Businesses that performed or funded R&D employed 24.1 million people in the United States in 2022 ([table 3](#)).⁴ Approximately 2.1 million (9%) were business R&D employees.⁵

Of the 2.1 million people working on R&D in companies that performed or funded business R&D in 2022, 1.5 million were men and 0.6 million were women; 48% of the men and 47% of the women worked in manufacturing industries, and 52% of the men and 53% of the women worked in nonmanufacturing industries ([table 4](#)). Researchers—that is, scientists, engineers, and their managers—accounted for 1.4 million of the 2.1 million R&D workers (68%). Of the R&D workers, 143,000 (7%) held PhD degrees. R&D technicians numbered 473,000, and 196,000 were grouped as other supporting staff.

Table 4**Domestic employment, R&D employment by sex and work activity, R&D researchers by level of education, and full-time equivalent researcher employment for companies that performed or funded business R&D in the United States, by industrial sector: 2022**

(Thousands of employees)

Industry and NAICS code	Domestic employment ^a	R&D employment									
		Total	Male	Female	Researchers ^b			Technicians and equivalent staff	Other supporting staff ^c	Full-time equivalent ^d	
					Total	With PhD				Total	Researchers ^b
All industries, 21–33, 42–81	24,092	2,110	1,501	609	1,441	143		473	196	1,941	1,316
Manufacturing industries, 31–33	10,251	1,008	723	285	690	86		205	113	925	634
Nonmanufacturing industries, 21–23, 42–81	13,840	1,102	778	324	752	56	i	267	82	1,016	682

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

NAICS = North American Industry Classification System.

^a Data recorded on 12 March represent employment figures for the year.^b Researchers includes R&D scientists and engineers and their managers.^c Other supporting staff includes clerical staff and others assigned to R&D groups.^d The number of persons employed who were assigned full time to R&D, plus a prorated number of employees who worked on R&D only part of the time.**Note(s):**

Detail may not add to total because of rounding. Industry classification was based on the 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. Also available in the full set of data tables are statistics on domestic R&D employment, by state; foreign R&D personnel headcounts, by country; and headcounts of leased (i.e., external) R&D personnel, by function.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2022.

R&D Performance, by Company Size

Small- and medium-sized companies (10–249 domestic employees) performed 9% of the nation's total business R&D in 2022 ([table 3](#)).⁶ For these companies as a group, the R&D intensity was 8.8%. These companies accounted for 5% of sales and employed 6% of the 24.1 million employees who worked for R&D-performing or R&D-funding companies. They employed 17% of the 2.1 million employees engaged in business R&D in the United States.

Larger companies with 250–24,999 domestic employees performed 50% of the nation's total business R&D in 2022, and their R&D intensity was 4.6%. They accounted for 53% of sales, employed 42% of those who worked for R&D-performing or R&D-funding companies, and employed 53% of R&D employees in the United States.

The largest companies (25,000 or more domestic employees) performed 41% of the nation's total business R&D in 2022, and their R&D intensity was 4.7%. They accounted for 42% of sales, employed 51% of those who worked for R&D-performing or R&D-funding companies, and employed 30% of business R&D employees in the United States.

R&D Performance, by State

In 2022, of the \$692 billion of R&D performed in the United States, businesses in California alone accounted for 34.1% ([table 5](#)). Other states with large amounts of business R&D were Washington (8.3% of the national total in 2022), Massachusetts (7.2%), New York (4.7%), Texas (4.5%), and New Jersey (3.8%).⁷

Table 5**Funds spent for business R&D performed in the United States, by state and source of funds: 2022**

(Millions of dollars)

State	All R&D ^a		Paid for by the company		Paid for by others	
United States	691,547		608,058		83,489	
Alabama	4,907		2,259		2,649	i
Alaska	211	i	189	i	22	
Arizona	10,261		8,250		2,010	
Arkansas	604		545		59	
California	235,556		220,081		15,474	
Colorado	10,496		8,135		2,362	i
Connecticut	11,443		9,037		2,406	
Delaware	4,544		2,874		1,670	
District of Columbia	1,007		881		126	
Florida	11,509		8,746		2,763	i
Georgia	8,666		7,684		982	i
Hawaii	491		447		44	
Idaho	2,932		2,883		49	
Illinois	18,061		16,785		1,276	i
Indiana	11,493		9,943		1,550	i
Iowa	3,956		3,257		698	
Kansas	2,996		2,219		777	i
Kentucky	1,053		925		129	i
Louisiana	604		530		75	
Maine	656		597		59	
Maryland	8,591		5,843		2,748	
Massachusetts	49,732		43,311		6,421	
Michigan	25,790		23,381		2,409	
Minnesota	8,537		8,141		396	
Mississippi	532		442		91	
Missouri	5,478		4,914		564	i
Montana	404		376		28	
Nebraska	1,459		1,395		64	
Nevada	1,811		1,471		340	
New Hampshire	3,293		1,449		1,844	
New Jersey	26,511		20,144		6,366	i
New Mexico	1,844		1,514		330	
New York	32,196		29,915		2,282	
North Carolina	16,541		11,503		5,038	i
North Dakota	472		454		18	
Ohio	13,759		10,501		3,257	
Oklahoma	1,893		1,820		73	
Oregon	12,678		12,426		252	
Pennsylvania	20,624		17,151		3,473	i
Rhode Island	635		594		40	
South Carolina	2,616		2,319		297	
South Dakota	213		201		12	
Tennessee	3,473		2,147		1,326	i
Texas	31,365		26,151		5,214	i
Utah	4,019		3,748		271	
Vermont	676		614		62	
Virginia	8,766		6,451		2,315	
Washington	57,295		55,718		1,576	

Table 5**Funds spent for business R&D performed in the United States, by state and source of funds: 2022**

(Millions of dollars)

State	All R&D ^a	Paid for by the company	Paid for by others
West Virginia	467	444	23
Wisconsin	7,585	6,470	1,114 i
Wyoming	81	78	3 i
Undistributed funds ^b	765	703	62

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 respondent company.^b Undistributed funds 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.**Note(s):**

Detail may not add to total because of rounding.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2022.

Capital Expenditures

Companies that performed or funded R&D in the United States in 2022 spent \$870 billion on capital, that is, assets with expected useful lives of more than 1 year ([table 6](#)). Of this amount, \$36 billion (4%) was for assets used for domestic R&D operations (i.e., land acquisitions, buildings and land improvement, equipment, capitalized software, and other assets). Companies in manufacturing industries spent \$24 billion on capital for domestic R&D, and companies in nonmanufacturing industries spent \$12 billion. Industries with high levels of capital expenditures on assets used for domestic R&D in 2022 were pharmaceuticals and medicines (NAICS 3254) (\$5.2 billion, or 15% of national capital expenditures on assets used for R&D) and semiconductor and other electronic products (NAICS 3344) (\$5 billion, or 14%). Among all types of capital assets, both manufacturing and nonmanufacturing industries spent the most on equipment. For equipment, manufacturing disbursed \$14.7 billion, or 62% of total capital assets used for domestic R&D and nonmanufacturing industries spent \$7.5 billion, or 61%.

Table 6**Capital expenditures in the United States, total and amount used for domestic R&D, by type of expenditure, industry, and company size: 2022**

(Millions of dollars)

Selected industry, NAICS code, and company size	Total ^b	Used for domestic R&D ^a						
		Total ^{b,c}	Land acquisition	Buildings and land improvement ^d	Equipment	Capitalized software	Other intellectual property	All other and undistributed ^e
All industries, 21–33, 42–81	869,538	36,069	155	5,135	22,228	2,743	3,726	2,082
Manufacturing industries, 31–33	310,111	23,717	100	3,790	14,713	1,466	2,144	1,504
Chemicals, 325	62,932	6,121	52	1,611	2,988	323	884	263
Pharmaceuticals and medicines, 3254	28,479	5,234	41	1,332	2,453	290	877	241
Other 325	34,453	887	11	279	535	33	7	22
Machinery, 333	16,324	1,788	1 i	255	978	167	39	349
Computer and electronic products, 334	47,559	8,444 i	2	721	6,106 i	514	788 i	312 i

Table 6**Capital expenditures in the United States, total and amount used for domestic R&D, by type of expenditure, industry, and company size: 2022**

(Millions of dollars)

Selected industry, NAICS code, and company size	Total ^b	Used for domestic R&D ^a									
		Total ^{b,c}	Land acquisition	Buildings and land improvement ^d	Equipment	Capitalized software	Other intellectual property	All other and undistributed ^e			
Communication equipment, 3342	3,855	482	1	D	307	71	i	D	D		
Semiconductor and other electronic products, 3344	26,434	i 4,981	i 1	i 185	i 3,846	i 239	i 491	i 220	i		
Other 334	17,270	2,981	i 0	D	1,953	i 204	i D	D			
Electrical equipment, appliance, and components, 335	6,676	i 675	* 44	i 495	28	14	i 94				
Transportation equipment, 336	56,376	3,128	12	i 542	1,892	245	253	i 183			
Motor vehicles, bodies, trailers, and parts, 3361–63	42,726	2,159	8	i 339	1,218	193	250	i 152			
Aerospace products and parts, 3364	10,782	819	4	168	574	49	2	22			
Other 336	2,868	150	0	i 35	100	3	1	i 9			
Manufacturing nec, other 31–33	120,244	3,561	33	617	2,254	189	166	303			
Nonmanufacturing industries, 21–23, 42–81	559,428	12,353	55	i 1,345	i 7,515	1,277	i 1,582	i 578			
Information, 51	218,255	7,889	13	i 765	i 5,062	878	i 886	i 285			
Software publishers, 5112	32,114	2,915	9	i 67	i 2,477	214	D	D			
Telecommunications, 517	93,417	487	i 0	61	i 116	i 309	i 0	*			
Other 51	92,724	4,487	4	i 637	i 2,469	355	D	D			
Finance and insurance, 52	26,641	59	i 0	6	39	5	i 8	1	i		
Professional, scientific, and technical services, 54	27,522	2,370	42	i 479	1,311	216	i 165	158			
Computer systems design and related services, 5415	10,418	528	0	19	362	81	27	40			
Scientific research and development services, 5417	9,266	i 1,423	i 41	i 426	737	54	68	97			
Other 54	7,838	419	1	i 34	212	81	i 70	21			
Nonmanufacturing nec, other 21–23, 42–81	287,010	2,035	0	95	1,103	178	523	134			
Size of company (number of domestic employees)											
Small companies											
10–19 ^f	1,349	i 204	i 2	i 26	122	i 23	i 13	17			
20–49	6,698	847	18	87	583	48	i 50	62			
Medium companies											
50–99	10,638	887	16	186	541	65	i 27	i 52			
100–249	15,299	1,540	8	i 268	949	125	110	80			
Large companies											
250–499	15,387	1,322	3	i 262	724	132	123	78			
500–999	27,577	1,729	22	234	974	178	115	206			
1,000–4,999	91,332	4,944	40	878	2,933	i 473	i 325	296			
5,000–9,999	85,689	3,152	5	i 301	2,254	360	113	i 119			
10,000–24,999	204,664	7,313	26	1,226	4,286	429	999	346			
25,000 or more	410,906	14,131	i 16	i 1,666	i 8,863	909	i 1,850	i 826			

* = amount < \$500,000; 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. Statistics from the Business Enterprise Research and Development Survey exclude the cost of assets acquired through mergers and acquisitions.

^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 2022, depreciation associated with domestic R&D paid for and performed by the company was \$20.2 billion and with domestic R&D performed by the company and paid for by others was \$2.3 billion.

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

^e All other and undistributed 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 Enterprise Research and Development Survey does not include companies with fewer than 10 domestic employees.

Note(s):

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.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2022.

Survey Information and Data Availability

The sample for the BERD Survey was selected to represent all for-profit, nonfarm companies that were publicly or privately held, had 10 or more employees in the United States, and performed or funded R&D either domestically or abroad. The estimates in this InfoBrief are based on responses from a sample of the population and may differ from actual values because of sampling variability or other factors. As a result, apparent differences between the estimates for two or more groups may not be statistically significant. All comparative statements in this InfoBrief have undergone statistical testing and are significant at the 90% confidence level unless otherwise noted. The variances of estimates in this report were calculated using design-based formulas. Also, because the statistics from the survey are based on a sample, they are subject to both sampling and nonsampling errors. (See the 2022 "Technical Notes" at <https://nces.nsf.gov/surveys/business-enterprise-research-development/2022#methodology>.)

Beginning in survey year 2018, companies that performed or funded less than \$50,000 of R&D were excluded from tabulation.

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.

For 2021, a total of 47,500 companies were sampled to represent the population of 1,137,000 companies; for 2022, a total of 45,500 companies were sampled, representing 1,104,000 companies. The actual numbers of reporting units in the sample that remained within the scope of the survey between sample selection and tabulation were 44,000 for 2021 and 42,500 for 2022. 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 10 employees in the United States or had gone out of business in the interim. Of these in-scope reporting units, 69% were considered to have met the criteria for a complete response to the 2021 survey; 67% fulfilled the 2022 complete response criteria. Coverage of the previous year's known positive R&D stratum for 2021 was 92%; the coverage rate for 2022 was 94%. 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 estimation methodology for state estimates in the BERD Survey takes the form of a hybrid estimator, combining the unweighted reported amount, by state, with a weighted amount apportioned (or raked) across states with relevant industrial activity. The hybrid estimator smooths the estimate over states with R&D activity, by industry, and accounts for real observed change within a state. [Table 5](#) shows the adjusted state estimates after this estimation methodology was applied.

The full set of data tables from the 2022 survey will be available at the [BERD Survey page](#). Individual data tables and tables with relative standard errors and imputation rates from the 2022 survey are available from the author in advance of the full release. To minimize reporting burden, survey items are rotated on and off the survey on an odd- and even-numbered year schedule. Statistics on R&D performed by others by type of performer, activities with academia, federal R&D by government agency, and R&D by application area were rotated off the survey for 2022. Items rotated on the survey for 2022 include questions on patents, intellectual property, and technology transfer activities.

The BERD Survey contains confidential data that are protected under Title 13 and Title 26 of the U.S. Code. Restricted microdata can be accessed at the secure Federal Statistical Research Data Centers (FSRDCs) administered by the Census Bureau. FSRDCs are partnerships between federal statistical agencies and leading research institutions. FSRDCs provide secure environments supporting qualified researchers using restricted-access data while protecting respondent confidentiality. Researchers interested in using the microdata can submit a proposal to the Census Bureau, which evaluates proposals based on their benefit to the Census Bureau, scientific merit, feasibility, and risk of disclosure. To learn more about the FSRDCs and how to apply, please visit <https://www.census.gov/about/adrm/fsrdc.html>.

NCSES has reviewed this product for unauthorized disclosure of confidential information and approved its release (NCSES-DRN24-042).

Notes

- 1 NSF has cosponsored 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 (BRDIS), collected data for 2008–16. Beginning with 2017, the collection of innovation data was moved to the Annual Business Survey (ABS), another survey cosponsored with the Census Bureau, and BRDIS became the Business Research and Development Survey (BRDS). Beginning with 2019, the business R&D data collection reported here was renamed for international comparability to the Business Enterprise Research and Development (BERD) Survey.
- 2 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.
- 3 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.
- 4 Employment statistics in this InfoBrief are headcounts unless they are designated as full-time equivalent (FTE) estimates. 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.
- 5 The number of persons employed who were assigned full time to R&D plus a prorated number of employees who worked on R&D only part of the time was 1.9 million FTEs, of which 1.3 million FTEs were R&D researchers.
- 6 Company size classifications changed for 2017 and subsequent years in response to the revised *Frascati Manual*; see Organisation for Economic Co-operation 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. Anderson and Kindlon (2019) provide estimates of R&D performance and employment using these new classifications over 2008–15. The authors also compare the trends to those observed in SIRD for the time prior to 2008. The ABS, also cosponsored by NCSES and the Census Bureau, collects R&D data from companies with fewer than 10 employees for 2017 and beyond. See Anderson G, Kindlon A; NCSES. 2019. *Indicators of R&D in Small Businesses: Data from the 2009–15 Business R&D and Innovation Survey*. NSF 19-316. Alexandria, VA: U.S. National Science Foundation. Available at <https://www.nsf.gov/statistics/2019/nsf19316/>.

7 In addition to statistics for all states and for all states by industry, below-state level statistics are available in the full set of data tables and in other InfoBriefs; see Shackelford B, Wolfe R; NCSES. 2019. *Over Half of U.S. Business R&D Performed in 10 Metropolitan Areas in 2015*. NSF 19-322. Alexandria, VA: U.S. National Science Foundation. Available at <https://www.nsf.gov/statistics/2019/nsf19322/>. Also see Shackelford B, Wolfe R; NCSES. 2020. *Businesses Performed 60% of Their U.S. R&D in 10 Metropolitan Areas in 2018*. NSF 21-331. Alexandria, VA: U.S. National Science Foundation. Available at <https://nces.nsf.gov/pubs/nsf21331>. Information and statistics on U.S. state trends in R&D, science and engineering education, workforce, patents and publications, and knowledge-intensive industries is also available in the Science and Engineering State Indicators data tool at <https://nces.nsf.gov/indicators/states>.

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