



National Center for Science and  
Engineering Statistics

# Business Enterprise Research and Development: 2020

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## General Notes

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The Business Enterprise Research and Development (BERD) Survey is the primary source of information on domestic and global research and development expenditures and the R&D workforce for companies operating in the 50 U.S. states and the District of Columbia. The survey is conducted annually by the Census Bureau in accordance with an interagency agreement with the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation. NCSES 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, another survey cosponsored with the Census Bureau, and the 2017 and 2018 business R&D data collections reported in this report series were renamed the Business Research and Development Survey (BRDS). Beginning with the data collection for 2019, the survey was renamed for international comparability. The BERD Survey [questionnaires](#), [publications](#), and [data](#) can be found at <https://www.nsf.gov/statistics/industry/>.

The results of the survey are used to assess trends in the performance and funding of R&D. Government agencies, corporations, and research organizations use the data to investigate productivity, formulate tax policy, and compare individual company performance with industry averages. Individual researchers in industry and academia use the data to investigate a variety of topics and to prepare professional papers, dissertations, and books. Total R&D expenditure statistics are used by the Bureau of Economic Analysis for inclusion in its System of National Accounts and Foreign Direct Investment programs.

Further, statistics from the BERD Survey make it possible to evaluate more fully the status of R&D in the United States and to compare the R&D activities of the United States with those of other nations. The usefulness of the information collected in this survey is enhanced by linking it to the Census Bureau's Longitudinal Establishment and Enterprise Microdata file, which contains information on the outputs and inputs of companies' manufacturing plants. Response to this survey is mandatory and confidential under Title 13 of the United States Code.

For the BERD Survey, data are collected from a probability sample of for-profit companies, which are classified in select manufacturing and nonmanufacturing industries. The BERD Survey is administered both to companies known to have performed R&D and to companies with no known history of R&D activity. The survey is sent to a single coordinator within each company, but it is organized into sections that help the coordinator collect specific types of information from different experts (human resources, accounting, R&D managers, etc.) in the company. Foreign-owned companies are instructed to report only for company operations owned by the U.S. subsidiary and, for purposes of the survey, to treat the foreign owners as if they were unrelated third parties.

The target population for the BERD Survey consists of all for-profit companies that have 10 or more paid employees in the United States, that have at least one establishment located in the United States in business during the survey year, and that are classified in certain industries, with a particular focus on those companies that perform R&D in the United States. A company is defined as one or more establishments under common domestic ownership or control.

The Census Bureau's Business Register contains information on more than 7.3 million establishments with paid employees. It serves as the primary input to the sampling frame from which the sample is selected. For companies with more than one establishment, data are summed to the company level to assign an industry classification code and a measure of size, which are used in designing the sample. Companies are excluded from the frame if they are classified in an industry that is outside the scope of the BERD Survey or if they have fewer than 10 employees, based on their prior year aggregated annual payroll and employment data.

In addition to single-year tables for 2020 ([table 1](#) through [table 57](#), [table 66](#) through [table 69](#)), this report includes tables containing statistics for multiple years ([table 58](#) through [table 65](#)). In these tables, most prior year statistics have been revised since originally published. Revised statistics include adjustments based on information obtained after the original statistics were prepared. For any given year, after the tables are published, the statistical file used to produce the tables stays open for about 1 year before it is permanently closed. During that year, respondents may provide updated data; also, information from other Census Bureau surveys or publicly available sources may become available. The new data and information are evaluated and tested; if appropriate, revisions are made to the statistical file. The multiyear tables in this report were prepared using the statistical files for the 2020 BERD Survey, the revised 2019 BERD Survey, and the revised BRDIS and BRDS statistical files for 2008–18.

Also in this report are tables designed to enable comparisons between U.S. BERD Survey statistics and those of other nations. There are three groups of tables corresponding to the three principal measures of domestic R&D in the U.S. BERD Survey—that is, R&D paid for by the respondent company and others outside of the company and performed by the respondent company ([table 70](#) through [table 75](#)), R&D paid for and performed by the respondent company ([table 76](#) through [table 81](#)), and R&D paid for by others and performed by the company ([table 82](#) through [table 87](#))—for 2015–20. In each table, an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD Survey domestic R&D, and then adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD Survey domestic R&D. Also shown in each table are the differences between U.S. BERD Survey estimates in this report and the adjusted internationally comparable estimates for domestic R&D.

Beginning with the tables for the 2017 survey year, disclosure avoidance is now handled differently than it had been in prior years' tables. Cell suppression is a disclosure avoidance technique that protects the confidentiality of individual survey units by withholding cell values from release and replacing the cell value with a data code. This technique was used in SIRD, BRDIS, and BRDS tables; data in affected cells were replaced with a "D." For most of the tables in this report, disclosure avoidance is accomplished by replacing cells with an estimate range. Confidentiality is maintained while the usefulness of the statistics is enhanced because most of the completely suppressed cells in past years' tables have been eliminated. For cases where confidentiality cannot be maintained even with the new estimate range technique, a "D" is substituted.

Terms used in business accounting and incorporated throughout the tables are defined in the section "[Technical Notes](#)." The information and statistics in this report supersede information and statistics in previously published reports.

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TABLE 1

**Business Enterprise Research and Development Survey aggregate estimates, by questionnaire reference: 2020**

(Millions of U.S. dollars and thousands of employees)

Question	Survey item	Aggregate amount
Company and financial information (US\$millions)		
1.12	Worldwide net sales and operating revenues	14,863,520
1.13	Net sales and operating revenues from domestic operations	11,296,552
	R&D paid for by the company and performed by the company and others	
2.1	Worldwide R&D paid for by the company (expense), total	660,748
2.3	Worldwide R&D paid for by the company (expense), adjustments	48,421
2.4/ 2.7c	Worldwide R&D paid for by the company and performed by the company and others	612,326
2.7a	Domestic R&D paid for by the company and performed by the company and others	504,793
2.7b	Foreign R&D paid for by the company and performed by the company and others	107,533
2.5	Indirect R&D charges to be recouped from the U.S. federal government (independent R&D [IR&D]) <sup>a</sup>	6,307
2.8m(1)	Domestic R&D paid for by the company and performed by the company and others	504,793
2.8a(1)	Salaries, wages, and fringe benefits	258,088
2.8b(1)	Stock-based compensation	47,548
2.8c(1)	Leased or temporary staffing, including on-site contractors, working on R&D	20,710
2.8d(1)	Expensed equipment (not capitalized)	7,555
2.8e(1)	Materials and supplies	27,379
2.8f(1)	Leased facilities and equipment	7,799
2.8g(1)	Depreciation and amortization on R&D property, plant, equipment, and intangible assets	18,558
2.8h(1)	Royalties and licensing fees	3,476
2.8i(1)	Collaborative R&D payments	7,751
2.8j(1)	Contract R&D	30,880
2.8k(1)	Other purchased services	12,415
2.8l(1)	All other costs	62,634
2.9(3)	Worldwide R&D paid for by the company and performed by others	47,977
2.9(1)	Domestic R&D paid for by the company and performed by others	38,631
2.9(2)	Foreign R&D paid for by the company and performed by others	9,346
2.10(3)	Worldwide R&D paid for and performed by the company	564,350
2.10(1)	Domestic R&D paid for and performed by the company	466,162
2.10(2)	Foreign R&D paid for and performed by the company	98,187
2.9(3) + 2.10(3) + 3.4(3) + 3.5(3)	Worldwide R&D paid for by the company and others and performed by the company and others	705,790
2.10(3) + 3.5(3)	Worldwide R&D paid for by the company and others and performed by the company	647,324
2.9(1) + 2.10(1) + 3.4(1) + 3.5(1)	Domestic R&D paid for by the company and others and performed by the company and others	585,694
2.10(1) + 3.5(1)	Domestic R&D paid for by the company and others and performed by the company	537,619
	Domestic R&D paid for and performed by the company	
2.14	Performed at largest domestic location	294,994
2.16	Performed at second-largest domestic location	44,160
2.18	Domestic R&D paid for by foreign operations or subsidiaries and performed by the company <sup>a</sup>	27,038
2.19	Foreign R&D paid for by domestic operations or subsidiaries and performed by the company <sup>a</sup>	21,993
2.9(1)	Domestic R&D paid for by the company and performed by others	38,631
	Projected worldwide R&D expense paid for and performed by the company in 2020	
2.20(3)	Worldwide R&D to be paid for and performed by the company	692,741
2.20(1)	Domestic R&D to be paid for and performed by the company	574,938
2.20(2)	Foreign R&D to be paid for and performed by the company	117,803
2.21	Projected R&D services and projected payments for collaborative R&D	45,995
3.1j/ 3.2c	Worldwide R&D paid for by others and performed by the company and others	93,463
3.1a	R&D reimbursed by the company's foreign parent or owner	20,299
3.1b	Collaborative R&D reimbursed by business partners	9,696
3.1c	R&D paid for by grants (government or private foundation)	11,113

TABLE 1

**Business Enterprise Research and Development Survey aggregate estimates, by questionnaire reference: 2020**

(Millions of U.S. dollars and thousands of employees)

Question	Survey item	Aggregate amount	
3.1d	Defense R&D goods or services provided as a prime contractor or subcontractor to the federal government and/ or government contractors	19,624	i
3.1e	Medical clinical trial Phase I–III services provided to others not owned by the company	21,577	i
3.1f	Medical R&D services, other than clinical trials, provided to others not owned by the company	2,945	
3.1g	Nondefense custom software development or computer systems designed for others not owned by the company	661	
3.1h	Prototype development, production, and testing for customer's products	1,559	
3.1i	All other R&D services provided to the federal government or to others not owned by the company	5,989	i
3.2c/ 3.1j	Worldwide R&D paid for by others and performed by the company and others	93,463	
3.2a	Domestic R&D paid for by others and performed by the company and others	80,901	
3.2b	Foreign R&D paid for by others and performed by the company and others	12,563	i
3.3m(1)	Domestic R&D paid for by others and performed by the company and others	80,901	
3.3a(1)	Salaries, wages, and fringe benefits	41,958	
3.3b(1)	Stock-based compensation	795	
3.3c(1)	Leased or temporary staffing, including on-site contractors	2,745	
3.3d(1)	Expensed equipment (not capitalized)	373	
3.3e(1)	Materials and supplies	7,642	
3.3f(1)	Leased facilities and equipment rental payments	1,110	
3.3g(1)	Depreciation and amortization on R&D property, plant, equipment, and intangible assets	2,414	
3.3h(1)	Royalties and licensing fees	309	
3.3i(1)	Collaborative R&D payments	2,834	
3.3j(1)	Contract R&D	6,610	
3.3k(1)	Other purchased services	4,386	i
3.3l(1)	All other costs	9,724	
3.4(3)	Worldwide R&D paid for and performed by others	10,489	
3.4(1)	Domestic R&D paid for and performed by others	9,444	
3.4(2)	Foreign R&D paid for and performed by others	1,045	
3.5(3)	Worldwide R&D paid for by others and performed by the company	82,975	
3.5(2)	Foreign R&D paid for by others and performed by the company	11,518	i
3.5(1)	Domestic R&D paid for by others and performed by the company	71,457	
3.8a	Other companies in the United States	21,572	
3.8b	Your company's foreign parent or owner	17,784	
3.8c	Other companies outside the United States	2,070	
3.8d/ 3.11j/ 3.12c	U.S. federal government agencies or laboratories	28,905	
3.8e	U.S. state and local government agencies or laboratories	199	
3.8f	Foreign government agencies or laboratories	128	
3.8g	U.S. universities, colleges, and academic researchers	60	
3.8h	Universities, colleges, and academic researchers outside the United States	2	
3.8i	All other organizations in the United States	707	
3.8j	All other organizations outside the United States	30	
3.8d	Federally funded R&D performed by the company	28,905	
	Domestic R&D paid for by others and performed by the company		
3.13	Performed at largest domestic location	32,965	
3.15	Performed at second-largest domestic location	6,916	
3.16	Domestic R&D paid for by U.S. federal government agencies or laboratories and performed by others	3,694	
	Projected R&D to be paid for by others and performed by the company in 2021		
3.17	Worldwide R&D to be paid for by others and performed by the company	99,058	
3.18	Domestic R&D to be paid for by others and performed by the company	77,900	
3.19	Domestic R&D to be paid for by the U.S. federal government and performed by the company	30,938	
4.1	Total domestic capital expenditures	686,393	
4.2/ 4.3f	Domestic capital expenditures for R&D	32,494	

TABLE 1

**Business Enterprise Research and Development Survey aggregate estimates, by questionnaire reference: 2020**

(Millions of U.S. dollars and thousands of employees)

Question	Survey item	Aggregate amount
4.3a	Land acquisition	147
4.3b	Buildings and land improvement	4,060
4.3c	Equipment	15,731
4.3d	Capitalized software	8,436
4.3e	All other capital expenditures for R&D	4,120
5.1	Worldwide R&D paid for and performed by the company and others directed toward business areas or product lines new to the company	86,264
5.2/ 2.10(1)	Domestic R&D paid for and performed by the company	466,162
	Type of R&D (character of work)	
5.4b	Basic research	29,330
5.4a	Applied research	60,620
5.3b	Development	376,213
	Technology focus areas	
5.5	Software products and software embedded in other projects or products	212,555 i
5.6	Biotechnology	72,459
5.7	Nanotechnology	20,721 i
5.8	Artificial intelligence	18,613 i
5.10c	Foreign R&D paid for and performed by the company	98,187
5.10a	Research	13,872
5.10b	Development	84,315
5.11/ 3.5(1)	Domestic R&D paid for by others and performed by the company	71,457
	Type of R&D (character of work)	
5.13b	Basic research	6,688
5.13a	Applied research	15,468
5.12b	Development	49,301
	Technology focus areas	
5.14	Software products and software embedded in other projects or products	13,589 i
5.15	Biotechnology	15,964
5.16	Nanotechnology	1,701 i
5.17	Artificial intelligence	2,030 i
	Federally funded R&D performed by the company	
	Type of R&D (character of work)	
5.20b	Basic research	2,148 i
5.20a	Applied research	5,698
5.19b	Development	21,059
	Technology focus areas	
5.21	Federally funded R&D performed by the company for software products and software embedded in other projects or products	6,303 i
5.23c	Foreign R&D paid for by others and performed by the company	11,518 i
5.23a	Research	3,138 i
5.23b	Development	8,380 i
Employees (thousands)		
	Worldwide	
1.8/ 1.9(3)/ 6.1c(3)	Total employees	33,086
6.1b(3)	Non-R&D employees	30,240
6.1a(3)	R&D employees	2,847
6.4a(3)	Female	797
6.4b(3)	Male	2,050
6.5a(3)	Researchers	1,924
6.5b(3)	Technicians	658
6.5c(3)	Support staff	265

TABLE 1

**Business Enterprise Research and Development Survey aggregate estimates, by questionnaire reference: 2020**

(Millions of U.S. dollars and thousands of employees)

Question	Survey item	Aggregate amount
	Domestic	
1.9(1)/ 6.1c(1)	Total employees	22,034
6.1b(1)	Non-R&D employees	20,098
6.1a(1)	R&D employees	1,936
6.4a(1)	Female	517
6.4b(1)	Male	1,419
6.5a(1)	Researchers	1,312
6.5b(1)	Technicians	443
6.5c(1)	Support staff	181
	Foreign	
1.9(2)/ 6.1c(2)	Total employees	11,052
6.1b(2)	Non-R&D employees	10,142
6.1a(2)	R&D employees	910
6.4a(2)	Female	280
6.4b(2)	Male	631
6.5a(2)	Researchers	613
6.5b(2)	Technicians	214
6.5c(2)	Support staff	83
	Researchers with PhD	
6.6(3)	Worldwide	163
6.6(1)	Domestic	129
6.6(2)	Foreign	35
	Full-time equivalent	
6.7d	R&D employees	1,765
6.7a	Full-time R&D employees	1,472
6.7b	Full-time employees not solely working on R&D	272
6.7c	Part-time employees working on R&D	21
6.8d	Researchers	1,201
6.8a	Full-time R&D employees	1,038
6.8b	Full-time employees not solely working on R&D	152
6.8c	Part-time employees working on R&D	10
6.9	Non-U.S. citizens employed as researchers under temporary visa <sup>a</sup>	66
6.10d(1)	Total leased and temporary employees working on R&D	250 i
6.10a(1)	Researchers	161 i
6.10b(1)	Technicians	56 i
6.10c(1)	Support staff	33 i
	U.S. patents (number) <sup>a</sup>	
7.1	Patents applied for, total	163,300
7.2	Nonprovisional utility patents applied for	112,959
7.3	Nonprovisional utility patent applications filed or planned in foreign jurisdictions	53,553
7.4	Nonprovisional utility patent applications originated from organized R&D activities	89,324
7.6	Utility patents issued	116,651
	U.S. patents (US\$millions) <sup>a</sup>	
	Revenue received	
7.7	From sale of utility patents	929
7.8	From licensing utility patents	28,777
	Amount paid	
7.10	To purchase patents	1,016
7.11	To license patents	12,671

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

<sup>a</sup> Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. These statistics include an adjustment to the weight to account for unit nonresponse.

**Note(s):**

Detail may not add to total because of rounding. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



**TABLE 2**  
**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
All industries	21-23, 31-33, 42-81	647,324	564,350	82,975	537,619	466,162	71,457	109,705	98,187	11,518 i
Manufacturing industries	31-33	374,688	329,425	45,263	308,445	264,596	43,848	66,243	64,829	1,414
Food	311	6,392 - 6,399	6,139	253 - 260	5,239	4,985	254	1,153 - 1,161	1,154	0 - 6
Beverage and tobacco products	312	1,935	1,814	121	1,177 i	1,056	121	759	759	0
Textile, apparel, and leather products	313-16	973	964	9	822	812	9	152	152	0
Wood products	321	195	192	3	187	183	3	8	8	0
Paper	322	1,021	1,020	1	928	927	1	93	93	* i
Printing and related support activities	323	294	292	1	283	282	1	10	10	0
Petroleum and coal products	324	1,476 - 1,490	1,387	89 - 103	1,311 - 1,324	1,222	89 - 103	165	165	* i
Chemicals	325	120,440	108,521	11,919	101,079	89,403	11,675	19,362	19,118	244
Basic chemicals	3251	3,540	3,364	175	2,694	2,523	171	846	842	4
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,745	1,665	81	1,234	1,161	73	512	504	8
Pesticide, fertilizer, and other agricultural chemicals	3253	1,157 - 1,172	866	291 - 306	1,060 - 1,066	775	284 - 291	92 - 108	91	0 - 17
Pharmaceuticals and medicines	3254	108,537	97,406	11,131	91,776	80,858	10,918	16,761	16,548	213
Soap, cleaning compound, and toilet preparation	3256	3,432	3,239	192	2,665	2,476	189	767	763	3
Paint, coating, adhesive, and other chemicals	3255, 3259	2,013 - 2,028	1,981	32 - 47	1,643 - 1,649	1,610	32 - 39	370 - 385	370	0 - 14 i
Plastics and rubber products	326	3,162	3,136	26	2,634	2,607	26	529	529	* i
Nonmetallic mineral products	327	1,924 i	1,822 i	102	1,717 i	1,619 i	98	206 i	203 i	3
Primary metals	331	847	827	20	815	795	20	32	32	* i
Fabricated metal products	332	3,746	3,681	65	3,396	3,336	60	349	345	5 i
Machinery	333	20,508	19,254	1,254	16,223	15,071	1,152	4,285	4,183	102
Agricultural implement	33311	2,450	2,399	51 i	1,769 - 1,811	1,760	10 - 52	639 - 681	640	0 - 41
Semiconductor machinery	333242	5,834	5,134	700	4,807	4,121	686	1,027	1,013	14
Engine, turbine, and power transmission equipment	3336	2,203	2,032	171	1,645	1,523	122	558	509	49
Other machinery	other 333	10,022	9,689	333	7,959 - 8,001	7,667	292 - 334	2,021 - 2,062	2,021	0 - 41
Computer and electronic products	334	126,102	114,726	11,376	99,535	88,505	11,030	26,567	26,222	346
Communications equipment	3342	15,491	14,486	1,005 i	12,103	11,107	996 i	3,388	3,379	9

TABLE 2

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance			
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	
Semiconductor and other electronic components	3344	56,204	53,669	2,535	43,181	40,801	2,380	13,023	12,868	155	i
Navigational, measuring, electromedical, and control instruments	3345	21,651	13,995	7,655	18,505	11,012	7,493	3,146	2,984	163	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,356	3,094	262	2,858	2,606	251	498	488	10	i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	11,270	4,119	7,151	10,586	3,561	7,025	684	558	126	i
Other measuring and controlling device	other 3345	7,025	6,783	243	5,061	4,844	217	1,964	1,939	26	
Other computer and electronic products	other 334	32,756	32,576	180	25,747	25,585	161	7,010	6,991	19	
Electrical equipment, appliances, and components	335	6,792	6,244	549	4,998	4,492	506	1,794	1,751	43	
Transportation equipment	336	55,311	36,134	19,177	48,796	30,232	18,564	6,515	5,902	613	
Motor vehicles, bodies, trailers, and parts	3361-63	28,910 - 28,922	24,821	4,089 - 4,101	23,121	19,522	3,599	5,789 - 5,801	5,299	490 - 502	i
Aerospace products and parts	3364	23,424	9,526	13,897	22,914	9,111	13,803	509	415	94	i
Aircraft, aircraft engine, and aircraft parts	336411-13	21,791	8,686	13,105	21,291	8,281	13,011	500	406	94	i
Guided missile, space vehicle, and related parts	336414-15, 336419	1,633	840	793	1,623	831	793	10	10	0	
Military armored vehicle, tank, and tank component	336992	11	4	6	11	4	6	0	0	0	
Other transportation	other 336	2,955 - 2,966	1,782	1,173 - 1,184	2,750	1,594	1,155	206 - 216	187	18 - 29	
Furniture and related products	337	535	532	3	496	492	3	39	39	0	
Miscellaneous	339	23,013 - 23,027	22,739	274 - 287	18,791 - 18,809	18,576	215 - 233	4,217 - 4,224	4,164	54 - 60	
Medical equipment and supplies	3391	19,938	19,718	221	16,116	15,944	173	3,822	3,774	48	
Other miscellaneous manufacturing	3399	3,075 - 3,088	3,022	53 - 66	2,674 - 2,692	2,632	42 - 60	396 - 403	390	6 - 13	
Nonmanufacturing industries	21-23, 42-81	272,637	234,925	37,712	229,174	201,566	27,608	43,462	33,359	10,104	i
Mining, quarrying, oil and gas extraction, and support activities	21	1,285 - 1,292	1,239	46 - 53	1,165	1,121	45	120 - 127	119	2 - 8	i
Utilities	22	271	230	40	264	224	40	6	6	0	
Wholesale trade	42	1,104	1,045	59	1,058	1,001	58	45	44	1	i
Electronic shopping and electronic auctions	454111-12	3,937 - 24,262	3,935 - 24,223	2 - 50	3,840 - 19,390	3,837 - 19,343	2 - 50	97 - 4,884	97 - 4,884	0	i
Transportation and warehousing	48-49	4,994	4,991	3	4,957	4,954	3	37	37	0	
Information	51	152,363	151,219	1,144	129,463	128,350	1,113	22,900	22,869	31	
Publishing	511	42,708	42,169	539	35,025	34,516	509	7,683	7,654	29	

TABLE 2

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Newspaper, periodical, book, and directory publishers	5111	60	60	0	60	60	0	0	0	0
Software publishers	5112	42,648	42,109	539	34,965	34,456	509	7,683	7,654	29
Telecommunications	517	3,519 - 3,532	3,466	54 - 66	3,425 - 3,437	3,371	54 - 66	94	94	0
Data processing, hosting, and related services	518	49,697	49,250	447	41,551	41,105	446	8,147	8,145	1 i
Other information	other 51	56,425 - 56,440	56,334	91 - 105	49,449 - 49,463	49,358	91 - 105	6,976	6,976	0
Finance and insurance	52	13,837	13,695	142	12,296	12,204	92	1,541	1,490	51
Real estate and rental and leasing	53	3,412	3,412	*	3,249	3,249	*	163	163	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6 - 21	6 - 21	*	7	7	*	0 - 15	0 - 15	0
Other real estate and rental and leasing	other 53	3,390 - 3,406	3,390 - 3,406	0	3,242	3,242	0	148 - 164	148 - 164	0
Professional, scientific, and technical services	54	68,112	32,053	36,059	54,367	28,322	26,045	13,744 i	3,731	10,013 i
Architectural, engineering, and related services	5413	4,235	2,225	2,009	4,214	2,214	2,001	20	12 i	9
Computer systems design and related services	5415	21,259	17,502	3,758	17,935	14,293	3,643	3,324	3,209	115
Scientific research and development services	5417	35,670 i	6,442 i	29,227 i	25,600	6,246	19,354	10,070 i	196	9,874 i
Research and development in nanotechnology	541713	179 - 182 i	125 - 129 i	53 i	179 i	126 i	53 i	0 - 3	0 - 3	0
Research and development in biotechnology (except nanobiotechnology)	541714	9,120	1,284	7,836	6,191	1,176	5,014	2,929	108	2,822
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	25,674 i	4,988 - 4,996 i	20,678 - 20,685 i	18,539 i	4,906 i	13,632 i	7,135 i	82 - 89 i	7,045 - 7,053 i
Research and development in the social sciences and humanities	541720	692 - 698	37 - 45	653 - 661	691	38	654	1 - 7	0 - 7 i	0 - 7
Other professional, scientific, and technical services	other 54	6,948	5,884	1,065	6,618	5,570	1,048	330	314	16
Health care services	621-23	1,495 - 1,498	1,393	102 - 105	1,477	1,374	103	18 - 22 i	19	0 - 2 i
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,504 - 21,828	1,429 - 21,717	63 - 111	1,491 - 17,041	1,429 - 16,934	62 - 109	1 - 4,789 i	0 - 4,787	2 i
All companies (number of domestic employees)	-	647,324	564,350	82,975	537,619	466,162	71,457	109,705	98,187	11,518 i
Small companies										
10-19 <sup>a</sup>	-	5,338	4,282	1,056	5,047	4,019	1,029	290	263	27
20-49	-	13,600	11,538	2,063	12,994	10,970	2,025	606	568	38

TABLE 2

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Medium companies										
50–99	–	13,791	11,935	1,857	12,993	11,177	1,816	798	758	41
100–249	–	27,483	24,122	3,361	25,411	22,132	3,280	2,072	1,991	81 i
Large companies										
250–499	–	23,743	20,772	2,971	20,878	18,067	2,811	2,866	2,705	161
500–999	–	24,451	21,478	2,973	21,264	18,458	2,807	3,187	3,020	167
1,000–4,999	–	106,758	94,028	12,730	88,238	75,917	12,322	18,520	18,111	409 i
5,000–9,999	–	60,241	51,966	8,275	48,397	42,451	5,945	11,845	9,515	2,330 i
10,000–24,999	–	111,753	89,792	21,961 i	88,567	72,827	15,739 i	23,186	16,965	6,221 i
25,000 or more	–	260,165	234,437	25,728	213,829	190,145	23,684	46,336	44,292	2,044

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 3

## Worldwide R&amp;D paid for by the company and others and performed by the company, by industry, company size, and worldwide R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
All industries	21–23, 31–33, 42–81	647,324	5,573	32,420	42,943	32,368	534,020
Manufacturing industries	31–33	374,688	3,106	14,656	23,863	17,983	315,079
Food	311	6,392 - 6,399	196 - 207	688	669	608	4,229
Beverage and tobacco products	312	1,935	36	72	45	268	1,515 i
Textile, apparel, and leather products	313–16	973	38	133	236	310	256
Wood products	321	195	26	77	92	0	0
Paper	322	1,021	13	115	171	63	659
Printing and related support activities	323	294	46	98	150 i	0	0
Petroleum and coal products	324	1,476 - 1,490	0 - 226	84	185	50 - 400	595 - 1,172
Chemicals	325	120,440	399	3,077	8,144	5,995	102,826
Basic chemicals	3251	3,540	48	330	962	612	1,587
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,745	33	223	159	132	1,198
Pesticide, fertilizer, and other agricultural chemicals	3253	1,157 - 1,172	17 - 35	68	79	0	992
Pharmaceuticals and medicines	3254	108,537	84	2,041	6,397	5,127	94,888
Soap, cleaning compound, and toilet preparation	3256	3,432	102	173	187	63	2,906
Paint, coating, adhesive, and other chemicals	3255, 3259	2,013 - 2,028	95 - 113	241	359	62	1,255
Plastics and rubber products	326	3,162	218	735	872	1,099	238
Nonmetallic mineral products	327	1,924 i	0 - 226	180	183	50 - 400	936 - 1,512 i
Primary metals	331	847	51	173	418	0	206
Fabricated metal products	332	3,746	517	1,451	915	530	332
Machinery	333	20,508	388	2,177	2,103	1,439	14,402
Agricultural implement	33311	2,450	0 - 62	96	141	50 - 112	2,103
Semiconductor machinery	333242	5,834	9 i	54	135	280	5,356
Engine, turbine, and power transmission equipment	3336	2,203	19	55	263	231	1,636
Other machinery	other 333	10,022	296 - 362	1,973	1,564	814 - 880	5,307
Computer and electronic products	334	126,102	433	2,193	3,820	2,858	116,797
Communications equipment	3342	15,491	64	400	603	695	13,728
Semiconductor and other electronic components	3344	56,204	102	582	1,268	1,102	53,150
Navigational, measuring, electromedical, and control instruments	3345	21,651	223	1,008	1,727	625	18,068
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,356 i	27	273	783	176 i	2,097 i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	11,270	0 - 24	120	350	50 - 74	10,728

**TABLE 3**  
**Worldwide R&D paid for by the company and others and performed by the company, by industry, company size, and worldwide R&D program size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	R&D program size						
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more	
Other measuring and controlling device	other 3345	7,025	171 - 197	615	595	374 - 400	5,243	
Other computer and electronic products	other 334	32,756	45	203	221	436	31,851	
Electrical equipment, appliances, and components	335	6,792	136	593	1,298	889	3,876	
Transportation equipment	336	55,311	158	1,156	1,956	2,203	49,838 i	
Motor vehicles, bodies, trailers, and parts	3361–63	28,910 - 28,922 i	76 - 91	589	1,068	1,320	25,855 i	
Aerospace products and parts	3364	23,424 i	58	335	707	644	21,680 i	
Aircraft, aircraft engine, and aircraft parts	336411–13	21,791 i	54	299	563	428	20,447 i	
Guided missile, space vehicle, and related parts	336414–15, 336419	1,633	5	35	144	216	1,233	
Military armored vehicle, tank, and tank component	336992	11	3	8	0	0	0	
Other transportation	other 336	2,955 - 2,966	7 - 22	224	181	239	2,302	
Furniture and related products	337	535	43	220	208	64 i	0	
Miscellaneous	339	23,013 - 23,027	189 - 416	1,434	2,399	1,214	17,549 - 17,791	
Medical equipment and supplies	3391	19,938	190	898	1,700	1,153	15,997	
Other miscellaneous manufacturing	3399	3,075 - 3,088	0 - 226	536	699	61 i	1,551 - 1,794	
Nonmanufacturing industries	21–23, 42–81	272,637	2,466	17,764	19,081	14,385	218,941	
Mining, quarrying, oil and gas extraction, and support activities	21	1,285 - 1,292 i	0 - 190	213 i	258 i	262 i	361 - 561	
Utilities	22	271	5	62	126	77	0	
Wholesale trade	42	1,104	318	718 i	68 i	0	0	
Electronic shopping and electronic auctions	454111–12	3,937 - 24,262 i	13	67	186	50 - 526	3,144 - 23,948 i	
Transportation and warehousing	48–49	4,994 i	4	63	183	0	4,743 i	
Information	51	152,363	596 i	5,565	8,212	8,866	129,124	
Publishing	511	42,708	347 i	2,351	1,783	997	37,229	
Newspaper, periodical, book, and directory publishers	5111	60	4	8 i	48	0	0	
Software publishers	5112	42,648	343 i	2,343	1,735	997	37,229	
Telecommunications	517	3,519 - 3,532	3 - 20	266	527	95 i	2,626	
Data processing, hosting, and related services	518	49,697	195 i	2,591	5,176	7,221	34,514	
Other information	other 51	56,425 - 56,440	33 - 50 i	358	726	554	54,754	
Finance and insurance	52	13,837	13	372	1,045	509	11,897	
Real estate and rental and leasing	53	3,412	4 - 195	16	10 - 698	50 - 526	1,977 - 3,333	

TABLE 3

**Worldwide R&D paid for by the company and others and performed by the company, by industry, company size, and worldwide R&D program size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6 - 21	5	1 - 16	0	0	0
Other real estate and rental and leasing	other 53	3,390 - 3,406	0 - 190	1 - 16	10 - 698	50 - 526	1,977 - 3,333
Professional, scientific, and technical services	54	68,112	1,231	9,069	7,820	3,690	46,302
Architectural, engineering, and related services	5413	4,235	281	1,569	1,031	554	800
Computer systems design and related services	5415	21,259	566	3,175	2,083	1,338	14,097
Scientific research and development services	5417	35,670 i	227 i	3,379	3,241	1,260	27,563 i
Research and development in nanotechnology	541713	179 - 182 i	22 - 27 i	156 i	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	9,120	42 i	687	785	436	7,170
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	25,674 i	156 - 163 i	2,508	1,885 - 2,447	824	19,732 - 20,294 i
Research and development in the social sciences and humanities	541720	692 - 698	1 i	28	10 - 570	0	100 - 660
Other professional, scientific, and technical services	other 54	6,948	157	946	1,465	538	3,842
Health care services	621–23	1,495 - 1,498	95 - 102	274	480	359	285
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,504 - 21,828	0 - 190	1,345	10 - 698	50 - 526 i	100 - 20,423
All companies (number of domestic employees)	–	647,324	5,573	32,420	42,943	32,368	534,020
Small companies							
10–19 <sup>a</sup>	–	5,338	1,155	3,648	379	0	155
20–49	–	13,600	2,146	7,672	3,537	246	0
Medium companies							
50–99	–	13,791	1,053	5,905	5,880	954	0
100–249	–	27,483	732	7,261	10,444	4,554	4,492
Large companies							
250–499	–	23,743	255	3,524	5,625	7,590	6,750
500–999	–	24,451	134	2,050	5,545	5,590	11,131
1,000–4,999	–	106,758	86	1,883	8,072	8,739	87,979
5,000–9,999	–	60,241	7 i	179	1,912	2,784	55,358
10,000–24,999	–	111,753	4	210	1,014	1,506	109,018
25,000 or more	–	260,165	1	89	535	404	259,136

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

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. R&D program size classifications are based on R&D performance. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



**TABLE 4**  
**Companies with worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by source of funds, industry, and company size: 2020**  
 (Number of companies)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance			
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	
All industries	21–23, 31–33, 42–81	30,540	28,890	4,030	30,360	28,720	3,900	3,520	3,330	390	i
Manufacturing industries	31–33	16,000	15,500	1,770	15,920	15,420	1,690	1,700	1,600	230	i
Food	311	970	970	80	970	970	80	50	50	10	i
Beverage and tobacco products	312	240	240	10	240	240	10	10	10	0	
Textile, apparel, and leather products	313–16	230	230	20	230	230	20	30	30	0	
Wood products	321	130	130	10	130	130	10	10	10	0	i
Paper	322	100	100	10	100	100	10	20	20	10	i
Printing and related support activities	323	230	210	20	220	210	20	20	20	0	i
Petroleum and coal products	324	100	100	10	100	100	10	10	10	10	i
Chemicals	325	2,570	2,470	410	2,550	2,450	380	390	370	60	i
Basic chemicals	3251	310	300	30	300	300	30	70	70	10	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	150	20	150	150	20	20	20	10	i
Pesticide, fertilizer, and other agricultural chemicals	3253	140	140	10	130	130	10	30	30	10	i
Pharmaceuticals and medicines	3254	1,230	1,190	280	1,230	1,190	270	220	220	30	
Soap, cleaning compound, and toilet preparation	3256	370	340	40	370	340	30	40	30	20	i
Paint, coating, adhesive, and other chemicals	3255, 3259	400	370	50	400	370	50	40	40	10	i
Plastics and rubber products	326	1,040	1,020	80	1,040	1,020	80	90	90	10	i
Nonmetallic mineral products	327	240	240	20	240	240	20	20	20	10	
Primary metals	331	270	270	20	270	270	20	10	10	10	i
Fabricated metal products	332	2,280	2,260	160	2,270	2,250	130	100	70	30	i
Machinery	333	2,160	2,080	230	2,120	2,050	230	240	230	20	i
Agricultural implement	33311	160	160	10	160	160	10	20	20	10	i
Semiconductor machinery	333242	60	60	20	60	60	20	30	30	10	
Engine, turbine, and power transmission equipment	3336	90	90	30	90	90	30	20	20	10	
Other machinery	other 333	1,860	1,790	190	1,830	1,760	190	180	180	10	i
Computer and electronic products	334	2,220	2,100	370	2,220	2,090	360	350	340	40	
Communications equipment	3342	400	360	60	400	360	60	80	80	10	
Semiconductor and other electronic components	3344	570	540	140	570	530	130	110	110	20	i
Navigational, measuring, electromedical, and control instruments	3345	1,060	1,000	170	1,060	1,000	170	130	130	20	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	190	180	40	190	180	40	50	50	10	
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	130	130	20	130	130	20	20	20	10	
Other measuring and controlling device	other 3345	740	700	120	740	700	120	70	70	10	
Other computer and electronic products	other 334	210	210	20	210	210	20	40	40	10	

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**Companies with worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by source of funds, industry, and company size: 2020**  
 (Number of companies)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Electrical equipment, appliances, and components	335	680	640	90	680	640	90	110	90	40
Transportation equipment	336	980	910	200	980	900	200	130	120	30
Motor vehicles, bodies, trailers, and parts	3361-63	500	470	100	490	470	100	90	80	20
Aerospace products and parts	3364	350	310	80	340	310	80	30	30	10
Aircraft, aircraft engine, and aircraft parts	336411-13	310	280	60	310	280	60	30	30	10
Guided missile, space vehicle, and related parts	336414-15, 336419	40	40	30	40	40	30	10	10	0
Military armored vehicle, tank, and tank component	336992	10	10	10	10	10	10	0	0	0
Other transportation	other 336	140	130	20	140	130	20	20	20	10
Furniture and related products	337	240	240	10	240	240	10	20	20	0
Miscellaneous	339	1,440	1,430	110	1,430	1,420	100	170	170	20
Medical equipment and supplies	3391	840	830	70	840	830	70	110	110	20 i
Other miscellaneous manufacturing	3399	600	600	40	600	600	40	70 i	70 i	10
Nonmanufacturing industries	21-23, 42-81	14,550	13,400	2,260	14,460	13,310	2,220	1,830	1,730	170 i
Mining, quarrying, oil and gas extraction, and support activities	21	300	280	30	300	280	30	30 i	20 i	10 i
Utilities	22	50	50	10	50	50	10	10	10	0
Wholesale trade	42	1,170	1,110	80	1,160	1,100	80	70 i	70 i	10 i
Electronic shopping and electronic auctions	454111-12	90	90	10	90	90	10	10	10	0
Transportation and warehousing	48-49	60	50	10	60	50	10	20	20	0
Information	51	3,860	3,780	230	3,810	3,740	200	1,030	1,020	40 i
Publishing	511	1,720	1,670	130	1,680	1,630	110	360 i	350 i	30
Newspaper, periodical, book, and directory publishers	5111	30	30	0	30	30	0	0	0	0
Software publishers	5112	1,690	1,650	130	1,650	1,610	110	360 i	350 i	30
Telecommunications	517	140	130	20	140	130	20	30	30	0
Data processing, hosting, and related services	518	1,660	1,640	70	1,660	1,640	70	600	600	10 i
Other information	other 51	350	350	30	350	350	30	60	60	0
Finance and insurance	52	220	220	10 i	220	220	10	70	70	10 i
Real estate and rental and leasing	53	60	60	10	60	60	10	10	10	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	20	20	10	20	20	10	10	10	0
Other real estate and rental and leasing	other 53	40	40	0	40	40	0	10	10	0
Professional, scientific, and technical services	54	7,010	6,100	1,790	6,980	6,070	1,780	540 i	450	110 i
Architectural, engineering, and related services	5413	1,390	1,180	370	1,390	1,180	370	80 i	40 i	50 i
Computer systems design and related services	5415	2,810	2,600	400	2,780	2,570	400	280 i	270 i	20
Scientific research and development services	5417	1,720	1,280 i	930	1,710	1,280	930	110	80	50 i
Research and development in nanotechnology	541713	110 i	90 i	50 i	110 i	90 i	50 i	10	10	0

**TABLE 4**  
**Companies with worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, by source of funds, industry, and company size: 2020**  
 (Number of companies)

Industry and company size	NAICS code	Worldwide R&D performance			Domestic R&D performance			Foreign R&D performance		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Research and development in biotechnology (except nanobiotechnology)	541714	350	270	180	350	270	180	40	20	20 i
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,250 i	920 i	700	1,250	920	700	80	70	30
Research and development in the social sciences and humanities	541720	20	20	10	20	20	10	10 i	10 i	10
Other professional, scientific, and technical services	other 54	1,110	1,060	110	1,110	1,060	110	80	70	10
Health care services	621-23	620	560	100	620	560	100	10 i	10 i	10 i
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,170	1,160	40	1,160	1,150	30	80 i	80 i	10 i
All companies (number of domestic employees)	-	30,540	28,890	4,030	30,360	28,720	3,900	3,520	3,330	390 i
Small companies										
10-19 <sup>a</sup>	-	5,160	4,660	1,170	5,110	4,610	1,150	400 i	360 i	70 i
20-49	-	9,540	9,020	1,090	9,510	9,000	1,060	660 i	590 i	90 i
Medium companies										
50-99	-	5,570	5,330	640	5,530	5,290	610	400	360	50 i
100-249	-	4,990	4,780	490	4,950	4,730	480	590	570	40 i
Large companies										
250-499	-	2,110	2,050	200	2,100	2,040	190	360	350	30
500-999	-	1,290	1,240	140	1,280	1,230	140	320	320	20
1,000-4,999	-	1,330	1,280	170	1,320	1,270	160	510	500	50
5,000-9,999	-	260	250	70	260	250	60	120	120	20
10,000-24,999	-	220	210	60	220	210	60	120	120	30
25,000 or more	-	130	130	40	130	130	40	80	80	20

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

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 5

**Worldwide R&D paid for by the company and performed by the company and others, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Performed by the company	Performed by others
All industries	21-23, 31-33, 42-81	612,326	564,350	47,977
Manufacturing industries	31-33	372,693	329,425	43,268
Food	311	6,516	6,139	377
Beverage and tobacco products	312	2,096	1,814	281
Textile, apparel, and leather products	313-16	976	964	12
Wood products	321	202	192	10
Paper	322	1,032	1,020	12
Printing and related support activities	323	296	292	4
Petroleum and coal products	324	1,634	1,387	247
Chemicals	325	140,240	108,521	31,719
Basic chemicals	3251	3,468	3,364	104
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,703	1,665	38
Pesticide, fertilizer, and other agricultural chemicals	3253	995	866	129
Pharmaceuticals and medicines	3254	128,431	97,406	31,025
Soap, cleaning compound, and toilet preparation	3256	3,609	3,239	370
Paint, coating, adhesive, and other chemicals	3255, 3259	2,034	1,981	53
Plastics and rubber products	326	3,168	3,136	32
Nonmetallic mineral products	327	1,952	1,822	130
Primary metals	331	859	827	32
Fabricated metal products	332	3,774	3,681	94
Machinery	333	19,806	19,254	552
Agricultural implement	33311	2,678	2,399	279
Semiconductor machinery	333242	5,142	5,134	8
Engine, turbine, and power transmission equipment	3336	2,044	2,032	13
Other machinery	other 333	9,942	9,689	253
Computer and electronic products	334	118,502	114,726	3,776
Communications equipment	3342	15,584	14,486	1,098
Semiconductor and other electronic components	3344	53,992	53,669	323
Navigational, measuring, electromedical, and control instruments	3345	14,490	13,995	495
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,225	3,094	132
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	4,325	4,119	206
Other measuring and controlling device	other 3345	6,940	6,783	158
Other computer and electronic products	other 334	34,435	32,576	1,859
Electrical equipment, appliances, and components	335	6,361	6,244	117
Transportation equipment	336	40,807	36,134	4,674
Motor vehicles, bodies, trailers, and parts	3361-63	28,987	24,821	4,166
Aerospace products and parts	3364	9,944	9,526	417
Aircraft, aircraft engine, and aircraft parts	336411-13	8,975	8,686	289
Guided missile, space vehicle, and related parts	336414-15, 336419	969	840	129
Military armored vehicle, tank, and tank component	336992	4	4	*
Other transportation	other 336	1,873	1,782	91
Furniture and related products	337	553	532	21
Miscellaneous	339	23,918	22,739	1,179
Medical equipment and supplies	3391	20,806	19,718	1,088
Other miscellaneous manufacturing	3399	3,112	3,022	91
Nonmanufacturing industries	21-23, 42-81	239,633	234,925	4,708
Mining, quarrying, oil and gas extraction, and support activities	21	1,375	1,239	136
Utilities	22	420	230	190
Wholesale trade	42	1,205	1,045	160

TABLE 5

**Worldwide R&D paid for by the company and performed by the company and others, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Performed by the company	Performed by others
Electronic shopping and electronic auctions	454111-12	3,935 - 24,328	3,935 - 24,223	0 - 106
Transportation and warehousing	48-49	5,193	4,991	203
Information	51	153,753	151,219	2,534
Publishing	511	43,750	42,169	1,580
Newspaper, periodical, book, and directory publishers	5111	64	60	4
Software publishers	5112	43,686	42,109	1,577
Telecommunications	517	3,925	3,466	459
Data processing, hosting, and related services	518	49,586	49,250	336
Other information	other 51	56,493	56,334	159
Finance and insurance	52	14,072	13,695	378
Real estate and rental and leasing	53	3,414	3,412	2
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6 - 21	6 - 21	0
Other real estate and rental and leasing	other 53	3,392 - 3,408	3,390 - 3,406	2
Professional, scientific, and technical services	54	33,007	32,053	954
Architectural, engineering, and related services	5413	2,290	2,225	65
Computer systems design and related services	5415	17,798	17,502	296
Scientific research and development services	5417	6,983	6,442	540
Research and development in nanotechnology	541713	128	125 - 129	0 - 3
Research and development in biotechnology (except nanobiotechnology)	541714	1,497	1,284	213
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,311 - 5,322	4,988 - 4,996	323 - 328
Research and development in the social sciences and humanities	541720	37 - 45	37 - 45	*
Other professional, scientific, and technical services	other 54	5,937	5,884	53
Health care services	621-23	1,432	1,393	38
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,434 - 21,831	1,429 - 21,717	5 - 118
All companies (number of domestic employees)	-	612,326	564,350	47,977
Small companies				
10-19 <sup>a</sup>	-	4,953	4,282	671
20-49	-	13,596	11,538	2,059
Medium companies				
50-99	-	13,639	11,935	1,704
100-249	-	27,557	24,122	3,435
Large companies				
250-499	-	22,541	20,772	1,769
500-999	-	23,839	21,478	2,361
1,000-4,999	-	99,309	94,028	5,281
5,000-9,999	-	57,865	51,966	5,899
10,000-24,999	-	101,269	89,792	11,477
25,000 or more	-	247,760	234,437	13,323

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 6

**Worldwide R&D paid for by the company and performed by the company and others, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Amount
All business activities	21100–81000	612,326
Oil and gas extraction	21100	790
Mining	21200	114
Support activities for mining, including oil and gas	21300	929
Utilities	22100	424
Construction	23000	1,068
Food manufacturing	31100	6,353
Beverage manufacturing	31210	803
Tobacco manufacturing	31220	856
Textile, apparel, and leather products manufacturing	31990	918
Wood products manufacturing	32100	270
Paper manufacturing	32200	1,531
Printing and related support activities	32300	392
Petroleum refineries	32401	499 - 4,458
Asphalt paving, roofing, and saturated materials manufacturing	32402	226
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	238
Basic chemicals manufacturing	32510	3,860
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	1,801
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	1,691
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing	32541	80,828
In vitro diagnostic substances manufacturing	32542	1,868
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	43,834
Soap, cleaning compound, and toilet preparations manufacturing	32591	3,052
Paint, adhesive, and other chemical manufacturing	32592	1,775
Plastics and rubber products manufacturing	32600	3,527
Clay and glass products manufacturing	32710	1,654
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	438
Primary metal manufacturing	33100	986
Fabricated metal products manufacturing	33200	4,087
Agricultural machinery and equipment manufacturing	33311	2,207
Construction machinery manufacturing	33312	1,529
Mining, oil, and gas field machinery and equipment manufacturing	33319	1,312
Semiconductor machinery manufacturing	33321	5,079
Industrial machinery manufacturing (except semiconductor machinery)	33322	1,133
Photographic and photocopying equipment manufacturing	33331	171
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	1,956
Digital cameras manufacturing	33333	364
Engine, turbine, and power transmission equipment manufacturing	33360	2,944
Metalworking and other general purpose machinery manufacturing	33390	3,191
Computers and peripheral equipment manufacturing and magnetic and optical media	33412	31,366
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	10,135
Radio, television, and wireless communication equipment manufacturing	33422	2,334
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	2,498
Audio and video equipment manufacturing	33430	1,667
Semiconductor and other electronic components manufacturing	33440	55,218
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	4,451
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	2,918
Measuring and control instruments manufacturing (not listed elsewhere)	33459	5,745
Electrical equipment, appliances, and components manufacturing	33500	6,474
Motor vehicles manufacturing	33610	20,643



TABLE 6

**Worldwide R&D paid for by the company and performed by the company and others, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Amount
Motor vehicle body and trailer manufacturing	33620	117
Motor vehicle parts manufacturing	33630	8,511
Aircraft manufacturing	33641	4,993
Aircraft engine and engine parts manufacturing	33642	1,310
Other aircraft parts and auxiliary equipment manufacturing	33643	1,414
Guided missiles, space vehicles, and related parts manufacturing	33644	1,876
Railroad rolling stock manufacturing	33651	299
Ship and boat building	33660	154
Motorcycle, bicycle, and parts manufacturing	33691	488
Military armored vehicle, tank, and tank components manufacturing	33692	275
All other transportation equipment manufacturing	33699	545
Furniture and related products manufacturing	33700	599
Medical equipment and supplies manufacturing	33910	19,425
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	3,749
Merchant wholesalers, durable goods	42300	841
Merchant wholesalers, nondurable goods	42400	535
Wholesale electronic markets and agents and brokers (business to business)	42500	62
Retail trade (except electronic shopping and electronic auctions)	44000	215 - 4,173
Electronic shopping and electronic auctions	45411	0 - 18,774 i
Transportation	48000	4,297
Couriers, messengers, and express delivery services	49200	922 - 4,881
Warehousing and storage	49300	35
Newspaper, periodical, book, and directory publishers (except Internet)	51110	91
Software publishers (except Internet)	51120	30,457
Motion picture and sound recording (except Internet)	51200	86
Broadcasting (except Internet)	51500	0 - 18,774 i
Wired telecommunications carriers	51710	504
Wireless telecommunications carriers (except satellite)	51720	2,414
Satellite telecommunications	51740	386
Other telecommunications (not listed elsewhere)	51790	501
Data processing, hosting, and related services	51800	12,535
Cloud computing applications and Internet-based software services	51801	47,668
Other information services, including Internet publishing, broadcasting, and Web search portals	51910	60,959
Finance: banking and credit intermediation	52200	9,028
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	2,061
Insurance carriers and related activities	52400	2,968
Real estate	53100	372
Rental and leasing services	53200	2,925
Lessors of nonfinancial intangible assets, including patent licensing	53300	75
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	2,597
Architectural, engineering, and related services	54130	2,604
Specialized design services	54140	196
Computer systems design and related services	54150	17,430
Management, scientific, and technical consulting services	54160	2,001
Research and development services in the social sciences and humanities	54172	37 - 3,996
Research and development services in biotechnology	54173	1,619
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	5,835
Research and development services in nanotechnology	54175	122 i
Advertising and related services	54180	1,277 - 5,236 i

TABLE 6

**Worldwide R&D paid for by the company and performed by the company and others, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Amount
Professional, scientific, and technical services (not listed elsewhere)	54190	1,570
Management of companies and enterprises	55100	51
Administrative and support services	56100	3,806
Waste management and remediation services	56200	0 - 18,774
Offices of physicians	62110	195
Medical and diagnostic laboratories	62150	1,633 i
Other ambulatory health care services (ambulance, dental, home health care)	62199	83
Hospitals and nursing care facilities	62200	0 - 18,774
Social assistance services	62400	0 - 18,774
Arts, entertainment, and recreation	71000	0 - 18,774
Accommodation and food services	72000	120 - 4,079
Other services (not listed elsewhere)	81000	584
Undistributed	-	0

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

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System industry definitions.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 7

**Worldwide R&D paid for by others and performed by the company and others, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Performed by the company	Performed by others
All industries	21-23, 31-33, 42-81	93,463	82,975	10,489
Manufacturing industries	31-33	53,459	45,263	8,196
Food	311	260	253 - 260	1 - 7
Beverage and tobacco products	312	125	121	4
Textile, apparel, and leather products	313-16	9	9	*
Wood products	321	3	3	0
Paper	322	1	1	* i
Printing and related support activities	323	1	1	0
Petroleum and coal products	324	102	89 - 103	0 - 13
Chemicals	325	17,016	11,919	5,097
Basic chemicals	3251	176	175	1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	113	81	33
Pesticide, fertilizer, and other agricultural chemicals	3253	305	291 - 306	0 - 13
Pharmaceuticals and medicines	3254	16,177	11,131	5,045
Soap, cleaning compound, and toilet preparation	3256	199	192	7
Paint, coating, adhesive, and other chemicals	3255, 3259	46	32 - 47	0 - 13
Plastics and rubber products	326	29	26	2
Nonmetallic mineral products	327	102	102	1
Primary metals	331	21	20	1
Fabricated metal products	332	68	65	3
Machinery	333	1,315	1,254	61
Agricultural implement	33311	50 - 61	51	i 0 - 10
Semiconductor machinery	333242	743	700	43
Engine, turbine, and power transmission equipment	3336	180	171	9
Other machinery	other 333	332 - 343	333	0 - 10
Computer and electronic products	334	11,965	11,376	589 i
Communications equipment	3342	1,051	1,005	i 46 i
Semiconductor and other electronic components	3344	2,647	2,535	112
Navigational, measuring, electromedical, and control instruments	3345	8,076	7,655	421 i
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	266	262	4
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,567 i	7,151 i	416 i
Other measuring and controlling device	other 3345	244	243	1
Other computer and electronic products	other 334	190	180	11
Electrical equipment, appliances, and components	335	549	549	1
Transportation equipment	336	21,592	19,177	2,415
Motor vehicles, bodies, trailers, and parts	3361-63	4,298	4,089 - 4,101	197 - 209
Aerospace products and parts	3364	16,104	13,897	i 2,207
Aircraft, aircraft engine, and aircraft parts	336411-13	15,307	13,105	i 2,203
Guided missile, space vehicle, and related parts	336414-15, 336419	797	793	4
Military armored vehicle, tank, and tank component	336992	6	6	0
Other transportation	other 336	1,183	1,173 - 1,184	0 - 10
Furniture and related products	337	4	3	*
Miscellaneous	339	296	274 - 287	9 - 23
Medical equipment and supplies	3391	231	221	10
Other miscellaneous manufacturing	3399	66	53 - 66	0 - 12
Nonmanufacturing industries	21-23, 42-81	40,005	37,712	2,293
Mining, quarrying, oil and gas extraction, and support activities	21	46 - 53	46 - 53	i 0

TABLE 7

**Worldwide R&D paid for by others and performed by the company and others, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Performed by the company	Performed by others
Utilities	22	48	40	8
Wholesale trade	42	108	59	49
Electronic shopping and electronic auctions	454111-12	2 - 50	2 - 50	0
Transportation and warehousing	48-49	3	3	0
Information	51	1,257	1,144	113
Publishing	511	592	539	54
Newspaper, periodical, book, and directory publishers	5111	0	0	0
Software publishers	5112	592	539	54
Telecommunications	517	54 - 69	54 - 66	0 - 3
Data processing, hosting, and related services	518	505	447	57
Other information	other 51	91 - 107	91 - 105	0 - 3
Finance and insurance	52	144	142	1
Real estate and rental and leasing	53	*	*	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	*	0
Other real estate and rental and leasing	other 53	0	0	0
Professional, scientific, and technical services	54	38,155	36,059	2,096
Architectural, engineering, and related services	5413	2,461	2,009	452
Computer systems design and related services	5415	3,777	3,758	19
Scientific research and development services	5417	30,768	29,227	1,541
Research and development in nanotechnology	541713	58	53	5
Research and development in biotechnology (except nanobiotechnology)	541714	7,938	7,836	102
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	20,757 - 22,120	20,678 - 20,685	79 - 1,436
Research and development in the social sciences and humanities	541720	653 - 2,014	653 - 661	0 - 1,354
Other professional, scientific, and technical services	other 54	1,148	1,065	84
Health care services	621-23	104	102 - 105	0 - 2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	85 - 138	63 - 111	21 - 27
All companies (number of domestic employees)	-	93,463	82,975	10,489
Small companies				
10-19 <sup>a</sup>	-	1,192	1,056	136
20-49	-	2,416	2,063	353
Medium companies				
50-99	-	2,254	1,857	398
100-249	-	3,994	3,361	633
Large companies				
250-499	-	3,274	2,971	303
500-999	-	3,434	2,973	461
1,000-4,999	-	14,622	12,730	1,891
5,000-9,999	-	9,281	8,275	1,006
10,000-24,999	-	24,205	21,961	2,244
25,000 or more	-	28,791	25,728	3,063

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

**TABLE 8**  
**Worldwide, domestic, and foreign sales for companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Sales					
		R&D performers or funders <sup>a</sup>			Domestic R&D performers <sup>b</sup>		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
All industries	21–23, 31–33, 42–81	14,863,520	11,296,552	3,566,968	14,321,852	10,852,576	3,469,276
Manufacturing industries	31–33	8,077,938	5,694,734	2,383,204	7,991,699	5,655,706	2,335,993
Food	311	820,572	596,972	223,601	817,151	593,683	223,468
Beverage and tobacco products	312	241,169	148,089	93,080	209,056	148,089	60,967
Textile, apparel, and leather products	313–16	87,886	62,897	24,989	87,886	62,897	24,989
Wood products	321	47,527	46,071	1,456	47,067	45,611	1,456
Paper	322	109,375	84,293	25,082	108,155	83,887	24,268
Printing and related support activities	323	33,713	30,368	3,345	33,447	30,132	3,315
Petroleum and coal products	324	375,112	221,590	153,522	375,112	221,590	153,522
Chemicals	325	1,584,353	1,117,545	466,808	1,575,191	1,109,086	466,105
Basic chemicals	3251	335,437	246,319	89,118	335,123	246,173	88,951
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	90,181	51,671	38,509	90,181	51,671	38,509
Pesticide, fertilizer, and other agricultural chemicals	3253	94,510	88,921	5,590	94,157	88,691	5,466
Pharmaceuticals and medicines	3254	753,541	551,305	202,235	745,284	543,459	201,824
Soap, cleaning compound, and toilet preparation	3256	204,204	114,601	89,603	204,200	114,597	89,603
Paint, coating, adhesive, and other chemicals	3255, 3259	106,481	64,728	41,752	106,247	64,494	41,752
Plastics and rubber products	326	236,613	185,321	51,293	235,549	184,256	51,293
Nonmetallic mineral products	327	76,769	59,764	17,005	61,345	48,299	13,046
Primary metals	331	91,852	69,597	22,255	90,514	68,259	22,255
Fabricated metal products	332	174,840	136,071	38,769	169,545	133,230	36,315
Machinery	333	581,912	356,214	225,698	578,865	354,371	224,494
Agricultural implement	33311	66,900	41,172	25,728	66,554 - 66,901	40,826 - 41,173	25,728
Semiconductor machinery	333242	49,963	26,822	23,141	49,963	26,822	23,141
Engine, turbine, and power transmission equipment	3336	76,227	43,439	32,789	75,873	43,093 - 43,439	32,433 - 32,781
Other machinery	other 333	388,821	244,781	144,041	386,127 - 386,476	243,282	142,844 - 143,193
Computer and electronic products	334	1,270,897	757,047	513,851	1,264,996	755,088	509,908
Communications equipment	3342	142,942	102,211	40,730	142,507 - 142,942	101,777 - 102,212	40,730
Semiconductor and other electronic components	3344	328,853	206,313	122,541	323,421	204,822	118,598
Navigational, measuring, electromedical, and control instruments	3345	269,296	186,480	82,816	269,260	186,444	82,816
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	33,990	21,029	12,961	33,990	21,029	12,961

TABLE 8

**Worldwide, domestic, and foreign sales for companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Sales					
		R&D performers or funders <sup>a</sup>			Domestic R&D performers <sup>b</sup>		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	119,823	86,765	33,059	119,787	86,729	33,059
Other measuring and controlling device	other 3345	115,483	78,686	36,797	115,483	78,686	36,797
Other computer and electronic products	other 334	529,806	262,043	267,763	529,372 - 529,807	261,609 - 262,044	267,763
Electrical equipment, appliances, and components	335	225,479	153,123	72,356	225,396	153,047	72,349
Transportation equipment	336	1,178,769	917,847	260,921	1,172,135	912,883	259,252
Motor vehicles, bodies, trailers, and parts	3361-63	780,577	578,503	202,074	774,549 - 779,439	573,615 - 578,504	200,935
Aerospace products and parts	3364	307,651	268,261	39,390	307,043	268,183	38,860
Aircraft, aircraft engine, and aircraft parts	336411-13	297,117	258,004	39,113	296,509	257,926	38,583
Guided missile, space vehicle, and related parts	336414-15, 336419	10,534	10,257	277	10,534	10,257	277
Military armored vehicle, tank, and tank component	336992	512	512	0	512	512	0
Other transportation	other 336	90,029	70,571	19,457	85,140 - 90,029	65,683 - 70,572	19,457
Furniture and related products	337	53,766	46,981	6,785	53,750	46,965	6,785
Miscellaneous	339	887,334	704,946	182,388	886,537	704,332	182,205
Medical equipment and supplies	3391	713,969	587,891	126,079	713,521	587,625	125,896
Other miscellaneous manufacturing	3399	173,365	117,056	56,310	173,017	116,707	56,310
Nonmanufacturing industries	21-23, 42-81	6,785,582	5,601,818	1,183,764	6,330,153	5,196,870	1,133,283
Mining, quarrying, oil and gas extraction, and support activities	21	176,007	99,154	76,854	174,765	98,556	76,209
Utilities	22	292,898	290,177	2,720	228,126	225,406	2,720
Wholesale trade	42	301,236	276,906	24,330	295,595	271,471	24,124
Electronic shopping and electronic auctions	454111-12	348,748 - 525,501	348,749	176,752	348,748 - 525,501	348,749	0 - 176,752
Transportation and warehousing	48-49	282,692	211,160	71,532	282,625	211,093	71,532
Information	51	2,167,074	1,653,526	513,548	2,163,690	1,650,317	513,373
Publishing	511	403,802	253,029	150,773	402,612	251,999	150,613
Newspaper, periodical, book, and directory publishers	5111	1,654	1,568	86	1,426	1,352	74
Software publishers	5112	402,148	251,461	150,687	401,186	250,646	150,539
Telecommunications	517	507,234	490,319	16,914	505,375 - 507,233	488,462 - 490,320	16,913
Data processing, hosting, and related services	518	670,759	510,302	160,458	670,422	509,978	160,444
Other information	other 51	585,279	399,876	185,403	583,422 - 585,280	398,019 - 399,877	185,403

TABLE 8

**Worldwide, domestic, and foreign sales for companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Sales					
		R&D performers or funders <sup>a</sup>			Domestic R&D performers <sup>b</sup>		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
Finance and insurance	52	1,557,846	1,447,133	110,714	1,361,723	1,257,970	103,752
Real estate and rental and leasing	53	15,598	13,542	2,056	15,589	13,533	2,056
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,552 - 3,609	1,553	0 - 2,057	1,552 - 3,609	1,553	0 - 2,057
Other real estate and rental and leasing	other 53	11,989 - 14,046	11,990	0 - 2,057	11,979 - 14,037	11,980	0 - 2,057
Professional, scientific, and technical services	54	582,276	417,867	164,409	574,406	412,818	161,588
Architectural, engineering, and related services	5413	87,737	71,287	16,450	86,358	69,926	16,432
Computer systems design and related services	5415	254,848	167,910	86,938	249,419	165,225	84,194
Scientific research and development services	5417	88,725	70,334	18,391	88,004	69,633	18,372
Research and development in nanotechnology	541713	403	383	19	383	383	0
Research and development in biotechnology (except nanobiotechnology)	541714	24,723	20,159	4,564	24,542	19,978	4,564
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	62,589	48,794	13,795	62,069	48,274	13,795
Research and development in the social sciences and humanities	541720	1,010	997	13	1,010	997	13
Other professional, scientific, and technical services	other 54	150,966	108,336	42,630	150,625	108,034	42,590
Health care services	621-23	144,193	143,012	1,181	144,109	142,929	1,181
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	740,259 - 917,017	700,592	39,667 - 216,425	564,028 - 740,781	564,029	0 - 176,752
All companies (number of domestic employees)	-	14,863,520	11,296,552	3,566,968	14,321,852	10,852,576	3,469,276
Small companies							
10-19 <sup>c</sup>	-	24,108	23,576	532	23,049	22,711	338
20-49	-	107,489	101,277	6,212	100,582	97,113	3,469
Medium companies							
50-99	-	134,720	128,409	6,311	129,921	125,112	4,810
100-249	-	472,351	406,650	65,702	433,970	401,297	32,672
Large companies							
250-499	-	352,934	299,155	53,779	337,017	286,184	50,833
500-999	-	485,285	411,894	73,390	481,537	408,287	73,250
1,000-4,999	-	1,980,088	1,517,137	462,951	1,953,278	1,497,511	455,767
5,000-9,999	-	1,533,778	1,177,564	356,214	1,491,784	1,139,819	351,965
10,000-24,999	-	2,959,589	2,071,049	888,539	2,945,920	2,057,380	888,539
25,000 or more	-	6,813,179	5,159,841	1,653,338	6,424,794	4,817,162	1,607,633



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

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Statistics are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics are representative of companies located in the United States that performed R&D.

<sup>c</sup> The Business Enterprise Research and Development Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Domestic sales are the amount of sales that originated from domestic operations. Foreign sales are the amount of sales that originated from foreign operations. Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 9

**Worldwide, domestic, and foreign sales for companies located in the United States that performed or funded R&D, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Sales		
		Worldwide	Domestic	Foreign
All business activities	21100–81000	14,863,520	11,296,552	3,566,968
Oil and gas extraction	21100	119,553	80,518	39,035
Mining	21200	15,337	13,947	1,391
Support activities for mining, including oil and gas	21300	53,272	28,322	24,950
Utilities	22100	288,292	286,719	1,573
Construction	23000	99,239	88,849	10,390
Food manufacturing	31100	795,967	583,067	212,900
Beverage manufacturing	31210	131,037	89,778	41,259
Tobacco manufacturing	31220	75,788	42,949	32,838
Textile, apparel, and leather products manufacturing	31990	80,098	56,047	24,051
Wood products manufacturing	32100	43,662	40,526	3,136
Paper manufacturing	32200	138,038	104,681	33,357
Printing and related support activities	32300	36,160	32,542	3,617
Petroleum refineries	32401	378,920	235,776	143,144
Asphalt paving, roofing, and saturated materials manufacturing	32402	18,932	16,003	2,929
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	8,947	8,476	471
Basic chemicals manufacturing	32510	253,285	160,717	92,568
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	96,423	57,106	39,317
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	67,234	56,369	10,865
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing	32541	707,023	539,191	167,833
In vitro diagnostic substances manufacturing	32542	18,981	12,134	6,846
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	126,405	115,183	11,222
Soap, cleaning compound, and toilet preparations manufacturing	32591	182,299	100,581	81,718
Paint, adhesive, and other chemical manufacturing	32592	121,547	78,266	43,281
Plastics and rubber products manufacturing	32600	242,938	179,939	62,999
Clay and glass products manufacturing	32710	34,344	19,924	14,420
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	44,002	37,810	6,192
Primary metal manufacturing	33100	103,454	79,274	24,180
Fabricated metal products manufacturing	33200	194,912	145,289	49,623
Agricultural machinery and equipment manufacturing	33311	57,227	36,219	21,008
Construction machinery manufacturing	33312	70,632	45,082	25,549
Mining, oil, and gas field machinery and equipment manufacturing	33319	55,194	22,695	32,500
Semiconductor machinery manufacturing	33321	49,278	26,287	22,992
Industrial machinery manufacturing (except semiconductor machinery)	33322	49,728	38,435	11,293
Photographic and photocopying equipment manufacturing	33331	1,441 - 233,432	1,442	0 - 231,989
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	93,455	66,485	26,969
Digital cameras manufacturing	33333	0 - 308,046	0 - 76,100	0 - 231,989
Engine, turbine, and power transmission equipment manufacturing	33360	103,655	52,517	51,138
Metalworking and other general purpose machinery manufacturing	33390	94,049	69,055	24,994
Computers and peripheral equipment manufacturing and magnetic and optical media	33412	454,712	215,104	239,608
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	70,064	40,719	29,345

TABLE 9

**Worldwide, domestic, and foreign sales for companies located in the United States that performed or funded R&D, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Sales		
		Worldwide	Domestic	Foreign
Radio, television, and wireless communication equipment manufacturing	33422	34,841	27,773	7,068
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	18,857	16,632	2,225
Audio and video equipment manufacturing	33430	16,369	13,107	3,261
Semiconductor and other electronic components manufacturing	33440	417,763	238,082	179,681
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	45,318	27,312	18,006
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	78,507	62,502	16,005
Measuring and control instruments manufacturing (not listed elsewhere)	33459	95,097	62,669	32,428
Electrical equipment, appliances, and components manufacturing	33500	203,459	134,384	69,075
Motor vehicles manufacturing	33610	458,784	353,992	104,792
Motor vehicle body and trailer manufacturing	33620	30,296	25,704	4,592
Motor vehicle parts manufacturing	33630	235,737	149,479	86,258
Aircraft manufacturing	33641	120,779	114,603	6,176
Aircraft engine and engine parts manufacturing	33642	42,793	29,630	13,164
Other aircraft parts and auxiliary equipment manufacturing	33643	68,917	60,083	8,835
Guided missiles, space vehicles, and related parts manufacturing	33644	43,696	38,386	5,309
Railroad rolling stock manufacturing	33651	16,854	9,421	7,433
Ship and boat building	33660	18,208	16,342	1,866
Motorcycle, bicycle, and parts manufacturing	33691	9,705	5,548	4,157
Military armored vehicle, tank, and tank components manufacturing	33692	10,766	9,398	1,367
All other transportation equipment manufacturing	33699	21,046	19,166	1,880
Furniture and related products manufacturing	33700	57,220	49,950	7,270
Medical equipment and supplies manufacturing	33910	515,125	403,496	111,629
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	149,045	100,331	48,714
Merchant wholesalers, durable goods	42300	185,285	159,409	25,876
Merchant wholesalers, nondurable goods	42400	645,419	513,510	131,910
Wholesale electronic markets and agents and brokers (business to business)	42500	20,637	19,901	736
Retail trade (except electronic shopping and electronic auctions)	44000	685,031	607,899	77,133
Electronic shopping and electronic auctions	45411	212,463 - 444,454	212,464	0 - 231,989
Transportation	48000	223,100	181,873	41,227
Couriers, messengers, and express delivery services	49200	0 - 308,046	0 - 76,100	231,989
Warehousing and storage	49300	17,095	11,394	5,701
Newspaper, periodical, book, and directory publishers (except Internet)	51110	6,869	5,379	1,490
Software publishers (except Internet)	51120	238,475	149,734	88,742
Motion picture and sound recording (except Internet)	51200	36,035	33,955	2,081
Broadcasting (except Internet)	51500	168,015	131,464	36,550
Wired telecommunications carriers	51710	150,710	146,787	3,923
Wireless telecommunications carriers (except satellite)	51720	254,772	253,127	1,645
Satellite telecommunications	51740	45,199	45,008	192
Other telecommunications (not listed elsewhere)	51790	23,263	17,041	6,222
Data processing, hosting, and related services	51800	102,570	69,438	33,132
Cloud computing applications and Internet-based software services	51801	323,266	226,559	96,707
Other information services, including Internet publishing, broadcasting, and Web search portals	51910	390,595	275,283	115,312
Finance: banking and credit intermediation	52200	637,872	574,077	63,795

TABLE 9

**Worldwide, domestic, and foreign sales for companies located in the United States that performed or funded R&D, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Sales		
		Worldwide	Domestic	Foreign
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	129,354	94,127	35,227
Insurance carriers and related activities	52400	914,331	883,590	30,741 i
Real estate	53100	11,841	11,840	1
Rental and leasing services	53200	10,127	6,941	3,186
Lessors of nonfinancial intangible assets, including patent licensing	53300	3,191 - 235,182	3,192	0 - 231,989
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	29,108	26,798	2,311
Architectural, engineering, and related services	54130	95,540	81,207	14,333
Specialized design services	54140	1,439 - 233,430	1,440	0 - 231,989
Computer systems design and related services	54150	229,217	145,903	83,314
Management, scientific, and technical consulting services	54160	59,488	54,222	5,265
Research and development services in the social sciences and humanities	54172	1,016	1,003	13
Research and development services in biotechnology	54173	13,779	9,617	4,162
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	54,377	41,331	13,047 i
Research and development services in nanotechnology	54175	362 i	362 i	0
Advertising and related services	54180	101,585 - 333,576	101,586	0 - 231,989
Professional, scientific, and technical services (not listed elsewhere)	54190	34,696	32,008	2,688
Management of companies and enterprises	55100	11,906 i	11,700 i	206 i
Administrative and support services	56100	63,563	55,353	8,211
Waste management and remediation services	56200	2,613 - 234,604	2,614	0 - 231,989
Offices of physicians	62110	65,797	65,797	0
Medical and diagnostic laboratories	62150	52,328	48,069	4,258 i
Other ambulatory health care services (ambulance, dental, home health care)	62199	30,615	26,979	3,636
Hospitals and nursing care facilities	62200	44,662	44,662	0
Social assistance services	62400	1,825	1,825	0
Arts, entertainment, and recreation	71000	17,465	14,352	3,112
Accommodation and food services	72000	52,941	35,098	17,843
Other services (not listed elsewhere)	81000	86,353	65,440	20,913
Less: intersegment eliminations	-	215,380	152,870	62,510
Undistributed	-	0	0	0

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

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System industry definitions.**Note(s):**

Domestic sales are the amount of sales that originated from domestic operations. Foreign sales are the amount of sales that originated from foreign operations. Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 10

## Domestic R&amp;D paid for by the company and others and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
All industries	21-23, 31-33, 42-81	537,619	300,046	48,343	23,456	7,929	35,020	8,909	20,972	3,785	16,802	72,358
Manufacturing industries	31-33	308,445	165,464	16,162	12,518	3,790	29,828	4,418	14,372	3,312	9,220	49,361
Food	311	5,239	3,171	37	202	22	710	83	249	15	150	599
Beverage and tobacco products	312	1,177 i	625 i	10	70	2	85	6	56	0	47	276
Textile, apparel, and leather products	313-16	822	636	18	16	15	64	5	15	3	11	38
Wood products	321	187	140	0	3	1	27	1	3	0	3	7 i
Paper	322	928	479	* i	6	17 i	314	6	6	*	7	92
Printing and related support activities	323	283	208	3 i	14 i	1 i	17 i	6 i	17 i	* i	1	17 i
Petroleum and coal products	324	1,311 - 1,324	695	0	12	1	53	6	56 - 78	*	232	230 - 266
Chemicals	325	101,079	44,297	5,535	7,227	902	9,073	1,662	4,674	1,918	4,845	20,945
Basic chemicals	3251	2,694	1,423	13	42	15	501	40	157	58	153	291
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234	852	1	45	6	61	19	93	5	54	97
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066	536	1 i	200	2 i	70	14	57	19	8 i	148 - 163
Pharmaceuticals and medicines	3254	91,776	38,684	5,501	6,843	864	8,191	1,542	4,185	1,835	4,565	19,566
Soap, cleaning compound, and toilet preparation	3256	2,665	1,569	16	89	3	160	29	102	1	25	671
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649	1,233	3	8	12	90	17	80	*	40	155 - 169
Plastics and rubber products	326	2,634	1,584	4	25	42	570	22	83	5	44	255
Nonmetallic mineral products	327	1,717 i	888 i	21 i	45 i	37 i	135 i	40 i	78 i	1	29	443 i
Primary metals	331	815	315	1	4	7	381	2	21	* i	38	46 i
Fabricated metal products	332	3,396	2,029	55	89	46	756	30	85	12	51	243
Machinery	333	16,223	9,434	302	589	167	2,255	220	678	35	426	2,116
Agricultural implement	33311	1,769 - 1,811	1,019	1	113	7	217	7	40 - 54	1	50	306 - 359
Semiconductor machinery	333242	4,807	2,543	232	37	8	505	135	367	*	150	829
Engine, turbine, and power transmission equipment	3336	1,645	1,017	9	29	12	106	26	59	15	21	351
Other machinery	other 333	7,959 - 8,001	4,855	61	410	139	1,428	52 i	199 - 213	19	205	575 - 631 i
Computer and electronic products	334	99,535	57,717	9,581	1,715	1,665	6,989	1,623	6,133	758	1,433	11,922

TABLE 10

## Domestic R&amp;D paid for by the company and others and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Communications equipment	3342	12,103	7,017	766	424	146	299	813	516	24	162	i 1,938
Semiconductor and other electronic components	3344	43,181	22,836	4,562	675	274	3,656	275	3,079	445	479	i 6,898
Navigational, measuring, electromedical, and control instruments	3345	18,505	12,728	339	492	183	1,823	113	551	16	429	1,829
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858	1,659	171	116	26	226	21	82	14	161	382
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586	7,782	i 63	294	77	1,215	43	231	*	117	764
Other measuring and controlling device	other 3345	5,061	3,287	106	82	80	382	50	239	2	151	683
Other computer and electronic products	other 334	25,747	15,135	3,913	125	1,062	1,210	422	1,986	273	363	1,257
Electrical equipment, appliances, and components	335	4,998	3,276	54	268	42	351	74	150	39	223	521
Transportation equipment	336	48,796	28,292	85	1,308	581	6,369	i 486	1,286	429	899	9,062
Motor vehicles, bodies, trailers, and parts	3361-63	23,121	14,460	45	968	479	2,510	380	996	403	299	2,580
Aerospace products and parts	3364	22,914	i 12,160	i 25	285	53	3,349	i 57	232	i 1	510	i 6,242
Aircraft, aircraft engine, and aircraft parts	336411-13	21,291	i 11,207	i 21	219	i 45	3,015	i 46	199	i 1	505	i 6,033
Guided missile, space vehicle, and related parts	336414-15, 336419	1,623	953	4	i 66	8	335	11	33	0	5	208
Military armored vehicle, tank, and tank component	336992	11	4	*	i 1	i *	3	* i	0	* i	1	i 2
Other transportation	other 336	2,750	1,667	i 15	54	49	506	i 49	i 57	i 24	i 89	i 239
Furniture and related products	337	496	282	2	16	6	92	4	9	23	i 18	43
Miscellaneous	339	18,791 - 18,809	11,396	454	908	236	1,584	143	755 - 776	73	763	2,473 - 2,500
Medical equipment and supplies	3391	16,116	9,508	435	831	188	1,333	122	700	29	717	2,254
Other miscellaneous manufacturing	3399	2,674 - 2,692	1,888	19	77	47	252	21	55 - 77	44	46	219 - 246
Nonmanufacturing industries	21-23, 42-81	229,174	134,582	32,181	10,938	4,139	5,193	4,491	6,600	473	7,582	i 22,996
Mining, quarrying, oil and gas extraction, and support activities	21	1,165	808	8	38	6	80	i 15	16	1	i 49	i 145
Utilities	22	264	128	2	28	2	11	1	10	3	27	53
Wholesale trade	42	1,058	799	*	i 14	i 5	62	i 2	18	4	12	144

TABLE 10

## Domestic R&amp;D paid for by the company and others and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Electronic shopping and electronic auctions	454111-12	3,840 - 19,390 i	0 - 11,484 i	2,016 - 4,233 i	155 i	0 - 313 i	0 - 256 i	2 - 241 i	0 - 775 i	0 - 55 i	3	0 - 5,514 i
Transportation and warehousing	48-49	4,957 i	2,396 i	1,373 i	342 i	30 i	96 i	8	0 - 210	0 - 55	205 i	301 - 454 i
Information	51	129,463	77,206	23,285	6,422	3,043	1,030	2,945	3,670	284	2,520	9,059
Publishing	511	35,025	22,532	4,306	1,675	349	566	342	438	112	1,422	3,283
Newspaper, periodical, book, and directory publishers	5111	60	56	0	3	*	*	*	*	0	*	*
Software publishers	5112	34,965	22,476	4,306	1,672	349	566	342	438	112	1,422	3,282
Telecommunications	517	3,425 - 3,437	2,592	23	183	19	57	22	13 - 20	4	485	18 - 42
Data processing, hosting, and related services	518	41,551	27,260	6,611	1,159	576	298	713	843	149	448	3,495
Other information	other 51	49,449 - 49,463	24,822	12,345	3,404	2,098	108	1,868	2,370 - 2,377	20	164	2,239 - 2,265 i
Finance and insurance	52	12,296	7,862	1,123	1,770	203	88	100	300	16	190	645
Real estate and rental and leasing	53	3,249	957	2 - 2,211	37	0 - 313	0 - 256	0 - 238	43	0 - 55	3	0 - 2,209
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	2	3	0 - 3 i	0 - 3 i	*	*	*	0 - 3 i	* i	1 i
Other real estate and rental and leasing	other 53	3,242	955	0 - 2,209	33 - 38	0 - 313	0 - 256	0 - 238	43	0 - 55	3	0 - 2,209
Professional, scientific, and technical services	54	54,367	32,099	1,982	1,849	521	3,473	1,150 i	1,743	96	4,479 i	6,975
Architectural, engineering, and related services	5413	4,214	3,092	6	136	19	459	52	24	1	62	363
Computer systems design and related services	5415	17,935	12,122	803	753	215	441	150	626	39	329	2,456
Scientific research and development services	5417	25,600	12,371	1,091 i	675	197 i	2,242	908 i	1,018 i	51	4,003 i	3,044
Research and development in nanotechnology	541713	179 i	103 i	*	3 i	1 i	15 i	21 i	7 i	1	2 i	26 i
Research and development in biotechnology (except nanobiotechnology)	541714	6,191	2,967	189	155	13	485	99	150	26	1,107 i	1,000
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539 i	8,787	885 i	496 i	183 i	1,707 i	770 i	851 i	24	2,841 i	1,994 i
Research and development in the social sciences and humanities	541720	691	515	16	21	*	36	18	10	0	53	23
Other professional, scientific, and technical services	other 54	6,618	4,513	82	285	91	331	39	74	4	85	1,113

TABLE 10

**Domestic R&D paid for by the company and others and performed by the company, by type of cost, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Health care services	621-23	1,477	819	95	157	20	99	32	29	17	46	163
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,491 - 17,041	27 - 11,513	81	128	0 - 313	1 - 258	1 - 240	0 - 775	*	47	0 - 5,514
All companies (number of domestic employees)	-	537,619	300,046	48,343	23,456	7,929	35,020	8,909	20,972	3,785	16,802	72,358
Small companies												
10-19 <sup>a</sup>	-	5,047	3,044	203	230	44	461	140	121	48	201	557
20-49	-	12,994	8,232	260	474	141	1,282	288	231	171	599	1,315
Medium companies												
50-99	-	12,993	7,890	345	471	187	1,602	321	286	99	524	1,267
100-249	-	25,411	14,382	1,939	1,026	235	2,384	781	513	255	1,363	2,534
Large companies												
250-499	-	20,878	13,090	1,366	807	153	1,481	325	728	178	676	2,074
500-999	-	21,264	11,958	1,230	892	227	1,519	449	819	299	794	3,077
1,000-4,999	-	88,238	49,457	10,845	3,341	1,281	5,066	1,363	2,996	846	3,243	9,801
5,000-9,999	-	48,397	27,763	3,070	2,295	606	3,536	788	2,246	295	1,267	6,530
10,000-24,999	-	88,567	48,978	6,506	4,863	659	6,397	827	4,534	497	4,602	10,703
25,000 or more	-	213,829	115,253	22,579	9,057	4,397	11,291	3,628	8,498	1,094	3,533	34,499

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



TABLE 11

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more
All industries	21-23, 31-33, 42-81	537,619	5,047	12,994	12,993	25,411	20,878	21,264	88,238	48,397	88,567	213,829
Manufacturing industries	31-33	308,445	1,697	6,269	7,009	13,189	10,155	12,963	47,984	33,421	66,449	109,310
Food	311	5,239	18	94	98	176	188	242	540	1,051	1,941	891 i
Beverage and tobacco products	312	1,177 i	7	8	23	18	116	16	41	349	74	524 i
Textile, apparel, and leather products	313-16	822	5	6	17	37	8	50	138	278	94 i	188
Wood products	321	187	0	8	13	11	11	13	38	89	5	0
Paper	322	928	0	5	6	33	12	6	182	67	338	279
Printing and related support activities	323	283	*	9	14	65 i	18	14	58	33	72 i	0
Petroleum and coal products	324	1,311 - 1,324	8	15	119	15	14	137	71	16	2 - 330	582 - 931
Chemicals	325	101,079	892	3,107	3,084	6,928	3,894	4,599	16,445	11,672	32,063	18,396
Basic chemicals	3251	2,694	4	174	167	229	97	163	1,160	301	381	18
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234	1	26	40	77	67	91	159	0	772	0
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066	17	17	31	27	11	5	516	0	432 - 445	0
Pharmaceuticals and medicines	3254	91,776	837	2,777	2,755	6,367	3,552	4,202	13,721	11,182	28,333	18,049
Soap, cleaning compound, and toilet preparation	3256	2,665	12	46	25	158	45	58	463 i	188	1,470	200 i
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649	21	66	65	70	122	79	426	0	661 - 674	129 i
Plastics and rubber products	326	2,634	5	111	122	245	177	355	1,033	174	181	232
Nonmetallic mineral products	327	1,717 i	1	0 - 134 i	31	117	0 - 205	107	172	288	0	660 - 1,005 i
Primary metals	331	815	0	107	52	64	28	36	285	223	21	0
Fabricated metal products	332	3,396	201	421	518	702	297	298	699	145	116	0
Machinery	333	16,223	97	571	875	1,047	676	654	2,522	3,552	3,481	2,748
Agricultural implement	33311	1,769 - 1,811	1	22	0 - 698	48	0 - 583	57	141	433	0	0 - 1,112
Semiconductor machinery	333242	4,807	5	19	58	41	42	173 i	1,380	1,258	1,829	0
Engine, turbine, and power transmission equipment	3336	1,645	0	18	36	59	46	68	51 i	1,367	0	0
Other machinery	other 333	7,959 - 8,001	91	511	84 - 783	898	6 - 589	356	950	494	1,651 i	1,635 - 2,749
Computer and electronic products	334	99,535	204	1,004	1,052	1,704	3,082	3,161	14,871	9,415	15,051	49,992

TABLE 11

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more
Communications equipment	3342	12,103	24	9 - 445	0 - 244	0 - 369	530	0 - 1,148	2,700	1,802	0	4,839 - 7,040
Semiconductor and other electronic components	3344	43,181	67	13 - 448	349	681	1,945	1,344	6,059	3,855	i 13,729	14,702 - 15,139
Navigational, measuring, electromedical, and control instruments	3345	18,505	26 - 115	547	460	656	497	670	3,947	1,386	504 - 601	9,719
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858	12	169	176	270	180	346	1,477	0	227	0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586	15	35	96	154	122	0 - 248	183	815 - 1,071	0	8,914
Other measuring and controlling device	other 3345	5,061	0 - 89	343	i 188	232	195	76 - 325	2,288	314 - 572	276 - 375	805
Other computer and electronic products	other 334	25,747	0 - 89	0 - 354	0 - 245	0 - 369	110	0 - 1,148	2,165	2,371	720 - 819	i 18,093 - 20,382
Electrical equipment, appliances, and components	335	4,998	55	220	157	305	254	849	1,791	164	873	331
Transportation equipment	336	48,796	50	161	243	514	763	1,706	5,327	3,367	7,516	29,148
Motor vehicles, bodies, trailers, and parts	3361-63	23,121	0 - 40	43 - 52	14 - 41	227	368	889	3,434	2,360	i 4,189 - 4,851	10,857 - 11,570
Aerospace products and parts	3364	22,914	i 11 - 36	98	118	237	337	650	i 1,476	719 - 743	2,666	16,578
Aircraft, aircraft engine, and aircraft parts	336411-13	21,291	i 10	92	109	174	271	293	400	699	2,666	16,578
Guided missile, space vehicle, and related parts	336414-15, 336419	1,623	1 - 26	6	10	63	66	357	i 1,076	20 - 44	0	0
Military armored vehicle, tank, and tank component	336992	11	0 - 7	0 - 4	3	1	2	0 - 7	0	0	0	0
Other transportation	other 336	2,750	0 - 24	7 - 21	80 - 109	50	56	159 - 169	416	264 - 289	0 - 661	i 1,000 - 1,714
Furniture and related products	337	496	0	9	37	132	14	20	118	155	11	0
Miscellaneous	339	18,791 - 18,809	153	287 - 421	550	1,077	404 - 610	700	3,653	2,382	4,290 - 4,618	4,694 - 5,314
Medical equipment and supplies	3391	16,116	134	287	393	790	405	504	2,394	2,224	4,291	4,695
Other miscellaneous manufacturing	3399	2,674 - 2,692	19	0 - 134	156	287	0 - 205	197	1,259	158	i 0 - 327	0 - 619
Nonmanufacturing industries	21-23, 42-81	229,174	3,351	6,726	5,984	12,223	10,723	8,301	40,254	14,975	22,118	104,520
Mining, quarrying, oil and gas extraction, and support activities	21	1,165	6	43	93	i 48	56	i 84	i 271	0 - 568	0 - 568	0

TABLE 11

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10–19 <sup>a</sup>	20–49	50–99	100–249	250–499	500–999	1,000–4,999	5,000–9,999	10,000–24,999	25,000 or more
Utilities	22	264	3	20	0	0	0	15	54	0 - 140	0 - 140	34 - 175
Wholesale trade	42	1,058	64	269	132	300	123	107	34	3	19	9
Electronic shopping and electronic auctions	454111–12	3,840 - 19,390	3	14	2 - 581	0 - 280	105	2	0 - 568	1,049	0 - 3,512	0 - 17,731
Transportation and warehousing	48–49	4,957	0	1	81	11	1	40	2,141	9	0 - 2,676	0 - 2,676
Information	51	129,463	727	1,860	1,362	4,554	6,130	4,638	24,753	7,317	5,373	72,748
Publishing	511	35,025	472	679	570	1,178	525	786	8,610	1,791	1,267	19,147
Newspaper, periodical, book, and directory publishers	5111	60	*	1	6	*	53	0	0	0	0	0
Software publishers	5112	34,965	472	678	564	1,178	472	786	8,610	1,791	1,267	19,147
Telecommunications	517	3,425 - 3,437	0 - 200	0 - 200	52	178	106	103	89	29	0 - 200	2,684
Data processing, hosting, and related services	518	41,551	48 - 251	896	678	2,576	5,331	2,724	12,382	4,994	2,316 - 2,527	9,399
Other information	other 51	49,449 - 49,463	6	84 - 286	63	621	169	1,026	3,673	503	1,580 - 1,791	41,518
Finance and insurance	52	12,296	36	11	47	237	4 - 569	510	3,167	1,292	2,477	3,945 - 4,518
Real estate and rental and leasing	53	3,249	0 - 23	9	5	7	0 - 23	21	3,186	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	0	2	3	2	0	0	0	0	0	0
Other real estate and rental and leasing	other 53	3,242	0 - 23	7	3	5	0 - 23	21	3,186	0	0	0
Professional, scientific, and technical services	54	54,367	2,469	4,352	3,490	6,462	3,728	2,004	5,808	5,280	10,723	10,052
Architectural, engineering, and related services	5413	4,214	365	471	490	688	682	150	334	259	190	587
Computer systems design and related services	5415	17,935	612	1,553	895	1,228	1,149	715	2,903	25	4,017	4,838
Scientific research and development services	5417	25,600	1,393	1,980	1,736	3,952	1,171	918	1,928	3,362	6,403	2,758
Research and development in nanotechnology	541713	179	112	67	0	0	0	0	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	6,191	330	454	434	429	112	59	0	0	1,615	2,758
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539	944	1,454	1,267 - 1,302	2,841 - 3,524	1,025 - 1,060	858	1,279 - 1,928	3,362	4,788	0
Research and development in the social sciences and humanities	541720	691	6	5	0 - 35	0 - 681	0 - 33	0	0 - 649	0	0	0
Other professional, scientific, and technical services	other 54	6,618	100	349	370	594	726	221	642	1,634	113	1,870
Health care services	621–23	1,477	15	89	197	305	0 - 285	305	252	16	17	0 - 285

TABLE 11

**Domestic R&D paid for by the company and others and performed by the company, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)											
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more	
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71- 72, 81	1,491 - 17,041	0 - 32	58	0 - 579	23 - 303	0 - 579	576	i	24 - 593	11 - 1,062	0 - 3,512	0 - 16,303

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 12

**Domestic R&D paid for by the company and others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
All industries	21-23, 31-33, 42-81	537,619	36,017	76,088	425,514
Manufacturing industries	31-33	308,445	25,963	46,771	235,711
Food	311	5,239	542	1,213	3,484
Beverage and tobacco products	312	1,177	131	214	831
Textile, apparel, and leather products	313-16	822	87	94	641
Wood products	321	187	17	29	141
Paper	322	928	131	207	590
Printing and related support activities	323	283	29	72	182
Petroleum and coal products	324	1,311 - 1,324	247	411	652 - 667
Chemicals	325	101,079	15,579	20,337	65,163
Basic chemicals	3251	2,694	290	728	1,676
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234	210	292	732
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066	194	442	423 - 431
Pharmaceuticals and medicines	3254	91,776	14,613	18,098	59,065
Soap, cleaning compound, and toilet preparation	3256	2,665	173	333	2,158
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649	99	443	1,100 - 1,108
Plastics and rubber products	326	2,634	204	390	2,039
Nonmetallic mineral products	327	1,717	309	224	1,184
Primary metals	331	815	50	174	590
Fabricated metal products	332	3,396	197	820	2,379
Machinery	333	16,223	815	1,666	13,742
Agricultural implement	33311	1,769 - 1,811	109	99 - 143	1,560
Semiconductor machinery	333242	4,807	112	404	4,291
Engine, turbine, and power transmission equipment	3336	1,645	42	170	1,433
Other machinery	other 333	7,959 - 8,001	552	948 - 992	6,458
Computer and electronic products	334	99,535	3,268	10,619	85,648
Communications equipment	3342	12,103	580	1,092	10,431
Semiconductor and other electronic components	3344	43,181	1,343	3,246	38,592
Navigational, measuring, electromedical, and control instruments	3345	18,505	900	2,886	14,718
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858	214	779	1,864
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586	268	1,501	8,817
Other measuring and controlling device	other 3345	5,061	418	605	4,037
Other computer and electronic products	other 334	25,747	445	3,395	21,906
Electrical equipment, appliances, and components	335	4,998	342	583	4,074
Transportation equipment	336	48,796	2,855	7,370	38,570
Motor vehicles, bodies, trailers, and parts	3361-63	23,121	992	4,225	17,904

TABLE 12

**Domestic R&D paid for by the company and others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
Aerospace products and parts	3364	22,914	1,816	2,851	18,247
Aircraft, aircraft engine, and aircraft parts	336411-13	21,291	1,806	2,829	16,656
Guided missile, space vehicle, and related parts	336414-15, 336419	1,623	10	21	1,592
Military armored vehicle, tank, and tank component	336992	11	0	*	11
Other transportation	other 336	2,750	47	294	2,408
Furniture and related products	337	496	39	99	357
Miscellaneous	339	18,791 - 18,809	1,120	2,248	15,422 - 15,441
Medical equipment and supplies	3391	16,116	882	1,898	13,337
Other miscellaneous manufacturing	3399	2,674 - 2,692	239	350	2,085 - 2,104
Nonmanufacturing industries	21-23, 42-81	229,174	10,054	29,317	189,803
Mining, quarrying, oil and gas extraction, and support activities	21	1,165	64	334	767
Utilities	22	264	30	57	177
Wholesale trade	42	1,058	118	89	852
Electronic shopping and electronic auctions	454111-12	3,840 - 19,390	20	173 - 3,504	363 - 17,304
Transportation and warehousing	48-49	4,957	179	291	4,487
Information	51	129,463	3,886	7,667	117,910
Publishing	511	35,025	1,235	1,653	32,137
Newspaper, periodical, book, and directory publishers	5111	60	*	2	58
Software publishers	5112	34,965	1,235	1,651	32,079
Telecommunications	517	3,425 - 3,437	233 - 298	775 - 827	2,363 - 2,402
Data processing, hosting, and related services	518	41,551	1,567	2,738	37,246
Other information	other 51	49,449 - 49,463	784 - 851	2,450 - 2,502	46,126 - 46,165
Finance and insurance	52	12,296	410	1,683	10,203
Real estate and rental and leasing	53	3,249	3 - 824	762 - 1,585	1,662
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	4	2	1
Other real estate and rental and leasing	other 53	3,242	0 - 821	760 - 1,583	1,660
Professional, scientific, and technical services	54	54,367	4,338	14,396	35,634
Architectural, engineering, and related services	5413	4,214	300	1,070	2,844
Computer systems design and related services	5415	17,935	1,450	3,462	13,023
Scientific research and development services	5417	25,600	1,953	8,280	15,367
Research and development in nanotechnology	541713	179	21	36	122

TABLE 12

**Domestic R&D paid for by the company and others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
Research and development in biotechnology (except nanobiotechnology)	541714	6,191	807	466	4,918
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539 i	739	7,573 i	10,227 i
Research and development in the social sciences and humanities	541720	691	386	204 i	101 i
Other professional, scientific, and technical services	other 54	6,618	634	1,584	4,400
Health care services	621-23	1,477	190	534	753
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,491 - 17,041	0 - 821	0 - 3,333	58 - 16,994
All companies (number of domestic employees)	-	537,619	36,017	76,088	425,514
Small companies					
10-19 <sup>a</sup>	-	5,047	491	1,131	3,425
20-49	-	12,994	1,336	2,834	8,824
Medium companies					
50-99	-	12,993	1,101	2,800	9,092
100-249	-	25,411	2,906	6,475	16,030
Large companies					
250-499	-	20,878	1,486	2,861	16,531
500-999	-	21,264	1,248	2,973	17,043
1,000-4,999	-	88,238	8,936	14,873	64,429
5,000-9,999	-	48,397	2,754	7,086	38,557
10,000-24,999	-	88,567	5,496	13,012 i	70,059
25,000 or more	-	213,829	10,262	22,043	181,525

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 13

**Domestic R&D paid for by the company and others and performed by the company, by source of funds and state: 2020**

(Millions of U.S. dollars)

State	Total	Paid for by the company		Paid for by others						
				Total	Federal	Nonfederal				
All states	537,619		466,162		71,457	28,905	42,552			
Alabama	2,937		1,329		1,609	1,497	112			
Alaska	47	e	43	e	3	1	2			
Arizona	7,110		4,899		2,211	i	1,457	i	754	
Arkansas	414		360		54		16		38	
California	193,063		175,459		17,604		8,580		9,024	
Colorado	7,145		6,042		1,103		887		216	
Connecticut	7,902		6,487		1,415		1,022		393	
Delaware	2,499		1,688		811		7		804	
District of Columbia	659		509		150		118		31	
Florida	7,885		5,762		2,122		1,284	i	838	
Georgia	5,389		4,426		963	i	149	i	814	i
Hawaii	279		216		62		25		37	
Idaho	2,210	i	2,139	i	71		5	i	66	
Illinois	14,097		13,415		683		101		582	
Indiana	8,305	i	7,202	i	1,102		126		976	
Iowa	3,455		2,664		791	i	204 - 792	i	0 - 588	i
Kansas	2,771		1,956		814	i	15		799	i
Kentucky	1,259		852		407		87		320	
Louisiana	535		475		60		30	i	30	
Maine	434		385		49		18		32	
Maryland	5,923		3,964		1,959		1,366		593	
Massachusetts	32,737		27,704		5,033		1,172		3,861	
Michigan	21,589		18,507		3,081	i	269		2,812	i
Minnesota	7,824		7,421		403		175		229	
Mississippi	278		244		34		9		25	i
Missouri	6,502		4,581		1,921	i	1,771	i	150	i
Montana	242		224		18	i	9	i	9	
Nebraska	838		769		68		25		44	
Nevada	931	i	707		224	i	29		195	i
New Hampshire	2,755		1,093		1,661		1,074 - 1,662		0 - 588	
New Jersey	22,009		18,054		3,955		234		3,722	
New Mexico	1,140		857		283		240		43	
New York	23,414		21,062		2,353		1,026	i	1,326	
North Carolina	13,369		9,242		4,127	i	118		4,010	i
North Dakota	342		331		12		1		10	
Ohio	11,005		7,511		3,494	i	941	i	2,552	
Oklahoma	1,012		945		67	i	39	i	28	
Oregon	10,472		10,190		283		70		213	
Pennsylvania	15,443		13,544		1,899	i	287		1,612	i
Rhode Island	700	i	581	i	119		104		15	
South Carolina	1,567		1,337		230		97		133	
South Dakota	216		209		7		1		6	
Tennessee	1,820		1,568		251		69		183	
Texas	26,084		22,834		3,250	i	1,265		1,985	i
Utah	3,285		2,981		304		61		243	
Vermont	368		295		73		9		64	
Virginia	7,235		5,072		2,163		1,734		429	i
Washington	41,615		40,576		1,038		265	i	773	
West Virginia	229		203		25		17		8	



TABLE 13

**Domestic R&D paid for by the company and others and performed by the company, by source of funds and state: 2020**

(Millions of U.S. dollars)

State	Total	Paid for by the company	Paid for by others		
			Total	Federal	Nonfederal
Wisconsin	6,430	5,506	924	87	837
Wyoming	1,047	1,035	11	2	9
Undistributed <sup>a</sup>	807	707	100	0 - 101	0 - 101

e = more than 50% of value is modeled—see "[Technical Notes](#)"; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

<sup>a</sup> 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. For a given estimate in this table, if the conditions are satisfied for both the "i" and "e" flags, the e flag is assigned because the imputation rate may be found in the corresponding table of imputation rates. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 14

**Domestic R&D paid for by the company and others and performed by the company, by source of funds and core-based statistical area: 2020**

(Millions of U.S. dollars)

Core-based statistical area (CBSA)	CBSA code	Total	Paid for by the company	Paid for by others
All locations		537,619	466,162	71,457
San Jose-Sunnyvale-Santa Clara, CA	41940	83,119	78,190	4,930
San Francisco-Oakland-Hayward, CA	41860	61,710	59,379	2,332
Seattle-Tacoma-Bellevue, WA	42660	40,126	39,163	963
New York-Newark-Jersey City, NY-NJ-PA	35620	34,534	30,993	3,542
Boston-Cambridge-Newton, MA-NH	14460	30,066	25,285	4,781
Los Angeles-Long Beach-Anaheim, CA	31080	24,112	17,205 i	6,907
Detroit-Warren-Dearborn, MI	19820	16,326	14,211	2,115 i
San Diego-Carlsbad, CA	41740	14,674	12,391	2,283 i
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	37980	13,452	11,113	2,339
Chicago-Naperville-Elgin, IL-IN-WI	16980	11,743	11,141	602
Portland-Vancouver-Hillsboro, OR-WA	38900	10,166	9,959	207
Austin-Round Rock, TX	12420	10,148 i	9,385 i	763 i
Dallas-Fort Worth-Arlington, TX	19100	9,199	7,308	1,891 i
Washington-Arlington-Alexandria, DC-VA-MD-WV	47900	8,680	5,883	2,797
Minneapolis-St. Paul-Bloomington, MN-WI	33460	7,091	6,665	427
Phoenix-Mesa-Scottsdale, AZ	38060	6,269 i	4,183 i	2,086 i
Indianapolis-Carmel-Anderson, IN	26900	5,862 i	5,032 i	830
St. Louis, MO-IL	41180	5,312	3,426	1,886 i
Houston-The Woodlands-Sugar Land, TX	26420	4,844	4,395	449
Trenton, NJ	45940	4,789	3,398	1,391
Durham-Chapel Hill, NC	20500	4,544 i	2,904	1,640 i
Atlanta-Sandy Springs-Roswell, GA	12060	4,523	3,617	906 i
Norwich-New London, CT	35980	4,357	3,435	922
Cincinnati, OH-KY-IN	17140	4,070	2,774	1,296 i
Raleigh, NC	39580	3,808 i	2,316	1,493 i
Denver-Aurora-Lakewood, CO	19740	3,224	2,935	289
Sacramento-Roseville-Arden-Arcade, CA	40900	2,864 i	2,640 i	224
Baltimore-Columbia-Towson, MD	12580	2,806	2,025	781 i
Kansas City, MO-KS	28140	2,769 i	1,954	815 i
Oxnard-Thousand Oaks-Ventura, CA	37100	2,660	2,193	467 i
Milwaukee-Waukesha-West Allis, WI	33340	2,227	2,105	122
Madison, WI	31540	2,203	1,553	650 i
Charlotte-Concord-Gastonia, NC-SC	16740	2,125 i	2,014 i	111
Columbus, OH	18140	2,053	1,017	1,036
Tampa-St. Petersburg-Clearwater, FL	45300	2,047	1,337	710
Boise City, ID	14260	2,036	1,978	58
Miami-Fort Lauderdale-West Palm Beach, FL	33100	2,002 i	1,712 i	290 i
Manchester-Nashua, NH	31700	2,000	0 - 1,899	101 - 2,001
Huntsville, AL	26620	1,990	490	1,500
Pittsburgh, PA	38300	1,864	1,718	147
Bridgeport-Stamford-Norwalk, CT	14860	1,754	1,433 i	321
Cleveland-Elyria, OH	17460	1,731	1,543	188
Kalamazoo-Portage, MI	28020	1,720	1,352	367 i
Salt Lake City, UT	41620	1,682	1,525	157 i
Boulder, CO	14500	1,673	1,573	100 i
Providence-Warwick, RI-MA	39300	1,636 i	1,501 i	135 i
Worcester, MA-CT	49340	1,567	1,395 i	172
Des Moines-West Des Moines, IA	19780	1,164 i	1,152 i	12 i
Orlando-Kissimmee-Sanford, FL	36740	1,161 i	867 i	294 i

TABLE 14

**Domestic R&D paid for by the company and others and performed by the company, by source of funds and core-based statistical area: 2020**

(Millions of U.S. dollars)

Core-based statistical area (CBSA)	CBSA code	Total	Paid for by the company	Paid for by others
Albany-Schenectady-Troy, NY	10580	1,080	746	334
Provo-Orem, UT	39340	1,070	992	78
Rochester, NY	40380	1,010	963	47
Cheyenne, WY	16940	1,005 i	1,002 i	2
Akron, OH	10420	973	714	260 i
Riverside-San Bernardino-Ontario, CA	40140	973	905	68 i
Albuquerque, NM	10740	971	697	274
Greensboro-High Point, NC	24660	958 i	834 i	123 i
Fort Collins, CO	22660	935 i	887 i	48
Allentown-Bethlehem-Easton, PA-NJ	10900	915 i	872 i	42
Palm Bay-Melbourne-Titusville, FL	37340	891 i	558 i	333 i
New Haven-Milford, CT	35300	878 i	822 i	56 i
Ames, IA	11180	842 i	0 - 843	0 - 843 i
Grand Rapids-Wyoming, MI	24340	818	624	193
Peoria, IL	37900	807 i	792 i	15 i
Santa Maria-Santa Barbara, CA	42200	799	647	152 i
Hartford-West Hartford-East Hartford, CT	25540	786	676	109 i
Tucson, AZ	46060	767	648	119
Richmond, VA	40060	741 i	599	141 i
Columbus, IN	18020	720	641	79
Buffalo-Cheektowaga-Niagara Falls, NY	15380	711 i	488	223 i
Ann Arbor, MI	11460	699	472	226
Lancaster, PA	29540	656 i	616 i	40 i
Wilmington, NC	48900	653 i	27 i	627 i
Syracuse, NY	45060	653 i	357	296 i
Santa Rosa, CA	42220	650 i	623 i	27 i
Omaha-Council Bluffs, NE-IA	36540	638	582	56
Jacksonville, FL	27260	628 i	596 i	31 i
Nashville-Davidson-Murfreesboro-Franklin, TN	34980	606	555	51 i
Pueblo, CO	39380	599 i	40 i	560 i
Dayton, OH	19380	592	288 i	304
Louisville-Jefferson County, KY-IN	31140	574	284	290
Las Vegas-Henderson-Paradise, NV	29820	562	526	36
Bloomington, IL	14010	556	536	21 i
San Antonio-New Braunfels, TX	41700	556 i	469 i	87
Colorado Springs, CO	17820	552 i	456 i	97
Wichita, KS	48620	490	479	11
Oshkosh-Neenah, WI	36780	454	450	4
Charleston-North Charleston, SC	16700	447	294	153 i
Binghamton, NY	13780	447 i	116 i	331 i
Toledo, OH	45780	419	390	29 i
Barnstable Town, MA	12700	396	0 - 397	0 - 397 i
Virginia Beach-Norfolk-Newport News, VA-NC	47260	390	220 i	170
Portland-South Portland, ME	38860	369	326	44
Warsaw, IN	47700	362	362	* e
Bakersfield, CA	12540	361	239	122 i
Ogden-Clearfield, UT	36260	359 i	298 i	61
Corning, NY	18500	1 - 1,048 i	0 - 1,046 i	2 i
Davenport-Moline-Rock Island, IA-IL	19340	367 - 1,414	368	0 - 1,046 i
Memphis, TN-MS-AR	32820	331 - 1,378	332	0 - 1,046 i

TABLE 14

**Domestic R&D paid for by the company and others and performed by the company, by source of funds and core-based statistical area: 2020**

(Millions of U.S. dollars)

Core-based statistical area (CBSA)	CBSA code	Total	Paid for by the company	Paid for by others
Niles-Benton Harbor, MI	35660	348 - 1,395	349	0 - 1,046 i
All other CBSAs		27,078	23,474	3,604 i
Locations outside a CBSA		2,883	2,608	275 i
Undistributed <sup>a</sup>		807	707	100

\* = amount < \$500,000; e = more than 50% of value is modeled—see "[Technical Notes](#)"; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

<sup>a</sup> Includes data reported that were not allocated to a specific location by multi-establishment companies. For single-establishment companies, data reported were allocated to the location in the address used to mail the survey form.

**Note(s):**

Detail may not add to total because of rounding. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. For a given estimate in this table, if the conditions are satisfied for both the "i" and "e" flags, the e flag is assigned because the imputation rate may be found in the corresponding table of imputation rates. A CBSA is a U.S. geographic area that consists of one or more counties (or equivalents) anchored by an urban center of at least 10,000 people plus adjacent counties that are socioeconomically tied to the urban center by commuting. CBSAs are defined by the Office of Management and Budget in the Executive Office of the President. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 15

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry, company size, and domestic R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
All industries	21–23, 31–33, 42–81	537,619	5,553	32,702	40,732	30,159	428,473
Manufacturing industries	31–33	308,445	3,103	14,669	23,534	17,048	250,091
Food	311	5,239	201	685	599	821	2,933
Beverage and tobacco products	312	1,177	i 36	81	32	362	665
Textile, apparel, and leather products	313–16	822	38	136	235	224	188
Wood products	321	187	26	69	91	0	0
Paper	322	928	13	102	139	141	532
Printing and related support activities	323	283	47	90	146	i 0	0
Petroleum and coal products	324	1,311 - 1,324	0 - 162	91	240	67 - 103	764 - 927
Chemicals	325	101,079	399	3,107	8,076	5,818	83,680
Basic chemicals	3251	2,694	52	325	1,067	523	728
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234	33	226	137	66	772
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066	24 - 33	63	73	0	898
Pharmaceuticals and medicines	3254	91,776	81	2,081	6,334	5,096	78,185
Soap, cleaning compound, and toilet preparation	3256	2,665	102	165	171	56	2,170
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649	96 - 105	248	293	78	927
Plastics and rubber products	326	2,634	225	734	974	469	232
Nonmetallic mineral products	327	1,717	i 53	165	219	50 - 212	1,070 - 1,232
Primary metals	331	815	51	171	388	0	206
Fabricated metal products	332	3,396	518	1,427	834	485	132
Machinery	333	16,223	381	2,149	2,195	1,301	10,197
Agricultural implement	33311	1,769 - 1,811	33	98	117	121 - 165	1,400
Semiconductor machinery	333242	4,807	8	52	197	217	4,332
Engine, turbine, and power transmission equipment	3336	1,645	18	56	250	169	1,153
Other machinery	other 333	7,959 - 8,001	322	1,944	1,632	749 - 793	3,312
Computer and electronic products	334	99,535	434	2,217	3,654	2,684	90,547
Communications equipment	3342	12,103	65	414	378	668	10,578
Semiconductor and other electronic components	3344	43,181	103	585	1,190	1,008	40,295
Navigational, measuring, electromedical, and control instruments	3345	18,505	220	1,007	1,633	686	14,959
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858	25	267	716	253	1,596
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586	0 - 24	116	344	50 - 73	10,054

TABLE 15

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry, company size, and domestic R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	R&D program size						
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more	
Other measuring and controlling device	other 3345	5,061	170 - 196	623	573	359 - 384	3,309	
Other computer and electronic products	other 334	25,747	46	211	453	322	24,715	
Electrical equipment, appliances, and components	335	4,998	137	624	1,112	975	2,150	
Transportation equipment	336	48,796	158	1,159	1,984	2,123	43,372	
Motor vehicles, bodies, trailers, and parts	3361–63	23,121	80	602	1,123	1,200	20,116	
Aerospace products and parts	3364	22,914	i 57	331	683	627	21,215	
Aircraft, aircraft engine, and aircraft parts	336411–13	21,291	i 53	296	539	421	19,982	
Guided missile, space vehicle, and related parts	336414–15, 336419	1,623	5	35	144	206	1,233	
Military armored vehicle, tank, and tank component	336992	11	3	8	0	0	0	
Other transportation	other 336	2,750	18	218	179	295	2,040	
Furniture and related products	337	496	43	226	227	0	0	
Miscellaneous	339	18,791 - 18,809	185 - 350	1,437	2,388	1,360 - 1,532	13,254	
Medical equipment and supplies	3391	16,116	186	893	1,775	1,139	12,124	
Other miscellaneous manufacturing	3399	2,674 - 2,692	0 - 165	544	613	221 - 393	1,131	
Nonmanufacturing industries	21–23, 42–81	229,174	2,450	18,033	17,198	13,111	178,383	
Mining, quarrying, oil and gas extraction, and support activities	21	1,165	57	262	i 10 - 559	189	i 100 - 649	
Utilities	22	264	5	56	126	77	0	
Wholesale trade	42	1,058	314	706	i 38	i 0	0	
Electronic shopping and electronic auctions	454111–12	3,840 - 19,390	i 0 - 145	64	1,000	50 - 664	2,053 - 19,229	
Transportation and warehousing	48–49	4,957	i 0 - 48	144	101	50 - 97	4,616	
Information	51	129,463	581	5,910	6,841	8,062	108,068	
Publishing	511	35,025	355	2,023	1,552	850	30,246	
Newspaper, periodical, book, and directory publishers	5111	60	4	8	48	0	0	
Software publishers	5112	34,965	351	2,015	1,503	850	30,246	
Telecommunications	517	3,425 - 3,437	7 - 18	248	478	65	i 2,626	
Data processing, hosting, and related services	518	41,551	171	3,240	4,206	6,624	27,309	
Other information	other 51	49,449 - 49,463	36 - 49	399	605	523	47,887	
Finance and insurance	52	12,296	11	348	1,192	474	10,271	
Real estate and rental and leasing	53	3,249	4 - 150	13	10 - 960	50 - 664	1,462 - 3,172	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	5	2	0	0	0	

TABLE 15

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry, company size, and domestic R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
Other real estate and rental and leasing	other 53	3,242	0 - 145	11	10 - 960	50 - 664	1,462 - 3,172
Professional, scientific, and technical services	54	54,367	1,238	8,938	7,400	3,140	33,652
Architectural, engineering, and related services	5413	4,214	279	1,565	1,028	549	792
Computer systems design and related services	5415	17,935	574	3,050	1,950	940	11,421
Scientific research and development services	5417	25,600	229 i	3,365	3,171	1,125	17,711 i
Research and development in nanotechnology	541713	179 i	25 i	155 i	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	6,191	41	700	749	328	4,373
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539 i	124 - 164 i	2,483	1,857 - 2,413	797	12,683 - 13,239 i
Research and development in the social sciences and humanities	541720	691	0 - 38 i	28	10 - 564	0	100 - 654
Other professional, scientific, and technical services	other 54	6,618	156	958	1,251	525	3,727
Health care services	621–23	1,477	98	274	461	359	285
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,491 - 17,041	0 - 145	1,317	20 - 1,013	50 - 664 i	100 - 15,615
All companies (number of domestic employees)	–	537,619	5,553	32,702	40,732	30,159	428,473
Small companies							
10–19 <sup>a</sup>	–	5,047	1,153	3,405	334	0	155
20–49	–	12,994	2,112	7,513	3,130	239	0
Medium companies							
50–99	–	12,993	1,068	5,780	5,361	784	0
100–249	–	25,411	726	7,857	8,923	4,307	3,599
Large companies							
250–499	–	20,878	261	3,526	5,283	6,222	5,586
500–999	–	21,264	136	2,135	5,546	4,706	8,741
1,000–4,999	–	88,238	85	1,982	8,419	8,621	69,131
5,000–9,999	–	48,397	7	208	2,137	2,412	43,632
10,000–24,999	–	88,567	4	212	1,081	2,386	84,884
25,000 or more	–	213,829	1	83	517	483	212,745

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

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. R&D program size classifications are based on R&D performance. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



TABLE 16

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Total	Paid for by the company	Paid for by others
All business activities	21100–81000	537,619	466,162	71,457
Oil and gas extraction	21100	681	648	33 i
Mining	21200	104	104	0
Support activities for mining, including oil and gas	21300	723	702	20
Utilities	22100	275	234	40
Construction	23000	1,070	1,045	25
Food manufacturing	31100	5,112	4,852	260
Beverage manufacturing	31210	647	596	51
Tobacco manufacturing	31220	226	207	19
Textile, apparel, and leather products manufacturing	31990	768	759	9
Wood products manufacturing	32100	233	229	3
Paper manufacturing	32200	1,244	1,243	1
Printing and related support activities	32300	349	347	1
Petroleum refineries	32401	499 - 735	500	0 - 235
Asphalt paving, roofing, and saturated materials manufacturing	32402	199	199	0
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	120	119	1
Basic chemicals manufacturing	32510	3,036	2,872	164
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	1,339	1,258	81 i
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	1,507	1,182	325
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing	32541	56,612	49,547	7,065
In vitro diagnostic substances manufacturing	32542	1,552	1,515	37
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	32,436	28,742	3,695
Soap, cleaning compound, and toilet preparations manufacturing	32591	2,404	2,190	214
Paint, adhesive, and other chemical manufacturing	32592	1,473	1,423	50
Plastics and rubber products manufacturing	32600	2,941	2,911	29
Clay and glass products manufacturing	32710	1,385 i	1,351 i	34 i
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	383	328	55 i
Primary metal manufacturing	33100	914	882	32
Fabricated metal products manufacturing	33200	3,901	3,617	284
Agricultural machinery and equipment manufacturing	33311	1,397 - 1,633	1,398	0 - 235
Construction machinery manufacturing	33312	1,257	1,246	11
Mining, oil, and gas field machinery and equipment manufacturing	33319	1,032	993	39
Semiconductor machinery manufacturing	33321	4,750	4,064	686
Industrial machinery manufacturing (except semiconductor machinery)	33322	1,044	910	133
Photographic and photocopying equipment manufacturing	33331	163	162	1
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	1,444	1,414	30
Digital cameras manufacturing	33333	313 i	310 i	3
Engine, turbine, and power transmission equipment manufacturing	33360	2,467	2,120	347
Metalworking and other general purpose machinery manufacturing	33390	2,851	2,601	249
Computers and peripheral equipment manufacturing and magnetic and optical media	33412	22,850	22,751	99
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	7,562	7,552	10
Radio, television, and wireless communication equipment manufacturing	33422	2,291	1,463	828 i
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	1,643	1,532	111

TABLE 16

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Total	Paid for by the company	Paid for by others
Audio and video equipment manufacturing	33430	1,285	1,278	7
Semiconductor and other electronic components manufacturing	33440	44,105	41,476	2,630
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	3,885	3,637	248
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	8,836 i	2,813	6,023 i
Measuring and control instruments manufacturing (not listed elsewhere)	33459	4,375	4,173	202 i
Electrical equipment, appliances, and components manufacturing	33500	5,273	4,739	534
Motor vehicles manufacturing	33610	15,572	13,342	2,231
Motor vehicle body and trailer manufacturing	33620	82	82	0
Motor vehicle parts manufacturing	33630	7,384	6,160	1,224
Aircraft manufacturing	33641	15,641	4,883	10,759
Aircraft engine and engine parts manufacturing	33642	2,038	982	1,056
Other aircraft parts and auxiliary equipment manufacturing	33643	1,742	1,190	552
Guided missiles, space vehicles, and related parts manufacturing	33644	3,327	1,673	1,654
Railroad rolling stock manufacturing	33651	239	195 i	45
Ship and boat building	33660	964	151	814
Motorcycle, bicycle, and parts manufacturing	33691	417	416	*
Military armored vehicle, tank, and tank components manufacturing	33692	468	194	273
All other transportation equipment manufacturing	33699	552	516	36
Furniture and related products manufacturing	33700	539	531	8
Medical equipment and supplies manufacturing	33910	14,680	14,515	165
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	3,033	2,956	77
Merchant wholesalers, durable goods	42300	860	795	65
Merchant wholesalers, nondurable goods	42400	390	376	13
Wholesale electronic markets and agents and brokers (business to business)	42500	36 i	34 i	3
Retail trade (except electronic shopping and electronic auctions)	44000	216	215	*
Electronic shopping and electronic auctions	45411	0 - 15,222 i	0 - 15,028 i	0 - 235
Transportation	48000	4,078 i	4,078 i	*
Couriers, messengers, and express delivery services	49200	923	923	0
Warehousing and storage	49300	33	29	3
Newspaper, periodical, book, and directory publishers (except Internet)	51110	87	87	0
Software publishers (except Internet)	51120	23,520	22,866	654
Motion picture and sound recording (except Internet)	51200	81	81	0
Broadcasting (except Internet)	51500	0 - 15,222 i	0 - 15,028 i	0 - 235
Wired telecommunications carriers	51710	505	500	5
Wireless telecommunications carriers (except satellite)	51720	2,022	1,966	56
Satellite telecommunications	51740	385	373	12
Other telecommunications (not listed elsewhere)	51790	427	402	25
Data processing, hosting, and related services	51800	11,083	11,076	7
Cloud computing applications and Internet-based software services	51801	39,367	38,913	453
Other information services, including Internet publishing, broadcasting, and Web search portals	51910	53,214	53,120	94
Finance: banking and credit intermediation	52200	7,932	7,891	41
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	1,815	1,810	5
Insurance carriers and related activities	52400	2,543	2,497	45
Real estate	53100	368	368	0
Rental and leasing services	53200	2,766	2,766	0

TABLE 16

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2020**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	Total	Paid for by the company	Paid for by others
Lessors of nonfinancial intangible assets, including patent licensing	53300	0 - 76	0 - 76	*
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	2,478	2,478	0
Architectural, engineering, and related services	54130	4,358	2,479	1,879
Specialized design services	54140	212	174	38
Computer systems design and related services	54150	16,759	13,776	2,983
Management, scientific, and technical consulting services	54160	2,676	1,914	763
Research and development services in the social sciences and humanities	54172	691	38	653
Research and development services in biotechnology	54173	5,541	1,215	4,326
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	19,456 i	5,417 i	14,039 i
Research and development services in nanotechnology	54175	180 i	121 i	59 i
Advertising and related services	54180	1,283 i	1,278 i	5
Professional, scientific, and technical services (not listed elsewhere)	54190	1,877	1,336	540
Management of companies and enterprises	55100	3 - 56	0 - 52	4
Administrative and support services	56100	3,521	3,498	23
Waste management and remediation services	56200	0 - 15,222	0 - 15,028	0 - 235
Offices of physicians	62110	235	194	41
Medical and diagnostic laboratories	62150	2,087	1,410 i	677
Other ambulatory health care services (ambulance, dental, home health care)	62199	93	81	11
Hospitals and nursing care facilities	62200	13 - 15,042	0 - 15,028	0 - 14
Social assistance services	62400	0 - 15,028	0 - 15,028	0
Arts, entertainment, and recreation	71000	0 - 15,028	0 - 15,028	0
Accommodation and food services	72000	121	121	*
Other services (not listed elsewhere)	81000	573	462	111
Undistributed	-	0	0	0

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System industry definitions.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 17

**Domestic R&D paid for by the company and others and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
All industries	21-23, 31-33, 42-81	537,619		4.8	5.0
Manufacturing industries	31-33	308,445		5.4	5.5
Food	311	5,239		0.9	0.9
Beverage and tobacco products	312	1,177	i	0.8	0.8
Textile, apparel, and leather products	313-16	822		1.3	1.3
Wood products	321	187		0.4	0.4
Paper	322	928		1.1	1.1
Printing and related support activities	323	283		0.9	0.9
Petroleum and coal products	324	1,311 - 1,324		D	D
Chemicals	325	101,079		9.0	9.1
Basic chemicals	3251	2,694		1.1	1.1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234		2.4	2.4
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066		D	D
Pharmaceuticals and medicines	3254	91,776		16.6	16.9
Soap, cleaning compound, and toilet preparation	3256	2,665		2.3	2.3
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649		D	D
Plastics and rubber products	326	2,634		1.4	1.4
Nonmetallic mineral products	327	1,717	i	2.9	3.6
Primary metals	331	815		1.2	1.2
Fabricated metal products	332	3,396		2.5	2.5
Machinery	333	16,223		4.6	4.6
Agricultural implement	33311	1,769 - 1,811		D	D
Semiconductor machinery	333242	4,807		17.9	17.9
Engine, turbine, and power transmission equipment	3336	1,645		3.8	D
Other machinery	other 333	7,959 - 8,001		D	D
Computer and electronic products	334	99,535		13.1	13.2
Communications equipment	3342	12,103		11.8	D
Semiconductor and other electronic components	3344	43,181		20.9	21.1
Navigational, measuring, electromedical, and control instruments	3345	18,505		9.9	9.9
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858		13.6	13.6
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586		12.2	12.2
Other measuring and controlling device	other 3345	5,061		6.4	6.4
Other computer and electronic products	other 334	25,747		9.8	D
Electrical equipment, appliances, and components	335	4,998		3.3	3.3
Transportation equipment	336	48,796		5.3	5.3
Motor vehicles, bodies, trailers, and parts	3361-63	23,121		4.0	D
Aerospace products and parts	3364	22,914	i	8.5	8.5
Aircraft, aircraft engine, and aircraft parts	336411-13	21,291	i	8.3	8.3
Guided missile, space vehicle, and related parts	336414-15, 336419	1,623		15.8	15.8
Military armored vehicle, tank, and tank component	336992	11		2.1	2.1

TABLE 17

**Domestic R&D paid for by the company and others and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
Other transportation	other 336	2,750		3.9	D
Furniture and related products	337	496		1.1	1.1
Miscellaneous	339	18,791 - 18,809		D	D
Medical equipment and supplies	3391	16,116		2.7	2.7
Other miscellaneous manufacturing	3399	2,674 - 2,692		D	D
Nonmanufacturing industries	21-23, 42-81	229,174		4.1	4.4
Mining, quarrying, oil and gas extraction, and support activities	21	1,165		1.2	1.2
Utilities	22	264		0.1	0.1
Wholesale trade	42	1,058		0.4	0.4
Electronic shopping and electronic auctions	454111-12	3,840 - 19,390	i	D	D
Transportation and warehousing	48-49	4,957	i	2.3	2.3
Information	51	129,463		7.8	7.8
Publishing	511	35,025		13.8	13.9
Newspaper, periodical, book, and directory publishers	5111	60		3.8	4.5
Software publishers	5112	34,965		13.9	13.9
Telecommunications	517	3,425 - 3,437		D	D
Data processing, hosting, and related services	518	41,551		8.1	8.1
Other information	other 51	49,449 - 49,463		D	D
Finance and insurance	52	12,296		0.8	1.0
Real estate and rental and leasing	53	3,249		24.0	24.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7		0.4	0.4
Other real estate and rental and leasing	other 53	3,242		27.0	27.1
Professional, scientific, and technical services	54	54,367		13.0	13.2
Architectural, engineering, and related services	5413	4,214		5.9	6.0
Computer systems design and related services	5415	17,935		10.7	10.9
Scientific research and development services	5417	25,600		36.4	36.8
Research and development in nanotechnology	541713	179	i	46.7	46.7
Research and development in biotechnology (except nanobiotechnology)	541714	6,191		30.7	31.0
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539	i	38.0	38.4
Research and development in the social sciences and humanities	541720	691		69.3	69.3
Other professional, scientific, and technical services	other 54	6,618		6.1	6.1
Health care services	621-23	1,477		1.0	1.0
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,491 - 17,041		D	D
All companies (number of domestic employees)	-	537,619		4.8	5.0
Small companies					
10-19 <sup>c</sup>	-	5,047		21.4	22.2
20-49	-	12,994		12.8	13.4
Medium companies					

TABLE 17

**Domestic R&D paid for by the company and others and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
50–99	–	12,993	10.1	10.4
100–249	–	25,411	6.2	6.3
Large companies				
250–499	–	20,878	7.0	7.3
500–999	–	21,264	5.2	5.2
1,000–4,999	–	88,238	5.8	5.9
5,000–9,999	–	48,397	4.1	4.2
10,000–24,999	–	88,567	4.3	4.3
25,000 or more	–	213,829	4.1	4.4

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 = 2017 North American Industry Classification System.

<sup>a</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed R&D. The calculation of percentages in this column excludes R&D and sales of companies that fund R&D but do not perform R&D.

<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 18

**Domestic R&D paid for by the company and others and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers only <sup>b</sup>
All industries	21-23, 31-33, 42-81	585,694	5.2	5.4
Manufacturing industries	31-33	350,276	6.2	6.2
Food	311	5,496	0.9	0.9
Beverage and tobacco products	312	1,351	0.9	0.9
Textile, apparel, and leather products	313-16	832	1.3	1.3
Wood products	321	197	0.4	0.4
Paper	322	934 - 936	D	1.1
Printing and related support activities	323	287	0.9	1.0
Petroleum and coal products	324	1,518	0.7	0.7
Chemicals	325	130,839	11.7	11.8
Basic chemicals	3251	2,759	1.1	1.1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,289	i 2.5	2.5
Pesticide, fertilizer, and other agricultural chemicals	3253	1,147	1.3	1.3
Pharmaceuticals and medicines	3254	121,028	22.0	22.2
Soap, cleaning compound, and toilet preparation	3256	2,925	2.6	2.6
Paint, coating, adhesive, and other chemicals	3255, 3259	1,691	2.6	2.6
Plastics and rubber products	326	2,657	1.4	1.4
Nonmetallic mineral products	327	1,810	3.0	D
Primary metals	331	836	1.2	1.2
Fabricated metal products	332	3,485	2.6	2.6
Machinery	333	16,663	4.7	4.7
Agricultural implement	33311	1,946 - 1,997	D	D
Semiconductor machinery	333242	4,856	18.1	18.1
Engine, turbine, and power transmission equipment	3336	1,667	3.8	D
Other machinery	other 333	8,144 - 8,195	D	D
Computer and electronic products	334	103,269	13.6	13.7
Communications equipment	3342	13,184	12.9	D
Semiconductor and other electronic components	3344	43,486	21.1	21.2
Navigational, measuring, electromedical, and control instruments	3345	19,214	10.3	10.3
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,963	14.1	14.1
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	11,030 - 11,191	D	D
Other measuring and controlling device	other 3345	5,061 - 5,221	D	D
Other computer and electronic products	other 334	27,385	10.5	D
Electrical equipment, appliances, and components	335	5,095	3.3	3.3
Transportation equipment	336	54,735	6.0	6.0
Motor vehicles, bodies, trailers, and parts	3361-63	26,399 - 26,412	D	D
Aerospace products and parts	3364	25,491	9.5	9.5
Aircraft, aircraft engine, and aircraft parts	336411-13	23,735	i 9.2	9.2
Guided missile, space vehicle, and related parts	336414-15, 336419	1,756	17.1	17.1
Military armored vehicle, tank, and tank component	336992	11	2.1	2.1

TABLE 18

**Domestic R&D paid for by the company and others and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>		Percent of domestic sales of R&D performers only <sup>b</sup>
Other transportation	other 336	2,822 - 2,833	D		D
Furniture and related products	337	516	1.1		1.1
Miscellaneous	339	19,752 - 19,760	D		D
Medical equipment and supplies	3391	16,998	2.9		2.9
Other miscellaneous manufacturing	3399	2,754 - 2,762	D		D
Nonmanufacturing industries	21-23, 42-81	235,418	4.2		4.5
Mining, quarrying, oil and gas extraction, and support activities	21	1,244	1.3		1.3
Utilities	22	462	0.2		0.2
Wholesale trade	42	1,261	0.5		0.4
Electronic shopping and electronic auctions	454111-12	3,840 - 19,494	i D		D
Transportation and warehousing	48-49	5,160	i 2.4		2.4
Information	51	131,710	8.0		8.0
Publishing	511	36,323	14.4		14.4
Newspaper, periodical, book, and directory publishers	5111	64	4.1		4.6
Software publishers	5112	36,259	14.4		14.5
Telecommunications	517	3,878 - 3,893	D		D
Data processing, hosting, and related services	518	41,893	8.2		8.2
Other information	other 51	49,601 - 49,617	D		D
Finance and insurance	52	12,587	0.9		1.0
Real estate and rental and leasing	53	3,249	24.0		24.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	0.4		0.4
Other real estate and rental and leasing	other 53	3,242	27.0		27.1
Professional, scientific, and technical services	54	57,233	13.7		13.8
Architectural, engineering, and related services	5413	4,729	6.6		6.7
Computer systems design and related services	5415	18,193	10.8		11.0
Scientific research and development services	5417	27,561	39.2		39.5
Research and development in nanotechnology	541713	183 - 187	i D		D
Research and development in biotechnology (except nanobiotechnology)	541714	6,470	32.1		32.3
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,858 - 20,217	i D		D
Research and development in the social sciences and humanities	541720	691 - 2,045	D		D
Other professional, scientific, and technical services	other 54	6,749	6.2		6.2
Health care services	621-23	1,510	1.1		1.1
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,512 - 17,167	D		D
All companies (number of domestic employees)	-	585,694	5.2		5.4
Small companies					
10-19 <sup>c</sup>	-	5,738	24.3		25.1
20-49	-	15,069	14.9		15.3



TABLE 18

**Domestic R&D paid for by the company and others and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers only <sup>b</sup>
Medium companies				
50–99	–	14,865	11.6	11.8
100–249	–	28,907	7.1	7.2
Large companies				
250–499	–	22,804	7.6	8.0
500–999	–	23,875	5.8	5.8
1,000–4,999	–	94,074	6.2	6.3
5,000–9,999	–	54,597	4.6	4.8
10,000–24,999	–	99,141	4.8	4.8
25,000 or more	–	226,623	4.4	4.7

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 = 2017 North American Industry Classification System.

<sup>a</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed R&D. The calculation of percentages in this column excludes R&D and sales of companies that fund R&D but do not perform R&D.

<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 19

**Companies with domestic R&D paid for by the company and others and performed by the company in the software products and embedded software technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Software products and embedded software R&D											
				Total		Paid for by the company				Paid for by others					
										Total		Federally funded			
		Companies <sup>a</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount		
All industries	21-23, 31-33, 42-81	30,360	537,619	14,020	226,144	13,160	212,555	1,500	13,589	620	6,303				
Manufacturing industries	31-33	15,920	308,445	4,730	47,948	4,590	43,045	340	4,903	80	3,236				
Food	311	970	5,239	100	1,150	100	1,146	10	4	0	0				
Beverage and tobacco products	312	240	1,177	10	8	10	8	0	0	0	0				
Textile, apparel, and leather products	313-16	230	822	30	23	30	23	0	0	0	0				
Wood products	321	130	187	40	16	40	16	0	0	0	0				
Paper	322	100	928	10	1	10	1	0	0	0	0				
Printing and related support activities	323	220	283	130	142	130	142	0	0	0	0				
Petroleum and coal products	324	100	1,311 - 1,324	20	99	20	99	0	0	0	0				
Chemicals	325	2,550	101,079	250	769	240	733	20	35	10	4				
Basic chemicals	3251	300	2,694	30	29	30	27	10	2	0	0				
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	1,234	10	3	10	3	0	0	0	0				
Pesticide, fertilizer, and other agricultural chemicals	3253	130	1,060 - 1,066	10	1 - 27	10	2	10	0 - 25	0	0				
Pharmaceuticals and medicines	3254	1,230	91,776	130	580	120	570	20	10	10	4				
Soap, cleaning compound, and toilet preparation	3256	370	2,665	30	4 - 30	30	5	10	0 - 25	0	0				
Paint, coating, adhesive, and other chemicals	3255, 3259	400	1,643 - 1,649	70	127	70	127	10	*	10	*				
Plastics and rubber products	326	1,040	2,634	170	241	170	241	0	0	0	0				
Nonmetallic mineral products	327	240	1,717	20	27	20	27	0	0	0	0				
Primary metals	331	270	815	60	8	60	8	10	*	0	0				
Fabricated metal products	332	2,270	3,396	390	326	390	325	10	1	0	0				
Machinery	333	2,120	16,223	870	1,947	860	1,881	20	66	10	8				
Agricultural implement	33311	160	1,769 - 1,811	90	110	90	110	10	*	10	*				
Semiconductor machinery	333242	60	4,807	40	199	40	187	10	12	0	0				
Engine, turbine, and power transmission equipment	3336	90	1,645	40	129	40	119	10	9	10	8				
Other machinery	other 333	1,830	7,959 - 8,001	710	1,510	700	1,465	10	45	0	0				

TABLE 19

**Companies with domestic R&D paid for by the company and others and performed by the company in the software products and embedded software technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Software products and embedded software R&D																
				Total				Paid for by the company				Paid for by others								
										Total		Federally funded								
		Companies <sup>a</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount							
Computer and electronic products	334	2,220	99,535	1,390	i	35,084	i	1,320	i	31,162	i	180	i	3,922	i	50	i	2,892	i	
Communications equipment	3342	400	12,103	300	i	8,546	i	290	i	8,474	i	20		72		10	i	0 - 73		
Semiconductor and other electronic components	3344	570	43,181	190	i	8,385	i	160	i	8,106	i	70	i	279	i	10		28	i	
Navigational, measuring, electromedical, and control instruments	3345	1,060	18,505	760	i	6,801	i	730	i	3,285		100	i	3,516	i	40	i	2,735 - 2,865	i	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	190	2,858	120	i	542	i	120	i	458	i	20		85		10	i	6		
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	130	10,586	110	i	4,950	i	110	i	1,606		20		3,344	i	20		2,717 - 2,849	i	
Other measuring and controlling device	other 3345	740	5,061	540	i	1,309	i	510	i	1,222		80	i	87		20	i	11	i	
Other computer and electronic products	other 334	210	25,747	160	i	11,352		150	i	11,297		10		55		10		0 - 56		
Electrical equipment, appliances, and components	335	680	4,998	390	i	1,092		380	i	942		20	i	150	i	10		1		
Transportation equipment	336	980	48,796	340	i	4,626	i	310	i	3,928	i	70	i	698		10		323		
Motor vehicles, bodies, trailers, and parts	3361-63	490	23,121	130	i	2,677	i	120	i	2,470	i	30		207		10		0 - 4		
Aerospace products and parts	3364	340	22,914	i	190	i	1,848	i	160	i	1,394	i	40	i	454		10		320	
Aircraft, aircraft engine, and aircraft parts	336411-13	310	21,291	i	170	i	1,833	i	150	i	1,382	i	40	i	452		10		320	
Guided missile, space vehicle, and related parts	336414-15, 336419	40	1,623		20	i	14		20	i	12		10	i	2		10	i	*	i
Military armored vehicle, tank, and tank component	336992	10	11		0		0		0		0		0		0		0		0	
Other transportation	other 336	140	2,750		30		101		30		63		10		38		10		0 - 4	
Furniture and related products	337	240	496	80	i	59		80	i	59		0		0		0		0		
Miscellaneous	339	1,430	18,791 - 18,809	510	i	2,329		500	i	2,303		40	i	26		20	i	7	i	
Medical equipment and supplies	3391	840	16,116	380	i	1,849		370	i	1,823		40	i	26		20	i	7	i	
Other miscellaneous manufacturing	3399	600	2,674 - 2,692	130		480		130		480		0		0		0		0		
Nonmanufacturing industries	21-23, 42-81	14,460	229,174	9,290	i	178,197	i	8,580	i	169,510	i	1,160	i	8,687		550	i	3,068		
Mining, quarrying, oil and gas extraction, and support activities	21	300	1,165	50	i	306		50	i	293		10		13	i	0		0		
Utilities	22	50	264	20		83	i	20		78	i	10		4		0		0		
Wholesale trade	42	1,160	1,058	220	i	101	i	210	i	92	i	20		9		0		0		
Electronic shopping and electronic auctions	454111-12	90	3,840 - 19,390	i	70		2,164 - 19,148	i	70		2,164 - 19,107	i	10		0 - 44		0		0	

**TABLE 19**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the software products and embedded software technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Software products and embedded software R&D											
		Domestic R&D		Total		Paid for by the company		Paid for by others					
		Companies <sup>a</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Total		Federally funded			
								Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount		
Transportation and warehousing	48-49	60	4,957 i	40	3,769 i	40	3,769 i	0	0	0	0	0	0
Information	51	3,810	129,463	3,680 i	119,125 i	3,610 i	118,335 i	130 i	789	20	299 i		
Publishing	511	1,680	35,025	1,650 i	29,411	1,610 i	29,180	100 i	231	10	10		
Newspaper, periodical, book, and directory publishers	5111	30	60	10 i	17	10 i	17	0	0	0	0		
Software publishers	5112	1,650	34,965	1,650 i	29,394	1,600 i	29,163	100 i	231	10	10		
Telecommunications	517	140	3,425 - 3,437	110	1,401	110	1,335 - 1,393	10	8 - 66 i	10	3		
Data processing, hosting, and related services	518	1,660	41,551	1,640	39,873	1,630	39,429	40 i	444	10	286 i		
Other information	other 51	350	49,449 - 49,463	280 i	48,440 i	280 i	48,334 - 48,393 i	10	105	0	0		
Finance and insurance	52	220	12,296	180	9,539	180	9,539	0	0	0	0		
Real estate and rental and leasing	53	60	3,249	10	3,070	10	3,070	0	0	0	0		
Lessors of nonfinancial intangible assets (except copyrighted works)	533	20	7	0	0	0	0	0	0	0	0		
Other real estate and rental and leasing	other 53	40	3,242	10	3,070	10	3,070	0	0	0	0		
Professional, scientific, and technical services	54	6,980	54,367	4,660 i	22,916 i	4,030 i	15,086	1,010 i	7,830 i	530 i	2,769		
Architectural, engineering, and related services	5413	1,390	4,214	460 i	790 i	310 i	310	190 i	480 i	90	353 i		
Computer systems design and related services	5415	2,780	17,935	2,740 i	10,914	2,520 i	7,987	390 i	2,927	150 i	485 i		
Scientific research and development services	5417	1,710	25,600	740 i	6,703 i	500 i	2,858 i	380 i	3,845 i	280 i	1,478		
Research and development in nanotechnology	541713	110 i	179 i	10 i	8 i	0	0	10 i	8 i	10 i	8 i		
Research and development in biotechnology (except nanobiotechnology)	541714	350	6,191	80 i	77	70 i	46	20	31	10 i	22		
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,250	18,539 i	650 i	6,606 i	440 i	2,812 i	360 i	3,794 i	260 i	1,437		
Research and development in the social sciences and humanities	541720	20	691	10	12	0	0	10	12	10 i	12 i		
Other professional, scientific, and technical services	other 54	1,110	6,618	740 i	4,509	710 i	3,930	60	578	30	453		
Health care services	621-23	620	1,477	220 i	145 i	220 i	145 i	0	0	0	0		

TABLE 19

**Companies with domestic R&D paid for by the company and others and performed by the company in the software products and embedded software technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Software products and embedded software R&D											
		Domestic R&D		Total		Paid for by the company		Paid for by others					
		Companies <sup>a</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Total		Federally funded			
								Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount		
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55- 56, 624, 71-72, 81	1,160	1,491 - 17,041	200 i	0 - 16,978	200 i	0 - 16,934	10	0 - 44	0	0		
All companies (number of domestic employees)	-	30,360	537,619	14,020 i	226,144 i	13,160 i	212,555 i	1,500 i	13,589 i	620 i	6,303 i		
Small companies													
10-19 <sup>c</sup>	-	5,110	5,047	2,790 i	1,687 i	2,500 i	1,379 i	520 i	308 i	260 i	121 i		
20-49	-	9,510	12,994	4,550 i	4,247 i	4,300 i	3,509 i	420 i	737 i	160 i	416 i		
Medium companies													
50-99	-	5,530	12,993	2,390 i	3,554	2,250 i	3,047	220 i	508	80	219		
100-249	-	4,950	25,411	2,070 i	9,416	1,970 i	8,421	160 i	995	70 i	615		
Large companies													
250-499	-	2,100	20,878	840	9,507	810	8,668	60	839 i	20	301		
500-999	-	1,280	21,264	490	7,818	470	7,338	40	480	10	71 i		
1,000-4,999	-	1,320	88,238	620	40,348	600	38,944	50	1,404	20	609		
5,000-9,999	-	260	48,397	130	15,658	130	14,776	30	882 i	10	142 i		
10,000-24,999	-	220	88,567	120	23,526 i	110	20,079 i	30	3,446	20	388 i		
25,000 or more	-	130	213,829	70	110,384 i	70	106,395 i	20	3,990 i	10	3,423 i		

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology.<sup>b</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology. These company count estimates also reflect an imputation process implemented for survey year 2014. This change has affected the comparability of these company count estimates with estimates published for years prior to 2014.<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Companies could report R&D in one, more than one, or no application area. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

**TABLE 20**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the biotechnology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Biotechnology R&D								
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others				
				Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount			
All industries	21-23, 31-33, 42-81	30,360	537,619	2,910	88,423	2,630	72,459	660	15,964			
Manufacturing industries	31-33	15,920	308,445	2,000	76,520	1,920	69,328	320	7,192			
Food	311	970	5,239	120	686	110	655	20	31			
Beverage and tobacco products	312	240	1,177	10	37 - 49	10	38	10	0 - 11			
Textile, apparel, and leather products	313-16	230	822	10	1	10	1	0	0			
Wood products	321	130	187	10	8	10	8	0	0			
Paper	322	100	928	10	3	10	3	0	0			
Printing and related support activities	323	220	283	0	0	0	0	0	0			
Petroleum and coal products	324	100	1,311 - 1,324	30	178 - 190	30	179	10	0 - 11			
Chemicals	325	2,550	101,079	1,210	71,042	1,160	64,339	240	6,703			
Basic chemicals	3251	300	2,694	50	226	50	126	10	100			
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	1,234	20	124 - 199	20	125	10	0 - 73			
Pesticide, fertilizer, and other agricultural chemicals	3253	130	1,060 - 1,066	50	154 - 252	50	155	10	0 - 97			
Pharmaceuticals and medicines	3254	1,230	91,776	970	70,192	920	63,723	230	6,469			
Soap, cleaning compound, and toilet preparation	3256	370	2,665	110	132	110	93	10	39			
Paint, coating, adhesive, and other chemicals	3255, 3259	400	1,643 - 1,649	40	117 - 157	40	118	10	0 - 39			
Plastics and rubber products	326	1,040	2,634	70	174	70	174	0	0			
Nonmetallic mineral products	327	240	1,717	10	10	10	9	10	*			
Primary metals	331	270	815	10	2	10	2	0	0			
Fabricated metal products	332	2,270	3,396	70	31	70	31	0	0			
Machinery	333	2,120	16,223	30	136	30	122	10	14			
Agricultural implement	33311	160	1,769 - 1,811	10	35	10	35	0	0			
Semiconductor machinery	333242	60	4,807	0	0	0	0	0	0			
Engine, turbine, and power transmission equipment	3336	90	1,645	10	61	10	61	0	0			
Other machinery	other 333	1,830	7,959 - 8,001	20	40	20	26	10	14			
Computer and electronic products	334	2,220	99,535	150	1,792	140	1,424	30	368			
Communications equipment	3342	400	12,103	0	0	0	0	0	0			
Semiconductor and other electronic components	3344	570	43,181	10	6	10	6	0	0			

**TABLE 20**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the biotechnology focus area, by industry and company size: 2020**  
(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Biotechnology R&D											
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others							
				Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount						
Navigational, measuring, electromedical, and control instruments	3345	1,060	18,505	140	i	1,649 - 1,787	i	140	i	1,281 - 1,419	i	30	i	367	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	190	2,858	60	i	1,275	i	50	i	1,166	i	10		108	
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	130	10,586	10	i	375		10	i	115 - 253		10		121 - 260	
Other measuring and controlling device	other 3345	740	5,061	90	i	0 - 138	i	80	i	0 - 138	i	20	i	0 - 138	
Other computer and electronic products	other 334	210	25,747	10		0 - 138		10		0 - 138		10		1	
Electrical equipment, appliances, and components	335	680	4,998	10		11		10		11		0		0	
Transportation equipment	336	980	48,796	10		6		10		6		0		0	
Motor vehicles, bodies, trailers, and parts	3361-63	490	23,121	10		3		10		3		0		0	
Aerospace products and parts	3364	340	22,914	i	10	3		10		3		0		0	
Aircraft, aircraft engine, and aircraft parts	336411-13	310	21,291	i	10	3		10		3		0		0	
Guided missile, space vehicle, and related parts	336414-15, 336419	40	1,623		10	i	*	i	10	i	*	i	0	0	
Military armored vehicle, tank, and tank component	336992	10	11		0	0		0		0		0		0	
Other transportation	other 336	140	2,750		0	0		0		0		0		0	
Furniture and related products	337	240	496		10	1		10		1		0		0	
Miscellaneous	339	1,430	18,791 - 18,809		320	i	2,393	i	310	i	2,325	i	30	i	68
Medical equipment and supplies	3391	840	16,116		310	i	2,273	i	300	i	2,205		30	i	68
Other miscellaneous manufacturing	3399	600	2,674 - 2,692		20		120	i	20		120	i	0		0
Nonmanufacturing industries	21-23, 42-81	14,460	229,174		910	i	11,904	i	720	i	3,131		350	i	8,773
Mining, quarrying, oil and gas extraction, and support activities	21	300	1,165		10		2 - 23		10		0 - 19		10		3
Utilities	22	50	264		10		1		10		1		0		0
Wholesale trade	42	1,160	1,058		30	i	41		30	i	41		0		0
Electronic shopping and electronic auctions	454111-12	90	3,840 - 19,390	i	0	0		0		0		0		0	
Transportation and warehousing	48-49	60	4,957	i	10	*		10		*		0		0	
Information	51	3,810	129,463		30		85		30		79		10	i	6
Publishing	511	1,680	35,025		20		80		20		74		10	i	6
Newspaper, periodical, book, and directory publishers	5111	30	60		0		0		0		0		0		0
Software publishers	5112	1,650	34,965		20		80		20		74		10	i	6
Telecommunications	517	140	3,425 - 3,437		10		*		10		*		0		0



**TABLE 20**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the biotechnology focus area, by industry and company size: 2020**  
(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Biotechnology R&D							
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others			
				Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount		
Data processing, hosting, and related services	518	1,660	41,551	10	4	10	4	0	0		
Other information	other 51	350	49,449 - 49,463	10	i *	10	i *	0	0		
Finance and insurance	52	220	12,296	0	0	0	0	0	0		
Real estate and rental and leasing	53	60	3,249	0	0	0	0	0	0		
Lessors of nonfinancial intangible assets (except copyrighted works)	533	20	7	0	0	0	0	0	0		
Other real estate and rental and leasing	other 53	40	3,242	0	0	0	0	0	0		
Professional, scientific, and technical services	54	6,980	54,367	790	i 10,820	600	i 2,085	340	i 8,735		
Architectural, engineering, and related services	5413	1,390	4,214	60	i 199	50	i 78	30	i 121		
Computer systems design and related services	5415	2,780	17,935	30	79	30	76	10	3		
Scientific research and development services	5417	1,710	25,600	670	i 10,429	510	i 1,861	300	i 8,568		
Research and development in nanotechnology	541713	110	i 179	10	i 12	10	i 12	10	i *		
Research and development in biotechnology (except nanobiotechnology)	541714	350	6,191	330	i 4,448	250	i 1,101	170	i 3,347		
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,250	18,539	i 340	i 5,966	i 260	i 747	i 140	i 5,220		
Research and development in the social sciences and humanities	541720	20	691	10	3	10	3	0	0		
Other professional, scientific, and technical services	other 54	1,110	6,618	40	i 114	30	i 70	20	44		
Health care services	621-23	620	1,477	70	i 937	60	i 909	10	28		
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,160	1,491 - 17,041	10	0 - 19	10	0 - 19	0	0		
All companies (number of domestic employees)	-	30,360	537,619	2,910	i 88,423	i 2,630	i 72,459	660	i 15,964		
Small companies											
10-19 <sup>c</sup>	-	5,110	5,047	720	i 1,416	650	i 1,187	190	i 229		
20-49	-	9,510	12,994	870	i 3,584	780	i 3,105	190	i 479		
Medium companies											
50-99	-	5,530	12,993	390	i 3,802	360	i 3,235	90	i 567		
100-249	-	4,950	25,411	480	7,191	450	6,372	110	819		
Large companies											
250-499	-	2,100	20,878	170	3,812	160	3,318	30	494		
500-999	-	1,280	21,264	90	4,211	80	3,741	i 20	470		
1,000-4,999	-	1,320	88,238	120	12,666	i 110	10,094	i 30	i 2,572		
5,000-9,999	-	260	48,397	30	11,716	i 30	8,136	i 10	3,580		

**TABLE 20**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the biotechnology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Biotechnology R&D					
				Total		Paid for by the company		Paid for by others	
		Companies <sup>a</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount
10,000–24,999	–	220	88,567	40	22,623 i	40	17,458 i	20	5,164
25,000 or more	–	130	213,829	20	17,403	20	15,814	10	1,589

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology.

<sup>b</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology. These company count estimates also reflect an imputation process implemented for survey year 2014. This change has affected the comparability of these company count estimates with estimates published for years prior to 2014.

<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Companies could report R&D in one, more than one, or no application area. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

**TABLE 21**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the nanotechnology focus area, by industry and company size: 2020**  
(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Nanotechnology R&D							
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others			
				Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount		
All industries	21-23, 31-33, 42-81	30,360	537,619	1,070	i 22,422	i 980	i 20,721	i 140	i 1,701	i	
Manufacturing industries	31-33	15,920	308,445	780	i 19,309	i 760	i 18,167	i 70	i 1,143	i	
Food	311	970	5,239	10	2	10	2	0	0		
Beverage and tobacco products	312	240	1,177	i 10	7	10	7	0	0		
Textile, apparel, and leather products	313-16	230	822	0	0	0	0	0	0		
Wood products	321	130	187	10	i *	i 10	i *	0	0		
Paper	322	100	928	10	i 17	i 10	i 17	0	0		
Printing and related support activities	323	220	283	0	0	0	0	0	0		
Petroleum and coal products	324	100	1,311 - 1,324	10	3	10	3	0	0		
Chemicals	325	2,550	101,079	220	i 409	210	i 370	20	39	i	
Basic chemicals	3251	300	2,694	50	i 135	50	i 126	10	9		
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	1,234	70	i 51	60	i 50	10	*		
Pesticide, fertilizer, and other agricultural chemicals	3253	130	1,060 - 1,066	20	i 15	i 20	i 15	0	0		
Pharmaceuticals and medicines	3254	1,230	91,776	30	151	i 30	125	10	i 26	i	
Soap, cleaning compound, and toilet preparation	3256	370	2,665	10	2	10	2	0	0		
Paint, coating, adhesive, and other chemicals	3255, 3259	400	1,643 - 1,649	60	i 55	60	i 51	10	5		
Plastics and rubber products	326	1,040	2,634	70	i 45	i 70	i 45	0	0		
Nonmetallic mineral products	327	240	1,717	i 10	12	10	9	10	3		
Primary metals	331	270	815	10	3	10	3	0	0		
Fabricated metal products	332	2,270	3,396	10	14	10	14	0	0		
Machinery	333	2,120	16,223	90	i 1,196	90	i 1,174	10	i 22		
Agricultural implement	33311	160	1,769 - 1,811	0	0	0	0	0	0		
Semiconductor machinery	333242	60	4,807	10	i 1,134	10	i 1,115	10	19		
Engine, turbine, and power transmission equipment	3336	90	1,645	0	0	0	0	0	0		
Other machinery	other 333	1,830	7,959 - 8,001	90	i 61	i 90	59	10	i 2	i	
Computer and electronic products	334	2,220	99,535	200	i 17,183	i 180	i 16,211	i 40	i 972	i	
Communications equipment	3342	400	12,103	10	0 - 150	10	0 - 150	0	0		
Semiconductor and other electronic components	3344	570	43,181	100	i 16,634	i 90	i 15,790	i 40	i 844	i	
Navigational, measuring, electromedical, and control instruments	3345	1,060	18,505	100	i 401	i 100	i 273	10	128	i	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	190	2,858	10	14	10	14	0	0		
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	130	10,586	20	i 191	i 20	i 62 - 192	10	0 - 129	i	

**TABLE 21**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the nanotechnology focus area, by industry and company size: 2020**  
(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Nanotechnology R&D							
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others			
				Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount		
Other measuring and controlling device	other 3345	740	5,061	80	197	80	68 - 198	10	0 - 129		
Other computer and electronic products	other 334	210	25,747	10	0 - 150	10	0 - 150	0	0		
Electrical equipment, appliances, and components	335	680	4,998	140	52	140	52	0	0		
Transportation equipment	336	980	48,796	20	245	20	139	10	106		
Motor vehicles, bodies, trailers, and parts	3361-63	490	23,121	10	11	10	9	10	3		
Aerospace products and parts	3364	340	22,914	10	234	10	131	10	103		
Aircraft, aircraft engine, and aircraft parts	336411-13	310	21,291	10	234	10	131	10	103		
Guided missile, space vehicle, and related parts	336414-15, 336419	40	1,623	10	*	10	*	0	0		
Military armored vehicle, tank, and tank component	336992	10	11	0	0	0	0	0	0		
Other transportation	other 336	140	2,750	0	0	0	0	0	0		
Furniture and related products	337	240	496	10	1	10	1	0	0		
Miscellaneous	339	1,430	18,791 - 18,809	30	121	30	120	10	1		
Medical equipment and supplies	3391	840	16,116	30	79	30	78	10	1		
Other miscellaneous manufacturing	3399	600	2,674 - 2,692	10	42	10	42	0	0		
Nonmanufacturing industries	21-23, 42-81	14,460	229,174	290	3,113	230	2,554	80	559		
Mining, quarrying, oil and gas extraction, and support activities	21	300	1,165	10	3	10	1	10	1		
Utilities	22	50	264	0	0	0	0	0	0		
Wholesale trade	42	1,160	1,058	10	2	10	2	0	0		
Electronic shopping and electronic auctions	454111-12	90	3,840 - 19,390	0	0	0	0	0	0		
Transportation and warehousing	48-49	60	4,957	0	0	0	0	0	0		
Information	51	3,810	129,463	30	1,362	30	1,356	10	6		
Publishing	511	1,680	35,025	30	1,354	30	1,348	10	6		
Newspaper, periodical, book, and directory publishers	5111	30	60	0	0	0	0	0	0		
Software publishers	5112	1,650	34,965	30	1,354	30	1,348	10	6		
Telecommunications	517	140	3,425 - 3,437	0	0	0	0	0	0		
Data processing, hosting, and related services	518	1,660	41,551	10	8	10	8	0	0		
Other information	other 51	350	49,449 - 49,463	0	0	0	0	0	0		
Finance and insurance	52	220	12,296	0	0	0	0	0	0		

**TABLE 21**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the nanotechnology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Nanotechnology R&D						
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others		
				Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	Companies <sup>b</sup> (number)	Amount	
Real estate and rental and leasing	53	60	3,249	0	0	0	0	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	20	7	0	0	0	0	0	0	0
Other real estate and rental and leasing	other 53	40	3,242	0	0	0	0	0	0	0
Professional, scientific, and technical services	54	6,980	54,367	250	i 1,733	i 190	i 1,182	80	i 551	i
Architectural, engineering, and related services	5413	1,390	4,214	30	i 43	i 20	i 22	20	i 21	i
Computer systems design and related services	5415	2,780	17,935	30	i 1,225	i 20	i 826	20	i 398	i
Scientific research and development services	5417	1,710	25,600	140	i 258	i 100	i 160	i 50	99	
Research and development in nanotechnology	541713	110	i 179	i 50	i 131	i 30	i 84	i 20	i 47	i
Research and development in biotechnology (except nanobiotechnology)	541714	350	6,191	30	i 18	i 20	i 16	i 10	i 2	i
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,250	18,539	i 70	i 109	i 50	i 60	30	50	
Research and development in the social sciences and humanities	541720	20	691	0	0	0	0	0	0	
Other professional, scientific, and technical services	other 54	1,110	6,618	80	i 207	i 70	i 174	10	i 32	i
Health care services	621–23	620	1,477	10	13	10	13	0	0	
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,160	1,491 - 17,041	0	0	0	0	0	0	
All companies (number of domestic employees)	–	30,360	537,619	1,070	i 22,422	i 980	i 20,721	i 140	i 1,701	i
Small companies										
10–19 <sup>c</sup>	–	5,110	5,047	180	i 185	i 150	i 150	i 40	i 35	i
20–49	–	9,510	12,994	390	i 373	i 360	i 282	i 40	i 91	i
Medium companies										
50–99	–	5,530	12,993	140	i 268	i 130	i 205	i 30	i 63	
100–249	–	4,950	25,411	170	i 331	i 160	i 307	20	24	i
Large companies										
250–499	–	2,100	20,878	70	i 783	i 60	i 601	10	i 182	i
500–999	–	1,280	21,264	40	410	i 40	227	i 10	183	i
1,000–4,999	–	1,320	88,238	70	4,193	i 60	3,429	i 10	764	i
5,000–9,999	–	260	48,397	30	1,833	i 30	1,766	i 10	68	
10,000–24,999	–	220	88,567	20	7,350	i 20	7,240	i 10	109	i
25,000 or more	–	130	213,829	20	6,696	i 20	6,514	i 10	182	i

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology.

<sup>b</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology. These company count estimates also reflect an imputation process implemented for survey year 2014. This change has affected the comparability of these company count estimates with estimates published for years prior to 2014.

<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Companies could report R&D in one, more than one, or no application area. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

**TABLE 22**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the artificial intelligence technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Artificial intelligence R&D							
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others			
				Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount		
All industries	21-23, 31-33, 42-81	30,360	537,619	3,580	20,644	3,270	18,613	490	2,030		
Manufacturing industries	31-33	15,920	308,445	1,100	6,636	1,060	6,345	80	291		
Food	311	970	5,239	20	9	20	8	10	1		
Beverage and tobacco products	312	240	1,177	10	1	10	1	0	0		
Textile, apparel, and leather products	313-16	230	822	20	8	20	8	0	0		
Wood products	321	130	187	0	0	0	0	0	0		
Paper	322	100	928	10	*	10	*	0	0		
Printing and related support activities	323	220	283	10	2	10	2	0	0		
Petroleum and coal products	324	100	1,311 - 1,324	10	1	10	1	0	0		
Chemicals	325	2,550	101,079	50	450	50	444	10	6		
Basic chemicals	3251	300	2,694	10	20	10	16	10	5		
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	1,234	10	*	10	*	0	0		
Pesticide, fertilizer, and other agricultural chemicals	3253	130	1,060 - 1,066	10	1	10	1	0	0		
Pharmaceuticals and medicines	3254	1,230	91,776	30	417	30	417	0	0		
Soap, cleaning compound, and toilet preparation	3256	370	2,665	0	0	0	0	0	0		
Paint, coating, adhesive, and other chemicals	3255, 3259	400	1,643 - 1,649	10	11	10	10	10	1		
Plastics and rubber products	326	1,040	2,634	20	12	20	12	0	0		
Nonmetallic mineral products	327	240	1,717	20	28	20	28	0	0		
Primary metals	331	270	815	10	*	10	*	10	*		
Fabricated metal products	332	2,270	3,396	30	23	30	23	0	0		
Machinery	333	2,120	16,223	210	374	200	371	10	3		
Agricultural implement	33311	160	1,769 - 1,811	20	58	20	58	0	0		
Semiconductor machinery	333242	60	4,807	10	1	10	*	10	1		
Engine, turbine, and power transmission equipment	3336	90	1,645	10	3	0	0	10	3		
Other machinery	other 333	1,830	7,959 - 8,001	180	312	180	312	10	*		
Computer and electronic products	334	2,220	99,535	340	3,497	320	3,384	40	113		
Communications equipment	3342	400	12,103	50	80	50	80	10	*		





**TABLE 22**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the artificial intelligence technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Artificial intelligence R&D											
		Companies <sup>a</sup> (number)	Amount	Total		Paid for by the company		Paid for by others							
				Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount						
Software publishers	5112	1,650	34,965	350	i	1,641	340	i	1,631	10	i	10			
Telecommunications	517	140	3,425 - 3,437	20		137	20		93 - 138	10		0 - 44			
Data processing, hosting, and related services	518	1,660	41,551	410		2,355	410		2,348	10	i	8			
Other information	other 51	350	49,449 - 49,463	40	i	1,655	40	i	1,611 - 1,656	10		0 - 44			
Finance and insurance	52	220	12,296	30		407	30		407	0		0			
Real estate and rental and leasing	53	60	3,249	10		0 - 1,263	10		0 - 1,263	0		0			
Lessors of nonfinancial intangible assets (except copyrighted works)	533	20	7	0		0	0		0	0		0			
Other real estate and rental and leasing	other 53	40	3,242	10		0 - 1,263	10		0 - 1,263	0		0			
Professional, scientific, and technical services	54	6,980	54,367	1,580	i	6,471	1,320	i	4,797	390	i	1,675			
Architectural, engineering, and related services	5413	1,390	4,214	170	i	150	90	i	60	100	i	91			
Computer systems design and related services	5415	2,780	17,935	880	i	1,635	830	i	1,291	110	i	344			
Scientific research and development services	5417	1,710	25,600	310	i	3,736	190	i	2,546	170	i	1,190			
Research and development in nanotechnology	541713	110	i	179	i	10	i	9	i	10	i	9	i	0	
Research and development in biotechnology (except nanobiotechnology)	541714	350	6,191	30	i	10 - 1,202	20	i	11	10	i	1,191			
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,250	18,539	280	i	2,525 - 3,717	170	i	2,526	160	i	1,191			
Research and development in the social sciences and humanities	541720	20	691	10		0 - 654	0		0	10		0 - 654			
Other professional, scientific, and technical services	other 54	1,110	6,618	230	i	950	220	i	900	20		50			
Health care services	621-23	620	1,477	20	i	37	20	i	37	0		0			
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,160	1,491 - 17,041	30		26	30		26	0		0			
All companies (number of domestic employees)	-	30,360	537,619	3,580	i	20,644	3,270	i	18,613	490	i	2,030			
Small companies															
10-19 <sup>b</sup>	-	5,110	5,047	830	i	462	710	i	414	180	i	48			
20-49	-	9,510	12,994	1,230	i	778	1,170	i	672	130	i	106			

**TABLE 22**  
**Companies with domestic R&D paid for by the company and others and performed by the company in the artificial intelligence technology focus area, by industry and company size: 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Domestic R&D		Artificial intelligence R&D									
		Domestic R&D		Total		Paid for by the company		Paid for by others					
		Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount	Companies <sup>a</sup> (number)	Amount				
Medium companies													
50–99	–	5,530	12,993	520	i 707	480	i 611	70	i 96				
100–249	–	4,950	25,411	470	i 3,272	430	i 3,070	60	i 202				
Large companies													
250–499	–	2,100	20,878	180	1,222	170	781	30	441				
500–999	–	1,280	21,264	110	849	100	784	20	65	i			
1,000–4,999	–	1,320	88,238	150	2,424	i 150	2,367	i 20	56				
5,000–9,999	–	260	48,397	50	1,437	i 50	1,214	20	223	i			
10,000–24,999	–	220	88,567	40	1,941	i 40	1,357	i 10	583	i			
25,000 or more	–	130	213,829	40	7,552	40	7,342	10	210				

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse.

<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Companies could report R&D in one, more than one, or no application area. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 23

## Foreign R&amp;D paid for by the company and others and performed by the company, by type of R&amp;D, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total foreign R&D performance			Research (basic and applied)			Development		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
All industries	21-23, 31-33, 42-81	109,705	98,187	11,518	17,011	13,872	3,138	92,694	84,315	8,380
Manufacturing industries	31-33	66,243	64,829	1,414	11,111	10,880	231	55,132	53,949	1,183
Food	311	1,153 - 1,161	1,154	0 - 6	283 - 290	284	0 - 6	870	870	*
Beverage and tobacco products	312	759	759	0	227	227	0	532	532	0
Textile, apparel, and leather products	313-16	152	152	0	38	38	0	114	114	0
Wood products	321	8	8	0	3	3	0	5	5	0
Paper	322	93	93	* i	13	13	* i	80	80	* i
Printing and related support activities	323	10	10	0	*	*	0	10	10	0
Petroleum and coal products	324	165	165	* i	46	46	* i	119	119	* i
Chemicals	325	19,362	19,118	244	4,810	4,743	67	14,552	14,375	177
Basic chemicals	3251	846	842	4	314	313	1	531	529	3
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	512	504	8	133	126	8	379	379	* i
Pesticide, fertilizer, and other agricultural chemicals	3253	92 - 108	91	0 - 17	18 - 35	18	0 - 17	73	73	0
Pharmaceuticals and medicines	3254	16,761	16,548	213	4,012	3,968	43	12,749	12,579	170
Soap, cleaning compound, and toilet preparation	3256	767	763	3	103	103	0	664	661	3
Paint, coating, adhesive, and other chemicals	3255, 3259	370 - 385	370	0 - 14	214 - 229	215	0 - 14	156	155	* i
Plastics and rubber products	326	529	529	* i	152	152	* i	377	377	* i
Nonmetallic mineral products	327	206	203	3	11	11	*	195	192	3
Primary metals	331	32	32	* i	4	4	* i	28	28	* i
Fabricated metal products	332	349	345	5	112	112	1	237	233	4
Machinery	333	4,285	4,183	102	524	504	20	3,761	3,679	82
Agricultural implement	33311	639 - 681	640	0 - 41	90 - 98	91	0 - 7	548 - 585	549	0 - 35
Semiconductor machinery	333242	1,027	1,013	14	32	32	* i	995	981	14
Engine, turbine, and power transmission equipment	3336	558	509	49	18	4	14	539	505	34
Other machinery	other 333	2,021 - 2,062	2,021	0 - 41	376 - 384	377	0 - 7	1,643 - 1,680	1,644	0 - 35
Computer and electronic products	334	26,567	26,222	346	2,769	2,734	36	23,798	23,488	310
Communications equipment	3342	3,388	3,379	9	478	476	2	2,910	2,903	7
Semiconductor and other electronic components	3344	13,023	12,868	155	1,450	1,448	2	11,573	11,419	153



TABLE 23

**Foreign R&D paid for by the company and others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total foreign R&D performance			Research (basic and applied)			Development		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Software publishers	5112	7,683	7,654	29	696	693	3	6,987	6,961	26
Telecommunications	517	94	94	0	7	7	0	87	87	0
Data processing, hosting, and related services	518	8,147	8,145	1 i	903	903	* i	7,244	7,243	1 i
Other information	other 51	6,976	6,976	0	393 i	393 i	0	6,583 i	6,583 i	0
Finance and insurance	52	1,541	1,490	51	185	144	41	1,356	1,346	10
Real estate and rental and leasing	53	163	163	0	84	84	0	80	80	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0 - 15	0 - 15	0	0 - 15	0 - 15	0	0	0	0
Other real estate and rental and leasing	other 53	148 - 164	148 - 164	0	69 - 84	69 - 84	0	80	80	0
Professional, scientific, and technical services	54	13,744 i	3,731	10,013 i	3,581 i	719 i	2,863 i	10,163 i	3,012 i	7,151 i
Architectural, engineering, and related services	5413	20	12 i	9	5 i	4	2 i	15 i	8 i	7 i
Computer systems design and related services	5415	3,324	3,209	115	632 i	559 i	73 i	2,692 i	2,650 i	42 i
Scientific research and development services	5417	10,070 i	196	9,874 i	2,863 i	77	2,786 i	7,207 i	119	7,087 i
Research and development in nanotechnology	541713	0 - 3	0 - 3	0	0	0	0	0 - 3	0 - 3	0
Research and development in biotechnology (except nanobiotechnology)	541714	2,929	108	2,822	423	58	365	2,506 i	50	2,456 i
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7,135 i	82 - 89 i	7,045 - 7,053 i	2,433 - 2,440 i	12 - 20 i	2,414 - 2,422 i	4,694 - 4,702 i	63 - 70 i	4,631 i
Research and development in the social sciences and humanities	541720	1 - 7	0 - 7 i	0 - 7	1 - 7	0 - 7 i	0 - 7	0 - 6 i	0 - 6 i	0
Other professional, scientific, and technical services	other 54	330	314	16	81 i	79 i	2	249 i	235 i	14
Health care services	621-23	18 - 22 i	19	0 - 2 i	3	3	0	15 - 19 i	16	0 - 2 i
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1 - 4,789 i	0 - 4,787	2 i	0 - 15	0 - 15	0	1 - 4,789 i	0 - 4,787	2 i
All companies (number of domestic employees)	-	109,705	98,187	11,518 i	17,011	13,872	3,138 i	92,694	84,315	8,380 i
Small companies										
10-19 <sup>a</sup>	-	290	263	27	58	57	1	232	206	26
20-49	-	606	568	38	83	82	1 i	523	486	37
Medium companies										
50-99	-	798	758	41	171	162	9	627	596	32
100-249	-	2,072	1,991	81 i	596	591	5	1,476	1,399	76 i

TABLE 23

**Foreign R&D paid for by the company and others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total foreign R&D performance			Research (basic and applied)			Development		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Large companies										
250–499	–	2,866	2,705	161	715	607	108	2,151	2,098	53
500–999	–	3,187	3,020	167	599	568	31 i	2,588	2,452	136
1,000–4,999	–	18,520	18,111	409 i	3,378	3,305	73 i	15,142	14,806	336 i
5,000–9,999	–	11,845	9,515	2,330 i	2,421	1,289	1,132	9,424 i	8,226	1,198 i
10,000–24,999	–	23,186	16,965	6,221 i	4,116 i	2,780	1,336 i	19,070 i	14,184	4,886 i
25,000 or more	–	46,336	44,292	2,044	4,875	4,431	444	41,462	39,861	1,601

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

**TABLE 24**  
**For companies that performed foreign R&D, domestic and foreign R&D paid for by the company and others and performed by the company, by type of R&D and selected industry: 2020**  
(Millions of U.S. dollars)

Industry	NAICS code	Total	Paid for by the company	Paid for by others	Research (basic and applied)			Development			
					Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others	
Total domestic R&D performance											
All industries	21-23, 31-33, 42-81	401,052	360,199	40,853	70,378	59,636	10,742	330,674	300,563	30,111	i
Manufacturing industries	31-33	229,008	203,609	25,400	47,693	41,898	5,796	181,315	161,711	19,604	
Chemicals	325	65,168	62,192	2,976	22,501	20,901	1,600	42,667	41,291	1,376	
Pharmaceuticals and medicines	3254	59,065	56,420	2,644	20,422	19,124	1,298	38,643	37,297	1,346	
Other chemicals	other 325	6,104	5,772	332	2,079	1,777	302	4,024	3,994	30	
Computer and electronic products	334	91,026	82,355	8,671	12,321	9,985	2,336	78,705	72,371	6,335	i
Semiconductor and other electronic components	3344	40,215	39,280	935	4,195	3,441	754	36,020	35,839	181	
Other computer and electronic products	other 334	50,811	43,075	7,736	8,126	6,544	1,582	42,685	36,531	6,154	i
Nonmanufacturing industries	21-23, 42-81	172,044	156,590	15,453	22,684	17,738	4,946	149,359	138,852	10,507	i
Information	51	113,256	112,811	445	8,400	8,268	132	104,856	104,543	313	
Software publishers					2,362 - 2,378			28,720 - 28,735		28,421	
Other information	5112	31,098	30,681	417	6,022 - 6,037	2,260	103 - 117	76,121 - 76,137		299 - 314	
Other information	other 51	82,158	82,130	29		6,008	14 - 29		76,122	0 - 14	
Professional, scientific, and technical services	54	27,190	12,257	14,933	7,693	2,882 - 2,922	4,772 - 4,811	19,497	9,335 - 9,376	10,122 - 10,162	i
Scientific research and development services	5417	14,611	715	13,897	4,465	257	4,208	10,147	458	9,689	i
Other professional, scientific, and technical services	other 54	12,578	11,542	1,036	3,228	2,624 - 2,665	563 - 603	9,350	8,876 - 8,918	432 - 473	i
Total foreign R&D performance											
All industries	21-23, 31-33, 42-81	109,705	98,187	11,518	17,011	13,872	3,138	92,694	84,315	8,380	i
Manufacturing industries	31-33	66,243	64,829	1,414	11,111	10,880	231	55,132	53,949	1,183	
Chemicals	325	19,362	19,118	244	4,810	4,743	67	14,552	14,375	177	
Pharmaceuticals and medicines	3254	16,761	16,548	213	4,012	3,968	43	12,749	12,579	170	
Other chemicals	other 325	2,601	2,570	30	798	775	24	1,802	1,796	7	
Computer and electronic products	334	26,567	26,222	346	2,769	2,734	36	23,798	23,488	310	
Semiconductor and other electronic components	3344	13,023	12,868	155	1,450	1,448	2	11,573	11,419	153	i
Other computer and electronic products	other 334	13,544	13,354	190	1,319	1,285	34	12,225	12,069	156	
Nonmanufacturing industries	21-23, 42-81	43,462	33,359	10,104	5,900	2,993	2,907	37,563	30,366	7,197	i
Information	51	22,900	22,869	31	1,999	1,995	3	20,901	20,874	28	
Software publishers	5112	7,683	7,654	29	696	693	3	6,987	6,961	26	
Other information	other 51	15,217	15,215	1	1,303	1,303	*	13,914	13,913	1	i
Professional, scientific, and technical services	54	13,744	3,731	10,013	3,581	719	2,863	10,163	3,012	7,151	i
Scientific research and development services	5417	10,070	196	9,874	2,863	77	2,786	7,207	119	7,087	i

**TABLE 24**  
**For companies that performed foreign R&D, domestic and foreign R&D paid for by the company and others and performed by the company, by type of R&D and selected industry: 2020**  
(Millions of U.S. dollars)

Industry	NAICS code	Total	Paid for by the company	Paid for by others	Research (basic and applied)			Development		
					Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Other professional, scientific, and technical services	other 54	3,675	3,535	140	718 i	642 i	76 i	2,956 i	2,893 i	63 i

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



TABLE 25

**Foreign R&D paid for by the company and others and performed by the company, by type of R&D, selected industry, and location: 2020**

(Millions of U.S. dollars)

Industry and location	NAICS code	Total foreign R&D performance	Research (basic and applied)	Development
<b>All locations</b>				
All industries	21-23, 31-33, 42-81	109,705	17,011	92,694
Manufacturing industries	31-33	66,243	11,111	55,132
Chemicals	325	19,362	4,810	14,552
Pharmaceuticals and medicines	3254	16,761	4,012	12,749
Computer and electronic products	334	26,567	2,769	23,798
Semiconductor and other electronic components	3344	13,023	1,450	11,573
Nonmanufacturing industries	21-23, 42-81	43,462	5,900	37,563
Information	51	22,900	1,999	20,901
Software publishers	5112	7,683	696	6,987
Professional, scientific, and technical services	54	13,744	3,581	10,163
Scientific research and development services	5417	10,070	2,863	7,207
<b>Africa</b>				
All industries	21-23, 31-33, 42-81	481	86	395
Manufacturing industries	31-33	265	77	189
Chemicals	325	88	22	65
Pharmaceuticals and medicines	3254	37 - 59	0 - 16	32 - 51
Computer and electronic products	334	46	43	2
Semiconductor and other electronic components	3344	0 - 44	0 - 44	0
Nonmanufacturing industries	21-23, 42-81	215	9	206
Information	51	51 - 104	4	47 - 100
Software publishers	5112	34	3	31
Professional, scientific, and technical services	54	112	5	107
Scientific research and development services	5417	97	2	95
<b>Asia and Pacific</b>				
All industries	21-23, 31-33, 42-81	36,070	4,592	31,478
Manufacturing industries	31-33	22,366	3,175	19,191
Chemicals	325	4,539	1,128	3,411
Pharmaceuticals and medicines	3254	3,824	931	2,893
Computer and electronic products	334	11,673	1,141	10,532
Semiconductor and other electronic components	3344	6,648	713	5,935
Nonmanufacturing industries	21-23, 42-81	13,703	1,417	12,286
Information	51	7,102	680	6,422
Software publishers	5112	2,784	228	2,556
Professional, scientific, and technical services	54	3,482	571	2,911
Scientific research and development services	5417	2,214	289	1,925
<b>Canada</b>				
All industries	21-23, 31-33, 42-81	7,586	1,136	6,450
Manufacturing industries	31-33	3,693	603	3,090
Chemicals	325	587	124	463
Pharmaceuticals and medicines	3254	540	109	431
Computer and electronic products	334	1,934	268	1,666
Semiconductor and other electronic components	3344	833	67	766
Nonmanufacturing industries	21-23, 42-81	3,893	533	3,360
Information	51	2,534	173	2,361
Software publishers	5112	1,219	97	1,122
Professional, scientific, and technical services	54	942	333	609
Scientific research and development services	5417	532	283	249
<b>Europe</b>				

TABLE 25

**Foreign R&D paid for by the company and others and performed by the company, by type of R&D, selected industry, and location: 2020**

(Millions of U.S. dollars)

Industry and location	NAICS code	Total foreign R&D performance	Research (basic and applied)	Development
All industries	21-23, 31-33, 42-81	52,624	9,630	42,994
Manufacturing industries	31-33	30,846	6,161	24,684
Chemicals	325	12,790	3,181	9,608
Pharmaceuticals and medicines	3254	11,224	2,694	i 8,530
Computer and electronic products	334	7,525	908	6,617
Semiconductor and other electronic components	3344	2,509	323	i 2,186
Nonmanufacturing industries	21-23, 42-81	21,778	3,469	i 18,309
Information	51	10,891	894	9,997
Software publishers	5112	2,974	293	2,681
Professional, scientific, and technical services	54	8,175	i 2,471	i 5,704
Scientific research and development services	5417	6,712	i 2,240	i 4,472
<b>Latin America and OWH</b>				
All industries	21-23, 31-33, 42-81	4,594	567	i 4,026
Manufacturing industries	31-33	3,461	502	2,959
Chemicals	325	845	206	i 639
Pharmaceuticals and medicines	3254	703	167	i 536
Computer and electronic products	334	1,369	i 78	i 1,291
Semiconductor and other electronic components	3344	479	i 43 - 79	i 400 - 435
Nonmanufacturing industries	21-23, 42-81	1,133	i 66	i 1,067
Information	51	442	34	i 408
Software publishers	5112	53 - 65	0 - 12	54
Professional, scientific, and technical services	54	472	i 28	i 445
Scientific research and development services	5417	374	i 11	363
<b>Middle East</b>				
All industries	21-23, 31-33, 42-81	7,174	842	i 6,332
Manufacturing industries	31-33	4,612	467	i 4,144
Chemicals	325	398	102	296
Pharmaceuticals and medicines	3254	333	83	250
Computer and electronic products	334	3,503	314	i 3,190
Semiconductor and other electronic components	3344	2,507	255	i 2,251
Nonmanufacturing industries	21-23, 42-81	2,562	375	2,187
Information	51	1,764	205	1,559
Software publishers	5112	589	66	523
Professional, scientific, and technical services	54	507	152	356
Scientific research and development services	5417	106	i 22	i 84
<b>Puerto Rico<sup>a</sup></b>				
All industries	21-23, 31-33, 42-81	533	i 67	466
Manufacturing industries	31-33	512	i 62	449
Chemicals	325	76 - 118	14 - 50	61 - 73
Pharmaceuticals and medicines	3254	77	15	i 62
Computer and electronic products	334	137 - 408	i 0 - 20	i 120 - 388
Semiconductor and other electronic components	3344	2	0	2
Nonmanufacturing industries	21-23, 42-81	21	4	17
Information	51	0 - 18	0 - 3	i 0 - 16
Software publishers	5112	0 - 17	*	0 - 16
Professional, scientific, and technical services	54	3 - 22	1 - 5	1 - 18
Scientific research and development services	5417	4	2	2

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System; OWH = other Western Hemisphere.

<sup>a</sup> Puerto Rico is not included in the U.S. total due to its classification as a U.S. territory.

**Note(s):**

Detail within a select location may not add to total because of rounding. Sum of locations does not equal all locations due to the undistributed portion not being published. Industry classification is 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. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and also performed foreign R&D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 26

## Domestic R&amp;D paid for and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
All industries	21-23, 31-33, 42-81	466,162	258,088	47,548	20,710	7,555	27,379	7,799	18,558	3,476	12,415	62,634
Manufacturing industries	31-33	264,596	138,844	15,665	10,767	3,566	24,503	3,844	12,946	3,024	8,306	43,131
Food	311	4,985	3,018	36	192	16	695	69	235	15	146	563
Beverage and tobacco products	312	1,056	561	10	61	2	73	1	49	0	39	260
Textile, apparel, and leather products	313-16	812	631	18	16	15	63	5	15	3	11	36
Wood products	321	183	138	0	3	1	27	1	3	0	3	7 i
Paper	322	927	479	*	6	17 i	314	6	6	*	7	92
Printing and related support activities	323	282	207	3	14 i	1 i	17 i	6 i	17 i	0	1	16 i
Petroleum and coal products	324	1,222	597 - 673	0	12	1	29 - 54	6	57	*	232	201 - 266
Chemicals	325	89,403	37,712	5,118	6,133	835	8,336	1,498	3,928	1,878	4,621	19,345
Basic chemicals	3251	2,523	1,298	13	26 - 43	13	487	40	146	55	149	275 - 292
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,161	791	1	44	6	60	19	84	5	54	96
Pesticide, fertilizer, and other agricultural chemicals	3253	775	385 - 424 i	1 i	101 - 122 i	2 i	50 - 71 i	6 i	39 i	19	8 i	106 - 163 i
Pharmaceuticals and medicines	3254	80,858	32,548	5,084	5,850	803	7,494	1,395	3,492	1,798	4,350	18,044
Soap, cleaning compound, and toilet preparation	3256	2,476	1,454	16	85	3	152	21	87	*	21	636
Paint, coating, adhesive, and other chemicals	3255, 3259	1,610	1,199 - 1,234	3	8	7	70 - 91	17	80	*	39	129 - 169
Plastics and rubber products	326	2,607	1,573	4	25	37	565	22	82	5	44	251
Nonmetallic mineral products	327	1,619 i	823 i	21 i	44 i	37 i	134 i	39 i	70 i	1	27	422 i
Primary metals	331	795	305	1	4	7	377	2	21	*	37	42
Fabricated metal products	332	3,336	1,994	55	89	45	735	30	84	12	51	242
Machinery	333	15,071	8,586	302	569	164	2,099	217	615	35	416	2,068
Agricultural implement	33311	1,760	973 - 1,020	1	112	7	213	3 - 8	41	1	48	306 - 359
Semiconductor machinery	333242	4,121	1,964	232	32	8	460	134	317	*	148	825
Engine, turbine, and power transmission equipment	3336	1,523	944	8	29	12	74	26	57	15	21	338
Other machinery	other 333	7,667	4,658 - 4,706	61	396	137	1,352	48 - 53	200	18	199	544 - 600 i

TABLE 26

## Domestic R&amp;D paid for and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Computer and electronic products	334	88,505	49,911	9,507	1,451	1,583	5,781	1,507	5,828	669	1,201	11,065
Communications equipment	3342	11,107	6,264	748	362	143	261	797	505	22	94 - 142	1,866 - 1,914
Semiconductor and other electronic components	3344	40,801	21,239	4,523	614	256	3,580	207	2,949	358	393	6,682
Navigational, measuring, electromedical, and control instruments	3345	11,012	7,362	325	353	124	745	84	395	16	350	1,259
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,606	1,509	171	96	25	206	17	76	13	154	340
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,561	2,699	47 - 64	180	20	170	18	86	*	71	250 - 273
Other measuring and controlling device	other 3345	4,844	3,154	90 - 107	77	79	368	48	233	2	125	647 - 670
Other computer and electronic products	other 334	25,585	15,046	3,912	121	1,061	1,196	419	1,980	273	317 - 364	1,211 - 1,258
Electrical equipment, appliances, and components	335	4,492	2,955	53	220	35	298	72	130	33	210	485
Transportation equipment	336	30,232	17,756	82	1,021	529	3,305	217	1,045	276	489	5,511
Motor vehicles, bodies, trailers, and parts	3361-63	19,522	12,577	42	805	454	2,071	176	867	271	100 - 193	2,063 - 2,162
Aerospace products and parts	3364	9,111	4,207	25	183	36	922	26	144	1	297	3,270
Aircraft, aircraft engine, and aircraft parts	336411-13	8,281	3,788	21	142	28	755	16	112	1	292	3,126
Guided missile, space vehicle, and related parts	336414-15, 336419	831	419	4	41	8	167	11	33	0	5	144
Military armored vehicle, tank, and tank component	336992	4	2	*	*	*	1	*	0	*	0 - 2	0 - 3
Other transportation	other 336	1,594	970	15	33	39	311	15	34	5	0 - 90	80 - 176
Furniture and related products	337	492	280	2	16	6	92	4	9	23	18	42
Miscellaneous	339	18,576	11,250 - 11,312	454	892	235	1,530 - 1,555	141	750	73	754	2,412 - 2,475
Medical equipment and supplies	3391	15,944	9,423	435	814	188	1,303	121	694	29	708	2,229
Other miscellaneous manufacturing	3399	2,632	1,828 - 1,889	19	77	47	227 - 252	20	56	44	46	182 - 246
Nonmanufacturing industries	21-23, 42-81	201,566	119,243	31,883	9,943	3,989	2,876	3,955	5,612	452	4,109	19,503

TABLE 26

## Domestic R&amp;D paid for and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Mining, quarrying, oil and gas extraction, and support activities	21	1,121	782	8	38	5	80	14	15	*	48	130
Utilities	22	224	119	1	25	2	7	1	10	3	21	35
Wholesale trade	42	1,001	765	*	10	5	55	2	15	4	9	136
Electronic shopping and electronic auctions	454111-12	3,837 - 19,343	0 - 11,438	2,016 - 4,233	155	0 - 313	0 - 256	0 - 238	0 - 772	0 - 55	3	0 - 5,493
Transportation and warehousing	48-49	4,954	2,393	1,373	342	30	96	8	0 - 209	0 - 55	205	301 - 454
Information	51	128,350	76,351	23,252	6,394	3,041	975	2,933	3,643	284	2,483	8,994
Publishing	511	34,516	22,150	4,304	1,664	349	516	340	418	112	1,418	3,245
Newspaper, periodical, book, and directory publishers	5111	60	56	0	3	*	*	*	*	0	*	*
Software publishers	5112	34,456	22,094	4,304	1,660	349	516	340	418	112	1,418	3,245
Telecommunications	517	3,371	2,559	23	175	18	57	13 - 23	14	4	484	11 - 29
Data processing, hosting, and related services	518	41,105	26,875	6,578 - 6,612	1,156	576	293	711	841	149	416 - 449	3,466 - 3,496
Other information	other 51	49,358	24,767	12,312 - 12,346	3,400	2,098	108	1,859 - 1,869	2,371	20	132 - 165	2,224 - 2,265
Finance and insurance	52	12,204	7,790	1,123	1,770	203	88	100	300	16	190	625
Real estate and rental and leasing	53	3,249	957	2 - 2,211	37	0 - 313	0 - 256	0 - 238	43	0 - 55	3	0 - 2,209
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	2	3	0 - 3	0 - 3	*	*	*	0 - 3	*	*
Other real estate and rental and leasing	other 53	3,242	955	0 - 2,209	33 - 38	0 - 313	0 - 256	0 - 238	43	0 - 55	3	0 - 2,209
Professional, scientific, and technical services	54	28,322	17,886	1,719	889	375	1,237	635	793	77	1,067	3,643
Architectural, engineering, and related services	5413	2,214	1,866	4	35	11	147	13	17	1	14	105
Computer systems design and related services	5415	14,293	9,631	694	601	198	387	98	539	39	197	1,909
Scientific research and development services	5417	6,246	2,556	945	147	83	415	491	166	32	798	614
Research and development in nanotechnology	541713	126	73	*	3	1	11	19	7	1	2	10
Research and development in biotechnology (except nanobiotechnology)	541714	1,176	536	153	48	10	123	36	37	26	55	153

TABLE 26

## Domestic R&amp;D paid for and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,906 i	1,931	792 i	95	73	257 - 282	416 - 437 i	122	5	717 - 743 i	428 - 453
Research and development in the social sciences and humanities	541720	38	15	0	1	*	0 - 23	0 - 19	*	0	0 - 23	0 - 23
Other professional, scientific, and technical services	other 54	5,570	3,834	76	106	84	289	33	71	4	59	1,014
Health care services	621-23	1,374	765	95	156	20	86	29	26	17	31	149
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,429 - 16,934	0 - 11,438	81	128	0 - 313	0 - 256	0 - 238 i	0 - 772 i	*	47	0 - 5,493
All companies (number of domestic employees)	-	466,162	258,088	47,548	20,710	7,555	27,379	7,799	18,558	3,476	12,415	62,634
Small companies												
10-19 <sup>a</sup>	-	4,019	2,393	199	199	32	370	113 i	108	46	161	398 i
20-49	-	10,970	7,026	245	368	124	1,056	220	198	167	536	1,030
Medium companies												
50-99	-	11,177	6,810	312	413	178	1,377	278	251	96	468	995
100-249	-	22,132	12,398	1,859	872	204	2,043	723	444	250	1,283	2,056
Large companies												
250-499	-	18,067	11,390	1,345	586	130	1,211	241	656	165	557	1,786
500-999	-	18,458	10,262	1,168	796	207	1,286	392	718	293	655	2,680
1,000-4,999	-	75,917	42,342	10,629	2,349	1,219	4,050	1,081	2,359	765	2,611	8,512
5,000-9,999	-	42,451	24,608	2,990	2,084	540	2,918	688	1,869	256 i	713	5,785
10,000-24,999	-	72,827	39,796	6,251	4,306	589	5,314	557	3,817	364	2,418	9,416
25,000 or more	-	190,145	101,061	22,551	8,739	4,331	7,754	3,506	8,139	1,075	3,014	29,976

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



TABLE 27

## Domestic R&amp;D paid for and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more
All industries	21-23, 31-33, 42-81	466,162	4,019	10,970	11,177	22,132	18,067	18,458	75,917	42,451	72,827	190,145
Manufacturing industries	31-33	264,596	1,556	5,814	6,349	12,053	8,999	11,309	38,379	31,160	59,081	89,896
Food	311	4,985	18	79	93	114	181	233	461	976	1,939	891 i
Beverage and tobacco products	312	1,056	7	8	23	18	14	16	41	330	74	524
Textile, apparel, and leather products	313-16	812	5	6	11	34	8	50	138	278	94 i	188
Wood products	321	183	0	8	13	11	11	9	38	89	5	0
Paper	322	927	0	5	6	33	12	6	182	67	338	279
Printing and related support activities	323	282	*	8	14	65 i	18	14	58	33	72 i	0
Petroleum and coal products	324	1,222	8	15	119	15	14	37 - 55	71	15	0 - 327	582 - 931
Chemicals	325	89,403	827	2,973	2,852	6,431	3,628	4,220	11,840	10,978	27,624	18,030
Basic chemicals	3251	2,523	4	173	165	214	94	156	1,040	281	378	18
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,161	1	16 - 27	39	77	67	90	87 - 97	0	771	0
Pesticide, fertilizer, and other agricultural chemicals	3253	775	17	17	31	27	11	5	224 - 232	0	432 - 445	0
Pharmaceuticals and medicines	3254	80,858	776	2,655	2,528	5,910	3,296	3,837	9,592	10,509	24,072	17,684
Soap, cleaning compound, and toilet preparation	3256	2,476	12	44	25	137	45	53	463 i	188	1,310	200 i
Paint, coating, adhesive, and other chemicals	3255, 3259	1,610	18	56 - 67	64	66	114	79	426	0	646 - 660	129
Plastics and rubber products	326	2,607	4	108	120	236	167	355	1,031	174	181	232
Nonmetallic mineral products	327	1,619 i	1	0 - 134 i	31	112	0 - 195	107	161 - 173	204	0	660 - 1,005 i
Primary metals	331	795	0	104	52	60	28	36	273	222	21	0
Fabricated metal products	332	3,336	194	416	517	679	296	294	679	145	116	0
Machinery	333	15,071	78	534	768	993	664	572	1,852	3,404	3,460	2,745
Agricultural implement	33311	1,760	1	22	0 - 698	45	0 - 583	57	141	383 - 431	0	0 - 1,112
Semiconductor machinery	333242	4,121	5	15	38	41	42	173 i	720	1,258	1,829	0
Engine, turbine, and power transmission equipment	3336	1,523	0	17	34	59	41	53	51 i	1,268	0	0
Other machinery	other 333	7,667	72	480	0 - 698	848	0 - 583	288	941	446 - 495	1,631	1,632 - 2,746
Computer and electronic products	334	88,505	183	833	852	1,413	2,449	2,525	12,987	8,934	14,998	43,332
Communications equipment	3342	11,107	2 - 25	0 - 354	0 - 244	0 - 329	407	0 - 1,148	2,081 - 2,240	1,479 - 1,803	0	4,557 - 7,040

TABLE 27

## Domestic R&amp;D paid for and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more
Semiconductor and other electronic components	3344	40,801	45 - 68	0 - 354	311	567	1,505	879	4,845	3,838	13,676 - 13,730	14,702 - 15,139
Navigational, measuring, electromedical, and control instruments	3345	11,012	15 - 115	480	298	519	425 - 486	499	3,900	921 - 1,245	493 - 601	3,058 - 3,382
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,606	0 - 13	157	96	225	169	252	1,477	0	215 - 228	0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,561	15	0 - 33	42	78	61 - 123	0 - 248	183	351 - 930	0	2,253 - 2,577
Other measuring and controlling device	other 3345	4,844	0 - 89	291 - 324	160	216	161 - 196	0 - 248	2,240	314 - 572	276 - 375	805
Other computer and electronic products	other 334	25,585	0 - 89	0 - 354	0 - 244	0 - 329	49 - 111	0 - 1,148	2,003 - 2,160	2,371	667 - 819	18,093 - 20,382
Electrical equipment, appliances, and components	335	4,492	47	182	135	300	227	828	1,660	164	619	331
Transportation equipment	336	30,232	33	139	165	345	701	1,313	3,188	2,651	4,926	16,770
Motor vehicles, bodies, trailers, and parts	3361-63	19,522	0 - 24	44	15	124 - 176	338	590	2,125	1,937	2,800 - 3,461	10,809 - 11,470
Aerospace products and parts	3364	9,111	9 - 19	82	65	169	309	570	695	435 - 449	1,466	5,301
Aircraft, aircraft engine, and aircraft parts	336411-13	8,281	10	75 - 83	60	107	243	225	349	435 - 449	1,466	5,301
Guided missile, space vehicle, and related parts	336414-15, 336419	831	0 - 8	0 - 7	5	63	66	345	346	0	0	0
Military armored vehicle, tank, and tank component	336992	4	0 - 4	0 - 4	0 - 4	1	0 - 3	*	0	0	0	0
Other transportation	other 336	1,594	0 - 24	7 - 14	80 - 87	0 - 51	50 - 55	153	369	264 - 280	0 - 661	0 - 661
Furniture and related products	337	492	0	6	37	131	14	20	118	155	11	0
Miscellaneous	339	18,576	150	263 - 397	541	1,063	380 - 576	655 - 679	3,585 - 3,605	2,337	4,281 - 4,609	4,688 - 5,308
Medical equipment and supplies	3391	15,944	131	264	386	776	381	504	2,353	2,179	4,282	4,689
Other miscellaneous manufacturing	3399	2,632	19	0 - 134	155	287	0 - 195	152 - 176	1,232 - 1,252	158	0 - 327	0 - 619
Nonmanufacturing industries	21-23, 42-81	201,566	2,462	5,155	4,828	10,079	9,068	7,149	37,537	11,292	13,747	100,249
Mining, quarrying, oil and gas extraction, and support activities	21	1,121	0 - 7	39	51 - 94	48	56	84	271	0 - 568	0 - 568	0
Utilities	22	224	3	15	0	0	0	15	53	0 - 140	0 - 140	0 - 140

TABLE 27

## Domestic R&amp;D paid for and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-999	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more
Wholesale trade	42	1,001	56	250	131	273	120	107	33	3	19	9
Electronic shopping and electronic auctions	454111-12	3,837 - 19,343	3	14	0 - 572	0 - 280	105	2	0 - 568	0 - 1,049	0 - 3,512	0 - 17,731
Transportation and warehousing	48-49	4,954	0	0	81	11	1	38	2,141	9	0 - 2,676	0 - 2,676
Information	51	128,350	695 - 721	1,709	1,335	4,439	6,067	4,543	24,684	7,200	5,124 - 5,157	72,524
Publishing	511	34,516	465	622	546	1,167	500	733	8,610	1,684	1,267	18,923
Newspaper, periodical, book, and directory publishers	5111	60	*	1	6	*	53	0	0	0	0	0
Software publishers	5112	34,456	465	621	540	1,166	447	733	8,610	1,684	1,267	18,923
Telecommunications	517	3,371	0 - 200	0 - 200	51	112 - 179	106	103	89	29	0 - 200	2,684
Data processing, hosting, and related services	518	41,105	24 - 251	849	676	2,543 - 2,577	5,293	2,682	12,312	4,994	2,069 - 2,310	9,399
Other information	other 51	49,358	6	37 - 240	63	524 - 587	169	1,026	3,673	494	1,580 - 1,791	41,518
Finance and insurance	52	12,204	36	11	47	237	0 - 564	510	3,167	1,247	2,477	3,904 - 4,477
Real estate and rental and leasing	53	3,249	0 - 23	9	5	6	0 - 23	21	3,186	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	0	2	3	2	0	0	0	0	0	0
Other real estate and rental and leasing	other 53	3,242	0 - 23	7	3	5	0 - 23	21	3,186	0	0	0
Professional, scientific, and technical services	54	28,322	1,625	2,974	2,446	4,498	2,159	958	3,187	1,783	2,609	6,083
Architectural, engineering, and related services	5413	2,214	260	284	313	429	238	108	315	120	145	0
Computer systems design and related services	5415	14,293	460	1,431	722	893	1,062	658	2,197	25	2,341	4,503
Scientific research and development services	5417	6,246	853	980	1,096	2,757	371	98	31	4	10	44
Research and development in nanotechnology	541713	126	94	32	0	0	0	0	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	1,176	252	252	284	308	36	0	0	0	0	44
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,906	504	693	778 - 813	2,415 - 2,450	301 - 336	98	31	4	10	0
Research and development in the social sciences and humanities	541720	38	3	3	0 - 33	0 - 33	0 - 33	0	0	0	0	0
Other professional, scientific, and technical services	other 54	5,570	52	279	315	417	488	94	642	1,634	113	1,536
Health care services	621-23	1,374	8	78	164	291	0 - 285	295	251	4	0 - 18	0 - 285

TABLE 27

**Domestic R&D paid for and performed by the company, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)											
		All companies	10–19 <sup>a</sup>	20–49	50–99	100–249	250–499	500–999	1,000–4,999	5,000–9,999	10,000–24,999	25,000 or more	
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,429 - 16,934	0 - 32	56	0 - 572	0 - 280	0 - 564	576	i	0 - 568	0 - 1,049	0 - 3,512	0 - 16,303

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 28

**Domestic R&D paid for and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
All industries	21-23, 31-33, 42-81	466,162	29,330	60,620	376,213
Manufacturing industries	31-33	264,596	21,388	38,696	204,513
Food	311	4,985	515	1,151	3,319
Beverage and tobacco products	312	1,056	90	209	757
Textile, apparel, and leather products	313-16	812	87	93	632
Wood products	321	183	17	29	138
Paper	322	927	131	207	590
Printing and related support activities	323	282	29	71	182
Petroleum and coal products	324	1,222	214 - 235	376 - 412	576 - 625
Chemicals	325	89,403	13,313	17,797	58,293
Basic chemicals	3251	2,523	274	678	1,570
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,161	197	277	687
Pesticide, fertilizer, and other agricultural chemicals	3253	775	131 - 144	205 - 219	423 - 431
Pharmaceuticals and medicines	3254	80,858	12,480	15,898	52,481
Soap, cleaning compound, and toilet preparation	3256	2,476	130	309	2,037
Paint, coating, adhesive, and other chemicals	3255, 3259	1,610	90 - 100	418 - 428	1,085 - 1,093
Plastics and rubber products	326	2,607	204	388	2,016
Nonmetallic mineral products	327	1,619	306	205	1,108
Primary metals	331	795	49	172	573
Fabricated metal products	332	3,336	196	812	2,328
Machinery	333	15,071	783	1,575	12,714
Agricultural implement	33311	1,760	109	90 - 143	1,508 - 1,560
Semiconductor machinery	333242	4,121	111	345	3,665
Engine, turbine, and power transmission equipment	3336	1,523	38	165	1,320
Other machinery	other 333	7,667	525	920 - 974	6,169 - 6,223
Computer and electronic products	334	88,505	2,500	8,672	77,333
Communications equipment	3342	11,107	484 - 538	736 - 790	9,834
Semiconductor and other electronic components	3344	40,801	933	2,753	37,115
Navigational, measuring, electromedical, and control instruments	3345	11,012	637	1,787	8,588
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,606	208	710	1,687
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,561	94	515	2,952
Other measuring and controlling device	other 3345	4,844	334	562	3,948
Other computer and electronic products	other 334	25,585	393 - 446	3,343 - 3,396	21,796
Electrical equipment, appliances, and components	335	4,492	325	556	3,611
Transportation equipment	336	30,232	1,467	4,055	24,710
Motor vehicles, bodies, trailers, and parts	3361-63	19,522	798	2,626	16,098
Aerospace products and parts	3364	9,111	634	1,281	7,195
Aircraft, aircraft engine, and aircraft parts	336411-13	8,281	630	1,261	6,390
Guided missile, space vehicle, and related parts	336414-15, 336419	831	4	20	806
Military armored vehicle, tank, and tank component	336992	4	0	0	4

TABLE 28

**Domestic R&D paid for and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
Other transportation	other 336	1,594	34	148	1,412
Furniture and related products	337	492	39	99	354
Miscellaneous	339	18,576	1,110 - 1,117	2,188 - 2,221	15,238 - 15,272
Medical equipment and supplies	3391	15,944	878	1,871	13,195
Other miscellaneous manufacturing	3399	2,632	232 - 239	317 - 349	2,043 - 2,077
Nonmanufacturing industries	21-23, 42-81	201,566	7,942	21,924	171,700
Mining, quarrying, oil and gas extraction, and support activities	21	1,121	57 - 65	309 - 318	746
Utilities	22	224	25	51	148
Wholesale trade	42	1,001	109	84	808
Electronic shopping and electronic auctions	454111-12	3,837 - 19,343	20	171 - 3,455	363 - 17,304
Transportation and warehousing	48-49	4,954	178	291	4,484
Information	51	128,350	3,706	7,503	117,140
Publishing	511	34,516	1,200	1,571	31,745
Newspaper, periodical, book, and directory publishers	5111	60	*	2	58
Software publishers	5112	34,456	1,200	1,569	31,686
Telecommunications	517	3,371	234	776	2,362
Data processing, hosting, and related services	518	41,105	1,493	2,705	36,907
Other information	other 51	49,358	779	2,451	46,127
Finance and insurance	52	12,204	387	1,678	10,139
Real estate and rental and leasing	53	3,249	3 - 824	762 - 1,585	1,662
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	4	2	1
Other real estate and rental and leasing	other 53	3,242	0 - 821	760 - 1,583	1,660
Professional, scientific, and technical services	54	28,322	2,462	7,279	18,582
Architectural, engineering, and related services	5413	2,214	218	477	1,518
Computer systems design and related services	5415	14,293	1,027	2,442	10,823
Scientific research and development services	5417	6,246	612	2,900	2,735
Research and development in nanotechnology	541713	126	16	21	89
Research and development in biotechnology (except nanobiotechnology)	541714	1,176	114	362	700
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,906	461 - 483	2,496 - 2,519	1,927
Research and development in the social sciences and humanities	541720	38	0 - 20	0 - 20	19
Other professional, scientific, and technical services	other 54	5,570	605	1,459	3,506
Health care services	621-23	1,374	173	510	691
Other nonmanufacturing	23, 44-45 (excluding 454111- 12), 55-56, 624, 71-72, 81	1,429 - 16,934	0 - 821	0 - 3,284	0 - 16,934
All companies (number of domestic employees)	-	466,162	29,330	60,620	376,213
Small companies					
10-19 <sup>a</sup>	-	4,019	387	782	2,849
20-49	-	10,970	1,195	2,404	7,371
Medium companies					
50-99	-	11,177	1,034	2,380	7,763

TABLE 28

**Domestic R&D paid for and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
100–249	–	22,132	2,601	5,780	13,751
Large companies					
250–499	–	18,067	1,252	2,080	14,735
500–999	–	18,458	947	2,670	14,840
1,000–4,999	–	75,917	6,418	11,444	58,054
5,000–9,999	–	42,451	2,656	5,219	34,577
10,000–24,999	–	72,827	4,668	9,054	59,106
25,000 or more	–	190,145	8,172	18,808	163,166

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 29-A

## Companies with domestic R&amp;D paid for and performed by the company, by industry, company size, and state (A-M): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Hawaii	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana
All industries	21-23, 31-33, 42-81	28,720	466,162	1,329	43 e	4,899	360	175,459	6,042	6,487	1,688	509	5,762	4,426	216	2,139 i	13,415	7,202 i	2,664	1,956	852	475	385	3,964	27,704	18,507	7,421	244	4,581	224
Manufacturing industries	31-33	15,420	264,596	859	10	3,975	244	82,147	3,552	5,692	1,441	61	2,995	2,273	145	1,853 i	10,257	6,780 i	2,278	1,339	649	271	265	2,515	21,060	17,191	5,671	188	3,558	95 i
Food	311	970	4,985	25	1 e	4	45 i	218	45	28	439 i	* e	32	24	105	69	804 i	259	839 i	86	24	4 e	1 e	71	21	166	396	5	64	3
Beverage and tobacco products	312	240	1,056	* e	* e	1 i	* e	51	7	10	* e	* e	16	90	* e	* e	88	* e	* e	* e	47	* e	1 i	1	5	3	1 e	* e	* e	* e
Textile, apparel, and leather products	313-16	230	812	6	* e	1	2	331	*	* e	* e	* e	24	99 i	*	* e	6	* e	1 i	1	*	* e	1 i	* e	8	13	5	* e	3 i	* e
Wood products	321	130	183	1	* e	*	1	21	*	* e	* e	0	2	6	* e	3	1 i	2	22	* i	* e	1	*	* e	* e	1 i	41	1 i	* e	* e
Paper	322	100	927	16	0	1	19	10	1	4	* e	0	24	35	0	*	36	1 i	1	10	16	5	12	*	21	10	8	1	1	* e
Printing and related support activities	323	210	282	* e	* e	2 i	*	65 i	11	* e	* e	* e	1 e	* e	* e	* e	5 i	* e	1 i	* e	1 i	* e	* e	* e	36 i	6	29	* e	6	* e
Petroleum and coal products	324	100	1,222	2 e	* e	1 e	2 e	19	8	1 e	* e	0	7 e	5 e	0	* e	33	13	* e	9	12	3 e	1 e	11	5	2 e	6	3	7 e	0
Chemicals	325	2,450	89,403	148	3	287	35 i	21,072	350	4,808	808	29	551	392	7	11	4,231	4,174 i	232	212	202	72	16	1,298	13,856	926	398	13	2,152	5 e
Basic chemicals	3251	300	2,523	26	0	4 e	7	111	10	69	108	0	7	96	* e	1 e	46	20	118	45	17	54	* e	78	67	22	5 e	6	21	* e
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	1,161	1 e	0	2	*	40	* e	1 e	16	0	4	36	0	* e	18	7	4	* e	17	8	3	* e	7	233	5	* e	1	* e
Pesticide, fertilizer, and other agricultural chemicals	3253	130	775	2	0	9	1	40	6	* e	146	0	9	5	4	2	6	2	5	1	1	1	* e	1 e	* e	18	3	2	13	1
Pharmaceuticals and medicines	3254	1,190	80,858	111	3	256	25 i	20,529	314	4,602	538	29	512	222	2 e	5	3,958	4,120 i	86	97	34	4	11	1,217	13,670	598	184	4	2,074	3 e
Soap, cleaning compound, and toilet preparation	3256	340	2,476	1 e	0	1 e	1 e	197	2 e	34	* e	0	12	13	* e	3	146	3 e	3	65 i	* e	* e	* e	1 e	67	2 e	131	* e	11	* e
Paint, coating, adhesive, and other chemicals	3255, 3259	370	1,610	7	* e	17	1	155	18	103	* e	0	7	19	1	*	57	22	16	3	133	5	1	2	45	54	70	1	33	1 i
Plastics and rubber products	326	1,020	2,607	16	* e	59	7	161	91	70 i	1 i	0	62	78	* e	3 i	93	117	16	10	57	53	1 e	4	28	167	80	8	13	* e
Nonmetallic mineral products	327	240	1,619 i	3 i	* e	0-80	* e	104	32	1 i	* e	* e	45	5	* e	* e	28	5	1 e	1 e	16	1 e	* e	6	47	20	20	20	3	* e
Primary metals	331	270	795	10	0	4	6	19	3	4	* e	0	2 e	10	0	* e	19	66	11	1 e	12	1 e	* e	5	25	61	27	13	4 e	1 e
Fabricated metal products	332	2,250	3,336	20 e	1 e	60	8 e	424	37	106 i	4 e	* e	73	132	* e	6 e	203	111	21 e	44	36	30 e	4 e	31	73	145 e	88	9 e	84	2 e
Machinery	333	2,050	15,071	27	* e	139	37	3,473	45	113	1 e	0	160	140	1	41 i	1,532	293	757	139	61	43	8 e	179	587 i	512	441	17 i	131	59 i



TABLE 29-A

Companies with domestic R&D paid for and performed by the company, by industry, company size, and state (A-M): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Hawaii	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana
Agricultural implement	33311	160	1,760	1	0	20	2	72	3	* e	0	0	*	31	0	3	410	3	710	60	* e	10	0	* e	0	5	94	* e	1	* e
Semiconductor machinery	333242	60	4,121	0	0	75	0	2,755	1 i	0	0	0	10	0	0	26 i	0	2	0	0	0	0	0	1 i	289 i	0	7 i	0	0	57 i
Engine, turbine, and power transmission equipment	3336	90	1,523	* e	0	1	* e	47	* e	7	0	0	32	17	0	* e	40	21	1 i	* i	* e	13	1	7	23	27	11	* e	9	* e
Other machinery	other 333	1,760	7,667	26	* e	43	35	599	41	105	1 e	0	117	92 i	1	12	1,081	267	46	78	61	20	7 e	171	275	480	329	16 i	121	1 e
Computer and electronic products	334	2,090	88,505	138	2	3,022	32	45,344	2,139	172	159 i	29	1,248 i	651	28	1,696 i	1,159	144	286 i	558	28	19	49	236	3,642	263	1,027	11	81	16
Communications equipment	3342	360	11,107	92	0-2	110	6	4,885	240	35	86 i	23	621 i	275	15	49	587	48	0-15	0-99	9	6	4	153	346	110	69	6	51	3
Semiconductor and other electronic components	3344	530	40,801	23	1 i	2,252	10 i	20,297 i	1,034 i	21	5	2 i	113	188 i	* e	1,539 i	183 i	42	56	0-415 e	14 i	0-11 i	27	42	1,427	52 i	231 i	* e	8	6
Navigational, measuring, electromedical, and control instruments	3345	1,000	11,012	7	0-2 e	619	15	3,476	348	113	67	*	188	115	8	0-110	226	37	217 i	144-479	4 i	3 e	16	28	1,229	77	400	5	18	5
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	180	2,606	* e	0	30	0	1,370	16	26	* e	0	76	3 i	0	*	40	13	1 e	* e	0	* e	* e	2 i	425	5	57	0	* e	* e
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	130	3,561	6	0	0-590	0	334	54	12	0	0	49	36	* e	* e	0-187	6	0-217 i	139-475	*	1 e	0-17	8	343	4	95	2	9	1
Other measuring and controlling device	other 3345	700	4,844	1 e	0-2 e	0-590 i	15	1,772	278	75	67	*	63	77	7	0-110	0-187	18	0-217 i	4	4 i	3 e	0-17	18	461	67	249	3	9 i	4
Other computer and electronic products	other 334	210	25,585	15	0	41	1	16,685	516	3	1	4	326 i	73 i	5	0-110 i	163	18	0-15	0-232	1	0-11	2	13	640	25	326	*	4	2
Electrical equipment, appliances, and components	335	640	4,492	28	0	13	3 e	1,164	25	65	* e	*	28	102	0	4 i	292	32	26	12	7	6	6	17	493	436	70	8	56	1 i
Transportation equipment	336	900	30,232	350	1 i	204	24	4,411	480	202	3	1	435	262	1	7	679	1,059	20	237	107	28	11	437	138	13,403	424	63 i	861	2
Motor vehicles, bodies, trailers, and parts	3361-63	470	19,522	198	1 i	113	1 e	2,402 i	13	10	* e	0	13	53	*	3	546	892	9	2	92	* e	* e	51	33	13,154	107	39 i	30	2

TABLE 29-A

Companies with domestic R&D paid for and performed by the company, by industry, company size, and state (A-M): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Hawaii	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana
Aerospace products and parts	3364	310	9,111	131	* e	78	23	1,905	447	179	3	1	376	50	*	4	91	141	9	228	1	24	6	332	100	84	33	23	825	1 e
Aircraft, aircraft engine, and aircraft parts	336411-13	280	8,281	80	* e	66	22	1,465	317	160	3	1	351	49	*	4	88	141	7	228	*	24	2	331	95	63	33	13	822	1 e
Guided missile, space vehicle, and related parts	336414-15, 336419	40	831	51	0	12	*	440	130	18	0	*	25	1	0	0	3	0	3	*	1	0	4	1	5	21	*	10	3	0
Military armored vehicle, tank, and tank component	336992	10	4	* e	0	1 i	0	* i	0	0	0	0	0	0	0	0	0	0	* e	0	0	0	0	1	0	* e	0	0	0	0
Other transportation	other 336	130	1,594	20	* e	12	1 e	104	20	13	* e	0	46	159	* e	* e	42	25	1	7	13	3 e	5 i	54 i	5	165	284	1	7	* e
Furniture and related products	337	240	492	3	* e	4	* e	58	28	2	* e	* e	3 e	20	* e	1 e	9	15	6	* e	4	* e	* e	1 e	14	116 i	17	10	1 e	* e
Miscellaneous	339	1,420	18,576	66	* e	101 - 181 i	20	5,199	250	105	24	2	283	223	1 e	11	1,038	486	38	17	20	6 e	155	216	2,060	941	2,593	6 e	91	5
Medical equipment and supplies	3391	830	15,944	58	* e	102 i	9 e	4,591	216	54	21	2	240	187	1 e	3 e	916	473	6 e	8 e	6 e	3 e	154	209 i	1,959	855	2,566	5 e	81	1 e
Other miscellaneous manufacturing	3399	600	2,632	9	* e	0 - 80	11	607	34	50 i	3 i	0	44	35	* e	8	122	13	33	9	14	3 e	1 e	7	101	85	27	1 e	10	5
Nonmanufacturing industries	21-23, 42-81	13,310	201,566	470	33 e	923	117	93,313	2,491	795	247	449	2,767	2,152	72	286 i	3,157	422	386	618 i	203	203	120	1,448	6,644	1,316	1,750	57	1,023 i	129
Mining, quarrying, oil and gas extraction, and support activities	21	280	1,121	* e	1	20	* e	155	6 e	5 i	* e	0	* e	26 i	* e	* e	7	1 e	* e	6 i	1 e	16 i	* e	* e	* e	1 e	* e	3 i	* e	1 e
Utilities	22	50	224	21	0	*	2	23 i	25	*	1	1	0	20	*	*	10	0	3	2	*	7	0	5	7	4 i	1	2	1	
Wholesale trade	42	1,100	1,001	5 e	1 i	15 i	3 e	165 i	18 i	15 i	1 e	* e	22 e	30	16 i	2 e	85 i	9 e	26	19 i	5 e	8 e	1 e	7 e	12 e	28	23 i	2 e	21	1 e
Electronic shopping and electronic auctions	454111-12	90	3,837 - 19,343 i	1 i	* e	0 - 123 i	* e	3,684 i	0 - 240 i	6 i	2 i	4 i	31 i	0 - 92 i	* i	1 i	24 i	16 i	1 i	1 i	0 - 46 i	* e	* e	4 i	0 - 837 i	0 - 135 i	0 - 213 i	* e	3 i	* i
Transportation and warehousing	48-49	50	4,954 i	1 e	* e	2 e	2	3,173 i	5	1 e	* e	*	30	4	9	1 i	17	3	1 e	8	1 e	1 e	* e	0 - 325	4	3 e	0 - 213	* e	24	* e
Information	51	3,740	128,350	262	22 e	391	68	67,390	1,551	507	34 e	300	1,718	1,455	19	60	1,219	221	250	147	90	59 e	40	565	3,689	751	605	21	192	53
Publishing	511	1,630	34,516	78	2	165	26	8,327	401	0 - 110	10 e	24 e	455	276	9	21	306	114	33	51	8	6 e	14	169	1,462	411	260	2	50	9
Newspaper, periodical, book, and directory publishers	5111	30	60	*	* e	*	* e	8	1	0 - 12	* e	* e	4	1	*	*	1 i	1	* e	*	* e	*	*	7	10	1 i	*	* e	1	* e
Software publishers	5112	1,610	34,456	78	2	164	26	8,319	401	0 - 110	10 e	24 e	451	275	8	21	304	114	33	50	8	6 e	14	162	1,452	410	260	2	50	9

TABLE 29-A

Companies with domestic R&D paid for and performed by the company, by industry, company size, and state (A-M): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Hawaii	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	
Telecommunications	517	130	3,371	3 e	3	25	1 e	357	96	0-91 e	2	0-91 e	462	68	0-2 e	1 e	56	3	2 e	3 e	1 e	6	1 e	11	23	6	5	0-10 e	7	1 e	
Data processing, hosting, and related services	518	1,640	41,105	115	16 e	196	40	23,496	673	190	21 e	144	731	986	10	36	549	95 e	107	89	78	45 e	23 i	371 e	1,559	293	324	11 e	124 e	43	
Other information	other 51	350	49,358	66	* e	5 e	1 e	35,210	381	115-318	* e	39-134	71	124	0-2 e	2	309	9	108	4 i	3	3 e	3	14	645	42	16	0-10	11	1 e	
Finance and insurance	52	220	12,204	6 i	* e	130	1 i	4,563	45	95	176	3	355 i	92	*	1	948	3	22	7	35	1 e	31	108	199	76	244	*	21	4	
Real estate and rental and leasing	53	60	3,249	* e	* e	2	* i	2,577	8	*	* e	1	1	4	* e	* e	7	* i	* i	* e	* e	* e	* e	* e	* e	1	3	* e	* e	* e	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	20	7	0	0	0	0	2	0	0	0	0	0	0	0	0	0	* i	0	0	0	0	0	0	0	0	0	0	0	0	
Other real estate and rental and leasing	other 53	40	3,242	* e	* e	2	* i	2,574	8	* e	* e	1	1	4	* e	* e	7	* e	* i	* e	* e	* e	* e	* e	* e	1	3	* e	* e	* e	
Professional, scientific, and technical services	54	6,070	28,322	155	7 e	238	33	9,936	584 i	128	26	130 i	530	427	22	214 i	673	131	49	396 i	28 e	83	43	436	1,691	319	663	24	739 i	66	
Architectural, engineering, and related services	5413	1,180	2,214	65	4	28	3 e	347	65	42	3	8	78	49	9	18	82	34	13	29	7	31	24	80	81	74	28	6	64	11	
Computer systems design and related services	5415	2,570	14,293	70	3 e	168	18	3,841	378 i	53	17	26 e	267	281	9	42 i	285	54	22	340 i	17 e	16 e	6 e	163 e	777	114	482	8	653 i	15 i	
Scientific research and development services	5417	1,280	6,246	14 e	*	29	5 i	3,601 i	67	9 i	4	1 i	91	11	2	2 i	45 i	30	7	12	1 i	7 i	13 i	155	647 i	69	69 i	7	11	39	
Research and development in nanotechnology	541713	90 i	126 i	* e	0	* e	* e	44 i	2 i	* e	* e	* e	* e	* e	0	0	2 i	* e	* e	* e	* e	* e	* e	* e	* e	1 i	11 i	* e	* e	1	* e
Research and development in biotechnology (except nanobiotechnology)	541714	270	1,176	* e	0	2	* e	508	4 i	1 i	2	* e	6	6	0	0	16	19	5	* e	* i	6 i	1 i	72	146	*	11	* e	* e	* e	

TABLE 29-A

## Companies with domestic R&amp;D paid for and performed by the company, by industry, company size, and state (A-M): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Hawaii	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	920	4,906 i	13 e *		27	5 i	3,020 - 3,051 i	61	7 i	2 i	* e	85 i	5 i	2	2 i	0 - 29 i	10	1 e	12	1	1 e	12 i	83	500 i	58	58 i	7	11	39	
Research and development in the social sciences and humanities	541720	20	38	0	0	0	0	0 - 28	0	0	0	1 i	0	0	0	0	0 - 28 i	0	0	0	0	0	0	* i	0	0	0	0	0	0	
Other professional, scientific, and technical services	other 54	1,060	5,570	6	1 e	13	6	2,146	74	24	2 e	94 i	94	87	1	152 i	260	13	7	15	3 e	29	1 e	37	186	63	85	2	11	1 e	
Health care services	621-23	560	1,374	3	* e	7 i	4	869	14	2 i	* e	* e	24	7	* e	* e	2 e	3 i	* e	3	1 e	1 e	1	2	209	3	2 e	* e	1 e	* e	
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,150	1,429 - 16,934	15	1 e	0 - 123	3 e	778 i	0 - 240 i	36	7	8	56 e	0 - 92	4 e	6	166	35	34	28	0 - 46	27	2 e	0 - 325	0 - 837	0 - 135	0 - 213	3 e	21	3	
All companies (number of domestic employees)	-	28,720	466,162	1,329	43 e	4,899	360	175,459	6,042	6,487	1,688	509	5,762	4,426	216	2,139 i	13,415	7,202 i	2,664	1,956	852	475	385	3,964	27,704	18,507	7,421	244	4,581	224	
Small companies																															
10-19 <sup>b</sup>	-	4,610	4,019	62	5 e	43 e	15 i	1,111	109	39 e	7 e	12 e	110 e	52 e	5 e	12 i	102 e	48 e	12 e	16 e	20 e	14 e	5 e	148	335	90 e	63 e	5 e	46	5 e	
20-49	-	9,000	10,970	61 e	5 e	96 e	22 e	3,042	183	92 e	91	27 e	254 e	152 e	22	28	315 e	131 e	80	81	42 e	49 e	20 e	304	1,428	289 e	248	19 e	100 e	21	
Medium companies																															
50-99	-	5,290	11,177	77 e	4 e	121	29 e	3,328	135	87 e	12 e	20	268	159	8 e	21 e	313	131 e	95	45 e	58 e	55 e	27 i	190	1,811	273	141 e	21 e	102	7 e	
100-249	-	4,730	22,132	161	6 e	248	49	8,459	362	244	25	33	424	342	9	38	595	216	63	134	62	69	20	349	2,410	499	382	31	170	31	
Large companies																															
250-499	-	2,040	18,067	94	14 e	282	23 e	6,025	369	227	18 e	53 e	371	322	21 i	25	501	139	118	184	52	60	6 e	261 e	1,612	450	294	13 e	177	60	
500-999	-	1,230	18,458	33	1	152	22	7,410	491	144	30	1	498 i	168	13	56	393	170	114	42	45	21	2	289	2,076	603	336	20	40	0 - 20	
1,000-4,999	-	1,270	75,917	509	2	654	103	31,822	1,209	941 i	745	99	1,002	1,191	10	120	1,617	599	321	266	371	128	72	728	8,012	1,955	912	43	556	24	
5,000-9,999	-	250	42,451	58	1	267	10	20,362	668	666	50	80 i	345	430	112	161 i	1,205	551	420	543	54	14	142	106	919	1,493 i	864	42 i	129	0 - 20	
10,000-24,999	-	210	72,827	78	3	442 i	25 i	21,762 i	1,271 i	365	461 i	7	536 i	493 i	2	1,551 i	4,678	4,877 i	480 i	517	105	25	16	769 i	3,884	2,937	1,318	28	1,333	60 i	

TABLE 29-A

**Companies with domestic R&D paid for and performed by the company, by industry, company size, and state (A–M): 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Hawaii	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana
25,000 or more	–	130	190,145	195	2	2,595	62 i	72,138	1,246	3,682	247	177	1,955	1,118	15	128	3,695	339	960	128	44 i	40	75	821	5,216	9,917	2,863	23	1,929	0 - 20

\* = amount < \$500,000; e = more than 50% of value is modeled—see "Technical Notes;" i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology.

<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. For a given estimate in this table, if the conditions are satisfied for both the "i" and "e" flags, the e flag is assigned because the imputation rate may be found in the corresponding table of imputation rates. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 29-B

## Companies with domestic R&amp;D paid for and performed by the company, by industry, company size, and state (N-Z): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Undistributed <sup>b</sup>				
All industries	21-23, 31-33, 42-81	28,720	466,162	769	707	1,093	18,054	857	21,062	9,242	331	7,511	945	10,190	13,544	581	1,337	209	1,568	22,834	2,981	295	5,072	40,576	203	5,506	1,035	707				
Manufacturing industries	31-33	15,420	264,596	234	374	702	14,211	282	8,949	5,634	163	6,058	612	8,643	10,523	518	991	157	990	15,059	1,447	171	1,365	5,061	170	3,486	1,010	425				
Food	311	970	4,985	56	2 e	13	254	2 i	50	159	4	153	66	19	70	1 e	7	5 i	27	53	7	3	51	50	* e	111	0-69 e	0-69				
Beverage and tobacco products	312	240	1,056	* e	* e	* e	1 e	* e	306	98	* e	1 i	1 i	3	5	* e	* e	* e	* e	204	* i	1 i	91	8	* e	7	* e	6				
Textile, apparel, and leather products	313-16	230	812	* e	* e	5	18	* e	23	40	* e	82	1	19	3	i	* e	64	* e	1 e	1 e	6	* e	1	* e	20	0-28	0-28				
Wood products	321	130	183	* e	* e	* e	* e	*	* i	5 i	7	2	*	2	4	i	2	* e	* e	4	7	* i	* i	7	* e	16	* e	10				
Paper	322	100	927	1	* e	2	14	* e	16	38	0	25	*	*	18	4	143	* e	15	5	* e	* e	62	11	* e	338	* e	5				
Printing and related support activities	323	210	282	* e	* e	*	1 i	1 i	7	17	* e	4	*	1 i	15	* i	1 i	* e	13	1	1 i	* e	* e	6	4	31	* e	12				
Petroleum and coal products	324	100	1,222	* e	2 e	* e	345	* e	7 e	4 e	0	13 e	0-58	3	20	* e	11	* e	1 e	597	4	0	7	1 e	* e	4	0	0-70				
Chemicals	325	2,450	89,403	23	20	48	11,883	14 e	4,460	2,103	3	2,486	25	133	7,421	41	116	35	319	1,340	332	20	228	1,336	i	132	558	2	40			
Basic chemicals	3251	300	2,523	5 e	2 e	2	166	8 e	157	36	1 e	249	10	9	212	3 e	25	31	229	232	2	0	116	19	10	50	1	8				
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	150	1,161	* e	*	* e	8	0	31	i	9	0	246	1	3	113	2	15	2	6	253	* e	* e	29	i	7	25	7	0	3		
Pesticide, fertilizer, and other agricultural chemicals	3253	130	775	1	* e	*	158	* e	2 e	268	*	4	* e	1	3 e	0	*	*	1	8	* e	* e	13	4	* e	27	0	4				
Pharmaceuticals and medicines	3254	1,190	80,858	14	16	i	39	11,267	6	4,036	1,700	1	585	9	30	6,920	33	53	1 e	71	779	324	15	59	1,264	i	96	328	* e	3		
Soap, cleaning compound, and toilet preparation	3256	340	2,476	2	* e	* e	212	i	* e	198	i	24	0	1,140	* e	2 e	17	i	3	3	i	* e	6	29	1 e	4	1 e	2 e	1 e	131	0	7
Paint, coating, adhesive, and other chemicals	3255, 3259	370	1,610	* e	1 i	6	71	* e	36	66	*	263	5	87	156	* e	20	* e	6	41	5	* i	9	39	* e	15	* e	15				
Plastics and rubber products	326	1,020	2,607	14	2 e	14	11 e	* e	168	119	1 e	443	84	5	i	86	9	51	3	34	117	3	* e	24	15	1 e	172	0-59	0-59			
Nonmetallic mineral products	327	240	1,619	i	* e	1 e	11	* e	913-1,060	i	12	* e	88	1 e	4	51	* e	8	* e	5	i	11	1 e	1	i	1 e	11	2	10	0-147 e	0-147	
Primary metals	331	270	795	* e	* e	8	3 e	4 i	11	11	* e	57	4	5	128	1 e	8	1	3 e	190	4	1	i	2	3 e	1	36	0-31 e	0-31			
Fabricated metal products	332	2,250	3,336	10	8 e	49	52	3 e	85 e	61	2 e	242	23 e	27 e	126 e	13	51	3 e	47	313	24	2 e	27 e	169	5 e	181	2	55				
Machinery	333	2,050	15,071	49	43	51	173	i	5	601	301	142	427	257	612	329	40	246	19	84	1,389	54	16	71	85	6 e	1,067	6	68			

TABLE 29-B

## Companies with domestic R&amp;D paid for and performed by the company, by industry, company size, and state (N-Z): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Undistributed <sup>b</sup>
Agricultural implement	33311	160	1,760	41	* i	0	* i	* e	1 e	36	55	72	0-92	2 i	0-92	*	3	8	5	2	3	0	* e	9	0	20	* e	0-38
Semiconductor machinery	333242	60	4,121	0	0	0	50 i	0	65 i	*	0	* e	0	446	21 i	0	0	0	* i	312 i	0	2 i	0	0	0	0	0	1
Engine, turbine, and power transmission equipment	3336	90	1,523	* e	3	1	15	0	313	12	* e	48	2	1	6	1 i	180	* e	* e	3	* e	0	32	4	* e	612	0	31
Other machinery	other 333	1,760	7,667	9 e	40	50	107 i	5	223	253	86	306	162-256	163	208-304	39	62	11	79	1,071	51	14	39	72	6 e	435	6	0-38
Computer and electronic products	334	2,090	88,505	43	45	406	796	243	1,476	1,939	2 e	605	54	7,092	1,032	48	122	32	92	9,180 i	500	105	295	1,048	5	155	821-1,002	0-165
Communications equipment	3342	360	11,107	7	21	122	369	11	360 i	792	1	86	12	47	209	6	0-32	1	41	614	110	2	181	186	2	23	0-99	0
Semiconductor and other electronic components	3344	530	40,801	8	4 i	101	191 i	227	303	770	0	105	0-9 e	6,722	418	26	38	2 e	17	2,730	202	97	35 i	179	1 e	48	489-1,002	0-165
Navigational, measuring, electromedical, and control instruments	3345	1,000	11,012	27	5	157	212	0-7	321	155	1 e	367	35	142	300	15	54	29	30	922	133 i	0-8	60	297	1 e	70	1 e	0-165
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	180	2,606	* e	0-4	59	17	0	43	13	0	61	1	2	134	* e	5	* e	21	11	97 i	* e	5	55	0	13	0	0-20 i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	130	3,561	10	2	76	0-196 i	1	100	39	0	67	23	65	52	13	0-50	0	1	312-912	1 e	*	29	84	0	3	1 e	0
Other measuring and controlling device	other 3345	700	4,844	17	0-4 e	21	0-196	0-6	178	103	1 e	238 i	11	75	114	2 e	0-50	29	8	0-598	36	0-8	25	158	1 e	53	* e	0-165
Other computer and electronic products	other 334	210	25,585	1	14	27	24	0-6	493 i	223	* e	46 i	0-9	181	105	*	0-32	* i	4	4,913 i	55	0-8	20	386	1	15	0-232	0-165
Electrical equipment, appliances, and components	335	640	4,492	1 e	2 e	10	197	1	84	189	* e	154	14 i	75	366	13	37	50	29	147	2 i	2 e	24	54	1 e	128	0-41 i	0-41
Transportation equipment	336	900	30,232	29	9	9	110	5	278	222 i	2	931	24	338	233	6	117	5	136	1,159	212	7	410	1,849	11	271	0-25 e	6-34
Motor vehicles, bodies, trailers, and parts	3361-63	470	19,522	5	1	4	16	*	124	185 i	*	454	8	300	70	* e	93	1	103	140	40	*	12	115	1 e	82	* e	4
Aerospace products and parts	3364	310	9,111	23	9	5	90	5	149	16	1	447	13	37	119	5	6	*	20	997	169	6	139	1,730	10	17	0-25 e	0-25

TABLE 29-B

## Companies with domestic R&amp;D paid for and performed by the company, by industry, company size, and state (N-Z): 2020

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Undistributed <sup>b</sup>																					
Aircraft, aircraft engine, and aircraft parts	336411-13	280	8,281	23	9	5	89	2	145	16	1	441	13	34	118	5	5	*	16	934	169	6	128	1,724	10	17	0-25	e	0-25																				
Guided missile, space vehicle, and related parts	336414-15, 336419	40	831	0	*	0	*	2	4	1	i	0	6	1	3	1	0	1	0	5	63	0	0	11	7	0	*	0	0																				
Military armored vehicle, tank, and tank component	336992	10	4	0	0	0	0	0	0	*	i	0	1	i	0	0	*	e	0	0	0	0	0	0	0	0	0	0	1																				
Other transportation	other 336	130	1,594	1	0	* e	5	0	5	20	*	29	2	i	1 e	45	i	* e	18	3	12	22	3	* e	259	3 e	* e	173	0	3																			
Furniture and related products	337	240	492	* e	* e	1 e	3	* e	5 e	39	* e	11	1 e	5	22	* e	* e	* e	11	16	13	3	14	4 e	1	14	* e	14																					
Miscellaneous	339	1,420	18,576	7	239	85	338	i	3 e	303 - 451	276	1 e	337	6 - 64	301	594	340	i	9 e	3 e	170	328	282	11	49	387	2 e	367	i	0 - 147	48 - 197																		
Medical equipment and supplies	3391	830	15,944	4	5 e	46	297	i	1 e	259	243	1 e	302	7	85	548	27	5 e	1 e	159	283	264	7	36	255	1 e	332	i	0	49																			
Other miscellaneous manufacturing	3399	600	2,632	4	235	39	41	1 e	44 - 191	i	33	* e	35	0 - 58	e	215	47	313	i	5 e	2 e	11	45	18	4	12	132	i	1 e	34	0 - 147	0 - 147																	
Nonmanufacturing industries	21-23, 42-81	13,310	201,566	535	334	i	392	3,843	575	12,113	3,608	167	1,453	333	1,547	3,021	63	346	52	579	7,775	1,534	124	3,707	35,515	33	2,020	25	282																				
Mining, quarrying, oil and gas extraction, and support activities	21	280	1,121	* e	1 e	* e	* e	10	* e	2	7	i	1 e	57	i	* e	14	i	* e	* e	* i	2	i	749	10	i	* e	* e	1	i	1 e	9	i	2	i	3													
Utilities	22	50	224	5	0	0	3	0	9	*	7	16	*	*	5	0	0	7	0	5	1	0	0	16	4	*	7	1	i																				
Wholesale trade	42	1,100	1,001	7	2 e	3 e	31	1 e	56	71	i	4	i	35	3 e	16	18	e	1 e	13	3	10 e	58	11	i	* e	0-71	e	20	i	1 e	50	i	* e	0-71														
Electronic shopping and electronic auctions	454111-12	90	3,837 - 19,343	i	* e	0 - 158	i	7	i	0 - 275	i	1	i	0 - 710	i	15	i	1	i	132	i	1	i	323	i	0 - 148	i	1	i	14	i	* i	6	i	0 - 801	i	23	i	* e	1,040	i	11,076	i	0 - 8	i	0 - 128	i	* e	2
Transportation and warehousing	48-49	50	4,954	i	7	1 e	* e	3 e	* e	0 - 710	i	8	* e	24	1 e	12	265	i	* e	1 e	* e	45	25	6	* e	1,040	e	0 - 1,276	i	* e	6	* e	0 - 96																
Information	51	3,740	128,350	419	90	e	235	2,136	100	7,781	2,014	112	584	210	951	1,590	32	220	19	384	2,971	1,121	73	1,169	23,215	8	1,144	11	e	82																			
Publishing	511	1,630	34,516	28	39	143	268	22	737	1,133	97	317	34	407	357	12	e	27	8	35	773	244	41	288	15,915	4	808	3	0-83																				
Newspaper, periodical, book, and directory publishers	5111	30	60	* e	* e	1	*	* e	1	1	* e	1	* e	2	1	*	*	* e	*	1	* e	* e	14	*	*	*	* e	0-12																					
Software publishers	5112	1,610	34,456	28	39	143	267	22	736	1,132	97	316	34	405	356	12	e	27	8	34	771	244	41	274	15,914	3	808	3	0-83																				
Telecommunications	517	130	3,371	1 e	3	6	1,203	0 - 79	382	59	1 e	7	3 e	8	6	0 - 3	5	1 e	8	58	4	*	47	339	0 - 3	e	17	1 e	0-83																				
Data processing, hosting, and related services	518	1,640	41,105	315	43 e	83	425	0 - 49	e	2,198	662	12 e	210 e	131	378	609	19	159	8 e	309	1,757	621	31	682	1,766	3 e	288	7 e	0-49																				





TABLE 29-B

**Companies with domestic R&D paid for and performed by the company, by industry, company size, and state (N-Z): 2020**

(Millions of U.S. dollars and number of companies)

Industry and company size	NAICS code	Companies, U.S. total <sup>a</sup> (number)	United States	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Undistributed <sup>b</sup>	
Other professional, scientific, and technical services	other 54	1,060	5,570	7	40 i	9	720 i	3	427	60	4	61	3 e	13	108	3 i	14	1 i	26	291	73	2	136	98	1 e	23	* e	36	
Health care services	621-23	560	1,374	7	* e	2	30	* e	13	3 e	* e	7	1 e	9	25	* e	4	* e	17	25	7	*	0-50	8	* e	26	* e	0-50	
Other nonmanufacturing	23, 44-45 (excluding 454111- 12), 55-56, 624, 71- 72, 81	1,150	1,429 - 16,934	12	0- 158	3 e	0- 275	4 e	0-710 e	120	1 e	0- 132	16	0- 323	0-148	2 e	6 e	1 e	18	0-801	27	1 e	0- 1,040	0- 11,076	0- 8 e	0- 128	1 e	0-96	
All companies (number of domestic employees)	-	28,720	466,162	769	707	1,093	18,054	857	21,062	9,242	331	7,511	945	10,190	13,544	581 i	1,337	209	1,568	22,834	2,981	295	5,072	40,576	203	5,506	1,035	707	
Small companies																													
10-19 <sup>c</sup>	-	4,610	4,019	8 e	15 e	33	172	8 e	168	85	5 e	98 e	16 e	40 e	116 e	15	17 e	6	23 e	292 i	57 e	5 e	101 e	173	4 e	50 e	0-46 e	0-46	
20-49	-	9,000	10,970	27 e	35 e	39 e	379	30	466	223	14 e	293 e	45 e	121	428	52	59 e	12 e	86 e	471 e	156	10 e	247 e	348	11 e	147 e	0-56 e	0-94	
Medium companies																													
50-99	-	5,290	11,177	30 e	31 e	50	265	74	364	213	9 e	310	45 e	134	493	16 e	88	12 e	71 e	541	103	23	176 e	285	13 e	196	4 e	96	
100-249	-	4,730	22,132	59	66	149	614	55	710	400	16	377	70	236	770	27	90	18	96 e	1,068	331	35 i	264	704	12 e	346	6 e	178	
Large companies																													
250-499	-	2,040	18,067	64	70	118	538	13 e	942	390	7 e	447	45 e	226	612	15	95	18	117	768	170	28	382 e	915	5 e	222	6 e	82	
500-999	-	1,230	18,458	78	28	71	639	6	456	636	11	416	42	72	225	23	40	6	91	1,223	234	8	213	320	4	318	6	76- 147	
1,000-4,999	-	1,270	75,917	164	202	383	1,277	24	3,560	2,074	110	1,228	282	927	1,719	205 i	261	118	194	2,920	758	22	736	3,613	20	962	11	139	
5,000-9,999	-	250	42,451	51	44 i	28	1,340	2	3,467	1,305	24	835	107	530	1,070	157 i	304	0- 19	99	817	175	99	823	316	98	1,061	0-32	0-32	
10,000-24,999	-	210	72,827	41	47	93 i	5,871	13	2,664	1,415	1	2,152	190	672	2,682	i 30	150	5	543	4,616	466	12	237	1,218	23	1,658	0-31	0-31	
25,000 or more	-	130	190,145	247	169 i	130	6,958	631	8,265	2,501	135	1,355	103	7,232	5,430	42	233	0- 19	249	10,118	531	53	1,894 i	32,684	13	549	949- 1005	*	

\* = amount &lt; \$500,000; e = more than 50% of value is modeled—see "Technical Notes;" i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2019, these company count estimates reflect a change in rounding methodology.<sup>b</sup> 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.<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. For a given estimate in this table, if the conditions are satisfied for both the "i" and "e" flags, the e flag is assigned because the imputation rate may be found in the corresponding table of imputation rates. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 30

## Domestic R&amp;D paid for and performed by the company, by industry, company size, and domestic R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
All industries	21–23, 31–33, 42–81	466,162	5,191	29,001	35,739	26,561	369,670
Manufacturing industries	31–33	264,596	2,965	13,685	21,592	15,150	211,204
Food	311	4,985	192 - 202	673	535	752 - 765	2,822
Beverage and tobacco products	312	1,056	36	81	32	240 - 276	629 - 666
Textile, apparel, and leather products	313–16	812	38	127	235	224	188
Wood products	321	183	26	66	91	0	0
Paper	322	927	13	101	139	141	532
Printing and related support activities	323	282	45	90	146	0	0
Petroleum and coal products	324	1,222	0 - 162	91	204 - 241	0	729 - 927
Chemicals	325	89,403	387	2,786	7,641	5,417	73,173
Basic chemicals	3251	2,523	51	317	1,000	448	706
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,161	32	220	137	0	771
Pesticide, fertilizer, and other agricultural chemicals	3253	775	24 - 33	63	73	0	606 - 615
Pharmaceuticals and medicines	3254	80,858	77	1,782	6,001	4,834	68,164
Soap, cleaning compound, and toilet preparation	3256	2,476	100	165	145	56	2,010
Paint, coating, adhesive, and other chemicals	3255, 3259	1,610	91 - 100	239	284	78	909 - 918
Plastics and rubber products	326	2,607	217	715	974	469	232
Nonmetallic mineral products	327	1,619	53	130 - 166	210	50 - 212	980 - 1,178
Primary metals	331	795	48	167	374	0	206
Fabricated metal products	332	3,336	509	1,409	801	485	132
Machinery	333	15,071	354	1,992	2,092	1,105	9,528
Agricultural implement	33311	1,760	33	46 - 99	117	121 - 165	1,348 - 1,401
Semiconductor machinery	333242	4,121	8	47	177	142	3,747
Engine, turbine, and power transmission equipment	3336	1,523	16	47	208	113	1,138
Other machinery	other 333	7,667	297	1,799 - 1,854	1,590	683 - 728	3,241 - 3,297
Computer and electronic products	334	88,505	396	2,037	2,961	2,217	80,893
Communications equipment	3342	11,107	37 - 66	369	254 - 368	524 - 638	9,810
Semiconductor and other electronic components	3344	40,801	93	543	991	684	38,489
Navigational, measuring, electromedical, and control instruments	3345	11,012	190 - 218	938	1,261	575 - 687	7,908 - 8,019
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,606	23	236	579	253	1,515

TABLE 30

## Domestic R&amp;D paid for and performed by the company, by industry, company size, and domestic R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,561	0 - 23	97	172	50 - 73	3,221
Other measuring and controlling device	other 3345	4,844	144 - 196	605	510	248 - 384	3,171 - 3,284
Other computer and electronic products	other 334	25,585	46	187	342 - 454	322	24,576 - 24,688
Electrical equipment, appliances, and components	335	4,492	133	560	979	969	1,851
Transportation equipment	336	30,232	131	1,043	1,600	1,553	25,906
Motor vehicles, bodies, trailers, and parts	3361–63	19,522	77	527	894	871	17,154
Aerospace products and parts	3364	9,111	34	294 - 319	570	400	7,786 - 7,813
Aircraft, aircraft engine, and aircraft parts	336411–13	8,281	31	283	467	257	7,243
Guided missile, space vehicle, and related parts	336414–15, 336419	831	3	11 - 36	103	144	544 - 570
Military armored vehicle, tank, and tank component	336992	4	3	2	0	0	0
Other transportation	other 336	1,594	17	194 - 219	135	282	940 - 967
Furniture and related products	337	492	42	224	227	0	0
Miscellaneous	339	18,576	182 - 348	1,351 - 1,386	2,309 - 2,353	1,360 - 1,531	13,167
Medical equipment and supplies	3391	15,944	183	841	1,745	1,139	12,036
Other miscellaneous manufacturing	3399	2,632	0 - 165	509 - 545	563 - 609	221 - 393	1,131 i
Nonmanufacturing industries	21–23, 42–81	201,566	2,225	15,316	14,147	11,412	158,467
Mining, quarrying, oil and gas extraction, and support activities	21	1,121	47 - 58	247 i	9 - 559	189 i	69 - 629
Utilities	22	224	5	43 - 57	125	36 - 50	0
Wholesale trade	42	1,001	294	669 i	38 i	0	0
Electronic shopping and electronic auctions	454111–12	3,837 - 19,343 i	0 - 145	64	0 - 950	50 - 664	2,053 - 19,229 i
Transportation and warehousing	48–49	4,954 i	0 - 47	141	101	50 - 97	4,616 i
Information	51	128,350	567 - 578	5,755	6,619	7,897 - 7,910	107,500
Publishing	511	34,516	352	1,939	1,460	850	29,914
Newspaper, periodical, book, and directory publishers	5111	60	4	8	48	0	0
Software publishers	5112	34,456	349	1,931	1,412	850	29,914
Telecommunications	517	3,371	8	227	444	65 i	2,626
Data processing, hosting, and related services	518	41,105	169	3,190	4,110	6,554	27,081
Other information	other 51	49,358	36 - 49	399	605	427 - 441	47,878

TABLE 30

## Domestic R&amp;D paid for and performed by the company, by industry, company size, and domestic R&amp;D program size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	R&D program size					
		All companies	Less than \$1 million	\$1 million–\$9.999 million	\$10 million–\$49.999 million	\$50 million–\$99.999 million	\$100 million or more
Finance and insurance	52	12,204	11	337 - 349	1,147	474	10,223 - 10,234
Real estate and rental and leasing	53	3,249	4 - 150	13	10 - 960	50 - 664	1,462 - 3,172
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	4	2	0	0	0
Other real estate and rental and leasing	other 53	3,242	0 - 145	11	10 - 960	50 - 664	1,462 - 3,172
Professional, scientific, and technical services	54	28,322	1,062	6,533	4,719	1,635	14,373
Architectural, engineering, and related services	5413	2,214	236	1,108	676	191	2
Computer systems design and related services	5415	14,293	536	2,712	1,568	761	8,716
Scientific research and development services	5417	6,246	143	1,897	1,585	360	2,262 i
Research and development in nanotechnology	541713	126 i	20	106 i	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	1,176	29	462	468	174	44
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,906 i	55 - 96 i	1,299 - 1,330	1,078 - 1,118	186	2,218 i
Research and development in the social sciences and humanities	541720	38	0 - 38 i	0 - 29	0 - 38	0	0
Other professional, scientific, and technical services	other 54	5,570	148	815	890	323	3,394
Health care services	621–23	1,374	81	216	432	359	285
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,429 - 16,934	0 - 145	1,269 - 1,298	0 - 950	50 - 664 i	100 - 15,615
All companies (number of domestic employees)	–	466,162	5,191	29,001	35,739	26,561	369,670
Small companies							
10–19 <sup>a</sup>	–	4,019	1,009	2,531	323	0	155
20–49	–	10,970	2,019	6,105	2,607	239	0
Medium companies							
50–99	–	11,177	993	5,257	4,211	716	0
100–249	–	22,132	691	7,362	7,116	3,392	3,571
Large companies							
250–499	–	18,067	257	3,319	4,818	5,162	4,511
500–999	–	18,458	129	2,037	5,117	4,126	7,050
1,000–4,999	–	75,917	81	1,905	8,042	8,120	57,769
5,000–9,999	–	42,451	7	194	1,925	2,109	38,217
10,000–24,999	–	72,827	4	210	1,064	2,249	69,300
25,000 or more	–	190,145	1	82	516	449	189,097

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

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. R&D program size classifications are based on R&D performance. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 31

**Domestic R&D paid for and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
All industries	21–23, 31–33, 42–81	466,162	4.1	4.3
Manufacturing industries	31–33	264,596	4.6	4.7
Food	311	4,985	0.8	0.8
Beverage and tobacco products	312	1,056	0.7	0.7
Textile, apparel, and leather products	313–16	812	1.3	1.3
Wood products	321	183	0.4	0.4
Paper	322	927	1.1	1.1
Printing and related support activities	323	282	0.9	0.9
Petroleum and coal products	324	1,222	0.6	0.6
Chemicals	325	89,403	8.0	8.1
Basic chemicals	3251	2,523	1.0	1.0
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,161	2.2	2.2
Pesticide, fertilizer, and other agricultural chemicals	3253	775	0.9	0.9
Pharmaceuticals and medicines	3254	80,858	14.7	14.9
Soap, cleaning compound, and toilet preparation	3256	2,476	2.2	2.2
Paint, coating, adhesive, and other chemicals	3255, 3259	1,610	2.5	2.5
Plastics and rubber products	326	2,607	1.4	1.4
Nonmetallic mineral products	327	1,619	2.7	3.4
Primary metals	331	795	1.1	1.2
Fabricated metal products	332	3,336	2.5	2.5
Machinery	333	15,071	4.2	4.3
Agricultural implement	33311	1,760	4.3	D
Semiconductor machinery	333242	4,121	15.4	15.4
Engine, turbine, and power transmission equipment	3336	1,523	3.5	D
Other machinery	other 333	7,667	3.1	3.2
Computer and electronic products	334	88,505	11.7	11.7
Communications equipment	3342	11,107	10.9	D
Semiconductor and other electronic components	3344	40,801	19.8	19.9
Navigational, measuring, electromedical, and control instruments	3345	11,012	5.9	5.9
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,606	12.4	12.4
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,561	4.1	4.1
Other measuring and controlling device	other 3345	4,844	6.2	6.2
Other computer and electronic products	other 334	25,585	9.8	D
Electrical equipment, appliances, and components	335	4,492	2.9	2.9
Transportation equipment	336	30,232	3.3	3.3
Motor vehicles, bodies, trailers, and parts	3361–63	19,522	3.4	D
Aerospace products and parts	3364	9,111	3.4	3.4
Aircraft, aircraft engine, and aircraft parts	336411–13	8,281	3.2	3.2
Guided missile, space vehicle, and related parts	336414–15, 336419	831	8.1	8.1
Military armored vehicle, tank, and tank component	336992	4	0.9	0.9
Other transportation	other 336	1,594	2.3	D
Furniture and related products	337	492	1.0	1.0
Miscellaneous	339	18,576	2.6	2.6
Medical equipment and supplies	3391	15,944	2.7	2.7
Other miscellaneous manufacturing	3399	2,632	2.2	2.3



TABLE 31

**Domestic R&D paid for and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
Nonmanufacturing industries	21–23, 42–81	201,566		3.6	3.9
Mining, quarrying, oil and gas extraction, and support activities	21	1,121		1.1	1.1
Utilities	22	224		0.1	0.1
Wholesale trade	42	1,001		0.4	0.4
Electronic shopping and electronic auctions	454111–12	3,837 - 19,343	i	D	D
Transportation and warehousing	48–49	4,954	i	2.3	2.3
Information	51	128,350		7.8	7.8
Publishing	511	34,516		13.6	13.7
Newspaper, periodical, book, and directory publishers	5111	60		3.8	4.5
Software publishers	5112	34,456		13.7	13.7
Telecommunications	517	3,371		0.7	D
Data processing, hosting, and related services	518	41,105		8.1	8.1
Other information	other 51	49,358		12.3	D
Finance and insurance	52	12,204		0.8	1.0
Real estate and rental and leasing	53	3,249		24.0	24.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7		0.4	0.4
Other real estate and rental and leasing	other 53	3,242		27.0	27.1
Professional, scientific, and technical services	54	28,322		6.8	6.9
Architectural, engineering, and related services	5413	2,214		3.1	3.2
Computer systems design and related services	5415	14,293		8.5	8.7
Scientific research and development services	5417	6,246		8.9	9.0
Research and development in nanotechnology	541713	126	i	32.8	32.8
Research and development in biotechnology (except nanobiotechnology)	541714	1,176		5.8	5.9
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,906	i	10.1	10.2
Research and development in the social sciences and humanities	541720	38		3.8	3.8
Other professional, scientific, and technical services	other 54	5,570		5.1	5.2
Health care services	621–23	1,374		1.0	1.0
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,429 - 16,934		D	D
All companies (number of domestic employees)	–	466,162		4.1	4.3
Small companies					
10–19 <sup>c</sup>	–	4,019		17.0	17.7
20–49	–	10,970		10.8	11.3
Medium companies					
50–99	–	11,177		8.7	8.9
100–249	–	22,132		5.4	5.5
Large companies					
250–499	–	18,067		6.0	6.3
500–999	–	18,458		4.5	4.5
1,000–4,999	–	75,917		5.0	5.1
5,000–9,999	–	42,451		3.6	3.7
10,000–24,999	–	72,827		3.5	3.5
25,000 or more	–	190,145		3.7	3.9

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 = 2017 North American Industry Classification System.

<sup>a</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed R&D. The calculation of percentages in this column excludes R&D and sales of companies that fund R&D but do not perform R&D.

<sup>c</sup> 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 is 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. Unless indicated otherwise, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 32

**Domestic R&D paid for by the company and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
All industries	21–23, 31–33, 42–81	504,793	4.5	4.6
Manufacturing industries	31–33	299,199	5.3	5.3
Food	311	5,241	0.9	0.9
Beverage and tobacco products	312	1,225	0.8	0.8
Textile, apparel, and leather products	313–16	823	1.3	1.3
Wood products	321	193	0.4	0.4
Paper	322	934	1.1	D
Printing and related support activities	323	286	0.9	0.9
Petroleum and coal products	324	1,416	0.6	0.6
Chemicals	325	114,951	10.3	10.3
Basic chemicals	3251	2,588	1.1	1.1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,188	i 2.3	2.3
Pesticide, fertilizer, and other agricultural chemicals	3253	842 - 860	D	D
Pharmaceuticals and medicines	3254	105,944	19.2	19.5
Soap, cleaning compound, and toilet preparation	3256	2,729	2.4	2.4
Paint, coating, adhesive, and other chemicals	3255, 3259	1,644 - 1,659	D	D
Plastics and rubber products	326	2,628	1.4	1.4
Nonmetallic mineral products	327	1,711	2.9	D
Primary metals	331	815	1.2	1.2
Fabricated metal products	332	3,422	2.5	2.5
Machinery	333	15,451	4.3	4.4
Agricultural implement	33311	1,936	4.7	D
Semiconductor machinery	333242	4,127	15.4	15.4
Engine, turbine, and power transmission equipment	3336	1,535	3.5	D
Other machinery	other 333	7,852	3.2	3.2
Computer and electronic products	334	91,680	12.1	12.1
Communications equipment	3342	12,142	11.9	D
Semiconductor and other electronic components	3344	41,022	19.9	20.0
Navigational, measuring, electromedical, and control instruments	3345	11,301	6.1	6.1
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,708	12.9	12.9
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,591 - 3,751	D	D
Other measuring and controlling device	other 3345	4,843 - 5,002	D	D
Other computer and electronic products	other 334	27,215	10.4	D
Electrical equipment, appliances, and components	335	4,589	3.0	3.0
Transportation equipment	336	33,805	3.7	3.7
Motor vehicles, bodies, trailers, and parts	3361–63	22,634	3.9	D
Aerospace products and parts	3364	9,499	3.5	3.5
Aircraft, aircraft engine, and aircraft parts	336411–13	8,540	3.3	3.3
Guided missile, space vehicle, and related parts	336414–15, 336419	959	9.4	9.4
Military armored vehicle, tank, and tank component	336992	4	0.9	0.9
Other transportation	other 336	1,667	2.4	D
Furniture and related products	337	513	1.1	1.1
Miscellaneous	339	19,517	2.8	D

TABLE 32

**Domestic R&D paid for by the company and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
Medical equipment and supplies	3391	16,815		2.9	2.9
Other miscellaneous manufacturing	3399	2,702		2.3	D
Nonmanufacturing industries	21–23, 42–81	205,595		3.7	4.0
Mining, quarrying, oil and gas extraction, and support activities	21	1,199		1.2	1.2
Utilities	22	414		0.1	0.2
Wholesale trade	42	1,155		0.4	0.4
Electronic shopping and electronic auctions	454111–12	3,837 - 19,445	i	D	D
Transportation and warehousing	48–49	5,156	i	2.4	2.4
Information	51	130,486		7.9	7.9
Publishing	511	35,762		14.1	14.2
Newspaper, periodical, book, and directory publishers	5111	64		4.1	4.6
Software publishers	5112	35,698		14.2	14.2
Telecommunications	517	3,825		0.8	D
Data processing, hosting, and related services	518	41,390		8.1	8.1
Other information	other 51	49,510		12.4	D
Finance and insurance	52	12,494		0.9	1.0
Real estate and rental and leasing	53	3,249		24.0	24.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7		0.4	0.4
Other real estate and rental and leasing	other 53	3,242		27.0	27.1
Professional, scientific, and technical services	54	29,166		7.0	7.1
Architectural, engineering, and related services	5413	2,278		3.2	3.3
Computer systems design and related services	5415	14,531		8.7	8.8
Scientific research and development services	5417	6,739		9.6	9.6
Research and development in nanotechnology	541713	125 - 129	i	D	D
Research and development in biotechnology (except nanobiotechnology)	541714	1,358		6.7	6.7
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,213 - 5,219	i	D	D
Research and development in the social sciences and humanities	541720	38		3.8	3.8
Other professional, scientific, and technical services	other 54	5,617		5.2	5.2
Health care services	621–23	1,405 - 1,408		D	D
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,429 - 17,036		D	D
All companies (number of domestic employees)	–	504,793		4.5	4.6
Small companies					
10–19 <sup>c</sup>	–	4,579		19.4	20.1
20–49	–	12,703		12.5	12.9
Medium companies					
50–99	–	12,667		9.9	10.0
100–249	–	25,069		6.2	6.2
Large companies					
250–499	–	19,693		6.6	6.9
500–999	–	20,622		5.0	5.0

TABLE 32

**Domestic R&D paid for by the company and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
1,000–4,999	–	80,110	5.3	5.3
5,000–9,999	–	48,050	4.1	4.2
10,000–24,999	–	81,357	3.9	4.0
25,000 or more	–	199,943	3.9	4.2

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 = 2017 North American Industry Classification System.

<sup>a</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed R&D. The calculation of percentages in this column excludes R&D and sales of companies that fund R&D but do not perform R&D.

<sup>c</sup> 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 is 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. Unless indicated otherwise, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 33

## Domestic R&amp;D paid for by others and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
All industries	21-23, 31-33, 42-81	71,457	41,958	795	2,745	373	7,642	1,110	2,414	309	4,386	i 9,724
Manufacturing industries	31-33	43,848	26,620	497	1,751	224	5,325	574	1,426	288	914	6,231
Food	311	254	153	1	10	6	15	15	13	*	4	36
Beverage and tobacco products	312	121	64	*	9	0	12	4	7	0	8	16
Textile, apparel, and leather products	313-16	9	5	* i	* i	* i	1	* i	1	0	* i	2
Wood products	321	3	2	0	0	*	*	*	*	0	*	1
Paper	322	1	*	* i	* i	* i	* i	* i	0	* i	* i	* i
Printing and related support activities	323	1	1	* i	* i	* i	* i	* i	* i	* i	* i	* i
Petroleum and coal products	324	89 - 103	22 - 97	0	*	0	0 - 25	0	0 - 21	0	0	0 - 37
Chemicals	325	11,675	6,586	417	1,094	67	737	163	746	40	224	i 1,600
Basic chemicals	3251	171	125	*	0 - 15	2	14	*	11	3	4	0 - 15
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	73	62	* i	1	* i	1	* i	9	* i	* i	1 i
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291	113 - 150	0	78 - 98	0	0 - 20	8	18	0	0	0 - 44
Pharmaceuticals and medicines	3254	10,918	6,136	417	993	61	697	147	694	37	215	i 1,522
Soap, cleaning compound, and toilet preparation	3256	189	115	* i	4	* i	7	8	14	1	5	35
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 39	0 - 33	0	*	5	0 - 20	*	1	0	1	0 - 33
Plastics and rubber products	326	26	11	0	0	5	5	0	1	0	*	4 i
Nonmetallic mineral products	327	98	66	0	1	*	1	*	8	0	2	i 21
Primary metals	331	20	9	* i	1	* i	5	*	*	* i	1	4
Fabricated metal products	332	60	35	0	0	2	21	0	1	0	*	1 i
Machinery	333	1,152	848	1	20	2	156	3	63	1	10	48
Agricultural implement	33311	10 - 52	0 - 45	0	1	0	4	0 - 3	0 - 13	*	3	0 - 33
Semiconductor machinery	333242	686	579	0	5	*	45	1	50	*	2	4
Engine, turbine, and power transmission equipment	3336	122	74	1	0	*	32	*	2	0	*	13
Other machinery	other 333	292 - 334	149 - 197	0	15	2	76	0 - 3	0 - 13	i *	6	0 - 33
Computer and electronic products	334	11,030	7,806	i 73	i 265	81	1,207	116	305	89	232	856
Communications equipment	3342	996	i 753	i 18	i 61	i 3	i 38	i 15	i 12	i 1	19 - 68	i 23 - 72
Semiconductor and other electronic components	3344	2,380	1,597	40	i 61	18	76	69	130	87	87	216

TABLE 33

## Domestic R&amp;D paid for by others and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Navigational, measuring, electromedical, and control instruments	3345	7,493	5,366	15	139	59	1,079	30	157	1	79	570
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	251	150	0	20	1	20	4	6	1	7	42
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,025	5,083	0 - 15	114	57	1,045	24	145	0	46	492 - 513
Other measuring and controlling device	other 3345	217	132	0 - 15	5	1	14	2	5	0	26	14 - 35
Other computer and electronic products	other 334	161	90	1	4	1	14	3	6	*	0 - 46	0 - 46
Electrical equipment, appliances, and components	335	506	321	1	48	7	52	2	20	6	13	36
Transportation equipment	336	18,564	10,536	3	287	52	3,064	269	241	152	410	3,550
Motor vehicles, bodies, trailers, and parts	3361-63	3,599	1,884	3	163	25	439	203	130	132	105 - 198	418 - 517
Aerospace products and parts	3364	13,803	7,953	0	102	17	2,428	31	87	0	213	2,972
Aircraft, aircraft engine, and aircraft parts	336411-13	13,011	7,419	0	77	17	2,260	31	87	0	213	2,907
Guided missile, space vehicle, and related parts	336414-15, 336419	793	534	0	25	0	168	*	0	0	0	65
Military armored vehicle, tank, and tank component	336992	6	2	0	1	0	2	*	0	0	0 - 2	0 - 3
Other transportation	other 336	1,155	698	*	20	10	195	34	23	20	0 - 90	62 - 158
Furniture and related products	337	3	2	0	0	0	*	*	*	0	0	1
Miscellaneous	339	215 - 233	84 - 145	0	17	1	29 - 54	1	5 - 26	*	9	24 - 61
Medical equipment and supplies	3391	173	85	0	16	1	30	1	5	0	9	25
Other miscellaneous manufacturing	3399	42 - 60	0 - 60	0	*	*	0 - 25	*	0 - 21	*	0	0 - 37
Nonmanufacturing industries	21-23, 42-81	27,608	15,338	298	995	150	2,317	536	988	21	3,473	3,494
Mining, quarrying, oil and gas extraction, and support activities	21	45	25	0	*	1	*	1	1	1	*	15
Utilities	22	40	9	1	3	*	4	*	0	0	6	18
Wholesale trade	42	58	33	0	4	*	6	*	3	0	3	8
Electronic shopping and electronic auctions	454111-12	2 - 50	0 - 47	0	0	*	0	3	0 - 7	0	0	0 - 25
Transportation and warehousing	48-49	3	2	0	0	0	0	0	1	0	0	*
Information	51	1,113	855	33	27	3	55	12	27	*	36	65
Publishing	511	509	381	2	11	1	50	3	19	0	5	38

TABLE 33

## Domestic R&amp;D paid for by others and performed by the company, by type of cost, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other	
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0	0	0	0	0	
Software publishers	5112	509	381	2	11	1	50	3	19	0	5	38	
Telecommunications	517	54 - 66	33	0	8	2	*	0 - 9	0 - 7	*	1	0 - 24	
Data processing, hosting, and related services	518	446	385	0 - 32	3	*	5	2	2	0	0 - 32	0 - 28	
Other information	other 51	91 - 105	55	0 - 32	4	*	*	0 - 9	0 - 7	0	0 - 32	0 - 28	
Finance and insurance	52	92	72	0	0	0	0	0	0	0	0	20	
Real estate and rental and leasing	53	*	0	0	0	0	0	0	0	0	0	* i	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	0	0	0	0	0	0	0	0	0	* i	
Other real estate and rental and leasing	other 53	0	0	0	0	0	0	0	0	0	0	0	
Professional, scientific, and technical services	54	26,045	14,212	264	960	146	2,236	515	950	i 19	3,412	i 3,331	
Architectural, engineering, and related services	5413	2,001	1,226	2	101	8	312	39	7	*	48	258	
Computer systems design and related services	5415	3,643	2,492	110	152	17	54	52	87	0	132	546	
Scientific research and development services	5417	19,354	9,815	146	527	114	1,828	418	852	i 19	3,205	i 2,429	
Research and development in nanotechnology	541713	53	i 29	i 0	* i	0	4	i 2	i *	i 0	* i	17	i
Research and development in biotechnology (except nanobiotechnology)	541714	5,014	2,430	36	107	3	362	63	113	*	1,052	i 847	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,632	i 6,856	94	i 401	i 111	1,424 - 1,450	i 333 - 354	i 729	i 19	2,098 - 2,124	i 1,541 - 1,567	i
Research and development in the social sciences and humanities	541720	654	499	16	20	0	13 - 37	0 - 19	10	0	30 - 54	0 - 24	
Other professional, scientific, and technical services	other 54	1,048	680	6	179	7	41	7	4	0	26	98	
Health care services	621-23	103	53	0	1	*	13	3	3	0	15	15	
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62 - 109	27 - 79	0	*	*	2	2	0 - 7	0	*	0 - 25	
All companies (number of domestic employees)	-	71,457	41,958	795	2,745	373	7,642	1,110	2,414	309	4,386	i 9,724	
Small companies													
10-19 <sup>a</sup>	-	1,029	650	4	i 31	11	i 91	27	13	2	40	i 159	
20-49	-	2,025	1,206	15	i 106	i 17	226	69	33	4	64	285	



TABLE 33

**Domestic R&D paid for by others and performed by the company, by type of cost, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Salaries, wages, and fringe benefits	Stock-based compensation	Temporary staffing	Expensed equipment	Materials and supplies	Lease and rental payments	Depreciation	Royalties and licensing fees	Other purchased services (except R&D)	Other
Medium companies												
50–99	–	1,816	1,080	34	58	9	226	43	35	4	57	272
100–249	–	3,280	1,984	80	153	31	341	58	69	5	79	478
Large companies												
250–499	–	2,811	1,700	21	221	22	271	83	72	13	119	288
500–999	–	2,807	1,696	62	96	20	233	57	101	6	139	397
1,000–4,999	–	12,322	7,115	216	i 993	63	1,016	282	636	81	632	i 1,289
5,000–9,999	–	5,945	3,154	79	212	66	618	100	i 377	39	i 554	i 745
10,000–24,999	–	15,739	i 9,181	255	558	i 69	i 1,083	i 270	i 718	i 134	2,184	i 1,288
25,000 or more	–	23,684	14,192	i 29	i 318	66	3,537	i 121	360	20	i 519	4,523

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 34

## Domestic R&amp;D paid for by others and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)													
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-599	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more			
All industries	21-23, 31-33, 42-81	71,457	1,029	2,025	1,816	3,280	2,811	2,807	12,322	5,945	15,739	i	23,684		
Manufacturing industries	31-33	43,848	140	454	661	1,136	1,155	1,654	9,605	2,262	7,368		19,414	i	
Food	311	254	0	15	5	62	7	10	79	75	2		0		
Beverage and tobacco products	312	121	0	0	0	0	102	0	0	19	0		*	i	
Textile, apparel, and leather products	313-16	9	*	0	6	3	0	0	0	0	0		0		
Wood products	321	3	0	0	*	0	0	3	0	0	0		0		
Paper	322	1	0	0	0	0	1	0	0	0	0		0		
Printing and related support activities	323	1	0	1	*	*	i	0	0	0	0		0		
Petroleum and coal products	324	89 - 103	*	0	*	0	0	83 - 100	0	1	3		*		
Chemicals	325	11,675	65	133	231	496	267	379	4,605	693	4,439		366		
Basic chemicals	3251	171	0	1	2	14	3	8	i	121	20		2	0	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	73	1	0 - 9	*	i	*	0	1	62 - 71	0		1	0	
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291	0	0	0	0	0	0	0	284 - 291	0		0	0	
Pharmaceuticals and medicines	3254	10,918	61	123	228	456	256	365	4,130	673	4,261		366		
Soap, cleaning compound, and toilet preparation	3256	189	0	2	0	21	0	5	0	0	160		0		
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 39	4	0 - 9	2	4	8	0	*	i	0		14	* i	
Plastics and rubber products	326	26	*	3	2	9	10	*	i	3	0		0	0	
Nonmetallic mineral products	327	98	0	0	*	i	5	0 - 11	0	0 - 11	84		0	0	
Primary metals	331	20	0	3	*	4	0	0	13	1	0		0	0	
Fabricated metal products	332	60	6	5	1	23	1	5	19	0	0		0	0	
Machinery	333	1,152	19	37	107	54	12	82	670	148	20	i	3		
Agricultural implement	33311	10 - 52	0	0	0	3	0	0	0	3 - 49	0		0 - 4		
Semiconductor machinery	333242	686	0	4	20	*	0	0	660	0	0		0	0	
Engine, turbine, and power transmission equipment	3336	122	0	1	2	1	5	15	0	99	0		0	0	
Other machinery	other 333	292 - 334	19	31	85	50	6	68	9	0 - 47	20	i	0 - 4		
Computer and electronic products	334	11,030	21	171	201	291	633	637	1,884	481	52		6,660	i	
Communications equipment	3342	996	i	0 - 22	9 - 92	*	0 - 42	123	0	460 - 619	i	0 - 323	i	0 - 323	i
Semiconductor and other electronic components	3344	2,380		0 - 22	13 - 94	38	114	i	440	466	1,214	18	i	0 - 53	0

TABLE 34

## Domestic R&amp;D paid for by others and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)													
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-599	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more			
Navigational, measuring, electromedical, and control instruments	3345	7,493	0-22	67	162	137	11-72	171	47	141-464	0-11	6,338-6,661	i		
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	251	0-11	12	80	45	12	i	94	*	0	0-11	0		
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,025	i	0	2-36	54	76	0-60	0	141-464	0	6,338-6,661	i		
Other measuring and controlling device	other 3345	217	0-22	18-52	i	27	16	0-33	77	47	0	0	0		
Other computer and electronic products	other 334	161	0	0	1	0-42	0-60	0	5-161	0	0-53	0	0		
Electrical equipment, appliances, and components	335	506	7	38	22	5	27	21	131	0	254	0	0		
Transportation equipment	336	18,564	17	23	78	169	63	393	2,138	716	2,590	12,378	i		
Motor vehicles, bodies, trailers, and parts	3361-63	3,599	0-16	0-8	0-25	50-102	31	299	1,310	423	i	1,389	i	0-100	
Aerospace products and parts	3364	13,803	i	1-18	16	54	68	28	80	i	781	278-294	1,201	11,277	i
Aircraft, aircraft engine, and aircraft parts	336411-13	13,011	i	0	9-17	49	67	28	69	i	51	250-263	1,201	11,277	i
Guided missile, space vehicle, and related parts	336414-15, 336419	793	1-18	0-7	5	*	0	11	730	20-44	0	0	0		
Military armored vehicle, tank, and tank component	336992	6	0-7	0	0-4	0	0-3	0-7	0	0	0	0	0		
Other transportation	other 336	1,155	0	0-8	0-25	0-51	0-5	6-16	48	0-16	0	1,000-1,102	0		
Furniture and related products	337	3	0	2	*	1	i	*	0	0	0	0	0		
Miscellaneous	339	215-233	4	24	8	14	23-38	21-45	49-67	45	9	6	6		
Medical equipment and supplies	3391	173	4	23	8	14	24	0	41	45	9	6	6		
Other miscellaneous manufacturing	3399	42-60	0	*	1	*	0-14	21-45	7-27	0	0	0	0		
Nonmanufacturing industries	21-23, 42-81	27,608	888	1,570	1,156	2,144	1,655	1,152	2,717	3,684	i	8,371	i	4,270	
Mining, quarrying, oil and gas extraction, and support activities	21	45	0-7	4	i	0-42	i	0	0	0	*	0-41	0		
Utilities	22	40	0	4	0	0	0	0	*	*	0	35	35		
Wholesale trade	42	58	8	19	1	i	27	i	3	0	*	0	0		
Electronic shopping and electronic auctions	454111-12	2-50	0	0	2-50	0	0	0	0	0	0	0	0		
Transportation and warehousing	48-49	3	0	1	0	0	0	3	0	0	0	0	0		
Information	51	1,113	6-31	150	27	115	63	95	70	117	217-249	224	224		

TABLE 34

## Domestic R&amp;D paid for by others and performed by the company, by industry and company size: 2020

(Millions of U.S. dollars)

Industry	NAICS code	Company size (domestic employees)										
		All companies	10-19 <sup>a</sup>	20-49	50-99	100-249	250-499	500-599	1,000-4,999	5,000-9,999	10,000-24,999	25,000 or more
Publishing	511	509	7	57	25	12	25	52	0	108	0	224
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0	0	0	0	0
Software publishers	5112	509	7	57	25	12	25	52	0	108	0	224
Telecommunications	517	54 - 66	0 - 25	0 - 48	1	0 - 65	0	0	0	0	0	0
Data processing, hosting, and related services	518	446	0 - 25	47	2	0 - 32	38	43	70	0	217 - 249	0
Other information	other 51	91 - 105	0	0 - 48	0	34 - 97	0	0	0	9	0	0
Finance and insurance	52	92	0	0	0	0	5	0	0	45	0	41
Real estate and rental and leasing	53	*	0	0	0	*	0	0	0	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	0	0	0	*	0	0	0	0	0	0
Other real estate and rental and leasing	other 53	0	0	0	0	0	0	0	0	0	0	0
Professional, scientific, and technical services	54	26,045	844	1,378	1,044	1,964	1,569	1,046	2,621	3,497	i 8,114	i 3,969
Architectural, engineering, and related services	5413	2,001	104	187	177	258	443	42	19	i 139	45	587
Computer systems design and related services	5415	3,643	152	122	172	335	88	57	706	0	1,676	335
Scientific research and development services	5417	19,354	540	1,000	640	1,194	800	819	1,896	3,358	i 6,393	i 2,713
Research and development in nanotechnology	541713	53	i 19	i 35	i 0	0	0	0	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	5,014	77	202	149	121	77	59	0	0	1,615	2,713
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,632	i 440	760	489	424 - 1,074	723	760	1,247 - 1,897	i 3,358	i 4,778	i 0
Research and development in the social sciences and humanities	541720	654	4	2	1	0 - 649	0	0	0 - 649	0	0	0
Other professional, scientific, and technical services	other 54	1,048	48	70	55	177	238	128	0	0	0	334
Health care services	621-23	103	7	11	33	14	0 - 18	9	*	i 12	i 0 - 18	1
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62 - 109	0 - 25	3	0 - 47	24	0 - 18	0	25	12	0	0

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 35

**Domestic R&D paid for by others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
All industries	21-23, 31-33, 42-81	71,457	6,688	15,468	49,301
Manufacturing industries	31-33	43,848	4,576 i	8,075 i	31,197
Food	311	254	27	62	166
Beverage and tobacco products	312	121	41	6	74
Textile, apparel, and leather products	313-16	9	*	*	9
Wood products	321	3	*	0	3
Paper	322	1	*	0	*
Printing and related support activities	323	1	* i	1 i	1 i
Petroleum and coal products	324	89 - 103	13 - 32	0 - 35	31 - 77
Chemicals	325	11,675	2,265	2,540	6,870
Basic chemicals	3251	171	15	50	106
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	73	13 i	15 i	45 i
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291	50 - 62 i	224 - 237 i	0
Pharmaceuticals and medicines	3254	10,918	2,134	2,200	6,584
Soap, cleaning compound, and toilet preparation	3256	189	43	25	121
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 39	0 - 9	15 - 24	15
Plastics and rubber products	326	26	*	2	24
Nonmetallic mineral products	327	98	4	19	76
Primary metals	331	20	1	2	17
Fabricated metal products	332	60	1	8	51
Machinery	333	1,152	32	91	1,028
Agricultural implement	33311	10 - 52	*	0 - 29	1 - 52
Semiconductor machinery	333242	686	1	59	626
Engine, turbine, and power transmission equipment	3336	122	4	5	113
Other machinery	other 333	292 - 334	27	0 - 29	236 - 289
Computer and electronic products	334	11,030	768	1,946 i	8,315
Communications equipment	3342	996 i	42 - 96 i	302 - 356 i	597 i
Semiconductor and other electronic components	3344	2,380	410	493	1,478
Navigational, measuring, electromedical, and control instruments	3345	7,493	264 i	1,099 i	6,130
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	251	6	69	176
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,025 i	173 i	986 i	5,865
Other measuring and controlling device	other 3345	217	84	43	89
Other computer and electronic products	other 334	161	0 - 52	0 - 52	110
Electrical equipment, appliances, and components	335	506	17	26	462
Transportation equipment	336	18,564	1,389 i	3,315 i	13,860
Motor vehicles, bodies, trailers, and parts	3361-63	3,599	194 i	1,599 i	1,806 i
Aerospace products and parts	3364	13,803 i	1,182 i	1,569 i	11,052
Aircraft, aircraft engine, and aircraft parts	336411-13	13,011 i	1,176 i	1,568 i	10,266
Guided missile, space vehicle, and related parts	336414-15, 336419	793	6	1	786
Military armored vehicle, tank, and tank component	336992	6	0	*	6
Other transportation	other 336	1,155	13	147	996
Furniture and related products	337	3	*	*	3
Miscellaneous	339	215 - 233	3 - 11	28 - 60	169 - 201
Medical equipment and supplies	3391	173	4	27	142

TABLE 35

**Domestic R&D paid for by others and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
Other miscellaneous manufacturing	3399	42 - 60	0 - 6	1 - 32	27 - 58
Nonmanufacturing industries	21-23, 42-81	27,608	2,112	7,393	18,103 i
Mining, quarrying, oil and gas extraction, and support activities	21	45	0 - 6 i	17 - 25 i	21 i
Utilities	22	40	5	6	30
Wholesale trade	42	58	8	5	44
Electronic shopping and electronic auctions	454111-12	2 - 50	0	2 - 50	0
Transportation and warehousing	48-49	3	1	*	2
Information	51	1,113	179	164	770
Publishing	511	509	35	82	393
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0
Software publishers	5112	509	35	82	393
Telecommunications	517	54 - 66	0 - 64	0 - 51	1 - 40
Data processing, hosting, and related services	518	446	74	33	339
Other information	other 51	91 - 105	5 - 72	0 - 51	0 - 38
Finance and insurance	52	92	23	5	64
Real estate and rental and leasing	53	*	0	0	*
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	0	0	*
Other real estate and rental and leasing	other 53	0	0	0	0
Professional, scientific, and technical services	54	26,045	1,876	7,117	17,052 i
Architectural, engineering, and related services	5413	2,001	81	593	1,326
Computer systems design and related services	5415	3,643	423	1,020	2,200
Scientific research and development services	5417	19,354	1,342	5,380	12,632 i
Research and development in nanotechnology	541713	53 i	5 i	15 i	33 i
Research and development in biotechnology (except nanobiotechnology)	541714	5,014	693	104	4,217
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,632 i	256 - 278	5,055 - 5,077	8,300 i
Research and development in the social sciences and humanities	541720	654	366 - 387	184 - 205 i	82 i
Other professional, scientific, and technical services	other 54	1,048	30	125	894
Health care services	621-23	103	17	24	62
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62 - 109	0 - 6	0 - 50	59
All companies (number of domestic employees)	-	71,457	6,688	15,468	49,301
Small companies					
10-19 <sup>a</sup>	-	1,029	104 i	349	575
20-49	-	2,025	142	430	1,453
Medium companies					
50-99	-	1,816	67	420	1,329
100-249	-	3,280	306	695	2,279
Large companies					
250-499	-	2,811	234	781	1,796
500-999	-	2,807	300	303	2,203
1,000-4,999	-	12,322	2,518	3,428 i	6,375
5,000-9,999	-	5,945	98	1,868	3,979 i
10,000-24,999	-	15,739 i	829 i	3,958 i	10,953 i
25,000 or more	-	23,684	2,090 i	3,235 i	18,359

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



TABLE 36

## Domestic R&amp;D paid for by others and performed by the company, by source of funds, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Companies in the United States		Companies outside the United States		U.S. federal government agencies	U.S. state government agencies	Foreign government agencies	U.S. universities, colleges, and academic researchers	Foreign universities, colleges, and academic researchers	All other			
			Company's parent	Unaffiliated companies	In the United States	Outside the United States									
All industries	21-23, 31-33, 42-81	71,457	21,572	17,784	2,070	28,905	199	128	60	2	707	30			
Manufacturing industries	31-33	43,848	5,929	14,162	1,636	21,710	i	42	127	12	*	209	21		
Food	311	254	11	205	14	0		0	0	*	0	22	i	2	i
Beverage and tobacco products	312	121	*	121	0	0		0	0	0	0	0	0	0	
Textile, apparel, and leather products	313-16	9	1	0	*	5		0	0	0	0	3		0	
Wood products	321	3	0	3	0	*		0	0	0	0	0		0	
Paper	322	1	0	1	0	0		0	0	0	0	0		0	
Printing and related support activities	323	1	1	0	0	0		0	0	0	0	*	i	0	
Petroleum and coal products	324	89 - 103	0 - 15	0 - 120	0	0		0	0	0	0	0 - 6		0 - 8	
Chemicals	325	11,675	2,602	7,045	861	1,101		15	0 - 4	2	*	39		4 - 12	
Basic chemicals	3251	171	6	157	1	5		*	0	*	*	2		0	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	73	2	66	*	4		0	0	*	0	*	i	0	
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291	0	284 - 291	0	0		0	0	0	0	*		0	
Pharmaceuticals and medicines	3254	10,918	2,592	6,342	856	1,066		14	0 - 4	2	*	35		4 - 12	
Soap, cleaning compound, and toilet preparation	3256	189	0	187	0	0		0	0	0	0	2		0	
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 39	1	0 - 11	4	25		0	0	0	*	i	*	i	0
Plastics and rubber products	326	26	19	5	1	*		0	0	0	0	1		0	
Nonmetallic mineral products	327	98	1	95	*	i	2	0	0	0	0	*		0	
Primary metals	331	20	0 - 6	*	12	0 - 2		0	0	0	0	4		0	
Fabricated metal products	332	60	38	7	2	12		2	0	*	0	*		0	
Machinery	333	1,152	214	684	141	98		2	0	4	0	9		0	
Agricultural implement	33311	10 - 52	0	0 - 57	0 - 57	*		0	0	0	0	0		0	
Semiconductor machinery	333242	686	*	606	79	*		0	0	0	0	*		0	
Engine, turbine, and power transmission equipment	3336	122	20	10	0	87		1	0	1	0	3		0	
Other machinery	other 333	292 - 334	194	10 - 70	4 - 63	9		2	0	3	0	6		0	

TABLE 36

Domestic R&D paid for by others and performed by the company, by source of funds, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Companies in the United States		Companies outside the United States		U.S. federal government agencies	U.S. state government agencies	Foreign government agencies	U.S. universities, colleges, and academic researchers	Foreign universities, colleges, and academic researchers	All other	
			Company's parent	Unaffiliated companies	In the United States	Outside the United States							
Computer and electronic products	334	11,030	1,586	2,727	227	6,434	i	3	29	6	*	14	6
Communications equipment	3342	996	i 0 - 446 i	116	7	366 - 531	i	0	0	4	0	5	4
Semiconductor and other electronic components	3344	2,380	70	2,068	169	68		1	0	*	*	2	2
Navigational, measuring, electromedical, and control instruments	3345	7,493	1,072	503	43	5,837	i	2	29	1	0	5	0
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	251	9	224	*	12		0	0	1	0	5	0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,025	i 1,002	160 - 235	0 - 44	5,788	i	1	0 - 30	*	0	0	0
Other measuring and controlling device	other 3345	217	61	43 - 120	0 - 44	38		*	0 - 30	1	0	1	0
Other computer and electronic products	other 334	161	0 - 446	40	8	0 - 162		*	0	0	0	1	0
Electrical equipment, appliances, and components	335	506	48	413	10	29		2	0	*	0	3	0
Transportation equipment	336	18,564	1,355	2,664	362	i 13,961	i	17	95	*	0	107	3
Motor vehicles, bodies, trailers, and parts	3361-63	3,599	654	2,570	273	i 68		17	*	i *	0	17	i *
Aerospace products and parts	3364	13,803	i 684 - 702	42	74 - 90	12,797	i	*	95	*	0	89	3
Aircraft, aircraft engine, and aircraft parts	336411-13	13,011	i 661	42	75	12,051	i	0	90	*	0	89	3
Guided missile, space vehicle, and related parts	336414-15, 336419	793	24 - 42	0	0 - 16	746		*	5	i 0	0	0	0
Military armored vehicle, tank, and tank component	336992	6	0 - 7	0	0	0 - 7		*	0	0	0	0	0
Other transportation	other 336	1,155	0 - 18	52	0 - 16	i 1,088 - 1,098		0	0	0	0	*	0
Furniture and related products	337	3	3	0	0	*		0	0	0	0	0	0
Miscellaneous	339	215 - 233	41 - 57	78 - 199	7	65 - 72		1	0 - 4	*	0	6 - 12	*
Medical equipment and supplies	3391	173	42	79	7	36		1	0	*	0	7	*
Other miscellaneous manufacturing	3399	42 - 60	0 - 15	0 - 120	0	29 - 36		0	0 - 4	0	0	0 - 6	0
Nonmanufacturing industries	21-23, 42-81	27,608	15,643	i 3,622	435	7,195		157	2	47	2	498	9
Mining, quarrying, oil and gas extraction, and support activities	21	45	12 - 43	i 0	0 - 26	i 3	i	0	0	0	0	*	1

TABLE 36

## Domestic R&amp;D paid for by others and performed by the company, by source of funds, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Companies in the United States	Companies outside the United States		U.S. federal government agencies	U.S. state government agencies	Foreign government agencies	U.S. universities, colleges, and academic researchers	Foreign universities, colleges, and academic researchers	All other	
				Company's parent	Unaffiliated companies						In the United States	Outside the United States
Utilities	22	40	0	4	0	35	*	0	0	0	*	0
Wholesale trade	42	58	9	32	0	0	0	0	0	0	17	i 0
Electronic shopping and electronic auctions	454111-12	2 - 50	0	0 - 51	0	0	0	0	0	0	0	0
Transportation and warehousing	48-49	3	2	0	*	0	0	0	0	0	1	0
Information	51	1,113	206	427	28	364	0	*	0	0	88	*
Publishing	511	509	181	187	*	65	0	0	0	0	76	*
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0	0	0	0	0
Software publishers	5112	509	181	187	*	65	0	0	0	0	76	*
Telecommunications	517	54 - 66	0 - 14	26 - 64	0	2 - 14	0	0	0	0	0	*
Data processing, hosting, and related services	518	446	13	101 - 121	28	287	0	*	0	0	0 - 13	0
Other information	other 51	91 - 105	0 - 14	54 - 113	0	0 - 11	0	0	0	0	0 - 13	0
Finance and insurance	52	92	5	0	0	45	0	0	0	0	41	0
Real estate and rental and leasing	53	*	0	0	0	0	0	0	0	0	*	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	0	0	0	0	0	0	0	0	*	0
Other real estate and rental and leasing	other 53	0	0	0	0	0	0	0	0	0	0	0
Professional, scientific, and technical services	54	26,045	15,297	i 3,111	380	6,733	135	1	44	2	335	7
Architectural, engineering, and related services	5413	2,001	359	27	4	1,466	56	*	26	1	62	0
Computer systems design and related services	5415	3,643	581	2,277	38	662	61	*	*	1	22	0
Scientific research and development services	5417	19,354	14,109	i 777	296	3,914	12	1	15	*	228	*
Research and development in nanotechnology	541713	53	i 5	i 9	i *	38	i *	0	*	i 0	1	i 0
Research and development in biotechnology (except nanobiotechnology)	541714	5,014	4,574	194	30	117	1	0	11	0	87	0
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,632	i 9,485 - 9,532	i 573	266	3,157	3	1	4	*	95 - 142	*
Research and development in the social sciences and humanities	541720	654	0 - 43	0	0	603	9	0	*	0	0 - 43	0
Other professional, scientific, and technical services	other 54	1,048	249	30	42	690	6	*	3	0	22	7
Health care services	621-23	103	72	0	3	13	0	0	1	0	14	*

TABLE 36

**Domestic R&D paid for by others and performed by the company, by source of funds, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Companies in the United States		Companies outside the United States		U.S. federal government agencies	U.S. state government agencies	Foreign government agencies	U.S. universities, colleges, and academic researchers	Foreign universities, colleges, and academic researchers	All other	
			Company's parent	Unaffiliated companies	In the United States	Outside the United States							
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62 - 109	5 - 44	0 - 51	0 - 26	2	21	0	2	0	2	0	
All companies (number of domestic employees)	-	71,457	21,572	17,784	2,070	28,905	199	128	60	2	707	30	
Small companies													
10-19 <sup>a</sup>	-	1,029	300	127	29	445	16	3	27	1	81	*	
20-49	-	2,025	601	414	42	856	26	1	6	* i	69	10	
Medium companies													
50-99	-	1,816	490	551	105	604	3	1	8	1	52	*	
100-249	-	3,280	723	689	153	1,499	22	*	12	* i	171	10	
Large companies													
250-499	-	2,811	550	833	210	1,070	13	0	*	*	134	*	
500-999	-	2,807	712	1,392	199	467	4	5 i	2 i	0	22	2	
1,000-4,999	-	12,322	1,825 i	7,323	330	2,744	62	0	4	* i	33	0	
5,000-9,999	-	5,945	3,677 i	843	489	814	34	* i	*	0	86	3 i	
10,000-24,999	-	15,739 i	8,356 i	5,536	459 i	1,330	16	37 i	0	0	5	0	
25,000 or more	-	23,684	4,338	76	55	19,075	i 1	80	0	0	54	3	

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 37

**Domestic R&D paid for by others and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
All industries	21-23, 31-33, 42-81	71,457		0.6	0.7
Manufacturing industries	31-33	43,848		0.8	0.8
Food	311	254		*	*
Beverage and tobacco products	312	121		0.1	0.1
Textile, apparel, and leather products	313-16	9		*	*
Wood products	321	3		*	*
Paper	322	1		*	*
Printing and related support activities	323	1		*	*
Petroleum and coal products	324	89 - 103		D	D
Chemicals	325	11,675		1.0	1.1
Basic chemicals	3251	171		0.1	0.1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	73		0.1	0.1
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291		D	D
Pharmaceuticals and medicines	3254	10,918		2.0	2.0
Soap, cleaning compound, and toilet preparation	3256	189		0.2	0.2
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 39		D	D
Plastics and rubber products	326	26		*	*
Nonmetallic mineral products	327	98		0.2	0.2
Primary metals	331	20		*	*
Fabricated metal products	332	60		*	*
Machinery	333	1,152		0.3	0.3
Agricultural implement	33311	10 - 52		D	D
Semiconductor machinery	333242	686		2.6	2.6
Engine, turbine, and power transmission equipment	3336	122		0.3	D
Other machinery	other 333	292 - 334		D	D
Computer and electronic products	334	11,030		1.5	1.5
Communications equipment	3342	996	i	1.0	D
Semiconductor and other electronic components	3344	2,380		1.2	1.2
Navigational, measuring, electromedical, and control instruments	3345	7,493		4.0	4.0
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	251		1.2	1.2
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,025	i	8.1	8.1
Other measuring and controlling device	other 3345	217		0.3	0.3
Other computer and electronic products	other 334	161		0.1	D
Electrical equipment, appliances, and components	335	506		0.3	0.3
Transportation equipment	336	18,564		2.0	2.0
Motor vehicles, bodies, trailers, and parts	3361-63	3,599		0.6	D
Aerospace products and parts	3364	13,803	i	5.1	5.1
Aircraft, aircraft engine, and aircraft parts	336411-13	13,011	i	5.0	5.0
Guided missile, space vehicle, and related parts	336414-15, 336419	793		7.7	7.7
Military armored vehicle, tank, and tank component	336992	6		1.3	1.3
Other transportation	other 336	1,155		1.6	D
Furniture and related products	337	3		*	*

TABLE 37

**Domestic R&D paid for by others and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>		Percent of domestic sales of R&D performers <sup>b</sup>	
Miscellaneous	339	215 - 233		D		D
Medical equipment and supplies	3391	173		*		*
Other miscellaneous manufacturing	3399	42 - 60		D		D
Nonmanufacturing industries	21-23, 42-81	27,608		0.5		0.5
Mining, quarrying, oil and gas extraction, and support activities	21	45		*		*
Utilities	22	40		*		*
Wholesale trade	42	58		*		*
Electronic shopping and electronic auctions	454111-12	2 - 50		D		D
Transportation and warehousing	48-49	3		*		*
Information	51	1,113		0.1		0.1
Publishing	511	509		0.2		0.2
Newspaper, periodical, book, and directory publishers	5111	0		0.0		0.0
Software publishers	5112	509		0.2		0.2
Telecommunications	517	54 - 66		D		D
Data processing, hosting, and related services	518	446		0.1		0.1
Other information	other 51	91 - 105		D		D
Finance and insurance	52	92		*		*
Real estate and rental and leasing	53	*		*		*
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*		*		*
Other real estate and rental and leasing	other 53	0		0.0		0.0
Professional, scientific, and technical services	54	26,045		6.2		6.3
Architectural, engineering, and related services	5413	2,001		2.8		2.9
Computer systems design and related services	5415	3,643		2.2		2.2
Scientific research and development services	5417	19,354		27.5		27.8
Research and development in nanotechnology	541713	53	i	13.9		13.9
Research and development in biotechnology (except nanobiotechnology)	541714	5,014		24.9		25.1
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,632	i	27.9		28.2
Research and development in the social sciences and humanities	541720	654		65.5		65.5
Other professional, scientific, and technical services	other 54	1,048		1.0		1.0
Health care services	621-23	103		0.1		0.1
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62 - 109		D		D
All companies (number of domestic employees)	-	71,457		0.6		0.7
Small companies						
10-19 <sup>c</sup>	-	1,029		4.4		4.5
20-49	-	2,025		2.0		2.1
Medium companies						
50-99	-	1,816		1.4		1.5
100-249	-	3,280		0.8		0.8
Large companies						
250-499	-	2,811		0.9		1.0
500-999	-	2,807		0.7		0.7

TABLE 37

**Domestic R&D paid for by others and performed by the company as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
1,000–4,999	–	12,322	0.8	0.8
5,000–9,999	–	5,945	0.5	0.5
10,000–24,999	–	15,739	i	0.8
25,000 or more	–	23,684	0.5	0.5

\* = amount < \$500,000 or less than 0.05%; 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 = 2017 North American Industry Classification System.

<sup>a</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed R&D. The calculation of percentages in this column excludes R&D and sales of companies that fund R&D but do not perform R&D.

<sup>c</sup> 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 is 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. Unless indicated otherwise, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 38

**Domestic R&D paid for by others and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
All industries	21-23, 31-33, 42-81	80,901		1	1
Manufacturing industries	31-33	51,077		1	1
Food	311	255		*	*
Beverage and tobacco products	312	125		0	0
Textile, apparel, and leather products	313-16	9		*	*
Wood products	321	3		*	*
Paper	322	0 - 2		D	D
Printing and related support activities	323	1		*	*
Petroleum and coal products	324	102		*	*
Chemicals	325	15,888		1	1
Basic chemicals	3251	172		0	0
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	101		0	0
Pesticide, fertilizer, and other agricultural chemicals	3253	288 - 304		D	D
Pharmaceuticals and medicines	3254	15,083		3	3
Soap, cleaning compound, and toilet preparation	3256	196		0	0
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 47		D	D
Plastics and rubber products	326	28		*	*
Nonmetallic mineral products	327	99		0	0
Primary metals	331	21		*	*
Fabricated metal products	332	63		*	*
Machinery	333	1,213		0	0
Agricultural implement	33311	10 - 61		D	D
Semiconductor machinery	333242	729		3	3
Engine, turbine, and power transmission equipment	3336	131		0	D
Other machinery	other 333	292 - 343		D	D
Computer and electronic products	334	11,589		2	2
Communications equipment	3342	1,042	i	1	D
Semiconductor and other electronic components	3344	2,463		1	1
Navigational, measuring, electromedical, and control instruments	3345	7,913	i	4	4
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	256		1	1
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,440	i	9	9
Other measuring and controlling device	other 3345	218		0	0
Other computer and electronic products	other 334	171		0	D
Electrical equipment, appliances, and components	335	506		0	0
Transportation equipment	336	20,930		2	2
Motor vehicles, bodies, trailers, and parts	3361-63	3,765 - 3,778		D	D
Aerospace products and parts	3364	15,992		6	6
Aircraft, aircraft engine, and aircraft parts	336411-13	15,195		6	6
Guided missile, space vehicle, and related parts	336414-15, 336419	797		8	8
Military armored vehicle, tank, and tank component	336992	6		1	1
Other transportation	other 336	1,155 - 1,165		D	D
Furniture and related products	337	4		*	*
Miscellaneous	339	235 - 243		D	D



TABLE 38

**Domestic R&D paid for by others and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)		Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
Medical equipment and supplies	3391	183		*	*
Other miscellaneous manufacturing	3399	53 - 60		D	D
Nonmanufacturing industries	21-23, 42-81	29,824		1	1
Mining, quarrying, oil and gas extraction, and support activities	21	45		*	*
Utilities	22	48		*	*
Wholesale trade	42	106		*	*
Electronic shopping and electronic auctions	454111-12	2 - 50		D	D
Transportation and warehousing	48-49	3		*	*
Information	51	1,224		0	0
Publishing	511	562		0	0
Newspaper, periodical, book, and directory publishers	5111	0		0	0
Software publishers	5112	562		0	0
Telecommunications	517	54 - 68		D	D
Data processing, hosting, and related services	518	503		0	0
Other information	other 51	91 - 107		D	D
Finance and insurance	52	93		*	*
Real estate and rental and leasing	53	*		*	*
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*		*	*
Other real estate and rental and leasing	other 53	0		0	0
Professional, scientific, and technical services	54	28,067		7	7
Architectural, engineering, and related services	5413	2,451		3	4
Computer systems design and related services	5415	3,662		2	2
Scientific research and development services	5417	20,822		30	30
Research and development in nanotechnology	541713	58	i	15	15
Research and development in biotechnology (except nanobiotechnology)	541714	5,112		25	26
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,643 - 14,999	i	D	D
Research and development in the social sciences and humanities	541720	653 - 2,008		D	D
Other professional, scientific, and technical services	other 54	1,132		1	1
Health care services	621-23	102 - 105		D	D
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	83 - 136		D	D
All companies (number of domestic employees)	-	80,901		1	1
Small companies					
10-19 <sup>c</sup>	-	1,159		5	5
20-49	-	2,366		2	2
Medium companies					
50-99	-	2,198		2	2
100-249	-	3,838		1	1
Large companies					
250-499	-	3,111		1	1
500-999	-	3,253		1	1
1,000-4,999	-	13,964		1	1

TABLE 38

**Domestic R&D paid for by others and performed by the company and others as a percentage of domestic net sales, by industry and company size: 2020**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D (US\$millions)	Percent of domestic sales of R&D performers or funders <sup>a</sup>	Percent of domestic sales of R&D performers <sup>b</sup>
5,000–9,999	–	6,547	1	1
10,000–24,999	–	17,784	1	1
25,000 or more	–	26,680	1	1

\* = amount < \$500,000 or less than 0.05%; 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 = 2017 North American Industry Classification System.

<sup>a</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed or funded R&D.

<sup>b</sup> Statistics used for both the numerator and denominator in the calculation of these percentages are representative of companies located in the United States that performed R&D. The calculation of percentages in this column excludes R&D and sales of companies that fund R&D but do not perform R&D.

<sup>c</sup> 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 is 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. Unless indicated otherwise, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 39

## Domestic R&amp;D paid for by the U.S. federal government and performed by the company, by type of R&amp;D, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
All industries	21-23, 31-33, 42-81	28,905	2,148 i	5,698	21,059
Manufacturing industries	31-33	21,710 i	1,428 i	3,401 i	16,881
Food	311	0	0	0	0
Beverage and tobacco products	312	0	0	0	0
Textile, apparel, and leather products	313-16	5	0	0	5
Wood products	321	*	0	0	* i
Paper	322	0	0	0	0
Printing and related support activities	323	0	0	0	0
Petroleum and coal products	324	0	0	0	0
Chemicals	325	1,101	39	692	370
Basic chemicals	3251	5	0-3 i	0-3 i	3
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	4	0	3 i	1 i
Pesticide, fertilizer, and other agricultural chemicals	3253	0	0	0	0
Pharmaceuticals and medicines	3254	1,066	37	669	360
Soap, cleaning compound, and toilet preparation	3256	0	0	0	0
Paint, coating, adhesive, and other chemicals	3255, 3259	25	0-3	15-20	6
Plastics and rubber products	326	*	0	* i	* i
Nonmetallic mineral products	327	2	*	1	2
Primary metals	331	0-2	0-2 i	0	0
Fabricated metal products	332	12	0	2 i	9
Machinery	333	98	4	4	90
Agricultural implement	33311	*	*	0	0
Semiconductor machinery	333242	*	0	0	* i
Engine, turbine, and power transmission equipment	3336	87	3	3	81
Other machinery	other 333	9	* i	* i	8
Computer and electronic products	334	6,434 i	250 i	1,073 i	5,110 i
Communications equipment	3342	366-531 i	15-91 i	114-190 i	157-271 i
Semiconductor and other electronic components	3344	68	0-22 i	0-22	47
Navigational, measuring, electromedical, and control instruments	3345	5,837 i	160 i	884 i	4,794 i
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	12	* i	1 i	11
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	5,788 i	158 i	868 i	4,761 i
Other measuring and controlling device	other 3345	38	1 i	15 i	22
Other computer and electronic products	other 334	0-162	0-52	0-52	0-111
Electrical equipment, appliances, and components	335	29	1	3	24
Transportation equipment	336	13,961 i	1,131 i	1,609 i	11,220

TABLE 39

**Domestic R&D paid for by the U.S. federal government and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
Motor vehicles, bodies, trailers, and parts	3361-63	68	7	9 - 62	0 - 53
Aerospace products and parts	3364	12,797	1,124	1,452	10,220
Aircraft, aircraft engine, and aircraft parts	336411-13	12,051	1,124	1,451	9,476
Guided missile, space vehicle, and related parts	336414-15, 336419	746	0	1	745
Military armored vehicle, tank, and tank component	336992	0 - 7	0	0	0 - 7
Other transportation	other 336	1,088 - 1,098	0	94 - 147	941 - 997
Furniture and related products	337	*	0	* i	0
Miscellaneous	339	65 - 72	0 - 6	16	50
Medical equipment and supplies	3391	36	* i	14	22
Other miscellaneous manufacturing	3399	29 - 36	0 - 6	2	28
Nonmanufacturing industries	21-23, 42-81	7,195	720	2,297	4,177
Mining, quarrying, oil and gas extraction, and support activities	21	3	0	0 - 3	0 - 4
Utilities	22	35	*	6	30
Wholesale trade	42	0	0	0	0
Electronic shopping and electronic auctions	454111-12	0	0	0	0
Transportation and warehousing	48-49	0	0	0	0
Information	51	364	*	80	284
Publishing	511	65	* i	54	11
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0
Software publishers	5112	65	* i	54	11
Telecommunications	517	2 - 14	*	*	1 - 14
Data processing, hosting, and related services	518	287	*	26	261
Other information	other 51	0 - 11	0	0	0 - 11
Finance and insurance	52	45	23	0	22
Real estate and rental and leasing	53	0	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0
Other real estate and rental and leasing	other 53	0	0	0	0
Professional, scientific, and technical services	54	6,733	691	2,210	3,832
Architectural, engineering, and related services	5413	1,466	69	537	860
Computer systems design and related services	5415	662	37	130	495
Scientific research and development services	5417	3,914	562	1,495	1,858
Research and development in nanotechnology	541713	38	5	14	19
Research and development in biotechnology (except nanobiotechnology)	541714	117	15	41	61
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	3,157	179	1,234 - 1,284	1,694 - 1,744

TABLE 39

**Domestic R&D paid for by the U.S. federal government and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Basic research	Applied research	Development
Research and development in the social sciences and humanities	541720	603	362	157 - 205 i	35 - 83 i
Other professional, scientific, and technical services	other 54	690	23	48	619
Health care services	621-23	13	6	* i	6
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	2	0	0 - 3 i	0 - 3
All companies (number of domestic employees)	-	28,905	2,148 i	5,698	21,059
Small companies					
10-19 <sup>a</sup>	-	445	47 i	172 i	227 i
20-49	-	856	44	159	653
Medium companies					
50-99	-	604	20	153	430
100-249	-	1,499	124	355	1,020
Large companies					
250-499	-	1,070	59	340	671
500-999	-	467	45	85 i	337
1,000-4,999	-	2,744	364	1,248	1,133
5,000-9,999	-	814	41	159	614
10,000-24,999	-	1,330	33 i	199	1,098
25,000 or more	-	19,075 i	1,373 i	2,827 i	14,875 i

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 40

## Domestic R&amp;D paid for by sources located outside the United States and performed by the company, by source of funds, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Foreign companies			Foreign government agencies	Foreign universities, colleges, and academic researchers	All other
			Subsidiaries <sup>a</sup>	Company's parent	Unaffiliated companies			
All industries	21-23, 31-33, 42-81	47,052	27,038	17,784	2,070	128	2	30
Manufacturing industries	31-33	34,929	18,984	14,162	1,636	127	*	21
Food	311	773 i	552 i	205	14	0	0	2 i
Beverage and tobacco products	312	152	31	121	0	0	0	0
Textile, apparel, and leather products	313-16	1	1	0	*	0	0	0
Wood products	321	3	0	3	0	0	0	0
Paper	322	1	*	1	0	0	0	0
Printing and related support activities	323	*	*	0	0	0	0	0
Petroleum and coal products	324	68 - 275	0 - 172	0 - 120	0	0	0	0 - 8
Chemicals	325	11,511	3,595	7,045	861	0 - 4	*	4 - 12
Basic chemicals	3251	162	5	157	1	0	*	0
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	66	0	66	*	0	0	0
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291	0	284 - 291	0	0	0	0
Pharmaceuticals and medicines	3254	10,781	3,572	6,342	856	0 - 4	*	4 - 12
Soap, cleaning compound, and toilet preparation	3256	203	17	187	0	0	0	0
Paint, coating, adhesive, and other chemicals	3255, 3259	5 - 15	1	0 - 11	4	0	*	i 0
Plastics and rubber products	326	41	35	5	1	0	0	0
Nonmetallic mineral products	327	96	1	95	*	i 0	0	0
Primary metals	331	14	1	*	12	0	0	0
Fabricated metal products	332	12	4	7	2	0	0	0
Machinery	333	861	37	684	141	0	0	0
Agricultural implement	33311	14 - 62	5 - 11	0 - 57	0 - 57	0	0	0
Semiconductor machinery	333242	685	0	606	79	0	0	0
Engine, turbine, and power transmission equipment	3336	10	0	10	0	0	0	0
Other machinery	other 333	102 - 153	26 - 32	10 - 70	4 - 63	0	0	0
Computer and electronic products	334	16,582	13,594	2,727	227	29	*	6
Communications equipment	3342	125 - 10,885 i	0 - 10,756 i	116	7	0	0	4
Semiconductor and other electronic components	3344	3,605	1,367	2,068	169	0	*	2
Navigational, measuring, electromedical, and control instruments	3345	657 - 5,306	84 - 4,730	503	43	29	0	0

TABLE 40

## Domestic R&amp;D paid for by sources located outside the United States and performed by the company, by source of funds, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Foreign companies			Foreign government agencies	Foreign universities, colleges, and academic researchers	All other
			Subsidiaries <sup>a</sup>	Company's parent	Unaffiliated companies			
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	305	81	224	*	0	0	0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	238	4	160 - 235	0 - 44	0 - 30	0	0
Other measuring and controlling device	other 3345	113 - 4,762	0 - 4,644	43 - 120	0 - 44	0 - 30	0	0
Other computer and electronic products	other 334	47 - 12,193	0 - 12,144	40	8	0	0	0
Electrical equipment, appliances, and components	335	585	162	413	10	0	0	0
Transportation equipment	336	3,537	413	2,664	362	i 95	0	3
Motor vehicles, bodies, trailers, and parts	3361-63	2,851 - 3,246	9 - 401	2,570	273	i *	i 0	* i
Aerospace products and parts	3364	227 - 245	13	42	74 - 90	95	0	3
Aircraft, aircraft engine, and aircraft parts	336411-13	223	13	42	75	90	0	3
Guided missile, space vehicle, and related parts	336414-15, 336419	4 - 21	0	0	0 - 16	5	i 0	0
Military armored vehicle, tank, and tank component	336992	0	0	0	0	0	0	0
Other transportation	other 336	51 - 459	0 - 392	52	0 - 16	i 0	0	0
Furniture and related products	337	0 - 172	0 - 172	0	0	0	0	0
Miscellaneous	339	478 - 683	392 - 565	78 - 199	7	0 - 4	0	*
Medical equipment and supplies	3391	479	393	79	7	0	0	*
Other miscellaneous manufacturing	3399	0 - 204	0 - 172	0 - 120	0	0 - 4	0	0
Nonmanufacturing industries	21-23, 42-81	12,123	i 8,054	i 3,622	435	2	2	9
Mining, quarrying, oil and gas extraction, and support activities	21	59	31 - 59	0	0 - 26	i 0	0	1 i
Utilities	22	7	3	4	0	0	0	0
Wholesale trade	42	33	1	i 32	0	0	0	0
Electronic shopping and electronic auctions	454111-12	204 - 2,583	i 204 - 2,535	i 0 - 51	0	0	0	0
Transportation and warehousing	48-49	*	0	0	*	0	0	0
Information	51	5,909	i 5,454	i 427	28	*	0	*
Publishing	511	1,188	1,001	187	*	0	0	*
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0
Software publishers	5112	1,188	1,001	187	*	0	0	*
Telecommunications	517	26 - 64	0	26 - 64	0	0	0	*
Data processing, hosting, and related services	518	552	404 - 421	101 - 121	28	*	0	0

TABLE 40

## Domestic R&amp;D paid for by sources located outside the United States and performed by the company, by source of funds, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Foreign companies			Foreign government agencies	Foreign universities, colleges, and academic researchers	All other
			Subsidiaries <sup>a</sup>	Company's parent	Unaffiliated companies			
Other information	other 51	4,104 - 4,144 i	4,031 - 4,050 i	54 - 113	0	0	0	0
Finance and insurance	52	0 - 2,298	0 - 2,298	0	0	0	0	0
Real estate and rental and leasing	53	0	0	0	0	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0	0	0	0
Other real estate and rental and leasing	other 53	0	0	0	0	0	0	0
Professional, scientific, and technical services	54	3,533	32	3,111	380	1	2	7
Architectural, engineering, and related services	5413	35	4	27	4	*	1	0
Computer systems design and related services	5415	2,328	12	2,277	38	*	1	0
Scientific research and development services	5417	1,085	11	777	296	1	*	*
Research and development in nanotechnology	541713	9 i	0	9 i	*	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	225	0	194	30	0	0	0
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	851	11	573	266	1	*	*
Research and development in the social sciences and humanities	541720	0	0	0	0	0	0	0
Other professional, scientific, and technical services	other 54	85	6	30	42	*	0	7
Health care services	621-23	3	0	0	3	0	0	*
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	0 - 76	0	0 - 51	0 - 26	0	0	0
All companies (number of domestic employees)	-	47,052	27,038	17,784	2,070	128	2	30
Small companies								
10-19 <sup>b</sup>	-	182	23	127	29	3	1	*
20-49	-	509	42	414	42	1	*	i 10
Medium companies								
50-99	-	706	47	551	105	1	1	*
100-249	-	1,129	277	689	153	*	*	i 10
Large companies								
250-499	-	1,590	547	833	210	0	*	*
500-999	-	2,308	708	1,392	199	5 i	0	2
1,000-4,999	-	9,629	1,976	7,323	330	0	*	i 0
5,000-9,999	-	2,878	1,544	843	489	* i	0	3 i
10,000-24,999	-	9,205	3,173	5,536	459 i	37 i	0	0



TABLE 40

**Domestic R&D paid for by sources located outside the United States and performed by the company, by source of funds, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Foreign companies			Foreign government agencies	Foreign universities, colleges, and academic researchers	All other
			Subsidiaries <sup>a</sup>	Company's parent	Unaffiliated companies			
25,000 or more	–	18,915	18,700	76	55	80	0	3

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. These statistics include an adjustment to the weight to account for unit nonresponse.

<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. In all other tables, R&D costs of foreign-company subsidiaries of U.S. companies are included in company-funded U.S. domestic R&D totals. Only in this table are such R&D costs classified as being part of R&D paid for by sources located outside of the United States. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 41

**Domestic R&D paid for by the company's foreign subsidiaries and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total <sup>a</sup>	Basic research <sup>b</sup>	Applied research <sup>b</sup>	Development <sup>b</sup>
All industries	21-23, 31-33, 42-81	27,038	740	2,999	23,298
Manufacturing industries	31-33	18,984	685	2,605	15,694
Food	311	552	0 - 169	140 - 322	60 - 242
Beverage and tobacco products	312	31	3	5	23
Textile, apparel, and leather products	313-16	1	0	0	1
Wood products	321	0	0	0	0
Paper	322	*	0	*	0
Printing and related support activities	323	*	*	*	*
Petroleum and coal products	324	0 - 172	0 - 169	0 - 172	0 - 172
Chemicals	325	3,595	321	595	2,678
Basic chemicals	3251	5	1	2	2
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	0	0	0	0
Pesticide, fertilizer, and other agricultural chemicals	3253	0	0	0	0
Pharmaceuticals and medicines	3254	3,572	318	591	2,663
Soap, cleaning compound, and toilet preparation	3256	17	2	2	13
Paint, coating, adhesive, and other chemicals	3255, 3259	1	*	*	*
Plastics and rubber products	326	35	7	0	28
Nonmetallic mineral products	327	1	*	*	1
Primary metals	331	1	*	*	1
Fabricated metal products	332	4	*	*	4
Machinery	333	37	3	2	31
Agricultural implement	33311	5 - 11	0 - 4	*	6
Semiconductor machinery	333242	0	0	0	0
Engine, turbine, and power transmission equipment	3336	0	0	0	0
Other machinery	other 333	26 - 32	0 - 4	2	25
Computer and electronic products	334	13,594	132	1,626	11,836
Communications equipment	3342	0 - 10,756	0 - 133	0 - 790	0 - 9,835
Semiconductor and other electronic components	3344	1,367	0 - 133	0 - 1,368	0 - 1,368
Navigational, measuring, electromedical, and control instruments	3345	84 - 4,730	0 - 133	1 - 566	81 - 4,032
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	81	*	2	78
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	4	*	*	4
Other measuring and controlling device	other 3345	0 - 4,644	0 - 133	0 - 563	0 - 3,949
Other computer and electronic products	other 334	0 - 12,144	0 - 133	0 - 1,625	0 - 11,756
Electrical equipment, appliances, and components	335	162	1	3	158
Transportation equipment	336	413	13	12	388

TABLE 41

**Domestic R&D paid for by the company's foreign subsidiaries and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total <sup>a</sup>	Basic research <sup>b</sup>	Applied research <sup>b</sup>	Development <sup>b</sup>
Motor vehicles, bodies, trailers, and parts	3361-63	9 - 401	0 - 13	10	0 - 379
Aerospace products and parts	3364	13	1	2	10
Aircraft, aircraft engine, and aircraft parts	336411-13	13	1	2	10
Guided missile, space vehicle, and related parts	336414-15, 336419	0	0	0	0
Military armored vehicle, tank, and tank component	336992	0	0	0	0
Other transportation	other 336	0 - 392	0 - 13	*	0 - 379
Furniture and related products	337	0 - 172	0	0 - 100	0 - 172
Miscellaneous	339	392 - 565	40	44	308 - 482
Medical equipment and supplies	3391	393	40	44	309
Other miscellaneous manufacturing	3399	0 - 172	0	0	0 - 172
Nonmanufacturing industries	21-23, 42-81	8,054	56	394	7,605
Mining, quarrying, oil and gas extraction, and support activities	21	31 - 59	0 - 36	0 - 59	0 - 59
Utilities	22	3	0	1	2
Wholesale trade	42	1	*	*	1
Electronic shopping and electronic auctions	454111-12	204 - 2,535	0	171 - 275	0 - 2,298
Transportation and warehousing	48-49	0	0	0	0
Information	51	5,454	18 - 54	118 - 156	5,281
Publishing	511	1,001	19	91	891
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0
Software publishers	5112	1,001	19	91	891
Telecommunications	517	0	0	0	0
Data processing, hosting, and related services	518	404 - 421	0 - 36	0 - 65	339 - 421
Other information	other 51	4,031 - 4,050	0 - 36	0 - 65	3,968 - 4,050
Finance and insurance	52	0 - 2,298	0	0	0 - 2,298
Real estate and rental and leasing	53	0	0	0	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0
Other real estate and rental and leasing	other 53	0	0	0	0
Professional, scientific, and technical services	54	32	2 - 7	1 - 6	25
Architectural, engineering, and related services	5413	4	*	*	3
Computer systems design and related services	5415	12	1	*	11
Scientific research and development services	5417	11	2	2	7
Research and development in nanotechnology	541713	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	0	0	0	0
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	11	2	2	7

TABLE 41

**Domestic R&D paid for by the company's foreign subsidiaries and performed by the company, by type of R&D, industry, and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total <sup>a</sup>	Basic research <sup>b</sup>	Applied research <sup>b</sup>	Development <sup>b</sup>
Research and development in the social sciences and humanities	541720	0	0	0	0
Other professional, scientific, and technical services	other 54	6	0 - 3	0 - 3	4
Health care services	621-23	0	0	0	0
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	0	0	0	0
All companies (number of domestic employees)	-	27,038	740	2,999	23,298
Small companies					
10-19 <sup>c</sup>	-	23	0	2	21
20-49	-	42	4	7	32
Medium companies					
50-99	-	47	3	4	39
100-249	-	277	3	115	160
Large companies					
250-499	-	547	36	188	323
500-999	-	708	9	25	674
1,000-4,999	-	1,976	18	136	1,822
5,000-9,999	-	1,544	183	329	1,032
10,000-24,999	-	3,173	297	129	2,747
25,000 or more	-	18,700	188	2,066	16,447

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. These statistics include an adjustment to the weight to account for unit nonresponse.

<sup>b</sup> Respondent was not asked to report categorical breakouts of research and development paid for by foreign subsidiaries. Rather, ratios of the company's basic research, applied research, and development were calculated as proportions of the overall domestic R&D performance paid for by the company. These ratios were applied to the company's domestic R&D performance paid for by foreign subsidiaries to get estimates of a company's basic research, applied research, and development paid for by foreign subsidiaries.

<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 42

## Domestic R&amp;D performance by performer and source of funds, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Performed by the company			Performed by others		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
All industries	21-23, 31-33, 42-81	537,619	466,162	71,457	48,075	38,631	9,444
Manufacturing industries	31-33	308,445	264,596	43,848	41,831	34,602	7,228
Food	311	5,239	4,985	254	257	255	1
Beverage and tobacco products	312	1,177	1,056	121	174	170	4
Textile, apparel, and leather products	313-16	822	812	9	10	10	*
Wood products	321	187	183	3	10	10	0
Paper	322	928	927	1	6 - 8	7	0 - 1
Printing and related support activities	323	283	282	1	4	4	0
Petroleum and coal products	324	1,311 - 1,324	1,222	89 - 103	194 - 207	195	0 - 12
Chemicals	325	101,079	89,403	11,675	29,761	25,548	4,213
Basic chemicals	3251	2,694	2,523	171	66	65	1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234	1,161	73	56	27	28
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066	775	284 - 291	81 - 88	68 - 85	0 - 13
Pharmaceuticals and medicines	3254	91,776	80,858	10,918	29,251	25,086	4,165
Soap, cleaning compound, and toilet preparation	3256	2,665	2,476	189	260	253	7
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649	1,610	32 - 39	42 - 49	33 - 49	0 - 13
Plastics and rubber products	326	2,634	2,607	26	23	21	2
Nonmetallic mineral products	327	1,717	1,619	98	92	92	1
Primary metals	331	815	795	20	21	20	1
Fabricated metal products	332	3,396	3,336	60	89	86	3
Machinery	333	16,223	15,071	1,152	440	379	61
Agricultural implement	33311	1,769 - 1,811	1,760	10 - 52	176 - 186	177	0 - 10
Semiconductor machinery	333242	4,807	4,121	686	49	6	43
Engine, turbine, and power transmission equipment	3336	1,645	1,523	122	22	12	9
Other machinery	other 333	7,959 - 8,001	7,667	292 - 334	184 - 194	185	0 - 10
Computer and electronic products	334	99,535	88,505	11,030	3,734	3,175	559
Communications equipment	3342	12,103	11,107	996	1,081	1,035	46
Semiconductor and other electronic components	3344	43,181	40,801	2,380	305	221	83
Navigational, measuring, electromedical, and control instruments	3345	18,505	11,012	7,493	710	290	420
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858	2,606	251	106	101	4
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586	3,561	7,025	444 - 604	30 - 189	415

TABLE 42

## Domestic R&amp;D performance by performer and source of funds, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Performed by the company			Performed by others		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Other measuring and controlling device	other 3345	5,061	4,844	217	0 - 160	0 - 158	1
Other computer and electronic products	other 334	25,747	25,585	161	1,639	1,629	9
Electrical equipment, appliances, and components	335	4,998	4,492	506	97	96	1
Transportation equipment	336	48,796	30,232	18,564	5,939	3,573	2,366
Motor vehicles, bodies, trailers, and parts	3361-63	23,121	19,522	3,599	3,278 - 3,291	3,112	166 - 178
Aerospace products and parts	3364	22,914	9,111	13,803	2,577	388	2,189
Aircraft, aircraft engine, and aircraft parts	336411-13	21,291	8,281	13,011	2,444	260	2,185
Guided missile, space vehicle, and related parts	336414-15, 336419	1,623	831	793	133	129	4
Military armored vehicle, tank, and tank component	336992	11	4	6	*	*	0
Other transportation	other 336	2,750	1,594	1,155	72 - 83	73	0 - 10
Furniture and related products	337	496	492	3	21	20	*
Miscellaneous	339	18,791 - 18,809	18,576	215 - 233	950 - 963	941	9 - 22
Medical equipment and supplies	3391	16,116	15,944	173	881	871	10
Other miscellaneous manufacturing	3399	2,674 - 2,692	2,632	42 - 60	69 - 82	70	0 - 12
Nonmanufacturing industries	21-23, 42-81	229,174	201,566	27,608	6,244	4,029	2,215
Mining, quarrying, oil and gas extraction, and support activities	21	1,165	1,121	45	79	79	0
Utilities	22	264	224	40	198	190	8
Wholesale trade	42	1,058	1,001	58	203	154	49
Electronic shopping and electronic auctions	454111-12	3,840 - 19,390	3,837 - 19,343	2 - 50	0 - 106	0 - 106	0
Transportation and warehousing	48-49	4,957	4,954	3	203	203	0
Information	51	129,463	128,350	1,113	2,247	2,136	111
Publishing	511	35,025	34,516	509	1,298	1,246	52
Newspaper, periodical, book, and directory publishers	5111	60	60	0	4	4	0
Software publishers	5112	34,965	34,456	509	1,295	1,242	52
Telecommunications	517	3,425 - 3,437	3,371	54 - 66	453 - 456	453	0 - 3
Data processing, hosting, and related services	518	41,551	41,105	446	342	285	57
Other information	other 51	49,449 - 49,463	49,358	91 - 105	152 - 155	153	0 - 3
Finance and insurance	52	12,296	12,204	92	291	290	1
Real estate and rental and leasing	53	3,249	3,249	*	*	*	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	7	*	0	0	0

**TABLE 42**  
**Domestic R&D performance by performer and source of funds, by industry and company size: 2020**  
 (Millions of U.S. dollars)

Industry and company size	NAICS code	Performed by the company			Performed by others		
		Total	Paid for by the company	Paid for by others	Total	Paid for by the company	Paid for by others
Other real estate and rental and leasing	other 53	3,242	3,242	0	*	*	0
Professional, scientific, and technical services	54	54,367	28,322	26,045	2,865	844	2,022
Architectural, engineering, and related services	5413	4,214	2,214	2,001	515	65	450
Computer systems design and related services	5415	17,935	14,293	3,643	258	239	19
Scientific research and development services	5417	25,600	6,246	19,354	1,961	493	1,468
Research and development in nanotechnology	541713	179	126	53	4 - 8	0 - 3	5
Research and development in biotechnology (except nanobiotechnology)	541714	6,191	1,176	5,014	280	182	98
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539	4,906	13,632	319 - 1,678	307 - 312	11 - 1,367
Research and development in the social sciences and humanities	541720	691	38	654	0 - 1,354	0	0 - 1,354
Other professional, scientific, and technical services	other 54	6,618	5,570	1,048	131	47	84
Health care services	621-23	1,477	1,374	103	34	31 - 34	0 - 2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,491 - 17,041	1,429 - 16,934	62 - 109	21 - 128	0 - 106	21 - 27
All companies (number of domestic employees)	-	537,619	466,162	71,457	48,075	38,631	9,444
Small companies							
10-19 <sup>a</sup>	-	5,047	4,019	1,029	691	560	131
20-49	-	12,994	10,970	2,025	2,075	1,733	342
Medium companies							
50-99	-	12,993	11,177	1,816	1,872	1,490	382
100-249	-	25,411	22,132	3,280	3,496	2,938	558
Large companies							
250-499	-	20,878	18,067	2,811	1,926	1,626	300
500-999	-	21,264	18,458	2,807	2,610	2,164	446
1,000-4,999	-	88,238	75,917	12,322	5,836	4,193	1,643
5,000-9,999	-	48,397	42,451	5,945	6,201	5,599	602
10,000-24,999	-	88,567	72,827	15,739	10,574	8,530	2,044
25,000 or more	-	213,829	190,145	23,684	12,794	9,798	2,996

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



TABLE 43

## Domestic R&amp;D performance by source of funds and performer, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Paid for by the company			Paid for by others				
		Total	R&D performed by others (purchased and collaborative R&D)	R&D performed by the company	Total	R&D performed by others (subcontracted/ passed-through R&D costs)	R&D performed by the company		
							Total	Paid for by the U.S. government	Paid for by non-U.S. government sources
All industries	21-23, 31-33, 42-81	504,793	38,631	466,162	80,901	9,444	71,457	28,905	42,552
Manufacturing industries	31-33	299,199	34,602	264,596	51,077	7,228	43,848	21,710	22,139
Food	311	5,241	255	4,985	255	1	254	0	254
Beverage and tobacco products	312	1,225	170	1,056	125	4	121	0	121
Textile, apparel, and leather products	313-16	823	10	812	9	*	9	5	4
Wood products	321	193	10	183	3	0	3	*	3
Paper	322	934	7	927	0-2	0-1	1	0	1
Printing and related support activities	323	286	4	282	1	0	1	0	1
Petroleum and coal products	324	1,416	195	1,222	102	0-12	89-103	0	89-103
Chemicals	325	114,951	25,548	89,403	15,888	4,213	11,675	1,101	10,574
Basic chemicals	3251	2,588	65	2,523	172	1	171	5	166
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,188	i 27	1,161	101	28	73	4	68
Pesticide, fertilizer, and other agricultural chemicals	3253	842-860	68-85	775	288-304	0-13	284-291	0	284-291
Pharmaceuticals and medicines	3254	105,944	25,086	80,858	15,083	4,165	10,918	1,066	9,852
Soap, cleaning compound, and toilet preparation	3256	2,729	253	2,476	196	7	189	0	189
Paint, coating, adhesive, and other chemicals	3255, 3259	1,644-1,659	33-49	1,610	32-47	0-13	32-39	25	8-14
Plastics and rubber products	326	2,628	21	2,607	28	2	26	*	26
Nonmetallic mineral products	327	1,711	92	i 1,619	i 99	1	98	2	96
Primary metals	331	815	20	795	21	1	20	0-2	18-21
Fabricated metal products	332	3,422	86	3,336	63	3	60	12	49
Machinery	333	15,451	379	15,071	1,213	61	1,152	98	1,054
Agricultural implement	33311	1,936	177	1,760	10-61	0-10	10-52	*	9-52
Semiconductor machinery	333242	4,127	6	4,121	729	43	686	*	685
Engine, turbine, and power transmission equipment	3336	1,535	12	1,523	131	9	122	87	35
Other machinery	other 333	7,852	i 185	7,667	292-343	0-10	292-334	9	282-325
Computer and electronic products	334	91,680	3,175	88,505	11,589	559	i 11,030	6,434	i 4,596

TABLE 43

## Domestic R&amp;D performance by source of funds and performer, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Paid for by the company			Paid for by others						
		Total	R&D performed by others (purchased and collaborative R&D)	R&D performed by the company	Total	R&D performed by the company					
						R&D performed by others (subcontracted/ passed-through R&D costs)	Total	Paid for by the U.S. government	Paid for by non-U.S. government sources		
Communications equipment	3342	12,142	1,035	11,107	1,042	46	996	366 - 531	465 - 630		
Semiconductor and other electronic components	3344	41,022	221	40,801	2,463	83	2,380	68	2,312		
Navigational, measuring, electromedical, and control instruments	3345	11,301	290	11,012	7,913	420	7,493	5,837	1,656		
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,708	101	2,606	256	4	251	12	240		
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,591 - 3,751	30 - 189	3,561	7,440	415	7,025	5,788	1,237		
Other measuring and controlling device	other 3345	4,843 - 5,002	0 - 158	4,844	218	1	217	38	179		
Other computer and electronic products	other 334	27,215	1,629	25,585	171	9	161	0 - 162	0 - 162		
Electrical equipment, appliances, and components	335	4,589	96	4,492	506	1	506	29	477		
Transportation equipment	336	33,805	3,573	30,232	20,930	2,366	18,564	13,961	4,603		
Motor vehicles, bodies, trailers, and parts	3361-63	22,634	3,112	19,522	3,765 - 3,778	166 - 178	3,599	68	3,531		
Aerospace products and parts	3364	9,499	388	9,111	15,992	2,189	13,803	12,797	1,007		
Aircraft, aircraft engine, and aircraft parts	336411-13	8,540	260	8,281	15,195	2,185	13,011	12,051	960		
Guided missile, space vehicle, and related parts	336414-15, 336419	959	129	831	797	4	793	746	47		
Military armored vehicle, tank, and tank component	336992	4	*	4	6	0	6	0 - 7	0 - 7		
Other transportation	other 336	1,667	73	1,594	1,155 - 1,165	0 - 10	1,155	1,088 - 1,098	57 - 67		
Furniture and related products	337	513	20	492	4	*	3	*	3		
Miscellaneous	339	19,517	941	18,576	235 - 243	9 - 22	215 - 233	65 - 72	147 - 168		
Medical equipment and supplies	3391	16,815	871	15,944	183	10	173	36	137		
Other miscellaneous manufacturing	3399	2,702	70	2,632	53 - 60	0 - 12	42 - 60	29 - 36	9 - 31		
Nonmanufacturing industries	21-23, 42-81	205,595	4,029	201,566	29,824	2,215	27,608	7,195	20,414		
Mining, quarrying, oil and gas extraction, and support activities	21	1,199	79	1,121	45	0	45	3	42		
Utilities	22	414	190	224	48	8	40	35	5		
Wholesale trade	42	1,155	154	1,001	106	49	58	0	58		

TABLE 43

**Domestic R&D performance by source of funds and performer, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Paid for by the company			Paid for by others					
		Total	R&D performed by others (purchased and collaborative R&D)	R&D performed by the company	Total	R&D performed by others (subcontracted/ passed-through R&D costs)	R&D performed by the company			
							Total	Paid for by the U.S. government	Paid for by non-U.S. government sources	
Electronic shopping and electronic auctions	454111-12	3,837 - 19,445	0 - 106	3,837 - 19,343	2 - 50	0	2 - 50	0	2 - 50	
Transportation and warehousing	48-49	5,156	203	4,954	3	0	3	0	3	
Information	51	130,486	2,136	128,350	1,224	111	1,113	364	749	
Publishing	511	35,762	1,246	34,516	562	52	509	65	444	
Newspaper, periodical, book, and directory publishers	5111	64	4	60	0	0	0	0	0	
Software publishers	5112	35,698	1,242	34,456	562	52	509	65	444	
Telecommunications	517	3,825	453	3,371	54 - 68	0 - 3	54 - 66	2 - 14	40 - 63	
Data processing, hosting, and related services	518	41,390	285	41,105	503	57	446	287	159	
Other information	other 51	49,510	153	49,358	91 - 107	0 - 3	91 - 105	0 - 11	81 - 105	
Finance and insurance	52	12,494	290	12,204	93	1	92	45	47	
Real estate and rental and leasing	53	3,249	*	3,249	*	0	*	0	*	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	0	7	*	0	*	0	*	
Other real estate and rental and leasing	other 53	3,242	*	3,242	0	0	0	0	0	
Professional, scientific, and technical services	54	29,166	844	28,322	28,067	2,022	26,045	6,733	19,313	
Architectural, engineering, and related services	5413	2,278	65	2,214	2,451	450	2,001	1,466	534	
Computer systems design and related services	5415	14,531	239	14,293	3,662	19	3,643	662	2,980	
Scientific research and development services	5417	6,739	493	6,246	20,822	1,468	19,354	3,914	15,439	
Research and development in nanotechnology	541713	125 - 129	0 - 3	126	58	5	53	38	15	
Research and development in biotechnology (except nanobiotechnology)	541714	1,358	182	1,176	5,112	98	5,014	117	4,898	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,213 - 5,219	307 - 312	4,906	13,643 - 14,999	11 - 1,367	13,632	3,157	10,476	
Research and development in the social sciences and humanities	541720	38	0	38	653 - 2,008	0 - 1,354	654	603	51	
Other professional, scientific, and technical services	other 54	5,617	47	5,570	1,132	84	1,048	690	359	
Health care services	621-23	1,405 - 1,408	31 - 34	1,374	102 - 105	0 - 2	103	13	90	

TABLE 43

**Domestic R&D performance by source of funds and performer, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Paid for by the company			Paid for by others					
		Total	R&D performed by others (purchased and collaborative R&D)	R&D performed by the company	Total	R&D performed by the company				
						R&D performed by others (subcontracted/ passed-through R&D costs)	Total	Paid for by the U.S. government	Paid for by non-U.S. government sources	
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	1,429 - 17,036	0 - 106	1,429 - 16,934	83 - 136	21 - 27	62 - 109	2	59 - 107	
All companies (number of domestic employees)	–	504,793	38,631	466,162	80,901	9,444	71,457	28,905	42,552	
Small companies										
10–19 <sup>a</sup>	–	4,579	560	4,019	1,159	131	1,029	445	584	
20–49	–	12,703	1,733	10,970	2,366	342	2,025	856	1,169	
Medium companies										
50–99	–	12,667	1,490	11,177	2,198	382	1,816	604	1,212	
100–249	–	25,069	2,938	22,132	3,838	558	3,280	1,499	1,781	
Large companies										
250–499	–	19,693	1,626	18,067	3,111	300	2,811	1,070	1,741	
500–999	–	20,622	2,164	18,458	3,253	446	2,807	467	2,340	
1,000–4,999	–	80,110	4,193	75,917	13,964	1,643	12,322	2,744	9,577	
5,000–9,999	–	48,050	5,599	42,451	6,547	602	5,945	814	5,131	
10,000–24,999	–	81,357	8,530	72,827	17,784	2,044	15,739	1,330	14,409	
25,000 or more	–	199,943	9,798	190,145	26,680	2,996	23,684	19,075	4,609	

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is based on the dominant business code for domestic R&amp;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&amp;D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 44

**R&D paid for by the company and others and performed by the company outside of the United States, by selected location: 2020**

(Millions of U.S. dollars)

Location	Total		Paid for by the company		Paid for by others	
Total	109,705		98,187		11,518	i
Puerto Rico <sup>a</sup>	533	i	515	i	18	
Canada	7,586		6,892		694	
Latin America and other Western Hemisphere	4,594	i	4,154		439	i
Argentina	390		266		125	i
Brazil	1,199		1,067		132	i
Chile	188		166		22	i
Mexico	1,087		1,000		87	i
Other Latin American and Western Hemisphere locations	1,729	i	1,655	i	74	i
Africa	481	i	379		102	i
South Africa	249	i	153		96	i
Other African locations	232		225		7	i
Asia and Pacific	36,070		33,502		2,567	i
Australia	2,167		1,960		207	i
China	8,985		8,373		612	
Hong Kong	493		472		21	i
India	11,067		10,677		391	i
Indonesia	31		28		3	i
Japan	4,490		3,789		701	i
Malaysia	925		912		13	i
New Zealand	250		159		91	i
Singapore	2,624		2,423		201	i
South Korea	1,650		1,483		167	i
Taiwan	2,232		2,130		102	i
Thailand	370		344		26	i
Other Asian or Pacific locations	786		753		33	i
Europe	52,624		45,171		7,452	i
Austria	521	i	457		64	i
Belgium	2,683		2,452		231	i
Czechia	503		439		64	i
Denmark	656		598		58	i
Finland	658		618		40	
France	3,633		2,958		675	i
Germany	8,600		7,859		741	i
Hungary	258		163		95	i
Ireland	5,229		5,078		151	i
Italy	1,643		1,402		241	i
Luxembourg	244		237		8	
Netherlands	2,845		2,051		793	i
Norway	392		375		17	
Poland	1,020		846		173	i
Russia	573		449		123	i
Spain	1,584	i	1,003		581	i
Sweden	1,402		1,278		124	i
Switzerland	5,097		4,589		508	
Turkey	250		225		25	i
United Kingdom	12,284		9,847		2,437	i
Other European locations	2,550		2,248		302	i
Middle East	7,174		7,040		133	i
Israel	6,827		6,720		107	i
Other Middle Eastern locations	347		320		27	i

TABLE 44

**R&D paid for by the company and others and performed by the company outside of the United States, by selected location: 2020**

(Millions of U.S. dollars)

Location	Total		Paid for by the company		Paid for by others	
Undistributed	645	i	533	i	112	i

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

<sup>a</sup> Puerto Rico is not included in the U.S. total due to its classification as a U.S. territory.

**Note(s):**

Detail may not add to total because of rounding. Country detail was not collected from companies reporting less than \$1 million of R&D paid for by the company or reporting less than \$1 million of R&D paid for by others. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 45-A

## R&amp;D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part A)

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Puerto Rico <sup>a</sup>	Canada	Austria	Belgium	Czechia	Denmark	Finland	France	Germany	Hungary	Ireland	Italy	Luxembourg	Netherlands	Norway	Poland	Russia	Spain	Sweden	Switzerland	Turkey	United Kingdom	Other European locations
All industries	21-23, 31-33, 42-81	109,705	533 i	7,586	521	2,683	503	656	658	3,633	8,600	258	5,229	1,643	244	2,845	392	1,020	573	1,584	1,402	5,097	250	12,284	2,550
Manufacturing industries	31-33	66,243	512 i	3,693	395	2,359	194	428	401	2,082	6,573	104	3,009	1,288	166	1,210	303	647	322	708	574	3,326	113	5,234	1,412
Food	311	1,153 - 1,161	0 - 259	41	3	13	4	8	*	59	53	3	1	9	0	20	7	28	15	14	2	19	14	99	54
Beverage and tobacco products	312	759	0	0 - 75	0	20	0	0	0	0	*	0	8	47	0	0	0	0	7	2	0	409	0	51	7
Textile, apparel, and leather products	313-16	152	0	2	0	16 i	2	0	4	18	8	0	0	3	0	3	0	0	0	0	3	30	0	5	9
Wood products	321	8	0	0 - 7	0	0 - 7	0	0	0	2	0 - 7	0	0	0	0	0	0	0	0	0	1 i	0	0	0	0
Paper	322	93	0	0 - 63	0	0	0	0	1	2	9	0	0	* i	0	1	0	1	1 i	* i	*	1	1	4 i	1 i
Printing and related support activities	323	10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum and coal products	324	165	0	0 - 105	*	0 - 39	0	3	0	4	7	0	0	0 - 11	0	6	0 - 5	0	0	*	*	*	0	42	*
Chemicals	325	19,362	76 - 118	587	182 i	1,960	31	160	43	669	1,497	31	1,398	387	149	540	44	127	136	339	151	1,908	77	2,175	784
Basic chemicals	3251	846	0	0 - 24	1	48	2	7	3	63	135	*	9	77	0	47	1	1	*	20	3	27	7	96	9
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	512	0	4	3 i	25	0	0	*	8	47	0	0	12	149	26	0	*	1	3	0	5	*	14	24
Pesticide, fertilizer, and other agricultural chemicals	3253	92 - 108	0 - 35	2	0 - 4	0	0	0 - 20	0	6	6	*	0	1	0	3	0	*	*	1	0	*	0 - 5	2	1
Pharmaceuticals and medicines	3254	16,761	77	540	176 i	1,776	29	135	39	554	1,084	30	1,387	288	0	429	42	118	132	312	146	1,855	66	1,887	738
Soap, cleaning compound, and toilet preparation	3256	767	0 - 21	20 i	*	102	*	0	*	24	179	1	0	3	0	9	0	3	1	1	0	16	1	118	2
Paint, coating, adhesive, and other chemicals	3255, 3259	370 - 385	0	0 - 24	0 - 4	9	*	0 - 20	1	14	46	*	2	6	*	27 i	*	4	1	2	2	5	0 - 5	58	9
Plastics and rubber products	326	529	0	19 i	0	11 i	1	0	2	63	91 i	1	2	38	5	9 i	0	2	1	5	*	9	0	15	26
Nonmetallic mineral products	327	206 i	0	0 - 140	0	4	*	1 i	0	16 i	0 - 59 i	0	0	0	0	0	0 - 5	5 i	4 i	*	0	14	0	0 - 36	2
Primary metals	331	32	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	*	0	0	1	4
Fabricated metal products	332	349	0	30	6	3	10	1	5	6	35	*	*	6	0	3	2 i	3	*	2	*	28	0	36	*
Machinery	333	4,285	0 - 43	124	30 i	28	2	65	79	366	734	3	9	225	0	104	61 i	31 i	3	37	53	52	*	321	39
Agricultural implement	33311	639 - 681	0	0 - 110	1	0 - 13	*	10	0 - 80	0 - 183	0 - 615	*	0	13	0	20 i	0	*	*	8	*	0 - 31	*	0 - 271	2
Semiconductor machinery	333242	1,027	0	7	26 i	16	0	0	0	2	54 i	0	4	8 i	0	1 i	0	0	0	0	0	0	0	3	10
Engine, turbine, and power transmission equipment	3336	558	0	9	1	*	*	44	0	183	67	1	*	20	0	19	0	1	0	14	0	22	*	49	0
Other machinery	other 333	2,021 - 2,062	0 - 43	0 - 110	2	0 - 13 i	2	11	0 - 80 i	0 - 183 i	0 - 615	1	5	185	0	63	61 i	30 i	3	15	53	0 - 31	0	0 - 271	28
Computer and electronic products	334	26,567	137 - 408 i	1,934	115	123	95	160	225	471	1,695	23	1,232	214	4	227	146	251	92	203 i	222	388	8	1,279	353

TABLE 45-A

## R&amp;D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part A)

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Puerto Rico <sup>a</sup>	Canada	Austria	Belgium	Czechia	Denmark	Finland	France	Germany	Hungary	Ireland	Italy	Luxembourg	Netherlands	Norway	Poland	Russia	Spain	Sweden	Switzerland	Turkey	United Kingdom	Other European locations	
Communications equipment	3342	3,388	*	613	0-43	29	14	24	24	65	121	0-11	73	61	*	38	15-101	74	2	7	42	35	0-3	213	49	
Semiconductor and other electronic components	3344	13,023	2	833	73	45	23	51	77	200	567	4	386	93	0	47	40	162	79	32	23	57	6	463	81	
Navigational, measuring, electromedical, and control instruments	3345	3,146	*	314	0-43	37	46	48	122	127	525	10	16	38	4	108	6-90	0-17	7-13	27	139	221	0	358	117	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	498	i 0	0-42	0	4	*	*	27	i 23	90	i 0	1	5	0	2	0	0	8	*	7	106	i 0	103	24	i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	684	*	210	*	11	0-47	0-49	0	17	0-341	0	*	6	0	12	7	0	0	0-28	0-133	0-116	0	69	5	
Other measuring and controlling device	other 3345	1,964	0	61-105	0-43	22	0-47	0-49	95	88	93-436	10	15	27	4	94	0-83	0-17	0-5	0-28	0-133	0-116	0	185	88	
Other computer and electronic products	other 334	7,010	134-407	i 173	0-43	11	11	37	2	79	482	0-11	757	23	0	34	*	0-17	0-5	137	i 17	75	0-3	245	105	
Electrical equipment, appliances, and components	335	1,794	0-25	358	i 20	10	1	1	7	74	251	2	12	105	0	14	8	24	3	2	*	72	2	128	25	
Transportation equipment	336	6,515	0	359	1	63	25	2	0	125	1,547	21	8	196	7	168	0	163	i *	77	52	9	i 5	864	65	i
Motor vehicles, bodies, trailers, and parts	3361-63	5,789-5,801	0	265	1	63	12	0	0	75	1,424	21	6	70	i 7	166	0	139	i *	41	51	*	3	741	55	i
Aerospace products and parts	3364	509	0	40	0	0	13	2	0	26	99	0	2	125	*	2	0	22	0	0	*	*	2	104	9	
Aircraft, aircraft engine, and aircraft parts	336411-13	500	0	38	0	0	13	2	0	19	99	0	2	125	*	1	0	22	0	0	*	*	2	104	9	
Guided missile, space vehicle, and related parts	336414-15, 336419	10	0	2	0	0	0	0	0	8	0	0	0	0	0	*	0	0	0	0	0	0	0	*	0	
Military armored vehicle, tank, and tank component	336992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other transportation	other 336	206-216	0	55	0	0	*	i 0	0	24	i 25	0	0	*	*	1	0	2	0	37	1	i 9	0	18	1	
Furniture and related products	337	39	0	3	0	0	0	6	0	7	2	0	0	5	0	*	0	0	0	0	*	0	0	11	i 1	
Miscellaneous	339	4,217-4,224	0-298	i 240	38	i 75-114	21	21	34	i 199	i 587-646	18	i 338	48-59	1	i 117	34	i 12	i 61	23	88	386	5	174-211	41	
Medical equipment and supplies	3391	3,822	0-162	i 162	32	i 76	12	20	34	i 186	i 588	18	i 336	49	0	115	34	i 2	61	22	73	385	4	175	27	
Other miscellaneous manufacturing	3399	396-403	0-292	0-240	6	0-39	i 9	i *	*	13	0-59	0	2	i 0-11	1	i 2	0	9	i 0	1	i 15	1	1	i 0-36	14	
Nonmanufacturing industries	21-23, 42-81	43,462	21	3,893	126	324	309	228	257	1,552	2,027	154	2,221	i 355	i 78	i 1,635	89	373	250	876	i 828	1,771	137	7,050	1,137	
Mining, quarrying, oil and gas extraction, and support activities	21	120-127	i 0	0-84	i 0	0-11	i *	i 0	0	0-84	0-84	i 0	0	0	0	0-84	2	i 0	0-11	i 0	0	0	0	40	i 0	
Utilities	22	6	0	0-2	*	0	*	0	0	0	0	0	0	0	0	0	0	*	*	*	0	0	0	*	0	
Wholesale trade	42	45	0	0-17	i 0	0	0	0	0	0	0-17	0	0	1	i 0	0-17	0	0	0	0	0	0	0	1	i *	i
Electronic shopping and electronic auctions	454111-12	97-4,884	i 0	0-392	i 0-7	i *	i 1	i 0-10	i 2	i 109	i 0-421	i *	i 850	i 14-50	i 30-76	i 0-128	i 1	i 0-34	i *	0-44	27-53	0-11	0-22	0-370	i 0-50	i
Transportation and warehousing	48-49	37	0	0-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0-34	0	0	0	0	0	0	0	



TABLE 45-A

**R&D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part A)**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Puerto Rico <sup>a</sup>	Canada	Austria	Belgium	Czechia	Denmark	Finland	France	Germany	Hungary	Ireland	Italy	Luxembourg	Netherlands	Norway	Poland	Russia	Spain	Sweden	Switzerland	Turkey	United Kingdom	Other European locations	
Information	51	22,900	0 - 18	2,534	65	158	220	168	212	678	732	38 - 70	1,084	62 - 93	3 - 34	712	79	177	116	228	580	1,150	92	3,624	691	
Publishing	511	7,683	0 - 17	1,219	11	0 - 134	76	117	49	224	253	0 - 31	214	38	3	0 - 200	49	49	68	115	476	0 - 200	0 - 59	764	277	
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Software publishers	5112	7,683	0 - 17	1,219	11	0 - 134	76	117	49	224	253	0 - 31	214	38	3	0 - 200	49	49	68	115	476	0 - 200	0 - 59	764	277	
Telecommunications	517	94	0	5	0	2	0	0 - 25	0	2	0 - 42	0	2	0	*	1	0	0 - 42	0	4	0	1	0	17	1	
Data processing, hosting, and related services	518	8,147	0 - 18	1,013	47	24	140	28	0 - 164	322	224	39	543	25	1	464	0 - 31	72	46	88	0 - 105	70	34	850	343	
Other information	other 51	6,976	0 - 18	296	7	0 - 134	3	0 - 25	0 - 164	131	211 - 257	0 - 31	325	0 - 31	0 - 31	46 - 249	0 - 31	12 - 58	2	20	0 - 105	878 - 1,081	0 - 59	1,993	70	
Finance and insurance	52	1,541	0	0 - 419	0 - 7	0 - 11	i 6	0	0	0 - 109	i 0 - 421	i 0 - 34	0 - 850	1	i *	0 - 128	0	0 - 34	i 0 - 11	0 - 44	i 56	11	0 - 22	i 308	35	i
Real estate and rental and leasing	53	163	*	0 - 110	0	*	0	0 - 10	0	8	6	0	0 - 151	*	0	*	0	0	*	*	0	*	*	0 - 151	*	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0 - 15	0	0 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other real estate and rental and leasing	other 53	148 - 164	*	0 - 110	0	*	0	0 - 10	0	8	6	0	0 - 151	*	0	*	0	0	*	*	0	*	*	0 - 151	*	
Professional, scientific, and technical services	54	13,744	i 3 - 22	942	56	i 157	i 82	i 61	i 44	759	870	83	i 288	i 243	i 0 - 13	797	i 7	164	i 125	i 606	i 141	i 601	24 - 38	i 2,710	363	i
Architectural, engineering, and related services	5413	20	0	2	i 0	0	0	*	0	*	*	0	0	*	0	2	i 0	0	0	0	*	i *	*	2	i 0	
Computer systems design and related services	5415	3,324	0 - 18	357	5	3	28	i 10	4	117	295	1	171	i 38	0 - 13	7	*	28	13	58	41	106	0 - 13	341	42	
Scientific research and development services	5417	10,070	i 4	532	49	i 154	i 54	i 51	i 39	607	i 558	i 82	i 117	i 197	i 0	767	i 6	135	i 112	i 545	i 98	i 493	25	i 2,326	i 296	i
Research and development in nanotechnology	541713	0 - 3	0	0	0	0	0	0	0	0	0 - 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	2,929	0 - 4	118	4	33	12	9	7	106	138 - 143	13	4	58	0	24	0 - 7	36	21	74	12	455	6	908	66	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7,135	i 1	414	45	i 121	i 42	i 43	i 33	502	i 416	i 69	i 113	i 139	i 0	743	i 0 - 7	i 99	i 91	i 472	i 86	i 38	i 19	i 1,418	i 230	i
Research and development in the social sciences and humanities	541720	1 - 7	0 - 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other professional, scientific, and technical services	other 54	330	*	52	2	*	0	0	0	34	17	0	*	8	0	21	0	1	*	3	2	2	*	41	24	i
Health care services	621-23	18 - 22	i 0	*	*	0	0	0	0	0	*	0	0	0	0	0 - 22	i 0	0	0	0	0	0 - 22	0	0	*	0

TABLE 45-A

R&D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part A)

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Puerto Rico <sup>a</sup>	Canada	Austria	Belgium	Czechia	Denmark	Finland	France	Germany	Hungary	Ireland	Italy	Luxembourg	Netherlands	Norway	Poland	Russia	Spain	Sweden	Switzerland	Turkey	United Kingdom	Other European locations	
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1 - 4,789 i	0 - 18	0 - 406	*	0	0	0 - 10	0	*	0 - 421	*	0 - 850	0	0	0 - 128	0	0	0 - 11	0 - 44 i	0	0 - 11	*	0 - 370	0 - 50	
All companies (number of domestic employees)	-	109,705	533 i	7,586	521	2,683	503	656	658	3,633	8,600	258	5,229	1,643	244	2,845	392	1,020	573	1,584	1,402	5,097	250	12,284	2,550	
Small companies																										
10-19 <sup>b</sup>	-	290	0	114	*	1	*	0 - 5	*	8	5	0 - 14	*	1	0	*	0	5	*	7	*	13	0 - 14	16	9	
20-49	-	606	0 - 36	77	*	4	*	12	0	9	13	3	1	7	0	3	*	3	*	5	3	13	0	22	10	
Medium companies																										
50-99	-	798	0	32	14	13	12	0 - 5	2	6	43	0	2	4	0	7	1 i	13	5	6	29	59	0 - 24	85	38	
100-249	-	2,072	17	117	1	17	10	6	1	129	69	0 - 26	21	70	0	96	1	13	30	26	17	455	0 - 26 i	140	45	
Large companies																										
250-499	-	2,866	0 - 36	536	18	3	4	21	4	74	132	0 - 36	94	36	0 - 36	176	6	25	11	27	30	53	0 - 36	252	48	
500-999	-	3,187	0 - 36	244	12	36	6	29	45	78	209	39	75	74	0 - 82	37	21	27	60	27	52	94	0 - 61	667	114	
1,000-4,999	-	18,520	32	2,640	38	218	64	154	183	691	1,344	46	866	144	9	343	36	132	95	189	420 i	579	46	1,727	875	
5,000-9,999	-	11,845	25	840	45 i	147	46 i	139	65 i	713	754	56	500	233	8	535	60 i	229 i	67 i	165	252	335	39	1,240	140 i	
10,000-24,999	-	23,186	426 i	599	237 i	528	77	123	73 i	955 i	2,360	64 i	451 i	671	147	871	i	89	221	106 i	772 i	258	463	45	2,930 i	638 i
25,000 or more	-	46,336	0 - 36	2,387	155	1,717	284	172	285	970	3,673	0 - 53	3,218	402	0 - 82	i	776	178	351	199	359	342	3,033	62	5,207	635

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Puerto Rico is not included in the U.S. total due to its classification as a U.S. territory.

<sup>b</sup> 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. Country detail was not collected from companies reporting less than \$1 million of R&D paid for by the company or reporting less than \$1 million of R&D paid for by others. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 45-B

## R&amp;D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part B)

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Argentina	Brazil	Chile	Mexico	Other Latin American locations	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia	New Zealand	Singapore	South Korea	Taiwan	Thailand	Other Asian or Pacific locations	Israel	Other Middle Eastern locations	South Africa	Other African locations	Undistributed
All industries	21-23, 31-33, 42-81	109,705	390	1,199	188	1,087	1,729	2,167	8,985	493	11,067	31	4,490	925	250	2,624	1,650	2,232	370	786	6,827	347	249	232	645
Manufacturing industries	31-33	66,243	152	825	115	828	1,541	1,114	6,544	241	5,329	3-27	2,899	897	87-140	1,765	1,225	1,401	233-312	554	4,399	212	81	184	489
Food	311	1,153-1,161	0-25	97	0-28	34	66	33	107	1	45	0-24	0-40	4	10	26	10	7	0-79	12	0-61	0-35	0-24	0-12	0-259
Beverage and tobacco products	312	759	0-25	0-32	0-28	27	0-43	5	48	0	10	0-24	29	0	0	19	0	0	0-75	0-16	0	0-35	3	0	0
Textile, apparel, and leather products	313-16	152	*	1	*	1	4	2	21	5	*	0	2	*	0-14	*	2	0-14	0	8	0	0	0	0	*
Wood products	321	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0-7
Paper	322	93	0-25	0-32	*	1	2	1	1	0	*	*	0	*	0	8	2	1	*	1	0-61	*	1	*	0-63
Printing and related support activities	323	10	0	0	0	0	0	0	*	0	5	0	0	0	0	0	0	*	0	0	0	0	0	0	1
Petroleum and coal products	324	165	0	0	0	0	0	1	0-94	0	1	0	0-40	0	0	1	*	0	*	0	0	0-35	0	0	0-105
Chemicals	325	19,362	114	296	75	139	221	292	1,462	104	558	0-25	1,324	33	0-38	313	182	113	28-66	97	282	116	47	40	0-42
Basic chemicals	3251	846	3	22	1	8	4	2	97	1	9	0-24	15	1	*	60	3	6	0-34	6	21	10	0-7	2	0-37
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	512	1	13	0	3	2	3	35	3	8	*	27	*	*	2	9	1	2	40	0	21	0	19	*
Pesticide, fertilizer, and other agricultural chemicals	3253	92-108	*	12	*	2	1	*	4	1	4	1	2	*	*	4	*	*	2	2	0	0	0	0	0-42
Pharmaceuticals and medicines	3254	16,761	105	216	72	109	201	277	1,163	98	501	0-24	1,240	27	0-27	169	165	103	26	34	250	83	38	0-21	0-26
Soap, cleaning compound, and toilet preparation	3256	767	3	26	*	5	11	2	110	1	9	0-21	32	3	*	73	2	0-5	0-21	3	0-13	0-4	0-7	0-21	0-21
Paint, coating, adhesive, and other chemicals	3255, 3259	370-385	2	7	2	11	*	8	53	1	27	*	9	2	0-34	5	3	0-5	0-34	12	0-13	0-4	4	0	0-42
Plastics and rubber products	326	529	3	12	0	35	1	4	77	*	6	*	8	0	*	3	3	*	6	0	16	0	0-24	0	14-70
Nonmetallic mineral products	327	206	0	2	0	5	0-43	1	16	0	1	*	2	0	0	0	0-69	0-19	0	0	0-61	*	0	0	0-140
Primary metals	331	32	0	4	0	0	0	16	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabricated metal products	332	349	1	2	*	5	*	1	23	0	4	*	47	1	13	1	1	51	*	12	0	2	3	0	4
Machinery	333	4,285	3	99	2	25	1	45	410	2-46	400	*	164	5	1-45	80	168	120	3-47	1-17	324	8	0-24	0-12	31-75
Agricultural implement	33311	639-681	2	0-99	0	0-23	*	2	0-270	0	0-236	0	*	*	2	*	0	0	0	0	0	0	0-24	0	0-43
Semiconductor machinery	333242	1,027	0	0	0	0	0	0	92	3	154	0	36	2	0	48	161	99	0	1	299	0	0	0	*

TABLE 45-B

**R&D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part B)**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Argentina	Brazil	Chile	Mexico	Other Latin American locations	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia	New Zealand	Singapore	South Korea	Taiwan	Thailand	Other Asian or Pacific locations	Israel	Other Middle Eastern locations	South Africa	Other African locations	Undistributed							
Engine, turbine, and power transmission equipment	3336	558	0	1	0	3	*	1	50	0	12	0	*	0	0	22	0	0	4	1	0	*	0	0	32							
Other machinery	other 333	2,021 - 2,062	1	0 - 99	2	0 - 23	*	42	0 - 270	0 - 43	0 - 236	*	128	2	0 - 43	10	7	21	0 - 43	0 - 16	25	8	0 - 24	0 - 12	0 - 43							
Computer and electronic products	334	26,567	2 - 27	25 - 54	i	*	180	1,135	i	150	2,736	79	3,862	3	927	848	64	1,158	239	1,052	176	378	3,461	42	3	43	i	109 - 377				
Communications equipment	3342	3,388	2	0 - 54	*	165	*	47	320	4	1,021	1	17	0 - 165	10	9	21	52	0 - 148	12	i	212	8	0 - 2	0 - 44	0 - 165						
Semiconductor and other electronic components	3344	13,023	0 - 25	0 - 54	i	*	i	181	245 - 480	i	10	1,645	52	2,145	*	461	516	10	710	119	597	29	354	2,502	5	*	i	44	i	0 - 49		
Navigational, measuring, electromedical, and control instruments	3345	3,146	1	0 - 54	0	0 - 83	0	54	328	5	89	1	47	43	25	155	12	7	*	5	34	1	2	0	0 - 43							
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	498	i	*	0 - 42	0	0 - 42	0	1	8	0	12	i	0	1	*	*	43	*	0	0	0	0	0	*	0	0 - 42					
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	684	0	0	0	0 - 83	0	0 - 54	0 - 321	1	0 - 78	0	0	*	0	0 - 113	9	2	0	0	0 - 35	1	*	0	0							
Other measuring and controlling device	other 3345	1,964	1	0 - 54	0	0 - 83	0	0 - 54	0 - 321	4	0 - 78	1	46	43	25	0 - 113	3	5	*	5	0 - 35	0	2	0	*							
Other computer and electronic products	other 334	7,010	*	0 - 54	i	*	0 - 181	654 - 889	i	40	443	19	608	0	402	i	123 - 291	i	19	284	86	i	396	0 - 148	7	i	713	29	0 - 2	0	0 - 377	
Electrical equipment, appliances, and components	335	1,794	0	46	*	33	*	15	i	379	2	56	*	69	*	*	4	40	14	i	5	4	0 - 25	0	0	0 - 12	0 - 25					
Transportation equipment	336	6,515	3	i	195	1	320	5	442	793	2	i	164	i	0	99	1	0	55	i	478	16	16	5	3	*	3	i	91	63		
Motor vehicles, bodies, trailers, and parts	3361-63	5,789 - 5,801	3	i	194	1	285	5	423	781	*	156	i	0	93	1	0	54	i	478	1	i	16	5	3	0	3	i	91	50 - 64		
Aerospace products and parts	3364	509	0	0 - 2	0	21	*	17	10	0	4	0	7	0	0	1	0	0	0	*	0	0	0	0	0	0	0	0 - 12				
Aircraft, aircraft engine, and aircraft parts	336411-13	500	0	0 - 2	0	21	*	17	10	0	4	0	7	0	0	1	0	0	0	*	0	0	0	0	0	0	0	0 - 12				
Guided missile, space vehicle, and related parts	336414-15, 336419	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Military armored vehicle, tank, and tank component	336992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Other transportation	other 336	206 - 216	0	0 - 2	i	0	15	0	2	i	2	i	2	i	5	i	0	0	0	*	i	15	*	i	0	0	*	*	i	*	i	0
Furniture and related products	337	39	0	0	0	2	0	0	*	*	0	0	0	0	0	0	0	0	*	0	1	0	0	0	0	0	0	1				
Miscellaneous	339	4,217 - 4,224	3 - 29	20	10 - 39	22	67 - 110	107	383 - 478	3 - 49	i	215	0 - 24	193 - 233	4	0 - 53	97	36 - 106	12 - 32	0 - 79	25	255 - 316	11 - 47	1	0 - 12	0 - 268						
Medical equipment and supplies	3391	3,822	4	20	11	18	68	95	384	4	i	188	i	24	194	4	0 - 53	96	37	13	0 - 79	24	256	12	1	0 - 12	0 - 162					
Other miscellaneous manufacturing	3399	396 - 403	0 - 25	i	*	0 - 28	i	4	i	0 - 43	i	12	0 - 94	0	0 - 40	0	0 - 53	i	1	0 - 69	0 - 19	0	1	i	0 - 61	0 - 35	i	*	*	i	0 - 268	

**TABLE 45-B**  
**R&D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part B)**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Argentina	Brazil	Chile	Mexico	Other Latin American locations	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia	New Zealand	Singapore	South Korea	Taiwan	Thailand	Other Asian or Pacific locations	Israel	Other Middle Eastern locations	South Africa	Other African locations	Undistributed	
Nonmanufacturing industries	21-23, 42-81	43,462	239 i	374 i	74	259	189	1,053	2,441	252	5,739	4-29	1,591 i	28 i	111-164 i	858 i	425 i	831	57-138 i	232	2,427	135 i	167 i	48	156 i	
Mining, quarrying, oil and gas extraction, and support activities	21	120-127 i	0	1 i	0	0	0	0-84	0-84 i	0	2 i	0	0-84	0	0	0	0	0	0	0	0	0-84 i	0-46	0	0	
Utilities	22	6	0	*	0	*	0	*	*	0	0	*	0	0	*	0	0	0	*	0	5	0	0-2	0	0	
Wholesale trade	42	45	0	0	0	0	0	* i	4 i	* i	1 i	1 i	0	0	0	0	0	24	0	* i	0	0	0	0	0-17 i	
Electronic shopping and electronic auctions	454111-12	97-4,884 i	1 i	19-157 i	1 i	0-25 i	0-26 i	0-285 i	0-398 i	0-88 i	0-1,136 i	0-1 i	0-671 i	0-5 i	1 i	0-332 i	0-226 i	0-24 i	0-138 i	2 i	0-198 i	0-92 i	0-46 i	* i	0	
Transportation and warehousing	48-49	37	0	*	0	0	0	0	0	0	3	0	0	0	0	0-35	0	0	0	0	0	0	0	0	*	i
Information	51	22,900	113	78-124	7-49	122	78	488	1,268	165	3,568	3-27	187-446	8	27-80	333	51-278	576	0-138	173	1,748	16	20-66	31-39	42-119 i	
Publishing	511	7,683	0-10	20	7	11	15	135	817	0-165	1,290	1	130	3	0-53	84	36	0-175	0-138	118	579	10	4	30	0-33 i	
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Software publishers	5112	7,683	0-10	20	7	11	15	135	817	0-165	1,290	1	130	3	0-53	84	36	0-175	0-138	118	579	10	4	30	0-33 i	
Telecommunications	517	94	0	*	0	0-6	1	*	2	1	10	0	0	0	0	*	5	0	0	0	6	0	*	0	0-42 i	
Data processing, hosting, and related services	518	8,147	104	23	1	107	62	168	296	0-165	1,990	3 i	58	4	27	45	12	0-172	0-138	50	648	4	17	2	0-118 i	
Other information	other 51	6,976	0-10	33-82	0-42	0-6	*	185	153	0-165	279	0-24	0-259	1	1	203	0-226	228-577	0-138	4	516	1	0-46	0-8	0-118 i	
Finance and insurance	52	1,541	1 i	2	0-42 i	0-25	14	22 i	46	0-88	0-1,040	0	0-671 i	1 i	0-53 i	0-332	5	0-24	0-138	0-54	0-198	0-92 i	0-46 i	0-8 i	0-81 i	
Real estate and rental and leasing	53	163	*	0-86	*	0-25	0-26	0-151	0-151	*	0-151	*	0-151	*	0	0-151	0-151	*	*	*	*	0	*	*	0	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other real estate and rental and leasing	other 53	148-164	*	0-86	*	0-25	0-26	0-151	0-151	*	0-151	*	0-151	*	0	0-151	0-151	*	*	*	*	0	*	*	0	
Professional, scientific, and technical services	54	13,744 i	123 i	138 i	25 i	114 i	73 i	260 i	728	0-68 i	1,032	1 i	734 i	16 i	84 i	195 i	144 i	209	0-80 i	4-59 i	478	29 i	102 i	10 i	33-53 i	
Architectural, engineering, and related services	5413	20	0	*	0	*	0	8	0-6 i	*	2	0	0	0	0	*	*	0-6	0-6	*	*	*	*	0	2 i	
Computer systems design and related services	5415	3,324	1	19	* i	48	18 i	52	210	*	687	0	72	3	9	10	1	113	0-29	0-29 i	379	3	12	3	0-20 i	
Scientific research and development services	5417	10,070 i	122 i	111 i	22 i	66 i	54 i	196 i	495	0-66 i	313 i	1 i	659 i	12 i	75 i	184 i	139 i	74 i	0-66 i	4-59 i	80 i	26 i	90 i	7 i	31 i	

**TABLE 45-B**  
**R&D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part B)**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Argentina	Brazil	Chile	Mexico	Other Latin American locations	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia	New Zealand	Singapore	South Korea	Taiwan	Thailand	Other Asian or Pacific locations	Israel	Other Middle Eastern locations	South Africa	Other African locations	Undistributed
Research and development in nanotechnology	541713	0 - 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	2,929	28	23	8	27	12	82	252	0 - 34	111	0	147	2	10	13	45	17	0 - 34	5	23	0	3	0	0 - 32
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7,135	i 94	i 88	i 14	i 38	i 41	i 113	i 244	i 66	i 202	i 1	i 511	i 10	i 65	i 172	i 94	i 57	i 0 - 66	i 54	i 58	i 26	i 86	i 7	0 - 32
Research and development in the social sciences and humanities	541720	1 - 7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0 - 6	0	0	0	1	0	0 - 6
Other professional, scientific, and technical services	other 54	330	*	8	3	*	1	4	16 - 24	*	30	0	3	*	1	1	3	15 - 24	0	0 - 30	18	0	0	0	2
Health care services	621-23	18 - 22	i 0	0	0	0	0	0 - 22	0	0	0	0	0 - 22	0	0	0	0	0	0	0	0	0	0 - 2	0	*
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1 - 4,789	i 0	*	0 - 42	i *	0 - 26	0 - 285	0 - 398	0 - 88	0 - 1,136	0	*	0 - 5	0	0 - 332	0 - 226	0	0 - 138	0 - 54	0 - 198	0 - 92	0	0	0 - 81
All companies (number of domestic employees)	-	109,705	390	1,199	188	1,087	1,729	i 2,167	8,985	493	11,067	31	4,490	925	250	2,624	1,650	2,232	370	786	6,827	347	249	i 232	645
Small companies																									
10-19 <sup>a</sup>	-	290	*	*	0	*	2	5	27	*	26	0	1	2	i 0	2	10	3	0	3	i 1	0	0	0	27
20-49	-	606	*	1	0	7	2	16	159	6	33	1	i 11	*	0	2	13	69	1	12	12	*	5	10	5 - 78
Medium companies																									
50-99	-	798	1	1	1	2	i 1	20	46	3	200	0	1	*	*	4	*	21	0	5	97	*	*	0	17
100-249	-	2,072	4	1	1	26	26	i 19	151	12	139	*	27	*	1	47	8	92	2	11	190	2	3	1	23
Large companies																									
250-499	-	2,866	10	3	1	20	12	40	216	40	188	*	68	3	24	83	124	109	2	45	310	i *	1	0	0 - 36
500-999	-	3,187	9	24	9	i 65	5	64	200	25	393	*	35	4	5	52	16	34	13	14	175	4	4	2	0 - 110
1,000-4,999	-	18,520	65	100	8	165	34	358	1,716	55	2,360	8	350	66	36	397	118	254	79	i 379	935	23	16	2	127
5,000-9,999	-	11,845	26	i 118	32	125	i 987	i 108	850	31	855	i 2	465	i 290	29	231	158	144	i 183	36	269	24	30	5	213
10,000-24,999	-	23,186	165	i 352	25	i 206	167	i 307	1,922	43	2,240	5	1,740	44	98	i 932	371	i 570	32	141	430	i 100	111	i 81	*
25,000 or more	-	46,336	111	598	111	470	493	1,229	3,699	277	4,633	14	1,792	515	56	874	831	935	58	141	4,408	193	79	i 130	92 - 236

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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. Country detail was not collected from companies reporting less than \$1 million of R&D paid for by the company or reporting less than \$1 million of R&D paid for by others. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 46

**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: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Domestic R&D					
			Total	Land acquisition	Buildings and land improvement	Equipment	Capitalized software	All other
All industries	21-23, 31-33, 42-81	686,393	32,494	147	4,060	15,731	8,436	4,120
Manufacturing industries	31-33	288,842	19,727	123	3,073	11,666	2,576	2,289
Food	311	18,659	449	17	112	224	62	34
Beverage and tobacco products	312	5,895	i 115	*	58	43	1	12
Textile, apparel, and leather products	313-16	2,001	43	*	16	12	13	2
Wood products	321	1,381	10	1	1	4	*	3
Paper	322	5,892	94	0	1	78	1	i 15
Printing and related support activities	323	1,583	66	0	*	11	53	2
Petroleum and coal products	324	21,622	115	0	0 - 25	84	0 - 32	0 - 32
Chemicals	325	57,186	5,311	19	1,661	2,336	452	844
Basic chemicals	3251	16,653	270	0	35	211	5	19
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	8,257	i 106	2	21	77	5	1
Pesticide, fertilizer, and other agricultural chemicals	3253	2,466	32 - 53	*	12	21	*	i 0 - 19
Pharmaceuticals and medicines	3254	22,872	4,619	16	1,545	1,841	425	792
Soap, cleaning compound, and toilet preparation	3256	4,547	194	*	39	136	3	16
Paint, coating, adhesive, and other chemicals	3255, 3259	2,390	72 - 93	1	9	51	13	0 - 19
Plastics and rubber products	326	10,040	310	*	65	154	5	85
Nonmetallic mineral products	327	4,747	166	i 0	25	i 125	i 1	i 16
Primary metals	331	9,752	96	0	17	66	*	13
Fabricated metal products	332	5,454	278	30	20	157	17	55
Machinery	333	16,259	1,298	2	157	727	290	122
Agricultural implement	33311	1,137	152	0	28	41	79	4
Semiconductor machinery	333242	1,902	400	1	36	313	28	21
Engine, turbine, and power transmission equipment	3336	2,398	109	0	19	80	2	7
Other machinery	other 333	10,822	638	1	74	292	181	90
Computer and electronic products	334	39,845	7,578	4	i 532	5,349	1,207	485
Communications equipment	3342	4,053	742	0	6	i 429	259	i 48
Semiconductor and other electronic components	3344	21,535	i 3,850	0	88	2,983	561	218
Navigational, measuring, electromedical, and control instruments	3345	6,783	1,046	i 4	i 99	i 673	i 97	i 173
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	864	211	i 0	21	i 152	i 22	i 15
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,223	638	i 4	i 65	i 370	i 64	i 135
Other measuring and controlling device	other 3345	2,696	197	0	13	150	11	i 23
Other computer and electronic products	other 334	7,474	1,940	*	339	1,265	290	47



TABLE 46

## Capital expenditures in the United States and for domestic R&amp;D paid for and performed by the company, by type of expenditure, industry, and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Domestic R&D						
			Total	Land acquisition	Buildings and land improvement	Equipment	Capitalized software	All other	
Electrical equipment, appliances, and components	335	3,817	638	0	34	479	21	104	
Transportation equipment	336	63,159	1,924	42	275	1,208	234	164	
Motor vehicles, bodies, trailers, and parts	3361-63	52,378	1,418	28	203	865	214	108	
Aerospace products and parts	3364	8,223	403	1	59	301	13	29	
Aircraft, aircraft engine, and aircraft parts	336411-13	7,695	318	1	35	250	11	20	
Guided missile, space vehicle, and related parts	336414-15, 336419	528	85	0	24	50	2	9	
Military armored vehicle, tank, and tank component	336992	22	1	0	*	i 1	* i	0	
Other transportation	other 336	2,537	102	13	i 14	i 41	7	27	
Furniture and related products	337	1,132	35	*	9	21	1	4	
Miscellaneous	339	20,418	1,201	7	73 - 98	589	182 - 226	288 - 338	
Medical equipment and supplies	3391	15,501	1,020	5	74	518	183	240	
Other miscellaneous manufacturing	3399	4,917	182	2	0 - 25	71	0 - 43	48 - 98	
Nonmanufacturing industries	21-23, 42-81	397,551	12,767	24	987	4,065	5,859	1,831	
Mining, quarrying, oil and gas extraction, and support activities	21	15,851	110	0	4	80	9	17 i	
Utilities	22	102,740	362	0	*	i 12	9	341	
Wholesale trade	42	5,072	181	4	53	56 i	32	36	
Electronic shopping and electronic auctions	454111-12	3 - 54,098	3 - 1,643	i 0	4	i 0 - 139	i 1,054	i 0 - 454 i	
Transportation and warehousing	48-49	20,208	220 - 311	0	*	i 14	i 207	0 - 91 i	
Information	51	153,819	5,301	1	361	2,554	2,010	374	
Publishing	511	22,655	1,091	*	186	547	232	125	
Newspaper, periodical, book, and directory publishers	5111	210	6 i	0	0	* i	2 i	5 i	
Software publishers	5112	22,445	1,085	*	186	547	231	121	
Telecommunications	517	61,468	205 i	0	*	53	148 i	3	
Data processing, hosting, and related services	518	26,346	2,130	*	146	620	1,265	100	
Other information	other 51	43,351	1,874	0	30	1,334	365	146	
Finance and insurance	52	28,420	1,969	*	i *	119	1,639 i	211	
Real estate and rental and leasing	53	1,395	35	0	0	7	26	2 i	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	65 i	2 i	0	0	* i	1 i	1 i	
Other real estate and rental and leasing	other 53	1,330	33	0	0	7	25	*	
Professional, scientific, and technical services	54	12,142	2,838	19	522	1,064	865	370	
Architectural, engineering, and related services	5413	1,381	135	*	6	28	19	81	

TABLE 46

**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: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total	Domestic R&D					
			Total	Land acquisition	Buildings and land improvement	Equipment	Capitalized software	All other
Computer systems design and related services	5415	4,543	1,148	0	63	573	363	149
Scientific research and development services	5417	3,532	1,063	18	446	415	100	84
Research and development in nanotechnology	541713	17	14	0	1	13	*	0
Research and development in biotechnology (except nanobiotechnology)	541714	1,355	328	18	88	146	39	36
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	2,151	712	*	356	253	55	48
Research and development in the social sciences and humanities	541720	9	9	0	*	3	6	0
Other professional, scientific, and technical services	other 54	2,686	493	0	7	48	383	55
Health care services	621-23	3,782	83	*	14	25	13	31
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	29 - 54,124	29 - 1,669	*	30	0 - 139	0 - 1,054	0 - 454
All companies (number of domestic employees)	-	686,393	32,494	147	4,060	15,731	8,436	4,120
Small companies								
10-19 <sup>a</sup>	-	1,784	452	2	50	152	108	141
20-49	-	8,869	1,025	1	121	525	199	178
Medium companies								
50-99	-	5,891	1,152	11	212	484	218	228
100-249	-	19,307	1,593	33	350	726	320	164
Large companies								
250-499	-	21,765	1,295	2	188	506	442	157
500-999	-	18,493	1,559	15	128	739	485	192
1,000-4,999	-	81,956	6,406	24	1,185	2,564	1,538	1,095
5,000-9,999	-	79,859	2,803	18	267	1,261	915	342
10,000-24,999	-	125,016	6,249	17	606	2,990	1,921	715
25,000 or more	-	323,454	9,960	23	953	5,785	2,290	908

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. The "undistributed" column shown in prior years is no longer necessary because of processing improvements implemented beginning in 2015. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 47

**Worldwide, domestic, and foreign total and R&D employment, by industry and company size: 2020**

(Thousands and percent)

Industry and company size	NAICS code	Worldwide employees			Domestic employees			Foreign employees		
		Total	R&D	Percent of R&D employees	Total	R&D	Percent of R&D employees	Total	R&D	Percent of R&D employees
All industries	21-23, 31-33, 42-81	33,086	2,847	8.6	22,034	1,936	8.8	11,052	910	8.2
Manufacturing industries	31-33	17,454	1,457	8.3	10,065	985	9.8	7,390	472	6.4
Food	311	1,723	44	2.6	1,125	28	2.5	598	17	2.8
Beverage and tobacco products	312	585	7	1.3	237	5	1.9	348	3	0.8
Textile, apparel, and leather products	313-16	428	8	1.9	238	6	2.7	190	1	0.8
Wood products	321	118	3	2.9	110	3	3.0	9	*	1.2
Paper	322	294	8	2.6	190	6	3.1	103	2	1.8
Printing and related support activities	323	159	5	2.8	136	4	3.1	22	*	1.5
Petroleum and coal products	324	167	8	5.1	101	6	6.1	66	2	3.6
Chemicals	325	2,518	266	10.5	1,459	193	13.2	1,059	73	6.9
Basic chemicals	3251	462	19	4.1	281	12	4.3	181	7	3.8
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	154	10	6.5	79	6	8.0	75	4	4.9
Pesticide, fertilizer, and other agricultural chemicals	3253	95	5	5.6	64	5	7.3	31	1	2.1
Pharmaceuticals and medicines	3254	1,034	193	18.7	606	146	24.1	428	47	11.0
Soap, cleaning compound, and toilet preparation	3256	445	17	3.8	249	11	4.4	196	6	3.0
Paint, coating, adhesive, and other chemicals	3255, 3259	328	21	6.4	180	12	6.8	148	9	5.9
Plastics and rubber products	326	724	32	4.4	499	27	5.4	225	5	2.2
Nonmetallic mineral products	327	227	7	3.1	165	6	3.8	62	1	1.4
Primary metals	331	182	8	4.4	138	8	5.6	43	*	0.6
Fabricated metal products	332	586	42	7.2	414	40	9.6	172	2	1.3
Machinery	333	1,786	153	8.6	899	101	11.2	887	52	5.9
Agricultural implement	33311	160	18	11.1	89	11	12.3	71	7	9.6
Semiconductor machinery	333242	96	22	22.7	37	13	35.0	59	9	15.2
Engine, turbine, and power transmission equipment	3336	226	12	5.1	94	7	7.7	132	4	3.2
Other machinery	other 333	1,304	102	7.8	679	70	10.3	625	32	5.1
Computer and electronic products	334	2,642	459	17.4	1,337	264	19.7	1,304	195	14.9
Communications equipment	3342	297	75	25.3	177	41	23.5	120	34	27.9
Semiconductor and other electronic components	3344	756	177	23.4	275	91	33.2	481	86	17.8
Navigational, measuring, electromedical, and control instruments	3345	896	96	10.7	549	67	12.1	347	29	8.5
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	110	10	9.3	68	8	11.1	42	3	6.4
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	386	40	10.4	310	35	11.4	76	5	6.6
Other measuring and controlling device	other 3345	401	46	11.4	172	24	13.9	229	22	9.5
Other computer and electronic products	other 334	692	111	16.0	337	64	19.1	356	46	13.0

TABLE 47

## Worldwide, domestic, and foreign total and R&amp;D employment, by industry and company size: 2020

(Thousands and percent)

Industry and company size	NAICS code	Worldwide employees			Domestic employees			Foreign employees		
		Total	R&D	Percent of R&D employees	Total	R&D	Percent of R&D employees	Total	R&D	Percent of R&D employees
Electrical equipment, appliances, and components	335	713	51 i	7.1	296	27	9.0	417	24 i	5.7
Transportation equipment	336	2,731	234	8.6	1,638	174	10.6	1,093	60	5.5
Motor vehicles, bodies, trailers, and parts	3361-63	1,728	151	8.7	832	101	12.1	896	50	5.6
Aerospace products and parts	3364	785	69	8.8	636	62	9.7	149	7	4.9
Aircraft, aircraft engine, and aircraft parts	336411-13	752	61	8.1	605	54	8.9	148	7	4.8
Guided missile, space vehicle, and related parts	336414-15, 336419	33	8	23.3	31	7	24.3	2	*	7.5
Military armored vehicle, tank, and tank component	336992	2	*	3.9	2	*	3.9	0	0	NA
Other transportation	other 336	216	14	6.4	168	11	6.7	48	3 i	5.4
Furniture and related products	337	195	5	2.4	156	4	2.7	39	*	1.2
Miscellaneous	339	1,678	117	7.0	926	84	9.0	752	34	4.5
Medical equipment and supplies	3391	1,247	94	7.5	635	65	10.2	612	29	4.7
Other miscellaneous manufacturing	3399	431	23	5.4	291	19	6.4	140	5	3.3
Nonmanufacturing industries	21-23, 42-81	15,632	1,390	8.9	11,970	952	8.0	3,662	438	12.0
Mining, quarrying, oil and gas extraction, and support activities	21	222	9 i	4.2	141	8	5.6	81	1 i	1.8
Utilities	22	349	0 - 20	D	340	0 - 20	D	9	*	1.0
Wholesale trade	42	448 i	13	3.0	366 i	13	3.5	82	*	0.5
Electronic shopping and electronic auctions	454111-12	58 - 4,716	58 - 147	D	58 - 4,017	58 - 80	D	0 - 703	0 - 70	D
Transportation and warehousing	48-49	1,335	13	1.0	1,041	13	1.2	294	*	0.1
Information	51	3,224	626	19.4	2,244	422	18.8	980	204	20.9
Publishing	511	739	188	25.4	452	113	25.1	287	74	25.9
Newspaper, periodical, book, and directory publishers	5111	6	1	10.6	5	1	11.3	*	0	0.0
Software publishers	5112	733	187	25.5	447	113	25.2	286	74	25.9
Telecommunications	517	638	23	3.5	552	21	3.8	86	2	1.8
Data processing, hosting, and related services	518	1,297	271	20.9	839	171	20.3	458	100	21.8
Other information	other 51	550	146	26.5	401	117	29.2	149	29	19.3
Finance and insurance	52	2,153	88	4.1	1,751	66	3.8	402	22	5.4
Real estate and rental and leasing	53	33	6	16.9	27	5	19.0	6	*	7.2
Lessors of nonfinancial intangible assets (except copyrighted works)	533	2	*	3.7	2 i	*	2.7	*	*	53.3
Other real estate and rental and leasing	other 53	31	5	17.8	25	5	20.2	6	*	6.9
Professional, scientific, and technical services	54	2,403	443	18.5	1,308	300	22.9	1,095	144	13.1
Architectural, engineering, and related services	5413	354	56	15.8	276	55	20.1	78	*	0.6
Computer systems design and related services	5415	977	136	13.9	428	94	21.8	548	42	7.7
Scientific research and development services	5417	397	203	51.0	257	107	41.8	141	95 i	67.7

TABLE 47

**Worldwide, domestic, and foreign total and R&D employment, by industry and company size: 2020**

(Thousands and percent)

Industry and company size	NAICS code	Worldwide employees			Domestic employees			Foreign employees								
		Total	R&D	Percent of R&D employees	Total	R&D	Percent of R&D employees	Total	R&D	Percent of R&D employees						
Research and development in nanotechnology	541713	2	i	1	i	43.9	2	i	1	i	45.7	*	*	i	2.3	
Research and development in biotechnology (except nanobiotechnology)	541714	128		62		48.5	88		30		34.1	40	32		80.6	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	259		133	i	51.2	159		70		43.9	101	i	63	i	62.8
Research and development in the social sciences and humanities	541720	8		7		85.9	8		7		86.8	*	*		36.4	
Other professional, scientific, and technical services	other 54	675		49		7.2	347		43		12.4	328	6		1.7	
Health care services	621-23	715		8		1.1	700		8		1.1	15	*		0.7	
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	39 - 4,697		39 - 110		D	39 - 3,998		40		D	0 - 703	0 - 70		D	
All companies (number of domestic employees)	-	33,086		2,847		8.6	22,034		1,936		8.8	11,052	910		8.2	
Small companies																
10-19 <sup>a</sup>	-	87		36		41.5	75		32		42.8	12	4		33.4	
20-49	-	380		102		26.9	319		94		29.5	62	8		13.6	
Medium companies																
50-99	-	446		102		22.9	394		89		22.5	52	13		25.4	
100-249	-	1,029		165		16.0	789		145		18.4	240	20		8.2	
Large companies																
250-499	-	990		135		13.6	750		112		14.9	240	23		9.7	
500-999	-	1,304		135		10.4	910		96		10.6	394	39		9.9	
1,000-4,999	-	4,727		484		10.2	2,899		327		11.3	1,828	157		8.6	
5,000-9,999	-	3,095		265		8.6	1,815		169		9.3	1,281	96		7.5	
10,000-24,999	-	6,115		494		8.1	3,345		277		8.3	2,769	217		7.8	
25,000 or more	-	14,912		928		6.2	10,739		595		5.5	4,174	333		8.0	

\* = amount < 500 employees; 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 = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 48

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, R&D employment, and R&D cost per R&D employee, by industry and company size: 2020**

(Millions of U.S. dollars, number of employees in thousands, and cost per employee in thousands of U.S. dollars)

Industry and company size	NAICS code	Company-performed R&D (US\$millions)			R&D employment (thousands)			Company-performed R&D per R&D employee (US\$thousands per employee)		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
All industries	21-23, 31-33, 42-81	647,324	537,619	109,705	2,847	1,936	910	227.4	277.6	120.5
Manufacturing industries	31-33	374,688	308,445	66,243	1,457	985	472	257.2	313.3	140.3
Food	311	6,392 - 6,399	5,239	1,153 - 1,161	44	28	17	D	188.6	D
Beverage and tobacco products	312	1,935	1,177	759	7	5	3	259.1	259.9	258.0
Textile, apparel, and leather products	313-16	973	822	152	8	6	1	122.5	127.4	101.4
Wood products	321	195	187	8	3	3	*	56.9	56.3	75.5
Paper	322	1,021	928	93	8	6	2	132.8	159.1	50.2
Printing and related support activities	323	294	283	10	5	4	*	65.1	67.6	32.6
Petroleum and coal products	324	1,476 - 1,490	1,311 - 1,324	165	8	6	2	D	D	70.3
Chemicals	325	120,440	101,079	19,362	266	193	73	453.4	524.8	265.1
Basic chemicals	3251	3,540	2,694	846	19	12	7	185.9	221.1	123.4
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,745	1,234	512	10	6	4	175.5	196.4	139.8
Pesticide, fertilizer, and other agricultural chemicals	3253	1,157 - 1,172	1,060 - 1,066	92 - 108	5	5	1	D	D	D
Pharmaceuticals and medicines	3254	108,537	91,776	16,761	193	146	47	561.3	627.9	355.2
Soap, cleaning compound, and toilet preparation	3256	3,432	2,665	767	17	11	6	202.8	241.4	130.3
Paint, coating, adhesive, and other chemicals	3255, 3259	2,013 - 2,028	1,643 - 1,649	370 - 385	21	12	9	D	D	D
Plastics and rubber products	326	3,162	2,634	529	32	27	5	98.8	97.1	108.9
Nonmetallic mineral products	327	1,924	1,717	206	7	6	1	269.5	273.9	237.7
Primary metals	331	847	815	32	8	8	*	106.3	105.9	119.8
Fabricated metal products	332	3,746	3,396	349	42	40	2	89.0	85.3	152.4
Machinery	333	20,508	16,223	4,285	153	101	52	134.1	160.8	82.4
Agricultural implement	33311	2,450	1,769 - 1,811	639 - 681	18	11	7	137.9	D	D
Semiconductor machinery	333242	5,834	4,807	1,027	22	13	9	268.1	376.2	114.4
Engine, turbine, and power transmission equipment	3336	2,203	1,645	558	12	7	4	191.0	227.3	129.8
Other machinery	other 333	10,022	7,959 - 8,001	2,021 - 2,062	102	70	32	98.4	D	D
Computer and electronic products	334	126,102	99,535	26,567	459	264	195	275.0	377.4	136.3
Communications equipment	3342	15,491	12,103	3,388	75	41	34	206.2	291.8	100.7
Semiconductor and other electronic components	3344	56,204	43,181	13,023	177	91	86	317.9	473.2	152.2
Navigational, measuring, electromedical, and control instruments	3345	21,651	18,505	3,146	96	67	29	225.5	277.9	107.0



TABLE 48

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, R&D employment, and R&D cost per R&D employee, by industry and company size: 2020**

(Millions of U.S. dollars, number of employees in thousands, and cost per employee in thousands of U.S. dollars)

Industry and company size	NAICS code	Company-performed R&D (US\$millions)			R&D employment (thousands)			Company-performed R&D per R&D employee (US\$thousands per employee)		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,356	2,858	498	10	8	3	327.9	378.2	186.0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	11,270	10,586	684	40	35	5	280.8	301.3	136.7
Other measuring and controlling device	other 3345	7,025	5,061	1,964	46	24	22	154.0	211.8	90.4
Other computer and electronic products	other 334	32,756	25,747	7,010	111	64	46	296.0	399.7	151.6
Electrical equipment, appliances, and components	335	6,792	4,998	1,794	51	27	24	134.1	187.4	74.8
Transportation equipment	336	55,311	48,796	6,515	234	174	60	236.5	280.9	108.3
Motor vehicles, bodies, trailers, and parts	3361-63	28,910 - 28,922	23,121	5,789 - 5,801	151	101	50	D	229.3	D
Aerospace products and parts	3364	23,424	22,914	509	69	62	7	340.3	372.3	70.0
Aircraft, aircraft engine, and aircraft parts	336411-13	21,791	21,291	500	61	54	7	356.1	393.8	70.1
Guided missile, space vehicle, and related parts	336414-15, 336419	1,633	1,623	10	8	7	*	214.0	216.7	68.2
Military armored vehicle, tank, and tank component	336992	11	11	0	*	*	0	141.1	141.1	NA
Other transportation	other 336	2,955 - 2,966	2,750	206 - 216	14	11	3	D	244.4	D
Furniture and related products	337	535	496	39	5	4	*	113.0	116.0	85.4
Miscellaneous	339	23,013 - 23,027	18,791 - 18,809	4,217 - 4,224	117	84	34	D	D	D
Medical equipment and supplies	3391	19,938	16,116	3,822	94	65	29	212.4	247.9	132.4
Other miscellaneous manufacturing	3399	3,075 - 3,088	2,674 - 2,692	396 - 403	23	19	5	D	D	D
Nonmanufacturing industries	21-23, 42-81	272,637	229,174	43,462	1,390	952	438	196.1	240.8	99.2
Mining, quarrying, oil and gas extraction, and support activities	21	1,285 - 1,292	1,165	120 - 127	9	8	1	D	147.9	D
Utilities	22	271	264	6	0 - 20	0 - 20	*	D	D	66.7
Wholesale trade	42	1,104	1,058	45	13	13	*	83.5	82.7	106.0
Electronic shopping and electronic auctions	454111-12	3,937 - 24,262	3,840 - 19,390	97 - 4,884	58 - 147	58 - 80	0 - 70	D	D	D
Transportation and warehousing	48-49	4,994	4,957	37	13	13	*	376.5	384.5	100.0
Information	51	152,363	129,463	22,900	626	422	204	243.2	306.8	112.0
Publishing	511	42,708	35,025	7,683	188	113	74	227.7	309.1	103.5
Newspaper, periodical, book, and directory publishers	5111	60	60	0	1	1	0	102.0	102.0	NA
Software publishers	5112	42,648	34,965	7,683	187	113	74	228.1	310.2	103.5
Telecommunications	517	3,519 - 3,532	3,425 - 3,437	94	23	21	2	D	D	60.1

TABLE 48

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, R&D employment, and R&D cost per R&D employee, by industry and company size: 2020**

(Millions of U.S. dollars, number of employees in thousands, and cost per employee in thousands of U.S. dollars)

Industry and company size	NAICS code	Company-performed R&D (US\$millions)			R&D employment (thousands)			Company-performed R&D per R&D employee (US\$thousands per employee)		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
Data processing, hosting, and related services	518	49,697	41,551	8,147	271	171	100	183.6	243.3	81.5
Other information	other 51	56,425 - 56,440	49,449 - 49,463	6,976	146	117	29	D	D	243.1
Finance and insurance	52	13,837	12,296	1,541	88	66	22	157.3	185.7	70.9
Real estate and rental and leasing	53	3,412	3,249	163	6	5	*	617.1	634.9	396.3
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6 - 21	7	0 - 15	*	*	*	D	128.5	D
Other real estate and rental and leasing	other 53	3,390 - 3,406	3,242	148 - 164	5	5	*	D	640.3	D
Professional, scientific, and technical services	54	68,112	54,367	13,744	i 443	300	144	153.6	181.4	95.7
Architectural, engineering, and related services	5413	4,235	4,214	20	56	55	*	75.7	76.0	44.8
Computer systems design and related services	5415	21,259	17,935	3,324	136	94	42	156.4	191.7	78.5
Scientific research and development services	5417	35,670	25,600	10,070	i 203	107	95	i 176.0	238.3	105.7
Research and development in nanotechnology	541713	179 - 182	i 179	i 0 - 3	1	i 1	i *	i D	193.7	D
Research and development in biotechnology (except nanobiotechnology)	541714	9,120	6,191	2,929	62	30	32	146.8	205.9	91.4
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	25,674	i 18,539	i 7,135	i 133	i 70	63	i 193.3	266.1	112.9
Research and development in the social sciences and humanities	541720	692 - 698	691	1 - 7	7	7	*	D	101.9	D
Other professional, scientific, and technical services	other 54	6,948	6,618	330	49	43	6	142.4	153.3	58.9
Health care services	621-23	1,495 - 1,498	1,477	18 - 22	i 8	8	*	D	185.4	D
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,504 - 21,828	1,491 - 17,041	1 - 4,789	i 39 - 110	40	0 - 70	D	D	D
All companies (number of domestic employees)	-	647,324	537,619	109,705	2,847	1,936	910	227.4	277.6	120.5
Small companies										
10-19 <sup>a</sup>	-	5,338	5,047	290	36	32	4	147.9	157.3	72.4
20-49	-	13,600	12,994	606	102	94	8	132.8	138.2	72.1
Medium companies										
50-99	-	13,791	12,993	798	102	89	13	135.3	146.3	60.8
100-249	-	27,483	25,411	2,072	165	145	20	166.9	175.2	105.2
Large companies										
250-499	-	23,743	20,878	2,866	135	112	23	175.7	186.5	123.5
500-999	-	24,451	21,264	3,187	135	96	39	180.7	220.6	81.9

TABLE 48

**Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, R&D employment, and R&D cost per R&D employee, by industry and company size: 2020**

(Millions of U.S. dollars, number of employees in thousands, and cost per employee in thousands of U.S. dollars)

Industry and company size	NAICS code	Company-performed R&D (US\$millions)			R&D employment (thousands)			Company-performed R&D per R&D employee (US\$thousands per employee)		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
1,000–4,999	–	106,758	88,238	18,520	484	327	157	220.6	269.8	118.1
5,000–9,999	–	60,241	48,397	11,845	265	169	96	227.3	285.8	123.7
10,000–24,999	–	111,753	88,567	23,186	494	277	217	226.3	320.1	106.8
25,000 or more	–	260,165	213,829	46,336	928	595	333	280.3	359.3	139.1

\* = amount < 500 employees; 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; NA = not available.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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. Ratios were calculated using unrounded data. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 49

## Worldwide, domestic, and foreign R&amp;D employment, by sex, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Worldwide			Domestic			Foreign		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
All industries	21-23, 31-33, 42-81	2,847	2,050	797	1,936	1,419	517	910	631	280
Manufacturing industries	31-33	1,457	1,083	373	985	736	249	472	347	125
Food	311	44	25	19	28	17	11	17	9	8
Beverage and tobacco products	312	7	4	3	5	3	2	3	1	1
Textile, apparel, and leather products	313-16	8	5	3	6	4	2	1	1	1
Wood products	321	3	3	1	3	3	1	*	*	*
Paper	322	8	6	2	6	4	1	2	1	1
Printing and related support activities	323	5	3	1	4	3	1	*	*	*
Petroleum and coal products	324	8	6	2	6	5	2	2	2	1
Chemicals	325	266	139	127	193	102	91	73	37	36
Basic chemicals	3251	19	13	6	12	9	3	7	4	3
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	10	7	2	6	5	2	4	3	1
Pesticide, fertilizer, and other agricultural chemicals	3253	5	4	2	5	3	2	1	* i	*
Pharmaceuticals and medicines	3254	193	93	100	146	71	75	47	22	25
Soap, cleaning compound, and toilet preparation	3256	17	8	9	11	6	5	6	3	3
Paint, coating, adhesive, and other chemicals	3255, 3259	21	14	7	12	8	4	9	6	3
Plastics and rubber products	326	32	26	6 i	27	22	5	5 i	4 i	1 i
Nonmetallic mineral products	327	7	6	1	6	5	1	1 i	1 i	* i
Primary metals	331	8	7	1	8	7	1	*	*	*
Fabricated metal products	332	42	38	4	40	36	4	2	2	*
Machinery	333	153	131	22	101	87	14	52	44	8
Agricultural implement	33311	18 i	15 i	2 i	11	10	1	7 i	6 i	1 i
Semiconductor machinery	333242	22	18	3	13	11	2	9	8	1
Engine, turbine, and power transmission equipment	3336	12	10	2	7	6	1	4	4	1
Other machinery	other 333	102	87	15	70	60	10	32	27	5
Computer and electronic products	334	459	369	89	264	214	50	195	156	39
Communications equipment	3342	75	62	13	41	34	7	34	28	6
Semiconductor and other electronic components	3344	177	143	34	91	74	17	86	69	17
Navigational, measuring, electromedical, and control instruments	3345	96	76	20	67	54	13	29	22	7
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	10	7	3	8	6	2	3 i	2	1 i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	40	33	7	35	29	6	5	4	1
Other measuring and controlling device	other 3345	46	36	10	24	19	5	22	17	5
Other computer and electronic products	other 334	111	88	23	64	51	13	46	36	10
Electrical equipment, appliances, and components	335	51 i	40 i	11 i	27	22	5	24 i	18 i	6 i

TABLE 49

## Worldwide, domestic, and foreign R&amp;D employment, by sex, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Worldwide			Domestic			Foreign		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
Transportation equipment	336	234	193	41	174	144	30	60	49	11
Motor vehicles, bodies, trailers, and parts	3361-63	151	125	26	101	84	17	50	41	9
Aerospace products and parts	3364	69	58	11	62	52	10	7	6	1
Aircraft, aircraft engine, and aircraft parts	336411-13	61	51	10	54	46	9	7	6	1
Guided missile, space vehicle, and related parts	336414-15, 336419	8	6	1	7	6	1	*	*	*
Military armored vehicle, tank, and tank component	336992	*	*	*	*	*	*	0	0	0
Other transportation	other 336	14	11	3	11	9	3	3 i	2 i	*
Furniture and related products	337	5	4	1	4	3	1	*	*	*
Miscellaneous	339	117	78	39	84	56	27	34	22	12
Medical equipment and supplies	3391	94	61	33	65	43	22	29	19	10
Other miscellaneous manufacturing	3399	23	17	6 i	19	14	5 i	5	3 i	1 i
Nonmanufacturing industries	21-23, 42-81	1,390	967	423	952	683	268	438	283	155
Mining, quarrying, oil and gas extraction, and support activities	21	9 i	8 i	2 i	8	6-8	0-2	1 i	0-2 i	0-2 i
Utilities	22	0-20	0-20	*	0-20	0-20	0-1	*	0-1	0-1
Wholesale trade	42	13	11	2	13	10-12	1-3	*	0-1	0-1
Electronic shopping and electronic auctions	454111-12	58-147	26-128	0-51	58-80	26-80	0-32	0-70	0-48	0-24
Transportation and warehousing	48-49	13	10 i	3	13	9-11 i	2-4	*	0-1	0-1
Information	51	626	468	158	422	317	105	204	151	53
Publishing	511	188	137	51	113	86	28 i	74	51	23
Newspaper, periodical, book, and directory publishers	5111	1	*	*	1	*	*	0	0	0
Software publishers	5112	187	136	50	113	85	28 i	74	51	23
Telecommunications	517	23	17 i	5	21	16 i	5	2	1	*
Data processing, hosting, and related services	518	271	201	69	171	125	45	100	76 i	24
Other information	other 51	146	113	33	117	90	27	29	23	6
Finance and insurance	52	88	55	33	66	41	26	22	15	7
Real estate and rental and leasing	53	6	4	2	5	3-5	1-3	*	0-1	0-1
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	*	*	*	0-1	0-1 i	*	0-1	0-1
Other real estate and rental and leasing	other 53	5	4	2	5	3-4	1-2	*	0-1	0-1
Professional, scientific, and technical services	54	443	270	173	300	200	100	144	71	73 i
Architectural, engineering, and related services	5413	56	43	13	55	42	13	*	*	*
Computer systems design and related services	5415	136	107	29	94	74	20	42	33	9
Scientific research and development services	5417	203	88	115 i	107	55	53	95 i	33 i	62 i
Research and development in nanotechnology	541713	1 i	1 i	* i	1 i	1 i	* i	* i	* i	* i
Research and development in biotechnology (except nanobiotechnology)	541714	62	27	35	30	13	17	32	13	19

TABLE 49

**Worldwide, domestic, and foreign R&D employment, by sex, industry, and company size: 2020**

(Thousands)

Industry and company size	NAICS code	Worldwide			Domestic			Foreign		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	133 i	58 i	74 i	70	39 i	31 i	63 i	20 i	43 i
Research and development in the social sciences and humanities	541720	7	2	5	7	2	5	*	*	*
Other professional, scientific, and technical services	other 54	49	33	16	43	29	14	6	4	2 i
Health care services	621-23	8	4	4	8	3-5	3-5	*	0-1	0-1
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	39-110	7-89	0-51	40	7-41	0-32	0-70	0-48	0-24
All companies (number of domestic employees)	-	2,847	2,050	797	1,936	1,419	517	910	631	280
Small companies										
10-19 <sup>a</sup>	-	36	28	8	32	25	7	4	3	1
20-49	-	102	81	22	94	74	20	8	7	2
Medium companies										
50-99	-	102	81	21	89	71	18	13	10	3
100-249	-	165	126	39	145	111	34	20	14	5
Large companies										
250-499	-	135	104	31	112	86	26	23	18	5
500-999	-	135	103	33	96	73	24	39	30	9
1,000-4,999	-	484	350	134	327	236	91	157	114	43
5,000-9,999	-	265	186	79	169	121	48	96	64	31
10,000-24,999	-	494	324	170	277	185	91	217	139	78 i
25,000 or more	-	928	668	261	595	436	159	333	232	101

\* = amount &lt; 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 50

## Worldwide total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
All industries	21-23, 31-33, 42-81	33,086	2,847	1,924	163	658	265
Manufacturing industries	31-33	17,454	1,457	1,025	107	274	157
Food	311	1,723	44	23	4	12	9
Beverage and tobacco products	312	585	7	5	1	2	1
Textile, apparel, and leather products	313-16	428	8	3	1	3	1
Wood products	321	118	3	1	*	2	*
Paper	322	294	8	5	*	2	1
Printing and related support activities	323	159	5	2	* i	1	1
Petroleum and coal products	324	167	8	3	1	4	1
Chemicals	325	2,518	266	171	44	47	48
Basic chemicals	3251	462	19	10	3	7	1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	154	10	6	1	3	1
Pesticide, fertilizer, and other agricultural chemicals	3253	95	5	3	1	1	1
Pharmaceuticals and medicines	3254	1,034	193	123	36	29	41
Soap, cleaning compound, and toilet preparation	3256	445	17	13	2	2	2
Paint, coating, adhesive, and other chemicals	3255, 3259	328	21	15	2	4	2
Plastics and rubber products	326	724	32	15	1 i	12	5
Nonmetallic mineral products	327	227	7	4	i 1	2	1
Primary metals	331	182	8	2	*	2	4
Fabricated metal products	332	586	42	18	1	17	7
Machinery	333	1,786	153	98	6	41	14
Agricultural implement	33311	160	18	12	i 1	4	i 2
Semiconductor machinery	333242	96	22	15	2	6	1
Engine, turbine, and power transmission equipment	3336	226	12	9	1	2	*
Other machinery	other 333	1,304	102	62	2	29	11
Computer and electronic products	334	2,642	459	385	32	i 44	30
Communications equipment	3342	297	75	59	3	i 10	6
Semiconductor and other electronic components	3344	756	177	159	13	i 11	6
Navigational, measuring, electromedical, and control instruments	3345	896	96	78	8	i 14	5
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	110	10	8	1	i 2	* i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	386	40	34	3	i 4	2
Other measuring and controlling device	other 3345	401	46	36	4	7	2
Other computer and electronic products	other 334	692	111	88	7	i 9	i 13

TABLE 50

## Worldwide total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
Electrical equipment, appliances, and components	335	713	51	37	1	9	5
Transportation equipment	336	2,731	234	174	9	40	20
Motor vehicles, bodies, trailers, and parts	3361-63	1,728	151	117	6	23	11
Aerospace products and parts	3364	785	69	49	3	14	6
Aircraft, aircraft engine, and aircraft parts	336411-13	752	61	44	3	12	5
Guided missile, space vehicle, and related parts	336414-15, 336419	33	8	5	*	2	1
Military armored vehicle, tank, and tank component	336992	2	*	*	*	*	0
Other transportation	other 336	216	14	8	*	3	3
Furniture and related products	337	195	5	2	*	2	1
Miscellaneous	339	1,678	117	75	6	32	10
Medical equipment and supplies	3391	1,247	94	60	5	26	8
Other miscellaneous manufacturing	3399	431	23	14	1	6	3
Nonmanufacturing industries	21-23, 42-81	15,632	1,390	899	56	384	107
Mining, quarrying, oil and gas extraction, and support activities	21	222	9	3-6	1	1-4	1
Utilities	22	349	0-20	1	*	0-20	0-13
Wholesale trade	42	448	13	6	*	5	2
Electronic shopping and electronic auctions	454111-12	58-4,716	58-147	40-105	*	13-55	2-14
Transportation and warehousing	48-49	1,335	13	11	*	1	1
Information	51	3,224	626	464	30	121	41
Publishing	511	739	188	147	9	29	12
Newspaper, periodical, book, and directory publishers	5111	6	1	*	*	*	*
Software publishers	5112	733	187	146	9	29	12
Telecommunications	517	638	23	10	1	12	*
Data processing, hosting, and related services	518	1,297	271	191	5	54	25
Other information	other 51	550	146	116	14	26	4
Finance and insurance	52	2,153	88	50	1	30	9
Real estate and rental and leasing	53	33	6	5	*	1	*
Lessors of nonfinancial intangible assets (except copyrighted works)	533	2	*	*	*	*	*
Other real estate and rental and leasing	other 53	31	5	5	*	1	*
Professional, scientific, and technical services	54	2,403	443	242	23	162	40
Architectural, engineering, and related services	5413	354	56	36	2	16	5
Computer systems design and related services	5415	977	136	101	4	25	10



TABLE 50

## Worldwide total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
Scientific research and development services	5417	397	203	80	14 i	101 i	21 i
Research and development in nanotechnology	541713	2 i	1 i	1 i	* i	* i	* i
Research and development in biotechnology (except nanobiotechnology)	541714	128	62	28	4	34	1
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	259	133 i	48	9 i	67 i	17 i
Research and development in the social sciences and humanities	541720	8	7	3	1	1	3
Other professional, scientific, and technical services	other 54	675	49	25	2 i	20	4
Health care services	621-23	715	8	4	1 i	2	2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	39 - 4,697	39 - 110	8 - 76	* i	0 - 51	0 - 13
All companies (number of domestic employees)	-	33,086	2,847	1,924	163	658	265
Small companies							
10-19 <sup>b</sup>	-	87	36	24	4	10	3
20-49	-	380	102	59	8	33	10
Medium companies							
50-99	-	446	102	57	6	36	9
100-249	-	1,029	165	96	9	49	19
Large companies							
250-499	-	990	135	94	7	30	11
500-999	-	1,304	135	89	6	33	13
1,000-4,999	-	4,727	484	335	26 i	102	47
5,000-9,999	-	3,095	265	176	18	55	33
10,000-24,999	-	6,115	494	292	28	147 i	55
25,000 or more	-	14,912	928	702	50 i	163	64

\* = amount &lt; 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Researchers include R&D scientists and engineers and their managers.<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 51

## Domestic total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
All industries	21-23, 31-33, 42-81	22,034	1,936	1,312	129	443	181
Manufacturing industries	31-33	10,065	985	668	82	204	112
Food	311	1,125	28	14	3	9	5
Beverage and tobacco products	312	237	5	3	*	1	1
Textile, apparel, and leather products	313-16	238	6	3	1	3	1
Wood products	321	110	3	1	*	2	*
Paper	322	190	6	4	*	1	1
Printing and related support activities	323	136	4	2	* i	1	1
Petroleum and coal products	324	101	6	2	1	3	1
Chemicals	325	1,459	193	127	36	34	32
Basic chemicals	3251	281	12	7	2	4	1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	79	6	4	1	2	1
Pesticide, fertilizer, and other agricultural chemicals	3253	64	5	3	1	1	1
Pharmaceuticals and medicines	3254	606	146	96	30	23	27
Soap, cleaning compound, and toilet preparation	3256	249	11	8	1	2	2
Paint, coating, adhesive, and other chemicals	3255, 3259	180	12	9	1	2	1
Plastics and rubber products	326	499	27	13	1	10	4
Nonmetallic mineral products	327	165	6	4	*	2	1
Primary metals	331	138	8	2	*	2	3
Fabricated metal products	332	414	40	17	1	16	7
Machinery	333	899	101	63	4	29	10
Agricultural implement	33311	89	11	7	*	3	1
Semiconductor machinery	333242	37	13	9	2	3	1
Engine, turbine, and power transmission equipment	3336	94	7	5	1	1	*
Other machinery	other 333	679	70	42	2	21	7
Computer and electronic products	334	1,337	264	219	23	27	18
Communications equipment	3342	177	41	32	2	6	3
Semiconductor and other electronic components	3344	275	91	79	10	8	4
Navigational, measuring, electromedical, and control instruments	3345	549	67	54	6	9	3
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	68	8	6	1	1	*
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	310	35	30	3	4	1
Other measuring and controlling device	other 3345	172	24	18	3	4	1
Other computer and electronic products	other 334	337	64	53	5	5	7

TABLE 51

## Domestic total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
Electrical equipment, appliances, and components	335	296	27	18	1 i	6	3
Transportation equipment	336	1,638	174	125	6	32	16
Motor vehicles, bodies, trailers, and parts	3361-63	832	101	77	3	15	9
Aerospace products and parts	3364	636	62	42	2	13	6
Aircraft, aircraft engine, and aircraft parts	336411-13	605	54	38	2	12	5
Guided missile, space vehicle, and related parts	336414-15, 336419	31	7	5	* i	2	1
Military armored vehicle, tank, and tank component	336992	2	*	*	*	*	0
Other transportation	other 336	168	11	6	*	3	2
Furniture and related products	337	156	4	2	*	2	1
Miscellaneous	339	926	84	51	4	24	8
Medical equipment and supplies	3391	635	65	40	4	19	6
Other miscellaneous manufacturing	3399	291	19	11 i	1 i	5	2
Nonmanufacturing industries	21-23, 42-81	11,970	952	643	46 i	239	69
Mining, quarrying, oil and gas extraction, and support activities	21	141	8	4	0-2 i	2 i	1
Utilities	22	340	0-20	0-2	*	0-20	0-12
Wholesale trade	42	366 i	13	6	0-1 i	5	2
Electronic shopping and electronic auctions	454111-12	58-4,017	58-80	40-64	*	14	3
Transportation and warehousing	48-49	1,041	13	11	* i	1 i	1 i
Information	51	2,244	422	317	24 i	83	23
Publishing	511	452	113	93	7 i	14	6
Newspaper, periodical, book, and directory publishers	5111	5	1	*	*	*	* i
Software publishers	5112	447	113	93	7 i	14	6
Telecommunications	517	552	21	10 i	1 i	11 i	*
Data processing, hosting, and related services	518	839	171	120	3 i	37	13
Other information	other 51	401	117	93	12	21	3
Finance and insurance	52	1,751	66	33-47	1 i	10-31	0-10
Real estate and rental and leasing	53	27	5	4	*	1 i	*
Lessors of nonfinancial intangible assets (except copyrighted works)	533	2 i	*	*	*	* i	* i
Other real estate and rental and leasing	other 53	25	5	4	*	1 i	*
Professional, scientific, and technical services	54	1,308	300	176	19 i	95	29

TABLE 51

## Domestic total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
Architectural, engineering, and related services	5413	276	55	35	2	16	5
Computer systems design and related services	5415	428	94	65	4 i	22	7
Scientific research and development services	5417	257	107	54	11	39	14
Research and development in nanotechnology	541713	2 i	1 i	1 i	* i	* i	* i
Research and development in biotechnology (except nanobiotechnology)	541714	88	30	14	3	15	1
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	159	70	36	7 i	23 i	11 i
Research and development in the social sciences and humanities	541720	8	7	3	1	1	3
Other professional, scientific, and technical services	other 54	347	43	22	2 i	18	3
Health care services	621-23	700	8	4	0-2 i	2	2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	39-3,998	40	8-41	0-1	0-30	0-12
All companies (number of domestic employees)	-	22,034	1,936	1,312	129	443	181
Small companies							
10-19 <sup>b</sup>	-	75	32	21	4	9	3
20-49	-	319	94	54	8	30	10
Medium companies							
50-99	-	394	89	52	6	29	8
100-249	-	789	145	83	8	44	18
Large companies							
250-499	-	750	112	76	6	26	10
500-999	-	910	96	60	5	26	10
1,000-4,999	-	2,899	327	221	20	71	35
5,000-9,999	-	1,815	169	114	12	33	21
10,000-24,999	-	3,345	277	173	22	72	31
25,000 or more	-	10,739	595	457	37 i	103	35

\* = amount &lt; 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Researchers include R&D scientists and engineers and their managers.<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 52

## Foreign total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
All industries	21-23, 31-33, 42-81	11,052	910	613	35	214	83
Manufacturing industries	31-33	7,390	472	357	25	70	45
Food	311	598	17	9	1	4	4
Beverage and tobacco products	312	348	3	2	*	1	*
Textile, apparel, and leather products	313-16	190	1	1	* i	1	*
Wood products	321	9	*	* i	* i	*	*
Paper	322	103	2	2	*	*	*
Printing and related support activities	323	22	*	*	* i	*	*
Petroleum and coal products	324	66	2	1	* i	1	*
Chemicals	325	1,059	73	44	8	13	16
Basic chemicals	3251	181	7	3	1	3	1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	75	4	2	*	1	*
Pesticide, fertilizer, and other agricultural chemicals	3253	31	1	* i	*	*	*
Pharmaceuticals and medicines	3254	428	47	27	6	6	14
Soap, cleaning compound, and toilet preparation	3256	196	6	5	1	*	*
Paint, coating, adhesive, and other chemicals	3255, 3259	148	9	6	*	2	1
Plastics and rubber products	326	225	5 i	2 i	* i	2 i	1 i
Nonmetallic mineral products	327	62	1 i	* i	* i	* i	*
Primary metals	331	43	*	*	*	* i	*
Fabricated metal products	332	172	2	2	*	*	*
Machinery	333	887	52	35	2	12	4
Agricultural implement	33311	71	7 i	5 i	* i	1 i	* i
Semiconductor machinery	333242	59	9	6	*	2	*
Engine, turbine, and power transmission equipment	3336	132	4	4	1	1	*
Other machinery	other 333	625	32	20 i	1	9	3
Computer and electronic products	334	1,304	195	166	8 i	16	12
Communications equipment	3342	120	34	27	1 i	4	3
Semiconductor and other electronic components	3344	481	86	80	4 i	4 i	2
Navigational, measuring, electromedical, and control instruments	3345	347	29	24	2 i	5	1
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	42	3 i	2 i	* i	*	* i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	76	5	4	*	1	*
Other measuring and controlling device	other 3345	229	22	17	1	3	1
Other computer and electronic products	other 334	356	46	35	2 i	5 i	7 i

TABLE 52

## Foreign total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff			
				Total	With PhD					
Electrical equipment, appliances, and components	335	417	24	i	19	i	*	i	3	2
Transportation equipment	336	1,093	60		49		3		8	3
Motor vehicles, bodies, trailers, and parts	3361-63	896	50		40		2		7	3
Aerospace products and parts	3364	149	7		6	i	*		1	*
Aircraft, aircraft engine, and aircraft parts	336411-13	148	7		6	i	*		1	*
Guided missile, space vehicle, and related parts	336414-15, 336419	2	*		*		*	i	0	0
Military armored vehicle, tank, and tank component	336992	0	0		0		0		0	0
Other transportation	other 336	48	3	i	2	i	*	i	*	i
Furniture and related products	337	39	*		*		0		*	*
Miscellaneous	339	752	34		24		1		8	2
Medical equipment and supplies	3391	612	29		20		1		7	2
Other miscellaneous manufacturing	3399	140	5		3	i	*	i	1	*
Nonmanufacturing industries	21-23, 42-81	3,662	438		256		10	i	144	38
Mining, quarrying, oil and gas extraction, and support activities	21	81	1	i	0-2	i	0-2	i	0-2	i
Utilities	22	9	*		0-1		0		0-1	0-1
Wholesale trade	42	82	*		*		0-1		*	*
Electronic shopping and electronic auctions	454111-12	0-703	0-70		0-41		0		0-41	0-11
Transportation and warehousing	48-49	294	*		*		*		*	*
Information	51	980	204		148		6		38	18
Publishing	511	287	74		53		2	i	15	6
Newspaper, periodical, book, and directory publishers	5111	*	0		0		0		0	0
Software publishers	5112	286	74		53		2	i	15	6
Telecommunications	517	86	2		1		*		1	*
Data processing, hosting, and related services	518	458	100		71		1	i	17	12
Other information	other 51	149	29		23		2		5	1
Finance and insurance	52	402	22		3-17		*	i	0-19	0-10
Real estate and rental and leasing	53	6	*		*		*		*	0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	*		*		*		*	0
Other real estate and rental and leasing	other 53	6	*		*		*	i	*	0
Professional, scientific, and technical services	54	1,095	144		66		4	i	67	i



TABLE 52

## Foreign total employment, R&amp;D employment, and level of education of researchers, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total employment	Total R&D employment	Researchers <sup>a</sup>		R&D technicians and equivalent staff	Other R&D supporting staff
				Total	With PhD		
Architectural, engineering, and related services	5413	78	*	*	*	*	*
Computer systems design and related services	5415	548	42	36	* i	3	3
Scientific research and development services	5417	141	95 i	26	3 i	63 i	7 i
Research and development in nanotechnology	541713	*	* i	* i	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	40	32	14	1	18	*
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	101 i	63 i	12	2 i	44 i	7 i
Research and development in the social sciences and humanities	541720	*	*	*	0	0	*
Other professional, scientific, and technical services	other 54	328	6	3	* i	1 i	1
Health care services	621-23	15	*	*	0-1	*	*
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	0-703	0-70	0-41	0-1 i	0-41	0-11
All companies (number of domestic employees)	-	11,052	910	613	35	214	83
Small companies							
10-19 <sup>b</sup>	-	12	4	3	*	1	*
20-49	-	62	8	5	*	3	1
Medium companies							
50-99	-	52	13	6	1	7	1
100-249	-	240	20	13	1	5	2
Large companies							
250-499	-	240	23	18	1	4	1
500-999	-	394	39	29	1 i	7	3
1,000-4,999	-	1,828	157	114	6 i	31	12
5,000-9,999	-	1,281	96	62	5 i	22 i	12
10,000-24,999	-	2,769	217	118	7	75 i	24
25,000 or more	-	4,174	333	245	13	60	28

\* = amount &lt; 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Researchers include R&D scientists and engineers and their managers.<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 53

## Domestic full-time equivalent R&amp;D employees and researchers, by work status, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	FTE R&D employees <sup>a</sup>				FTE R&D scientists and engineers <sup>b</sup>			
		Total	Full-time R&D employees	Full-time employees working on R&D part time	Part-time employees working on R&D	Total	Full-time R&D employees	Full-time employees working on R&D part time	Part-time employees working on R&D
All industries	21-23, 31-33, 42-81	1,765	1,472	272	21	1,201	1,038	152	10
Manufacturing industries	31-33	888	757	119	11	608	541	61	6
Food	311	24	20	3	1	12	11	1	i *
Beverage and tobacco products	312	4	3	1	*	3	3	*	*
Textile, apparel, and leather products	313-16	5	4	1	* i	2	2	*	* i
Wood products	321	2	1	1	*	1	1	*	*
Paper	322	4	3	1	*	3	3	*	*
Printing and related support activities	323	3	2	1	*	1	1	*	i *
Petroleum and coal products	324	6	5	*	*	2	2	*	*
Chemicals	325	187	179	7	1	118	114	3	i 1
Basic chemicals	3251	11	10	1	*	7	6	*	*
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	6	5	*	*	4	3	*	*
Pesticide, fertilizer, and other agricultural chemicals	3253	4	4	*	*	3	3	*	*
Pharmaceuticals and medicines	3254	143	139	4	i 1	88	86	2	i *
Soap, cleaning compound, and toilet preparation	3256	10	9	1	*	8	7	*	i *
Paint, coating, adhesive, and other chemicals	3255, 3259	12	11	1	*	9	8	*	*
Plastics and rubber products	326	19	13	i 6	*	10	i 8	i 2	i *
Nonmetallic mineral products	327	5	3	2	i *	3	2	1	i *
Primary metals	331	6	1	5	*	2	1	1	*
Fabricated metal products	332	27	14	12	1	13	8	5	*
Machinery	333	82	59	22	1	53	40	12	*
Agricultural implement	33311	10	9	1	*	6	6	*	i *
Semiconductor machinery	333242	12	12	*	i *	9	i 8	i *	i *
Engine, turbine, and power transmission equipment	3336	7	6	1	*	5	4	*	i *
Other machinery	other 333	53	31	21	1	33	21	12	*
Computer and electronic products	334	251	225	23	4	207	189	16	3
Communications equipment	3342	41	38	3	i *	32	30	2	i *
Semiconductor and other electronic components	3344	87	76	8	2	74	67	5	2
Navigational, measuring, electromedical, and control instruments	3345	59	47	11	1	48	39	9	1
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	7	7	1	*	6	5	*	i *
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	30	21	8	1	26	18	7	1

TABLE 53

## Domestic full-time equivalent R&amp;D employees and researchers, by work status, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	FTE R&D employees <sup>a</sup>				FTE R&D scientists and engineers <sup>b</sup>			
		Total	Full-time R&D employees	Full-time employees working on R&D part time	Part-time employees working on R&D	Total	Full-time R&D employees	Full-time employees working on R&D part time	Part-time employees working on R&D
Other measuring and controlling device	other 3345	22	20	2	*	17	15	1	*
Other computer and electronic products	other 334	64	64	*	*	53	53	*	i *
Electrical equipment, appliances, and components	335	24	20	3	1	16	14	2	* i
Transportation equipment	336	155	131	22	1	113	99	13	1
Motor vehicles, bodies, trailers, and parts	3361-63	95	89	5	1	73	70	3	*
Aerospace products and parts	3364	49	34	i 14	1 i	35 i	25 i	9	* i
Aircraft, aircraft engine, and aircraft parts	336411-13	45	32	i 13	* i	32 i	24 i	8	* i
Guided missile, space vehicle, and related parts	336414-15, 336419	4	2	2	*	3	2	1	*
Military armored vehicle, tank, and tank component	336992	*	*	*	*	*	*	*	0
Other transportation	other 336	10	7	3 i	*	5 i	4	1 i	*
Furniture and related products	337	4	2	1	*	2	1	*	*
Miscellaneous	339	79	69	8	1	47	44	3	*
Medical equipment and supplies	3391	64	59	4	1	39	38	1	*
Other miscellaneous manufacturing	3399	15 i	11	4 i	* i	8 i	6 i	2 i	* i
Nonmanufacturing industries	21-23, 42-81	878	715	153	10	593	497	92	5
Mining, quarrying, oil and gas extraction, and support activities	21	7	5 i	2 i	* i	4	4 i	* i	* i
Utilities	22	1	1	*	* i	0-2	0-2	0-1	0-1
Wholesale trade	42	10 i	6	4 i	* i	5 i	3 i	1	* i
Electronic shopping and electronic auctions	454111-12	58 - 80	0 - 45	16 - 66	*	40 - 64	0 - 37	3 - 51	* i
Transportation and warehousing	48-49	13 i	12 i	1 i	*	10 i	9 i	1 i	*
Information	51	411	384	24	2	303	289	13	1
Publishing	511	110	104	6	1	90	86	4	*
Newspaper, periodical, book, and directory publishers	5111	1	1	*	* i	*	*	*	0
Software publishers	5112	110	103	6	1	90	85	4	*
Telecommunications	517	21	19 i	2	*	9 i	9 i	1	*
Data processing, hosting, and related services	518	164	148	15	1	111	103	7	1
Other information	other 51	116	113	2	1	93	91	1 i	* i
Finance and insurance	52	55	43	12	1	34	29	4 i	* i
Real estate and rental and leasing	53	5	5	*	*	3	3	*	*
Lessors of nonfinancial intangible assets (except copyrighted works)	533	* i	* i	* i	0	* i	* i	0	0
Other real estate and rental and leasing	other 53	5	5	*	*	3	3	*	*

TABLE 53

## Domestic full-time equivalent R&amp;D employees and researchers, by work status, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	FTE R&D employees <sup>a</sup>				FTE R&D scientists and engineers <sup>b</sup>			
		Total	Full-time R&D employees	Full-time employees working on R&D part time	Part-time employees working on R&D	Total	Full-time R&D employees	Full-time employees working on R&D part time	Part-time employees working on R&D
Professional, scientific, and technical services	54	265	214	46	6	153	126	24	3
Architectural, engineering, and related services	5413	40	19	19	1	25	13	11	1
Computer systems design and related services	5415	85	72	12	1	59	52	7	1
Scientific research and development services	5417	103	95	5	3	49	46	2	1
Research and development in nanotechnology	541713	1	1	*	*	1	1	*	*
Research and development in biotechnology (except nanobiotechnology)	541714	29	28	*	1	11	11	*	*
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	66	60	4	2	34	31	2	1
Research and development in the social sciences and humanities	541720	7	6	*	*	3	3	*	*
Other professional, scientific, and technical services	other 54	37	28	9	*	19	15	4	*
Health care services	621-23	7	5	2	*	3	2	1	*
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	21 - 41	0 - 41	0 - 41	*	8 - 41	0 - 37	0 - 41	0 - 1
All companies (number of domestic employees)	-	1,765	1,472	272	21	1,201	1,038	152	10
Small companies									
10-19 <sup>c</sup>	-	29	21	6	1	19	15	4	1
20-49	-	79	55	22	2	47	35	11	1
Medium companies									
50-99	-	76	48	26	1	45	32	13	*
100-249	-	119	84	33	2	72	57	14	1
Large companies									
250-499	-	94	75	18	1	63	54	8	1
500-999	-	84	69	14	1	54	47	7	*
1,000-4,999	-	292	257	31	3	202	185	16	1
5,000-9,999	-	159	141	17	1	107	98	8	*
10,000-24,999	-	259	232	24	4	155	140	13	2
25,000 or more	-	573	489	81	3	438	377	59	3

\* = amount < 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

FTE = full-time equivalent; NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Includes scientists and engineers; their managers; and technicians, technologists, and support staff.

<sup>b</sup> Includes scientists and engineers and their managers.

<sup>c</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 54

**Domestic employment and R&D employment, by state: 2020**

(Thousands)

State	Employees		
	Total	R&D	
All states	22,034	1,936	
Alabama	250	16	
Alaska	20	*	e
Arizona	374	24	
Arkansas	153	4	
California	2,511	450	
Colorado	405	35	
Connecticut	242	18	
Delaware	64	7	
District of Columbia	36	4	
Florida	889	42	
Georgia	645	29	
Hawaii	34	2	
Idaho	88	7	
Illinois	1,025	63	
Indiana	479	34	
Iowa	254	20	
Kansas	219	17	
Kentucky	313	10	
Louisiana	156	5	
Maine	59	3	
Maryland	258	30	
Massachusetts	461	89	
Michigan	805	99	
Minnesota	640	44	
Mississippi	113	3	
Missouri	327	20	
Montana	29	2	
Nebraska	152	8	
Nevada	107	5	
New Hampshire	69	11	
New Jersey	569	63	
New Mexico	53	3	
New York	762	80	
North Carolina	622	52	
North Dakota	41	3	
Ohio	781	60	
Oklahoma	151	12	
Oregon	247	29	
Pennsylvania	746	69	
Rhode Island	36	3	
South Carolina	277	11	
South Dakota	45	2	
Tennessee	455	13	
Texas	1,661	107	
Utah	248	18	
Vermont	29	2	
Virginia	494	44	
Washington	632	133	
West Virginia	65	2	

TABLE 54

**Domestic employment and R&D employment, by state: 2020**

(Thousands)

State	Employees	
	Total	R&D
Wisconsin	502	45
Wyoming	22	1
Undistributed <sup>a</sup>	2,423	84

\* = amount < 500 employees; e = more than 50% of value is modeled—see "[Technical Notes](#)."

<sup>a</sup> 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. Beginning in survey year 2018, 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, 2020.



TABLE 55

**Foreign employment and R&D employment, by location: 2020**

(Thousands)

Location	Employees	
	Total	R&D
Total	11,052	910
Puerto Rico <sup>a</sup>	50	4 i
Canada	534	55
Latin America and other Western Hemisphere	1,749	42
Argentina	79	4 i
Brazil	359	12
Chile	54	1
Mexico	952	17
Other Latin American and Western Hemisphere locations	305	7
Africa	133	6
South Africa	62	4
Other African locations	71	1
Asia and Pacific	3,299	418
Australia	160	13
China	906	88
Hong Kong	43	1
India	1,043	227
Indonesia	82	*
Japan	250	24
Malaysia	112	8
New Zealand	16	2
Singapore	132	11
South Korea	94	12
Taiwan	91	17
Thailand	123	4
Other Asian or Pacific locations	246	10
Europe	3,212	302
Austria	23	3
Belgium	105	12
Czechia	79	6
Denmark	25	3
Finland	18	3
France	290	22
Germany	504	56
Hungary	53	3
Ireland	129	19
Italy	152	14
Luxembourg	12	2
Netherlands	133	12
Norway	30	3
Poland	196	11
Russia	116	6
Spain	129	11
Sweden	44	7
Switzerland	70	12
Turkey	53	2
United Kingdom	786	72
Other European locations	267	23
Middle East	186	29
Israel	72	25

TABLE 55

**Foreign employment and R&D employment, by location: 2020**

(Thousands)

Location	Employees	
	Total	R&D
Other Middle Eastern locations	115	4
Undistributed <sup>b</sup>	1,888	54

\* = amount < 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

<sup>a</sup> Puerto Rico is not included in the U.S. total due to its classification as a U.S. territory.

<sup>b</sup> Includes data reported that were not allocated to a specific country.

**Note(s):**

Detail may not add to total because of rounding. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. No systematic item imputation was applied. These statistics include an adjustment to the weight to account for unit nonresponse.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 56

## Domestic temporary R&amp;D employment, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total	Researchers <sup>a</sup>	R&D technicians and equivalent staff	Other R&D supporting staff
All industries	21-23, 31-33, 42-81	250 i	161 i	56 i	33 i
Manufacturing industries	31-33	124 i	80 i	24 i	20 i
Food	311	2 i	1 i	1 i	1
Beverage and tobacco products	312	*	*	*	*
Textile, apparel, and leather products	313-16	* i	* i	* i	* i
Wood products	321	* i	* i	* i	*
Paper	322	* i	* i	* i	* i
Printing and related support activities	323	1 i	* i	* i	* i
Petroleum and coal products	324	*	* i	* i	* i
Chemicals	325	72 i	49 i	9 i	14 i
Basic chemicals	3251	* i	* i	* i	* i
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	*	*	* i	* i
Pesticide, fertilizer, and other agricultural chemicals	3253	4 i	1 i	1 i	2 i
Pharmaceuticals and medicines	3254	66 i	47 i	7 i	12 i
Soap, cleaning compound, and toilet preparation	3256	2 i	1 i	1 i	* i
Paint, coating, adhesive, and other chemicals	3255, 3259	*	*	*	* i
Plastics and rubber products	326	* i	* i	* i	* i
Nonmetallic mineral products	327	2 i	1 i	1 i	* i
Primary metals	331	*	*	*	*
Fabricated metal products	332	1 i	1 i	1 i	* i
Machinery	333	9 i	7 i	1 i	1 i
Agricultural implement	33311	*	*	* i	* i
Semiconductor machinery	333242	1 i	* i	*	* i
Engine, turbine, and power transmission equipment	3336	* i	* i	* i	* i
Other machinery	other 333	8 i	6 i	1 i	1 i
Computer and electronic products	334	13 i	8 i	3 i	1 i
Communications equipment	3342	4 i	2 i	1 i	* i
Semiconductor and other electronic components	3344	5 i	3 i	1 i	* i
Navigational, measuring, electromedical, and control instruments	3345	3 i	2 i	1 i	* i
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	1 i	* i	* i	* i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	1 i	1 i	* i	* i
Other measuring and controlling device	other 3345	1 i	1 i	* i	* i
Other computer and electronic products	other 334	1 i	1 i	1 i	* i

TABLE 56

## Domestic temporary R&amp;D employment, by activity, industry, and company size: 2020

(Thousands)

Industry and company size	NAICS code	Total	Researchers <sup>a</sup>		R&D technicians and equivalent staff		Other R&D supporting staff	
Electrical equipment, appliances, and components	335	2 i	1	i	1	i	*	i
Transportation equipment	336	9 i	5	i	3	i	1	i
Motor vehicles, bodies, trailers, and parts	3361-63	6 i	4	i	2	i	*	i
Aerospace products and parts	3364	2 i	1	i	1	i	*	
Aircraft, aircraft engine, and aircraft parts	336411-13	2 i	1		*	i	*	
Guided missile, space vehicle, and related parts	336414-15, 336419	* i	*	i	*		*	i
Military armored vehicle, tank, and tank component	336992	*	*		0		*	
Other transportation	other 336	*	*		*	i	*	i
Furniture and related products	337	*	*		*		*	
Miscellaneous	339	11	7		4		1	
Medical equipment and supplies	3391	11	6		3		1	
Other miscellaneous manufacturing	3399	1 i	*		*	i	*	
Nonmanufacturing industries	21-23, 42-81	126 i	81	i	32	i	13	i
Mining, quarrying, oil and gas extraction, and support activities	21	1 i	1	i	*	i	*	i
Utilities	22	* i	*	i	*	i	*	i
Wholesale trade	42	* i	*		*	i	*	
Electronic shopping and electronic auctions	454111-12	7	2		3		2	
Transportation and warehousing	48-49	*	*		*		*	i
Information	51	59 i	40	i	13	i	6	i
Publishing	511	18 i	9	i	6	i	3	
Newspaper, periodical, book, and directory publishers	5111	* i	*	i	*	i	*	i
Software publishers	5112	18 i	9	i	6	i	3	
Telecommunications	517	3 i	3	i	*	i	*	i
Data processing, hosting, and related services	518	15 i	10	i	3	i	1	i
Other information	other 51	23 i	18	i	3	i	2	i
Finance and insurance	52	25 i	20	i	4	i	1	
Real estate and rental and leasing	53	2 i	*		1	i	1	i
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	*		0		0	
Other real estate and rental and leasing	other 53	2 i	*		1	i	1	i
Professional, scientific, and technical services	54	27 i	15	i	9	i	2	i
Architectural, engineering, and related services	5413	1	*		*		*	i
Computer systems design and related services	5415	13 i	9	i	3	i	1	i
Scientific research and development services	5417	10 i	3	i	5	i	1	i

TABLE 56

**Domestic temporary R&D employment, by activity, industry, and company size: 2020**

(Thousands)

Industry and company size	NAICS code	Total	Researchers <sup>a</sup>		R&D technicians and equivalent staff		Other R&D supporting staff	
Research and development in nanotechnology	541713	* i	*	i	*	i	*	i
Research and development in biotechnology (except nanobiotechnology)	541714	2 i	1	i	1	i	*	i
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7 i	2	i	4	i	1	i
Research and development in the social sciences and humanities	541720	* i	*	i	0		0	
Other professional, scientific, and technical services	other 54	4 i	2	i	1	i	1	i
Health care services	621-23	2 i	2	i	*	i	*	i
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	2 i	1	i	*	i	*	i
All companies (number of domestic employees)	-	250 i	161	i	56	i	33	i
Small companies								
10-19 <sup>b</sup>		- 4 i	2	i	1	i	1	i
20-49		- 9 i	5	i	2	i	1	i
Medium companies								
50-99		- 5 i	3	i	1	i	1	i
100-249		- 12 i	6	i	4	i	1	i
Large companies								
250-499		- 9 i	5	i	2	i	1	i
500-999		- 9 i	5	i	3	i	1	i
1,000-4,999		- 32 i	16	i	8	i	8	i
5,000-9,999		- 25	17		5	i	3	
10,000-24,999		- 58 i	39	i	10	i	9	i
25,000 or more		- 88 i	64	i	18	i	6	i

\* = amount < 500 employees; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Researchers include R&D scientists and engineers and their managers.

<sup>b</sup> 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 is 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, 2020.

TABLE 57

## R&amp;D costs paid for by the company and others projected for 2021, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Projected worldwide R&D cost		Projected domestic R&D cost						Projected foreign R&D cost paid for by the company
		Paid for by the company	Paid for by others	Paid for by the company			Paid for by others			
				Total	Purchased and collaborative R&D	R&D performed by the company	Total	U.S. government	Non-U.S. government sources	
All industries	21-23, 31-33, 42-81	692,741	99,058	574,938	45,995	528,942	77,900	30,938	46,962	117,803
Manufacturing industries	31-33	426,130	55,475	347,220	41,242	305,977	47,035	22,348	24,687	78,910
Food	311	6,590	245	5,293	262	5,031	237	0	237	1,297
Beverage and tobacco products	312	2,163	101	1,186	155	1,031	101	0	101	977
Textile, apparel, and leather products	313-16	1,014	9	858	10	848	9	5	4	156
Wood products	321	218	4	210	12	199	4	*	4	8 i
Paper	322	965	1	836	3	833	1	0	1	129
Printing and related support activities	323	285	1	275	2	272	1	0	1	11
Petroleum and coal products	324	1,348	102	1,237	157	1,080	91 - 103	0	91 - 103	111
Chemicals	325	174,901	18,651	147,940	30,563	117,377	13,254	1,287	11,967	26,961
Basic chemicals	3251	3,860	163	2,924	49	2,875	158	4	154	936
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,880	106	1,315	19	1,297	63 - 91	0 - 28	63	565
Pesticide, fertilizer, and other agricultural chemicals	3253	1,029	305	873	101	772	279 - 306	0	279 - 306	157
Pharmaceuticals and medicines	3254	162,311	17,818	138,317	30,109	108,209	12,473	1,257	11,216	23,994
Soap, cleaning compound, and toilet preparation	3256	3,691	224	2,787	248	2,538	218	0	218	904
Paint, coating, adhesive, and other chemicals	3255, 3259	2,130	35	1,724	37	1,687	34	0 - 27	8 - 35	406
Plastics and rubber products	326	3,365	26	2,724	41	2,682	23	*	23	641
Nonmetallic mineral products	327	2,133	91	1,881	119	1,762	88	2	86	252
Primary metals	331	1,011	20	963	21	942	19	1	18	48
Fabricated metal products	332	3,705	73	3,350	166	3,183	61	11	50	356
Machinery	333	21,023	1,433	16,333	425	15,908	1,337	146	1,191	4,689
Agricultural implement	33311	2,837	71	1,919	174	1,745	43 - 72	*	42 - 72	918
Semiconductor machinery	333242	5,459	816	4,396	6	4,390	801	*	800	1,063
Engine, turbine, and power transmission equipment	3336	2,173	206	1,639	10	1,629	153	74	78	534
Other machinery	other 333	10,554	339	8,379	236	8,144	311 - 340	71	240 - 269	2,175
Computer and electronic products	334	133,657	11,730	102,969	3,198	99,771	10,382	5,292	5,090	30,689
Communications equipment	3342	15,703	1,313	12,118	810	11,308	1,133	433 - 636	496 - 699	3,585
Semiconductor and other electronic components	3344	65,479	3,019	49,231	308	48,923	2,659	95	2,564	16,248

TABLE 57

## R&amp;D costs paid for by the company and others projected for 2021, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Projected worldwide R&D cost		Projected domestic R&D cost						Projected foreign R&D cost paid for by the company
		Paid for by the company	Paid for by others	Paid for by the company			Paid for by others			
				Total	Purchased and collaborative R&D	R&D performed by the company	Total	U.S. government	Non-U.S. government sources	
Navigational, measuring, electromedical, and control instruments	3345	14,811	7,178	11,589	278	11,311	6,391	4,562	1,828	3,222
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,623	288	3,033	96	2,937	277	24	253	590
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	4,032	6,143	3,510	71	3,438	5,593	4,486	1,107	523
Other measuring and controlling device	other 3345	7,156	747	5,047	111	4,936	521	53	468	2,109
Other computer and electronic products	other 334	37,663	219	30,030	1,801	28,229	200	0 - 201	0 - 201	7,634
Electrical equipment, appliances, and components	335	6,678	695	4,773	79	4,694	649	48	601	1,905
Transportation equipment	336	41,414	22,015	35,481	5,076	30,404	20,544	15,509	5,035	5,933
Motor vehicles, bodies, trailers, and parts	3361-63	28,517	4,007	23,221	3,941	19,279	3,440	44 - 1,164	2,275 - 3,396	5,296
Aerospace products and parts	3364	11,004	16,861	10,567	1,071	9,496	15,986	14,346	1,640	437
Aircraft, aircraft engine, and aircraft parts	336411-13	10,228	16,077	9,803	939	8,864	15,203	13,589	1,614	425
Guided missile, space vehicle, and related parts	336414-15, 336419	776	784	764	132	632	784	757	26	12
Military armored vehicle, tank, and tank component	336992	4	0 - 1,119	4	*	4	0 - 1,119	0 - 1,119	1	0
Other transportation	other 336	1,889	26 - 1,148	1,689	64	1,625	0 - 1,119	1,119	0 - 1,119	200
Furniture and related products	337	634	5	586	30	556	4	*	4	48
Miscellaneous	339	25,024	272	20,326	922	19,403	210 - 222	46	163 - 176	4,698
Medical equipment and supplies	3391	21,274	231	17,108	809	16,299	179	29	150	4,166
Other miscellaneous manufacturing	3399	3,750	42	3,218	113	3,105	30 - 42	17	13 - 26	532
Nonmanufacturing industries	21-23, 42-81	266,611	43,583	227,718	4,753	222,965	30,866	8,590	22,276	38,893
Mining, quarrying, oil and gas extraction, and support activities	21	1,292	66	1,104	58	1,046	57	2	55	188
Utilities	22	389	46	382	197	185	45	41	5	6
Wholesale trade	42	1,245	95	1,182	136	1,046	36	0	36	62
Electronic shopping and electronic auctions	454111-12	39 - 31,592	0 - 132	39 - 25,496	40	0 - 25,457	0 - 132	0	0 - 132	0 - 6,100
Transportation and warehousing	48-49	4,475 - 10,576	3	4,476	137	4,338	3	0	3	0 - 6,100
Information	51	174,810	1,297	147,041	1,846	145,195	1,186	337	849	27,769
Publishing	511	48,499	667	39,611	838	38,773	586	60	526	8,889

TABLE 57

## R&amp;D costs paid for by the company and others projected for 2021, by industry and company size: 2020

(Millions of U.S. dollars)

Industry and company size	NAICS code	Projected worldwide R&D cost		Projected domestic R&D cost						Projected foreign R&D cost paid for by the company
		Paid for by the company	Paid for by others	Paid for by the company			Paid for by others			
				Total	Purchased and collaborative R&D	R&D performed by the company	Total	U.S. government	Non-U.S. government sources	
Newspaper, periodical, book, and directory publishers	5111	68	0	68	3	64	0	0	0	0
Software publishers	5112	48,432	667	39,543	834	38,709	586	60	526	8,889
Telecommunications	517	4,097	5 - 156	3,993	453	3,539	5 - 156	6	0 - 150	104
Data processing, hosting, and related services	518	57,551	475	47,055	394	46,661	445	270	175	10,497
Other information	other 51	64,662	0 - 151	56,383	161	56,222	0 - 151	1	0 - 150	8,279
Finance and insurance	52	14,687	111	13,128	299	12,829	21	0	21	1,560
Real estate and rental and leasing	53	2,106	*	2,015	0	2,015	*	0	*	91
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6	*	4	0	4	*	0	*	2
Other real estate and rental and leasing	other 53	2,100	0	2,011	0	2,011	0	0	0	90
Professional, scientific, and technical services	54	34,019	41,732	30,959	1,346	29,613	29,288	8,198	21,089	3,060
Architectural, engineering, and related services	5413	2,540	2,559	2,513	147	2,366	2,403	1,897	506	27
Computer systems design and related services	5415	15,210	3,901	12,877	247	12,629	3,778	851	2,927	2,334
Scientific research and development services	5417	10,037	34,026	9,629	857	8,772	21,891	4,576	17,315	407
Research and development in nanotechnology	541713	151	67	150	*	150	63	26	36	2
Research and development in biotechnology (except nanobiotechnology)	541714	2,087	8,688	1,874	435	1,439	5,552	195	5,357	213
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7,762	24,549	7,569	422	7,147	15,554	3,688	11,867	192
Research and development in the social sciences and humanities	541720	36	722	36	0	36	722	667	55	*
Other professional, scientific, and technical services	other 54	6,232	1,246	5,940	94	5,846	1,215	874	342	292
Health care services	621-23	1,929	103	1,868	622	1,246	101	11	90	60
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	70 - 31,623	0 - 135	70 - 25,527	71	0 - 25,457	0 - 133	1	0 - 132	0 - 6,100
All companies (number of domestic employees)	-	692,741	99,058	574,938	45,995	528,942	77,900	30,938	46,962	117,803
Small companies										
10-19 <sup>a</sup>	-	5,721	1,257	5,119	917	4,202	1,125	666	458	602
20-49	-	17,350	2,621	16,090	2,820	13,270	2,293	983	1,310	1,260
Medium companies										
50-99	-	16,315	2,559	14,998	2,155	12,843	2,061	646	1,416	1,318
100-249	-	33,881	3,995	30,767	3,874	26,894	3,627	1,711	1,915	3,114



**TABLE 57**  
**R&D costs paid for by the company and others projected for 2021, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Projected worldwide R&D cost		Projected domestic R&D cost						Projected foreign R&D cost paid for by the company		
		Paid for by the company	Paid for by others	Paid for by the company			Paid for by others					
				Total	Purchased and collaborative R&D	R&D performed by the company	Total	U.S. government	Non-U.S. government sources			
Large companies												
250–499	–	24,984	3,566	21,902	1,900	20,002	3,253	1,336	1,918	3,082		
500–999	–	25,181	3,524	21,723	2,561	19,162	3,139	638	2,501	3,458		
1,000–4,999	–	110,246	15,434	88,192	4,823	83,369	13,596	2,942	10,654	22,054		
5,000–9,999	–	70,452	9,975 i	60,176	4,138	56,038	6,319 i	768	5,551 i	10,276		
10,000–24,999	–	107,416	27,902 i	88,034	11,821	76,213	17,911 i	1,345	16,566 i	19,383		
25,000 or more	–	281,195 i	28,225	227,937 i	10,987	216,950 i	24,577	19,903	4,673	53,258 i		

\* = amount < \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 58

## Worldwide R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2009–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All industries	21–23, 31–33, 42–81	336,571	338,451	359,490	374,916	396,352	416,343	429,174	457,591	484,740	543,369	595,683	647,324
Manufacturing industries	31–33	236,858	243,611	253,821	261,697	276,110	285,661	287,895	303,044	314,167	339,076	348,904	374,688
Food	311	4,916	D	5,589	5,163	6,335	6,136	6,058	5,824	5,424	5,459	5,014	6,392 - 6,399
Beverage and tobacco products	312	933	D	D	D	1,358	1,423	1,529	1,076 - 1,654	1,769	1,628	1,755	1,935
Textile, apparel, and leather products	313–16	519	522	656	605	759	734	818	1,247	1,131	1,223	1,060	973
Wood products	321	283	254	211	282	222	341	198	166 - 751	174	206	193	195
Paper	322	NA	1,665	769	858	1,022	880	867	943	1,594	1,013	1,161	1,021
Printing and related support activities	323	217	269	212	291	258	238	198	223	236	246	422	294
Petroleum and coal products	324	NA	D	1,281	D	327	298	252	312	377	1,460 - 1,463	1,477 - 1,481	1,476 - 1,490
Chemicals	325	64,442	72,610	72,068	70,218	74,551	79,428	80,961	84,612	90,236	101,132	115,781	120,440
Basic chemicals	3251	NA	2,671	5,166	3,400	3,336	3,633	3,677	536 - 5,694	3,101	3,046	3,102	3,540
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	NA	1,038	1,117	D	1,794	1,842	1,780	332 - 5,490	805	2,435	1,695	1,745
Pesticide, fertilizer, and other agricultural chemicals	3253	NA	D	2,049	D	1,966	2,042	3,405	0 - 5,157	1,864	1,782 - 1,797	2,272 - 2,297	1,157 - 1,172
Pharmaceuticals and medicines	3254	53,456	60,537	58,866	58,920	62,480	66,731	D	73,193	79,004	88,776	103,636	108,537
Soap, cleaning compound, and toilet preparation	3256	NA	3,285	3,386	3,212	3,358	3,501	D	3,589	3,699	3,567	3,517	3,432
Paint, coating, adhesive, and other chemicals	3255, 3259	NA	D	1,485	D	1,617	1,679	1,664	1,806 - 1,830	1,764	1,508 - 1,529	1,531 - 1,562	2,013 - 2,028
Plastics and rubber products	326	2,982	2,515	2,640	4,446	4,576	4,519	2,906	4,583	4,626	3,170	3,348	3,162
Nonmetallic mineral products	327	1,153	1,596	1,428	1,588	1,578	1,599	1,487	1,474	1,485	1,567	1,699	1,924
Primary metals	331	993	802	763	818	700	770	711	662	862	990	721 - 747	847
Fabricated metal products	332	2,174	1,818	1,993	1,949	2,303	2,329	2,467	2,273	2,405	2,533	3,144	3,746
Machinery	333	11,156	12,403	18,312	17,462	15,420	15,089	16,827	15,958	16,626	19,279	19,283	20,508
Agricultural implement	33311	NA	D	1,570	2,142	2,243	D	2,152	2,189	2,132	2,730	2,777	2,450
Semiconductor machinery	333242	NA	2,469	2,727	1,357	3,645	3,434	3,812	4,138	4,530	5,077	5,374	5,834
Engine, turbine, and power transmission equipment	3336	NA	D	D	D	1,795	2,894	2,920	2,484	2,577	3,418 - 3,440	1,780	2,203
Other machinery	other 333	NA	6,566	D	D	7,736	D	7,943	7,147	7,387	8,030 - 8,057	9,352	10,022

TABLE 58

## Worldwide R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2009–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Computer and electronic products	334	68,772	75,345	79,145	87,406	90,114	94,199	92,860	98,319	101,910	112,188	110,836	126,102
Communications equipment	3342	NA	17,069	15,197	18,877	20,392	22,048	23,049	16,124	15,568	16,467	15,814	15,491
Semiconductor and other electronic components	3344	26,082	29,354	32,146	38,300	40,611	42,028	40,348	41,789	41,362	45,795	48,175	56,204
Navigational, measuring, electromedical, and control instruments	3345	16,498	17,905	18,242	18,640	18,046	18,993	17,020	18,112	17,965	20,828	21,596	21,651
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	NA	4,548	4,987	4,999	2,837	5,049	3,599	3,553	3,702	1,167 - 14,309	4,621	3,356
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	NA	8,769	8,641	8,312	8,753	8,486	8,033	8,372	8,347	0 - 13,142	10,541	11,270
Other measuring and controlling device	other 3345	NA	4,588	4,615	5,329	6,456	5,458	5,387	6,187	5,916	6,520	6,434	7,025
Other computer and electronic products	other 334	NA	11,017	13,559	11,589	11,065	11,130	12,443	22,294	27,016	29,099	25,251	32,756
Electrical equipment, appliances, and components	335	4,475	4,767	5,319	4,140	5,738	5,705	5,710	6,207	6,154	6,179	7,025	6,792
Transportation equipment	336	56,183	51,362	49,030	50,415	51,547	56,597	57,698	60,161	59,432	59,850	53,518	55,311
Motor vehicles, bodies, trailers, and parts	3361–63	NA	17,764	D	D	23,610	D	25,735	6,671 - 54,230	30,069	31,869 - 31,899	31,440	28,910 - 28,922
Aerospace products and parts	3364	36,409	31,627	26,858	D	25,684	D	29,113	3,240 - 50,799	26,189	25,006	18,943	23,424
Aircraft, aircraft engine, and aircraft parts	336411–13	NA	D	D	D	D	D	27,463	1,812 - 49,371	24,666	23,683	17,476	21,791
Guided missile, space vehicle, and related parts	336414–15, 336419	NA	D	D	1,425	D	D	1,649	1,428	1,523	1,323	1,467	1,633
Military armored vehicle, tank, and tank component	336992	NA	D	52	D	9	D	16	3 - 38	9	11	35	11
Other transportation	other 336	NA	D	D	D	2,245	D	2,834	2,653 - 2,690	3,164	2,936 - 2,961	3,100	2,955 - 2,966
Furniture and related products	337	433	407	347	383	401	422	477	381	470	418 - 444	444	535
Miscellaneous	339	NA	9,528	D	D	18,900	14,951	15,869	18,045	19,257	20,515	22,005	23,013 - 23,027
Medical equipment and supplies	3391	NA	7,461	D	10,311	15,938	12,091	13,166	15,387 - 15,400	16,470	17,443	19,068	19,938
Other miscellaneous manufacturing	3399	NA	2,066	D	D	2,962	2,860	2,703	2,646 - 2,657	2,788	3,072	2,937	3,075 - 3,088
Nonmanufacturing industries	21–23, 42–81	99,713	94,840	105,669	113,220	120,242	130,682	141,279	154,547	170,574	204,293	246,779	272,637

TABLE 58

## Worldwide R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2009–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mining, quarrying, oil and gas extraction, and support activities	21	NA	2,785	2,597	D	4,452	D	4,348	3,604	3,647	1,990	3,306	1,285 - 1,292 i
Utilities	22	NA	442	396	368	317	314	483	353	336	283	284	271
Wholesale trade	42	NA	1,145	1,697 i	2,165 i	459 i	D	1,723 i	489 i	0 - 12,105	883 i	1,298	1,104
Electronic shopping and electronic auctions	454111-12	NA	D	D	D	1,845	D	D	0 - 14,624	0 - 12,105	11,715 - 15,515 i	69 - 21,372 i	3,937 - 24,262 i
Transportation and warehousing	48-49	NA	124	159	186	D	692	416	495	1,221	2,562 i	9,952 i	4,994 i
Information	51	43,197	45,099	52,341	56,815	68,375	78,013	77,965	84,400	94,412	111,653	129,742	152,363
Publishing	511	33,171	33,883	36,310	36,947	43,821	46,806	42,190	42,156	42,368	39,890	39,918	42,708
Newspaper, periodical, book, and directory publishers	5111	NA	826	401	221 i	348 i	92 i	107 i	84 i	72	150	61	60
Software publishers	5112	NA	33,058	35,910	36,726	43,473	46,714	42,083	42,073	42,296	39,739	39,857	42,648
Telecommunications	517	1,609	2,043	2,267	2,787 i	3,112	3,830	3,648	3,617 - 3,659	3,828	3,827 - 3,833	119 - 46,668	3,519 - 3,532
Data processing, hosting, and related services	518	3,008	2,895	5,450	5,574	7,787	10,356	10,600	14,051 - 14,099	18,893	28,214 - 28,226	37,071	49,697
Other information	other 51	5,410	6,278	8,313	11,506	13,654	17,022	21,526	24,530	29,323	39,713	6,086 - 52,635	56,425 - 56,440
Finance and insurance	52	NA	2,568	3,943	4,159	4,999	4,748	6,359	8,468	8,582	8,347	10,081	13,837
Real estate and rental and leasing	53	NA	367	D	400	202	268	313	477	892	1,072	1,472	3,412
Lessors of nonfinancial intangible assets (except copyrighted works)	533	NA	NA	365	379	D	58	D	27	77	6	48	6 - 21
Other real estate and rental and leasing	other 53	NA	NA	D	21 i	D	210	D	450	814	1,066	1,423	3,390 - 3,406
Professional, scientific, and technical services	54	47,709	37,108	39,731	40,843	37,345	37,995 i	46,255	39,585 - 54,209	46,587	58,333	66,987	68,112
Architectural, engineering, and related services	5413	3,384	4,156	D	2,541 i	3,173	3,374	4,158 i	56 - 9,557	2,575	4,005	4,192	4,235
Computer systems design and related services	5415	15,310	12,458	13,181	13,404 i	10,535 i	12,579 i	17,227	15,483 - 20,617	17,190	20,378	26,357	21,259
Scientific research and development services	5417	19,307	16,408	19,295	20,225	18,478	17,870	20,630	20,194	22,635	28,620	30,131	35,670 i
Research and development in nanotechnology	541713	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	179 - 182 i
Research and development in biotechnology (except nanobiotechnology)	541714	8,492	6,266	7,985	8,364	5,889	4,898	7,114 i	6,062	6,076	8,428 - 8,442	8,884	9,120

TABLE 58

**Worldwide R&D paid for by the company and others and performed by the company, by industry and company size: 2009–20**

(Millions of U.S. dollars)

Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020					
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	10,129	9,591	10,697	11,261	11,794	12,291	12,807	13,409	15,680	19,507	20,473	25,674					
Research and development in the social sciences and humanities	541720	686	551	613	600	795	682	709	723	879	672 - 683	774	692 - 698					
Other professional, scientific, and technical services	other 54	9,708	4,086	D	4,674	5,158	4,172	i	4,240	3,852	4,188	5,330	6,307	6,948				
Health care services	621–23	NA	D	D	708	i	535	i	501	i	771	i	1,002	1,132	1,497	2,290	1,495 - 1,498	
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	NA	NA	D	D	D	D	D	D	1,054 - 6,188	i	1,665	2,162 - 5,963	0 - 21,303	1,504 - 21,828			
All companies (number of domestic employees)	–	336,571	338,451	359,490	374,916	396,352	416,343	429,174	457,591	484,740	543,369	595,683	647,324					
Micro companies <sup>a</sup>																		
5–9	–	NA	3,792	4,143	3,025	i	3,442	i	3,409	i	3,101	i	1,728	i	NA	NA	NA	NA
Small companies																		
10–19	–	NA	NA	NA	NA	NA	NA	NA	5,750	i	5,031	i	3,532	4,511	5,647	5,338		
20–49	–	NA	NA	NA	NA	NA	NA	NA	10,654	i	9,972	9,513	11,825	12,753	13,600			
Medium companies																		
50–99	–	13,785	9,470	9,834	9,728	9,289	10,677	11,946	9,639	10,635	13,095	14,566	13,791					
100–249	–	14,365	12,989	13,354	13,665	14,980	15,081	14,964	16,160	18,584	20,486	21,707	27,483					
Large companies																		
250–499	–	12,315	11,439	14,573	12,693	13,379	13,675	14,837	14,751	16,522	21,971	21,517	23,743					
500–999	–	12,124	11,794	11,388	12,955	13,663	15,422	17,442	16,601	20,173	20,309	26,988	24,451					
1,000–4,999	–	54,600	60,782	63,801	62,729	69,212	71,679	71,259	79,017	79,494	83,959	92,592	106,758					
5,000–9,999	–	27,461	34,453	32,578	41,006	43,087	51,305	48,399	49,479	54,572	61,047	62,772	60,241					
10,000–24,999	–	61,681	50,710	61,593	60,544	60,844	63,818	70,864	81,547	87,965	108,249	111,685	111,753					
25,000 or more	–	118,424	125,067	132,719	144,097	152,547	155,180	159,959	173,666	183,750	197,916	225,456	260,165					

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; NA = not available.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development Survey did not include companies with fewer than 5 domestic employees from 2008 to 2016 and does not include fewer than 10 domestic employees beginning in 2017.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Beginning with survey year 2011, the composition of the Other nonmanufacturing industry changed. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 59

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All industries	21–23, 31–33, 42–81	290,680	282,505	279,289	290,240	302,759	323,107	340,539	355,671	378,590	396,979	443,633	491,434	537,619
Manufacturing industries	31–33	203,755	196,441	199,147	202,363	208,577	222,718	231,705	236,170	249,999	255,602	274,315	284,673	308,445
Food	311	2,100	4,099	D	4,393	4,087	5,021	4,854 i	4,828	4,830	4,588	4,595	4,179	5,239
Beverage and tobacco products	312	780	477	D	D	D	827	920	1,006	1,076 - 1,099	1,098	1,113	1,082	1,177 i
Textile, apparel, and leather products	313–16	815	439	482	608	553	662	631	748	1,166 i	959	1,005	903	822
Wood products	321	273	280	252	211	280	220	336 i	195	166 - 204	173	203	186	187
Paper	322	NA	NA	1,341	676	752	920	723	766	854	1,327	933	1,059	928
Printing and related support activities	323	349	210	231	181	256 i	252 i	234	196 i	219 i	231	242	412 i	283
Petroleum and coal products	324	NA	NA	D	D	888	281	234	214	268	324	1,269	1,306	1,311 - 1,324
Chemicals	325	58,250	54,753	58,343	55,853	56,748	62,086	66,134	68,032	71,803	75,733	84,367	97,180	101,079
Basic chemicals	3251	NA	NA	1,810	D	2,705	2,620	2,849	3,042	0 - 5,157	2,544	2,443	2,360	2,694
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	NA	NA	783	798	997	1,197	1,154	1,201	0 - 5,157	541	1,636 - 1,662	1,172	1,234
Pesticide, fertilizer, and other agricultural chemicals	3253	NA	NA	D	D	D	1,691 i	1,743 i	D	0 - 5,157	1,469	1,460	1,822 - 1,846	1,060 - 1,066
Pharmaceuticals and medicines	3254	48,131	46,415	49,469	46,308	47,851	52,790	56,482	57,332	62,346 - 67,504	66,870	74,815	87,735	91,776
Soap, cleaning compound, and toilet preparation	3256	NA	NA	2,400	2,476	2,342	2,434	2,548	2,579	2,800	2,860	2,720	2,760	2,665
Paint, coating, adhesive, and other chemicals	3255, 3259	NA	NA	D	1,290	D	1,354	1,357 i	D	1,500 - 1,523	1,450	1,265 - 1,294	1,302 - 1,334	1,643 - 1,649
Plastics and rubber products	326	1,817	2,388	2,129	2,278	3,585	3,647	3,614	2,549	3,752	3,722	2,742	2,857	2,634
Nonmetallic mineral products	327	1,556	1,098 i	1,314 i	1,175	1,327 i	1,329 i	1,445 i	1,259	1,289	1,304	1,385	1,507 i	1,717 i
Primary metals	331	695	863	681	655	741	618	677	625	592	747	839	663	815
Fabricated metal products	332	2,419	2,057	1,727	1,857	1,827 i	2,194 i	2,107 i	2,273 i	2,094	2,234	2,316	2,866	3,396
Machinery	333	10,104	9,226	10,260	14,725	13,752	12,586	12,106	13,539	12,718	13,341	14,770	15,182	16,223
Agricultural implement	33311	NA	NA	1,345	1,277	1,546	1,597	1,578	1,531	1,565	1,565	1,872	1,920	1,769 - 1,811
Semiconductor machinery	333242	NA	NA	2,173	2,351	1,291	3,194	2,941	3,214	3,411	3,737	4,166	4,459	4,807

TABLE 59

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Engine, turbine, and power transmission equipment	3336	NA	NA	1,430	4,273	4,336	1,448	2,356	2,515	2,060	649 - 2,579	2,483	1,301	1,645
Other machinery	other 333	NA	NA	5,312	6,824	6,579	6,347	5,229	6,280	5,683	5,459 - 7,388	6,249	7,503	7,959 - 8,001
Computer and electronic products	334	60,464	55,856	61,623	62,438	66,290	68,629	73,256	72,182	77,451	78,003	83,948	85,571	99,535
Communications equipment	3342	NA	NA	13,875	12,335	14,352	15,663	18,345	19,424	13,156	12,492	13,090	12,497 - 12,503	12,103
Semiconductor and other electronic components	3344	22,324	20,023	23,011	24,237	28,218	30,176	31,668	30,451	31,413	30,373	30,232 - 43,377	35,178	43,181
Navigational, measuring, electromedical, and control instruments	3345	15,460	14,318	15,747	15,852	15,918	15,119	15,871	14,202	14,885	14,325	4,671 - 17,814	17,644	18,505
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	NA	NA	4,189	4,430	4,413	2,634	3,975	2,676	2,632	2,632	0 - 13,142	3,342	2,858
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	NA	NA	8,293	8,066	7,734	8,106	7,861	7,360	7,532	7,379	0 - 13,142	9,662	10,586
Other measuring and controlling device	other 3345	NA	NA	3,265	3,356	3,772	4,379	4,035	4,165	4,722	4,314	4,672	4,640	5,061
Other computer and electronic products	other 334	NA	NA	8,990	10,014	7,801	7,671	7,372	8,105	17,997	20,814	22,811	20,244 - 20,254	25,747
Electrical equipment, appliances, and components	335	3,143	3,317	3,320	3,624	3,078	4,133	4,323	4,359	4,771	4,319	4,487	5,282	4,998
Transportation equipment	336	50,552	48,209	42,940	41,094	42,340	43,648	46,977	49,286	51,569	50,698	52,446	45,482	48,796
Motor vehicles, bodies, trailers, and parts	3361–63	NA	NA	D	D	D	16,733	18,518	19,113	0 - 47,558	23,542	25,393	24,223	23,121
Aerospace products and parts	3364	36,941	34,563	29,857	26,086	24,874	24,783	26,292	27,440	1,423 - 48,982	24,154	24,301	18,358	22,914
Aircraft, aircraft engine, and aircraft parts	336411–13	NA	NA	24,777	24,839	23,454	D	25,002	25,793	0 - 47,558	22,629 - 24,155	22,978	16,891	21,291
Guided missile, space vehicle, and related parts	336414–15, 336419	NA	NA	5,080	1,247	1,420	D	1,290	1,647	1,424	0 - 1,524	1,323	1,467	1,623
Military armored vehicle, tank, and tank component	336992	NA	NA	D	51	D	9	18	16	3 - 38	9	11	35	11
Other transportation	other 336	NA	NA	D	D	D	2,124	2,148	2,716	2,549 - 2,586	2,993	2,741	2,866	2,750



TABLE 59

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Furniture and related products	337	477	395	374	319	360	374	377	452	359	430	409	409	496
Miscellaneous	339	NA	NA	D	D	D	15,292	12,757	13,662	14,988	16,370	17,245	18,546	18,791 - 18,809
Medical equipment and supplies	3391	NA	NA	6,459	7,796	8,333	12,741	10,309	11,353	12,647 - 12,660	13,930	14,559	16,022	16,116
Other miscellaneous manufacturing	3399	NA	NA	D	D	D	2,551	2,449	2,309	2,329 - 2,340	2,439	2,686	2,524	2,674 - 2,692
Nonmanufacturing industries	21–23, 42–81	86,926	86,064	80,142	87,877	94,183	100,389	108,834	119,501	128,591	141,377	169,318	206,761	229,174
Mining, quarrying, oil and gas extraction, and support activities	21	NA	NA	2,545	2,365	3,031	4,000	4,633	4,012	3,296	3,292	1,827	2,716	1,165
Utilities	22	NA	NA	425	358	348	294	313	480	351	326	275	275	264
Wholesale trade	42	NA	NA	1,092	1,556	2,053	452	339	1,698	467	0 - 9,599	851	1,186	1,058
Electronic shopping and electronic auctions	454111–12	NA	NA	D	949	1,353	1,356	1,388	D	0 - 9,499	0 - 9,599	11,652	0 - 17,176	3,840 - 19,390
Transportation and warehousing	48–49	NA	NA	95	132	178	D	679	403	488	1,214	2,548	9,890	4,957
Information	51	37,695	35,953	37,088	42,697	46,900	56,608	64,277	65,457	70,946	80,120	94,507	110,665	129,463
Publishing	511	28,427	26,838	26,957	28,411	29,067	34,365	36,621	33,348	33,459	33,868	32,716	32,973	35,025
Newspaper, periodical, book, and directory publishers	5111	NA	NA	770	372	219	342	88	98	79	66	131	61	60
Software publishers	5112	NA	NA	26,187	28,039	28,848	34,023	36,533	33,250	33,379	33,802	32,585	32,912	34,965
Telecommunications	517	1,684	1,523	1,912	2,169	2,729	3,049	3,768	3,607	3,568 - 3,611	3,733	3,696	0 - 46,548	3,425 - 3,437
Data processing, hosting, and related services	518	6,567	2,741	2,753	5,111	4,914	7,156	9,062	9,355	9,344 - 14,099	16,623	23,472	31,146	41,551
Other information	other 51	1,016	4,850	5,466	7,006	10,190	12,039	14,826	19,147	19,820 - 24,532	25,896	34,623	0 - 46,548	49,449 - 49,463
Finance and insurance	52	NA	NA	2,101	3,447	3,530	4,412	4,122	5,409	7,331	7,611	7,425	8,906	12,296
Real estate and rental and leasing	53	NA	NA	330	343	363	191	262	300	475	772 - 852	1,021	1,368	3,249
Lessors of nonfinancial intangible assets (except copyrighted works)	533	NA	NA	NA	324	342	58	55	68	27	0 - 79	6	45	7
Other real estate and rental and leasing	other 53	NA	NA	NA	19	21	133	207	232	448	773	1,015	1,323	3,242

TABLE 59

## Domestic R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Professional, scientific, and technical services	54	37,954	42,380	31,798	33,307	34,121	30,926	31,461	i 38,601	33,839 - 43,338	36,024	45,575	52,318	54,367
Architectural, engineering, and related services	5413	3,422	3,258	4,008	3,114	2,483	i 3,132	3,309	4,100	i 0 - 9,499	2,525	3,463 - 4,007	4,154	4,214
Computer systems design and related services	5415	12,146	13,351	10,359	10,938	11,006	i 9,241	i 11,053	i 14,334	15,484	13,702	16,553	20,988	17,935
Scientific research and development services	5417	17,913	16,402	13,712	15,713	16,415	14,219	13,324	16,249	14,778	16,029	20,225	21,218	25,600
Research and development in nanotechnology	541713	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	179
Research and development in biotechnology (except nanobiotechnology)	541714	NA	7,809	5,537	7,043	7,387	4,492	3,459	5,594	i 4,445	4,207	5,848	6,119	6,191
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	NA	7,916	7,628	8,058	8,431	8,935	9,187	9,950	9,613	10,946	13,707	14,333	i 18,539
Research and development in the social sciences and humanities	541720	NA	676	547	612	598	792	678	705	719	876	671	766	691
Other professional, scientific, and technical services	other 54	4,474	9,370	3,720	3,542	4,216	4,334	3,775	3,918	3,579	3,770	4,788 - 5,332	5,958	6,618
Health care services	621–23	NA	NA	1,049	542	672	i 528	i 501	i 758	i 848	921	1,475	2,266	1,477
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	NA	NA	NA	2,181	1,635	D	857	i D	1,055	i 1,503	2,163	0 - 17,176	1,491 - 17,041
All companies (number of domestic employees)	–	290,680	282,505	279,289	290,240	302,759	323,107	340,539	355,671	378,590	396,979	443,633	491,434	537,619
Micro companies <sup>a</sup>														
5–9	–	NA	NA	3,614	4,060	2,926	i 3,390	i 3,314	i 2,983	i 1,583	i NA	NA	NA	NA
Small companies														
10–19	–	NA	NA	NA	NA	NA	NA	NA	5,674	i 4,930	i 3,390	4,383	5,509	5,047
20–49	–	NA	NA	NA	NA	NA	NA	NA	10,281	i 9,635	i 9,084	11,255	12,301	12,994

TABLE 59

**Domestic R&D paid for by the company and others and performed by the company, by industry and company size: 2008–20**

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Medium companies														
50–99	–	9,351	13,277	8,781	9,295	9,100	i 8,939	10,130	i 11,538	9,275	10,164	12,412	13,829	12,993
100–249	–	14,662	12,791	11,631	12,303	12,454	13,704	13,606	13,586	14,860	17,205	18,611	19,667	25,411
Large companies														
250–499	–	10,219	11,330	10,194	13,013	11,387	12,021	12,228	13,686	12,978	14,312	19,775	18,799	20,878
500–999	–	11,886	10,131	10,053	9,993	11,499	12,013	13,129	15,005	14,441	17,736	17,753	24,062	21,264
1,000–4,999	–	46,336	44,197	49,108	51,110	50,311	55,974	57,336	57,998	63,431	64,838	68,764	75,990	88,238
5,000–9,999	–	24,764	21,769	27,546	24,452	30,708	31,657	38,327	38,858	40,530	40,340	45,509	50,852	48,397
10,000–24,999	–	48,737	51,239	41,853	49,107	50,226	51,103	54,452	59,330	66,032	73,540	86,463	88,144	88,567
25,000 or more	–	100,820	97,056	99,291	102,222	110,042	119,493	122,533	126,732	140,895	146,369	158,707	182,282	213,829

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; NA = not available.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development Survey did not include companies with fewer than 5 domestic employees from 2008 to 2016 and does not include fewer than 10 domestic employees beginning in 2017.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. For survey year 2008, industry classification was based on the 2002 NAICS. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Beginning with survey year 2011, the composition of the Other nonmanufacturing industry changed. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 60

## Foreign R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All industries	21–23, 31–33, 42–81	61,475	54,066	59,162	69,251	72,157	73,245	75,804	73,503	79,001	87,761	99,736	104,248	109,705
Manufacturing industries	31–33	46,572	40,417	44,464	51,458	53,120	53,392	53,955	51,725	53,045	58,565	64,761	64,230	66,243
Food	311	596	817	1,006	1,195	1,076	1,315	1,282	1,231	994	835	865	835	1,153 - 1,161
Beverage and tobacco products	312	123	455	783	599	532	531	503	523	0 - 555	671	516	674	759
Textile, apparel, and leather products	313–16	367	80	39	49	52	98	103	70	81	172	218	157	152
Wood products	321	4	2	3	1	2	2	5	3	0 - 555	1	3	7	8
Paper	322	274	257	324	93	106	103	158	102	89	267	80	101	93
Printing and related support activities	323	9	7	38	30	35	6	3	2	4	5	4	9	10
Petroleum and coal products	324	D	156	D	D	D	46	64	38	44	53	192 - 194	171 - 176	165
Chemicals	325	13,990	9,689	14,267	16,215	13,470	12,464	13,294	12,929	12,809	14,503	16,766	18,601	19,362
Basic chemicals	3251	1,198	797	861	D	695	716	784	636	537	557	603	742	846
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	224	260	255	319	D	597	688	579	333	264	774 - 798	523	512
Pesticide, fertilizer, and other agricultural chemicals	3253	371	D	D	D	D	275	299	D	0 - 5,157	396	321 - 337	450	92 - 108
Pharmaceuticals and medicines	3254	10,862	7,041	11,068	12,557	11,069	9,690	10,249	D	5,688 - 10,846	12,133	13,962	15,900	16,761
Soap, cleaning compound, and toilet preparation	3256	965	873	884	910	870	924	952	D	789	839	847	757	767
Paint, coating, adhesive, and other chemicals	3255, 3259	370	D	D	195	210	263	321	D	307	314	235 - 259	227	370 - 385
Plastics and rubber products	326	341	595	386	362	861	929	905	358	831	904	428	491	529
Nonmetallic mineral products	327	106	54	282	253	261	249	155	228	185	181	181	192	206
Primary metals	331	114	130	121	108	77	82	94	86	69	116	151	58 - 85	32
Fabricated metal products	332	188	117	91	135	122	109	222	194	179	171	216	278	349
Machinery	333	1,929	1,930	2,143	3,587	3,710	2,833	2,984	3,288	3,239	3,285	4,509	4,101	4,285
Agricultural implement	33311	399	391	D	293	596	646	D	621	625	566	858	857	639 - 681
Semiconductor machinery	333242	366	285	296	376	66	451	493	599	727	793	911	915	1,027
Engine, turbine, and power transmission equipment	3336	92	83	D	D	D	347	537	405	424	0 - 1,928	935 - 958	479	558
Other machinery	other 333	1,072	1,170	1,254	D	D	1,389	D	1,664	1,464	0 - 1,928	1,781 - 1,807	1,850	2,021 - 2,062
Computer and electronic products	334	15,774	12,917	13,722	16,708	21,117	21,485	20,943	20,678	20,868	23,907	28,240	25,264	26,567
Communications equipment	3342	2,951	2,862	3,194	2,863	4,525	4,730	3,702	3,625	2,967	3,076	3,377	3,312 - 3,316	3,388

TABLE 60

## Foreign R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Semiconductor and other electronic components	3344	7,075	6,058	6,343	7,909	10,082	10,434	10,360	9,896	10,377	10,989	2,418 - 15,563	12,996	13,023
Navigational, measuring, electromedical, and control instruments	3345	2,308	2,180	2,158	2,390	2,722	2,927	3,122	2,819	3,227	3,640	3,015 - 16,157	3,952	3,146
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	838	522	360	557	586	202	1,073	923	922	1,069	1,168	1,280	498
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	D	508	475	575	578	647	625	673	840	968	0 - 13,142	878	684
Other measuring and controlling device	other 3345	D	1,149	1,324	1,258	1,557	2,077	1,423	1,222	1,465	1,603	1,848	1,794	1,964
Other computer and electronic products	other 334	3,440	1,817	2,027	3,546	3,788	3,395	3,759	4,338	4,297	6,202	6,287	4,997 - 5,007	7,010
Electrical equipment, appliances, and components	335	1,162	1,158	1,447	1,695	1,062	1,605	1,382	1,351	1,436	1,835	1,692	1,742	1,794
Transportation equipment	336	10,267	7,974	8,422	7,936	8,075	7,899	9,621	8,412	8,592	8,734	7,404	8,036	6,515
Motor vehicles, bodies, trailers, and parts	3361–63	8,448	6,023	D	D	D	6,877	D	6,622	6,672	6,527	6,476 - 6,506	7,217	5,789 - 5,801
Aerospace products and parts	3364	1,816	1,846	1,770	772	D	901	D	1,672	1,817	2,035	705	585	509
Aircraft, aircraft engine, and aircraft parts	336411–13	1,742	1,760	D	D	D	D	D	1,670	1,813	511 - 2,036	705	585	500
Guided missile, space vehicle, and related parts	336414–15, 336419	74	85	D	D	5	D	D	2	4	0 - 1,524	1	*	10
Military armored vehicle, tank, and tank component	336992	0	D	D	1	0	0	D	0	0	0	0	0	0
Other transportation	other 336	3	D	D	D	D	121	D	118	104	171	195 - 221	234	206 - 216
Furniture and related products	337	27	38	33	28	23	28	45	25	22	40	9 - 33	35	39
Miscellaneous	339	D	4,044	D	D	D	3,608	2,194	2,207	3,057	2,888	3,271	3,459	4,217 - 4,224
Medical equipment and supplies	3391	766	3,813	1,003	D	1,978	3,197	1,782	1,813	2,739	2,539	2,884	3,046	3,822
Other miscellaneous manufacturing	3399	D	231	D	D	D	411	412	394	317	348	386	413	396 - 403
Nonmanufacturing industries	21–23, 42–81	14,903	13,648	14,698	17,792	19,037	19,853	21,849	21,778	25,956	29,196	34,975	40,018	43,462
Mining, quarrying, oil and gas extraction, and support activities	21	D	D	239	232	D	452	D	336	308	355	163	589	120 - 127
Utilities	22	6	13	17	38	21	23	1	3	1	10	8	9	6
Wholesale trade	42	509	D	53	141	112	7	D	25	21	0 - 2,590	32	112	45

TABLE 60

## Foreign R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–20

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electronic shopping and electronic auctions	454111–12	NA	NA	D	D	D	490	D	D	0 - 5,132	0 - 2,590	63 - 3,863	69 - 4,198	97 - 4,884
Transportation and warehousing	48–49	2	1	29	28	8	D	13	13	7	7	14	62	37
Information	51	7,657	7,243	8,011	9,644	9,915	11,767	13,736	12,508	13,454	14,292	17,146	19,077	22,900
Publishing	511	6,301	6,332	6,926	7,899	7,880	9,456	10,185	8,842	8,698	8,500	7,174	6,945	7,683
Newspaper, periodical, book, and directory publishers	5111	27	47	55	29	2	6	4	9	4	6	19	0	0
Software publishers	5112	6,274	6,285	6,871	7,870	7,878	9,450	10,181	8,833	8,693	8,494	7,154	6,945	7,683
Telecommunications	517	175	86	131	98	59	63	61	41	49	96	131 - 138	120	94
Data processing, hosting, and related services	518	1,089	266	142	339	661	631	1,294	1,245	0 - 4,710	2,270	4,742 - 4,753	5,924	8,147
Other information	other 51	93	559	812	1,308	1,316	1,616	2,196	2,378	0 - 4,710	3,427	5,090	6,087	6,976
Finance and insurance	52	74	518	467	496	628	587	625	950	1,136	971	923	1,175	1,541
Real estate and rental and leasing	53	65	28	37	D	38	11	6	13	2	40 - 120	51	104	163
Lessors of nonfinancial intangible assets (except copyrighted works)	533	NA	NA	NA	41	37	D	3	D	*	0 - 79	0	4	0 - 15
Other real estate and rental and leasing	other 53	NA	NA	NA	D	*	D	3	D	2	41	51	101	148 - 164
Professional, scientific, and technical services	54	6,150	5,328	5,309	6,424	6,723	6,418	6,534	7,653	5,744 - 10,877	10,563	12,758	14,669	13,744
Architectural, engineering, and related services	5413	200	126	148	D	57	41	65	58	57	50	0 - 542	37	20
Computer systems design and related services	5415	2,164	1,959	2,099	2,243	2,398	1,293	1,525	2,893	0 - 5,132	3,488	3,825	5,369	3,324
Scientific research and development services	5417	3,544	2,905	2,696	3,581	3,810	4,259	4,546	4,380	5,416	6,606	8,394	8,913	10,070
Research and development in nanotechnology	541713	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0 - 3
Research and development in biotechnology (except nanobiotechnology)	541714	NA	683	729	942	977	1,398	1,438	1,520	1,616	1,869	2,580 - 2,594	2,764	2,929
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	NA	2,213	1,962	2,638	2,830	2,859	3,103	2,858	3,796	4,733	5,801	6,140	7,135
Research and development in the social sciences and humanities	541720	NA	9	5	1	2	3	4	3	4	3	1 - 12	8	1 - 7

TABLE 60

**Foreign R&D paid for by the company and others and performed by the company, by industry and company size: 2008–20**

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Other professional, scientific, and technical services	other 54	241	338	366	D	458	825	398 i	322	273	418	0 - 542	349	330
Health care services	621–23	1	10	D	D	36	7	*	12 i	154	211	22	24	18 - 22 i
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	NA	NA	NA	D	D	D	D	D	0 - 5,132	162	0 - 3,800	0 - 4,131	1 - 4,789 i
All companies (number of domestic employees)	–	61,475	54,066	59,162	69,251	72,157	73,245	75,804	73,503	79,001	87,761	99,736	104,248	109,705
Micro companies <sup>a</sup>														
5–9	–	NA	NA	178	83	99 i	52 i	95 i	118 i	145	NA	NA	NA	NA
Small companies														
10–19	–	NA	NA	NA	NA	NA	NA	NA	76	101	142	128	138	290
20–49	–	NA	NA	NA	NA	NA	NA	NA	373	337	429	569	452	606
Medium companies														
50–99	–	976	509	688 i	539	628	351	547	407	364	471	684	737	798
100–249	–	1,735	1,574	1,358 i	1,051	1,212	1,276	1,475	1,378	1,300	1,379	1,875	2,040	2,072
Large companies														
250–499	–	1,178	985	1,245	1,561	1,306	1,359	1,446	1,151	1,773	2,210	2,196	2,718	2,866
500–999	–	1,753	1,992	1,741	1,396	1,455	1,650	2,293	2,437	2,159	2,437	2,557	2,925	3,187
1,000–4,999	–	11,350	10,403	11,674	12,691	12,419	13,238	14,343	13,261	15,587	14,656	15,195	16,602	18,520
5,000–9,999	–	7,000	5,692	6,907	8,126	10,298	11,430	12,979	9,541	8,949	14,232	15,538	11,919	11,845
10,000–24,999	–	11,785	10,442	8,856	12,485	10,317	9,741	9,366	11,534	15,515	14,425	21,787	23,541	23,186
25,000 or more	–	24,671	21,368	25,777	30,497	34,056	33,054	32,647	33,226	32,771	37,381	39,208	43,175	46,336

\* = 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; NA = not available.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development Survey did not include companies with fewer than 5 domestic employees from 2008 to 2016 and does not include fewer than 10 domestic employees beginning in 2017.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. For survey year 2008, industry classification was based on the 2002 NAICS. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Beginning with survey year 2011, the composition of the Other nonmanufacturing industry changed. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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



TABLE 61

## Worldwide R&amp;D paid for by the company and performed by the company and others, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All business activities	21100–81000	328,040	311,170	316,262	336,629	352,951	376,974	399,656	412,590	440,429	471,440	523,512	570,184	612,326
Oil and gas extraction	21100	1,215	1,223	1,268	1,379	D	1,487	1,308	1,486	1,089	986	0 - 23,467	902	790
Mining	21200	NA	D	75	128	92	114	56	71	63	170	114	0 - 25,025	114
Support activities for mining, including oil and gas	21300	NA	993	1,638	1,386	1,814	1,749	1,995	1,831	1,380	1,577	951	i 1,650	i 929
Utilities	22100	NA	1,607	903	639	686	615	549	726	515	501	0 - 23,467	415	424
Construction	23000	NA	198	918	269	393	i 307	297	700	276	501	691	880	1,068
Food manufacturing	31100	2,983	4,039	4,478	4,970	4,635	7,028	6,842	5,892	6,073	5,827	5,806	5,905	6,353
Beverage manufacturing	31210	605	564	926	668	641	772	753	728	787	i 851	762	723	803
Tobacco manufacturing	31220	D	792	800	717	662	668	672	681	731	853	722	807	856
Textile, apparel, and leather products manufacturing	31990	NA	673	658	712	759	787	780	847	1,333	1,093	1,155	965	918
Wood products manufacturing	32100	264	304	239	208	D	244	336	i 251	0 - 7,094	263	297	0 - 25,025	270
Paper manufacturing	32200	1,130	1,144	1,231	1,156	1,362	1,588	1,614	D	1,555	1,743	1,592	1,784	1,531
Printing and related support activities	32300	297	241	244	265	356	i 391	390	321	340	286	359	468	392
Petroleum refineries	32401	NA	NA	708	591	807	558	617	526	625	567	640	0 - 25,025	499 - 4,458
Asphalt paving, roofing, and saturated materials manufacturing	32402	NA	NA	35	39	45	123	78	75	93	137	134	134	226
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	NA	NA	403	415	382	488	460	i 416	339	383	258	0 - 25,025	238
Basic chemicals manufacturing	32510	3,806	2,978	3,133	3,614	4,271	4,136	4,036	3,505	3,579	3,576	3,540	3,267	3,860
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	1,152	1,459	1,444	1,228	1,437	1,383	1,771	1,703	1,401	1,200	1,743	1,803	1,801
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	2,100	1,990	1,722	2,333	2,307	2,364	i 2,508	i D	2,338	i 2,479	i 3,196	i 2,919	1,691

TABLE 61

## Worldwide R&amp;D paid for by the company and performed by the company and others, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing <sup>c</sup>	32541	70,016	68,588	71,603	67,688	69,473	68,318	68,846	63,606	69,518	71,762	77,733	80,548	80,828
In vitro diagnostic substances manufacturing <sup>c</sup>	32542	1,988	1,159	1,207	1,544	1,371	i 1,066	1,159	972	1,286	1,567	1,381	1,582	1,868
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	NA	NA	NA	10,356	14,947	23,172	24,458	30,555	36,012	41,733	43,834
Soap, cleaning compound, and toilet preparations manufacturing	32591	2,787	2,883	3,147	3,472	3,266	3,406	3,493	3,353	3,361	3,257	3,380	3,196	3,052
Paint, adhesive, and other chemical manufacturing	32592	2,152	2,320	2,238	2,011	2,087	1,979	2,131	D	2,121	2,094	1,666	1,747	1,775
Plastics and rubber products manufacturing	32600	2,536	2,842	3,128	3,689	3,739	3,586	3,592	3,251	3,926	3,904	3,643	3,491	3,527
Clay and glass products manufacturing	32710	966	i 312	1,056	i 920	i 1,154	i 1,077	1,130	1,145	1,198	1,345	1,521	1,511	1,654
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	738	555	522	590	621	618	i 800	601	652	443	446	543	438
Primary metal manufacturing	33100	NA	840	933	783	882	792	853	719	0 - 7,094	714	808	849	986
Fabricated metal products manufacturing	33200	2,935	2,438	1,971	2,471	2,517	2,460	2,560	2,521	2,562	2,695	2,798	3,110	4,087
Agricultural machinery and equipment manufacturing	33311	1,404	1,507	1,523	1,430	1,893	2,055	1,990	1,916	1,977	1,867	2,440	2,458	2,207
Construction machinery manufacturing	33312	581	653	682	875	816	1,693	1,729	1,556	1,462	1,588	1,880	i 1,871	1,529
Mining, oil, and gas field machinery and equipment manufacturing	33319	NA	1,629	1,765	2,204	2,589	1,942	i 1,462	2,115	1,528	1,586	1,739	1,300	1,312
Semiconductor machinery manufacturing	33321	2,553	1,978	2,279	2,574	1,266	i 3,500	3,363	3,459	3,688	3,996	4,465	4,687	5,079
Industrial machinery manufacturing (except semiconductor machinery)	33322	1,191	853	806	1,128	1,031	1,006	1,237	1,181	893	1,222	0 - 23,467	1,406	1,133
Photographic and photocopying equipment manufacturing	33331	NA	852	270	757	25	i 108	25	114	59	52	67	0 - 25,025	171

TABLE 61

## Worldwide R&amp;D paid for by the company and performed by the company and others, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	NA	977	1,268	1,143	1,621	1,661	2,251	1,947	0 - 7,094	2,245	2,263	2,169	1,956
Digital cameras manufacturing	33333	NA	NA	NA	NA	NA	NA	33	587	519	571	274	458	364
Engine, turbine, and power transmission equipment manufacturing	33360	2,386	1,589	3,481	3,623	4,068	3,870	3,346	2,626	2,641	3,164	2,756	0 - 25,025	2,944
Metalworking and other general purpose machinery manufacturing	33390	2,039	1,618	1,998	2,359	1,916	2,052	2,585	2,728	2,591	2,547	2,996	2,860	3,191
Computers and peripheral equipment manufacturing and magnetic and optical media <sup>d</sup>	33412	NA	13,094	12,672	13,319	14,716	15,113	13,437	16,547	23,130	27,553	27,801	25,331	31,366
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	6,739	7,758	9,010	9,530	9,335	9,622	10,526	12,366	10,715	10,403	11,487	11,254	10,135
Radio, television, and wireless communication equipment manufacturing	33422	5,958	5,181	5,719	4,383	4,773	5,967	5,848	3,542	2,839	2,482	0 - 23,467	2,475	2,334
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	2,482	1,352	715	1,092	2,111	1,826	1,782	1,844	1,660	1,977	0 - 23,467	2,192	2,498
Audio and video equipment manufacturing	33430	773	977	1,352	1,019	1,081	1,108	1,282	1,587	1,535	1,252	1,461	1,686	1,667
Semiconductor and other electronic components manufacturing	33440	29,911	26,118	29,457	32,354	38,109	40,001	41,125	39,810	40,585	41,053	44,130	46,545	55,218
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	3,822	2,544	3,046	3,230	3,494	3,816	4,330	3,875	4,053	3,865	4,815	4,646	4,451
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	1,845	2,229	2,417	2,161	2,337	2,564	2,424	2,033	2,614	2,378	3,136	3,198	2,918
Measuring and control instruments manufacturing (not listed elsewhere)	33459	3,458	4,425	4,579	4,566	4,871	5,308	5,424	5,637	5,662	5,505	5,469	5,430	5,745
Electrical equipment, appliances, and components manufacturing	33500	4,687	4,229	4,500	4,768	4,773	5,272	5,501	5,313	5,905	6,177	5,456	6,455	6,474
Motor vehicles manufacturing	33610	18,296	13,165	14,524	17,011	18,362	17,743	18,984	18,357	20,573	22,481	23,693	21,666	20,643

TABLE 61

## Worldwide R&amp;D paid for by the company and performed by the company and others, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Motor vehicle body and trailer manufacturing	33620	70	96	190	73	98 i	107 i	104	160	118	47	99	0 - 25,025	117
Motor vehicle parts manufacturing	33630	5,401	4,158	4,310	4,681	4,736	5,600	7,146	7,285	6,801	7,621	8,852	9,459	8,511
Aircraft manufacturing	33641	4,053	7,390	4,430	4,512	4,716 i	4,373	4,221	4,859	5,639	4,671	6,467	5,404	4,993
Aircraft engine and engine parts manufacturing	33642	2,433	1,765	1,978	2,136	D	1,787	2,068 i	D	0 - 7,094	1,455	1,759	1,474	1,310
Other aircraft parts and auxiliary equipment manufacturing	33643	1,222	1,135	1,825	1,752	3,121	3,270	2,980	3,482	3,047	3,239	2,054	1,347	1,414
Guided missiles, space vehicles, and related parts manufacturing	33644	1,402	1,176	1,132	1,050	659	487	877	1,034	954	1,055	1,210	1,140	1,876
Railroad rolling stock manufacturing	33651	195	83	177	165	237	224	363	310	224	251	213	0 - 25,025	299
Ship and boat building	33660	151	616 i	608 i	154	143 i	192	489	251	618	157	144	0 - 25,025	154
Motorcycle, bicycle, and parts manufacturing	33691	199	194	186	234	197	231	283	320	335	355	429	437	488
Military armored vehicle, tank, and tank components manufacturing	33692	107	228	182	118	135	90	159	202	130	367 i	0 - 23,467 i	381	275
All other transportation equipment manufacturing	33699	176	135	232	367	437	425	361	430	478	505	521	496	545
Furniture and related products manufacturing	33700	511	495	402	344	431	433	455	509	411	479	467	517	599
Medical equipment and supplies manufacturing	33910	11,587	11,457	13,226	13,701	14,259	15,264	14,317	15,145	15,939	17,055	16,832	18,877	19,425
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	2,976	2,793	2,341	2,698	D	2,976	2,816	D	3,121	3,130	3,415	3,052	3,749
Merchant wholesalers, durable goods	42300	449	923 i	714	711	1,277 i	589	516	1,551	637	448	771 i	702	841
Merchant wholesalers, nondurable goods	42400	257	365 i	348	605	699 i	327	209	484	219	273	322	0 - 25,025	535
Wholesale electronic markets and agents and brokers (business to business)	42500	14	43 i	19 i	70	173 i	18	D	35	24	0 - 12,866 i	89 i	0 - 25,025 i	62
Retail trade (except electronic shopping and electronic auctions)	44000	NA	50	164	74	100 i	120	65	D	120	119	263	0 - 25,025	215 - 4,173
Electronic shopping and electronic auctions	45411	NA	NA	753	D	1,749	1,284	D	D	0 - 8,200 i	0 - 12,866	0 - 23,467 i	0 - 25,025 i	0 - 18,774 i
Transportation	48000	NA	319	211	111	199	377	412	229 i	123	722	2,080	9,072	4,297

TABLE 61

**Worldwide R&D paid for by the company and performed by the company and others, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Couriers, messengers, and express delivery services	49200	D	14	6	D	D	90	348	D	394	425	451	290	922 - 4,881
Warehousing and storage	49300	26	17	19	16	17	4	3	D	0	82	79	162	i 35
Newspaper, periodical, book, and directory publishers (except Internet)	51110	180	748	853	408	i 257	i 339	i 103	117	87	99	175	88	91
Software publishers (except Internet) <sup>e</sup>	51120	31,369	26,362	28,457	29,992	31,209	35,047	41,052	36,040	34,699	31,400	32,842	31,525	30,457
Motion picture and sound recording (except Internet)	51200	104	135	93	67	67	38	83	i 12	20	42	i 155	0 - 25,025	86
Broadcasting (except Internet)	51500	NA	89	100	115	165	i 179	206	306	347	460	424	500	0 - 18,774
Wired telecommunications carriers	51710	673	D	1,499	i 1,685	1,631	i 1,012	i 1,166	1,269	i 1,180	1,027	476	428	504
Wireless telecommunications carriers (except satellite)	51720	532	i 186	724	i 815	860	i 1,732	i 2,500	1,192	i 1,458	i 1,969	2,439	2,641	2,414
Satellite telecommunications	51740	153	108	229	114	163	176	134	705	i 746	625	476	486	386
Other telecommunications (not listed elsewhere)	51790	501	351	338	462	399	377	330	536	362	381	745	0 - 25,025	501
Data processing, hosting, and related services <sup>e</sup>	51800	NA	2,889	3,051	5,293	4,406	4,381	5,402	6,895	7,040	6,975	7,699	9,985	12,535
Cloud computing applications and Internet-based software services	51801	NA	NA	NA	NA	NA	4,344	6,730	6,801	11,913	19,581	24,607	33,733	47,668
Other information services, including Internet publishing, broadcasting, and Web search portals <sup>e</sup>	51910	NA	5,519	7,270	9,456	12,998	15,433	17,443	25,330	27,524	32,484	43,287	53,057	60,959
Finance: banking and credit intermediation	52200	NA	D	1,235	1,703	2,454	3,238	3,553	3,299	5,171	5,657	4,975	5,718	9,028
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	NA	678	903	1,347	1,110	1,323	1,147	1,597	1,683	1,785	1,445	1,654	2,061
Insurance carriers and related activities	52400	NA	798	611	872	1,429	1,772	1,069	1,573	1,444	1,430	0 - 23,467	2,596	2,968
Real estate	53100	20	32	3	13	27	105	199	288	440	253	380	0 - 25,025	372
Rental and leasing services	53200	NA	129	146	51	59	94	80	80	106	i 571	i 699	1,067	2,925

TABLE 61

## Worldwide R&amp;D paid for by the company and performed by the company and others, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Lessors of nonfinancial intangible assets, including patent licensing	53300	80	259	268	369	437	100	97	104	45	97	24 i	71	75
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	NA	D	505	705 i	535	696	1,128	1,587	1,052	1,130	1,426	2,040	2,597
Architectural, engineering, and related services	54130	1,742	1,115	1,390	1,380	1,232	1,495	1,649	2,449	1,975	1,795	2,575	0 - 25,025	2,604
Specialized design services	54140	75	76	65	283	157 i	81	42	13	26	133	0 - 23,467	0 - 25,025	196
Computer systems design and related services <sup>e</sup>	54150	11,476	12,292	11,528	13,673	13,909 i	12,577	13,288	14,090	14,864	13,998	18,287	22,535	17,430
Management, scientific, and technical consulting services	54160	1,110	2,246	1,380	1,618	2,066 i	1,428	1,681	1,531	1,668	1,591	2,443	1,689	2,001
Research and development services in the social sciences and humanities	54172	NA	96	8	19	64	36	47	15	0 - 7,094 i	348	27	28	37 - 3,996
Research and development services in biotechnology <sup>c,f</sup>	54173	NA	6,850	2,601	6,238	6,294	1,723	1,344	2,387	1,176	930	1,147	1,244	1,619
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	NA	3,208	1,447	2,751	3,166	2,143	3,040	3,197	2,767	2,226	2,324	2,750	5,835
Research and development services in nanotechnology	54175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	122 i
Advertising and related services	54180	37	1,950	422	97	375 i	390	424	452	373	412	1,160 i	1,262 i	1,277 - 5,236 i
Professional, scientific, and technical services (not listed elsewhere)	54190	439	1,036	543	1,242	1,199	1,627	810	944	622	695	912	1,266	1,570
Management of companies and enterprises	55100	11	40	23	43	18	76	43	D	20	71	0 - 23,467	0 - 25,025	51
Administrative and support services	56100	NA	419	640	348	609	589	459	375	588	1,558	2,668	3,575	3,806
Waste management and remediation services	56200	NA	15	684	20	D	23	D	D	8	0 - 12,866	0 - 23,467	0 - 25,025	0 - 18,774
Offices of physicians	62110	40	37	371	36	42 i	43	39	28	70	102 i	113	196	195
Medical and diagnostic laboratories	62150	903	246	409	287	364	347	410	424	0 - 7,094 i	855	1,739 i	2,104	1,633 i

TABLE 61

**Worldwide R&D paid for by the company and performed by the company and others, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Other ambulatory health care services (ambulance, dental, home health care)	62199	NA	47	145	i	15	45	i	52	37	39	23	70	48	150	83
Hospitals and nursing care facilities	62200	NA	62	i	68	2	2	i	2	2	4	6	18	0 - 23,467	0 - 15,636	0 - 18,774
Social assistance services	62400	NA	D	15	13	36	47	17	2	2	6	13	25,025	0 - 18,774	0 - 18,774	
Arts, entertainment, and recreation	71000	NA	161	137	85	70	29	103	i	50	45	42	45	479	0 - 18,774	
Accommodation and food services	72000	NA	50	119	84	149	i	163	D	106	76	62	126	0 - 25,025	120 - 4,079	
Other services (not listed elsewhere)	81000	NA	89	465	345	484	405	550	669	0 - 7,094	0 - 12,866	0 - 23,467	507	584		
Undistributed	-	10,660	14,175	5,373	i	D	491	359	i	69	0	0	0	0	0	

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; NA = not available.

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System (NAICS) industry definitions.

<sup>c</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 32543, Biotechnology-based pharmaceutical and biological products (except diagnostic substances).

<sup>d</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2014 and beyond: 33333, Digital cameras manufacturing.

<sup>e</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 51801, Cloud computing applications and Internet-based software services.

<sup>f</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2020 and beyond: 54175, Research and development services in nanotechnology.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. For survey year 2008, industry classification was based on the 2002 NAICS. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 62

## Worldwide sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All business activities	21100–81000	10,976,518	10,221,923	12,204,773	12,874,185	12,975,886	13,279,075	13,409,822	12,201,595	12,246,930	12,878,032	14,493,394	14,927,124	14,863,520
Oil and gas extraction	21100	271,493	153,939	212,469	331,320	271,983	250,884	241,227	141,687	117,720	108,940	178,064	58,355 - 1,966,830	119,553
Mining	21200	NA	D	38,302	57,661	43,857	54,531	D	D	29,976	23,057	44,867	18,307	15,337
Support activities for mining, including oil and gas	21300	NA	45,184	61,062	68,523	79,788	100,175	129,989	74,421	44,705	64,412	84,366	89,793	53,272
Utilities	22100	NA	317,243	310,768	348,763	318,893	324,150	356,225	346,925	309,116	407,052	4,778 - 1,152,314	304,369	288,292
Construction	23000	NA	42,287	93,305	107,286	107,685	94,057	91,507	64,463	52,363	69,900	87,053	93,308	99,239
Food manufacturing	31100	475,588	630,500	694,763	690,698	688,804	941,309	844,673	744,318	705,021	789,784	718,760	785,374	795,967
Beverage manufacturing	31210	143,008	129,396	141,259	180,153	167,003	164,270	166,544	170,059	155,459	146,561	138,524	119,571	131,037
Tobacco manufacturing	31220	28,970	134,972	133,993	140,998	130,759	69,191	D	D	64,978	72,291	67,629	70,749	75,788
Textile, apparel, and leather products manufacturing	31990	NA	56,131	68,515	66,416	89,086	70,260	66,546	83,170	109,296	88,817	84,900	24,172 - 1,932,647	80,098
Wood products manufacturing	32100	34,563	27,826	28,342	24,165	32,908	42,472	51,879	33,713	0 - 373,524	36,180	41,001	41,880	43,662
Paper manufacturing	32200	139,953	110,534	136,302	144,064	142,335	146,748	148,797	D	129,369	146,927	157,969	0 - 2,264,461	138,038
Printing and related support activities	32300	26,426	37,743	37,398	32,823	32,152	29,576	34,227	42,885	31,310	47,910	36,015	65,568	36,160
Petroleum refineries	32401	NA	NA	837,945	954,108	911,784	968,046	787,825	512,224	415,433	325,034 - 733,821	586,670	565,849	378,920
Asphalt paving, roofing, and saturated materials manufacturing	32402	NA	NA	7,566	8,872	8,563	14,504	11,150	10,324	12,322	16,662	17,798	18,422	18,932
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	NA	NA	32,282	43,514	D	23,425	22,348	20,440	15,665	20,790	16,008	11,434	8,947
Basic chemicals manufacturing	32510	273,809	179,494	243,193	299,476	473,666	278,661	270,287	212,951	264,935	231,673	262,007	228,984	253,285



TABLE 62

**Worldwide sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	89,805	94,915	108,693	88,762	97,410	95,249	108,867	92,708	91,399	92,324	128,075	111,483	96,423
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	40,337	71,003	51,940	47,381	57,246	67,823	68,738	72,737	58,476	74,274	83,310	67,388	67,234
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing <sup>c</sup>	32541	582,910	438,687	471,763	577,607	594,394	577,930	569,968	564,398	608,453	636,157	669,845	555,403	707,023
In vitro diagnostic substances manufacturing <sup>c</sup>	32542	22,317	16,940	20,637	25,005	27,022	13,871	25,365	14,159	7,892 - 171,885	15,915	17,050	9,160 - 594,175	18,981
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	NA	NA	NA	40,409	56,454	84,437	0 - 373,524	90,419	110,160	126,736	126,405
Soap, cleaning compound, and toilet preparations manufacturing	32591	142,212	151,565	167,258	170,417	166,942	185,266	196,651	180,201	164,810	179,865	192,314	178,596	182,299
Paint, adhesive, and other chemical manufacturing	32592	113,118	104,308	103,452	120,242	128,998	113,108	128,730	107,146	118,885	124,026	131,768	122,393	121,547
Plastics and rubber products manufacturing	32600	162,401	161,057	193,471	243,447	265,623	219,020	241,780	201,164	232,466	229,347	227,659	207,637	242,938
Clay and glass products manufacturing	32710	36,417	27,803	37,853	34,184	36,960	39,365	34,863	39,676	47,603	41,355	48,534	39,769	34,344

TABLE 62

## Worldwide sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	48,680	35,530	31,789	32,864	40,193	42,592	35,322	35,377	34,503	29,688	41,567	46,610	44,002
Primary metal manufacturing	33100	NA	124,478	197,315	179,318	176,544	161,443	128,532	103,093	121,321	100,279	158,304	162,531	103,454
Fabricated metal products manufacturing	33200	188,359	132,465	161,593	179,228	207,423	199,678	235,784	194,098	165,184	175,986	203,494	183,323	194,912
Agricultural machinery and equipment manufacturing	33311	48,185	46,695	53,946	43,410	59,651	68,793	63,617	53,559	51,776	60,038	67,224	36,554 - 621,568	57,227
Construction machinery manufacturing	33312	32,109	23,195	30,685	42,974	43,355	63,344	65,348	56,090	49,267	60,563	74,106	80,257	70,632
Mining, oil, and gas field machinery and equipment manufacturing	33319	NA	69,074	75,563	101,549	110,356	84,384	76,466	73,725	48,023	65,286	86,513	68,944	55,194
Semiconductor machinery manufacturing	33321	20,019	10,505	21,588	25,960	9,973	24,420	27,333	24,653	30,749	38,320	47,008	24,628 - 609,643	49,278
Industrial machinery manufacturing (except semiconductor machinery)	33322	26,984	21,368	30,723	44,666	42,619	39,357	51,615	39,189	37,659	38,252	44,624	38,113	49,728
Photographic and photocopying equipment manufacturing	33331	NA	7,471	D	D	307	7,502	9,162	8,602	6,775 - 170,768	6,849	0 - 1,147,536	836	1,441 - 233,432
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	NA	49,546	76,811	73,896	90,814	97,984	111,674	101,920	113,832	100,874	116,411	115,647	93,455
Digital cameras manufacturing	33333	NA	NA	NA	NA	NA	NA	15	D	5,579	5,947	0 - 1,147,536	3,372	0 - 308,046

TABLE 62

## Worldwide sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Engine, turbine, and power transmission equipment manufacturing	33360	86,660	46,879	84,686	112,562	120,116	146,129	D	85,560	87,887	106,205	95,099	55,890 - 640,904	103,655
Metalworking and other general purpose machinery manufacturing	33390	90,067	66,350	95,017	112,947	125,495	105,487	149,607	140,673	116,838	117,535	124,745	101,458	94,049
Computers and peripheral equipment manufacturing and magnetic and optical media <sup>d</sup>	33412	NA	273,429	330,020	342,416	304,309	307,523	297,193	282,890	414,641	452,483	479,840	453,517	454,712
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	48,816	66,123	87,159	64,811	64,652	75,886	72,421	202,399	76,218	74,054	80,804	0 - 2,264,461	70,064
Radio, television, and wireless communication equipment manufacturing	33422	76,167	64,808	79,675	92,884	136,470	148,680	168,774	D	39,937 - 203,930	37,092	0 - 1,147,536	37,124	34,841
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	17,976	13,324	12,856	21,004	15,949	23,299	14,548	15,997	0 - 373,524	13,808	14,852 - 257,625	15,898	18,857
Audio and video equipment manufacturing	33430	13,212	15,041	22,242	11,476	17,926	19,596	18,333	38,954	35,473	3,724 - 417,696	11,671	15,984	16,369
Semiconductor and other electronic components manufacturing	33440	220,272	196,399	296,058	336,789	332,771	320,780	350,779	D	323,512	373,892	464,768	0 - 2,264,461	417,763

TABLE 62

**Worldwide sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	41,395	27,437	29,041	38,560	39,590	43,130	43,537	44,739	46,152	44,317	54,101 i	50,472	45,318
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	38,474	55,866	68,907	47,701	63,724	66,326	67,154	58,670	59,653	65,730 i	72,999	73,068	78,507
Measuring and control instruments manufacturing (not listed elsewhere)	33459	57,989	78,228	88,305	84,368	99,774	97,153	102,909	101,098	102,226	91,098	80,604	85,037	95,097
Electrical equipment, appliances, and components manufacturing	33500	154,206	129,174	160,532	165,156	164,998	182,490	198,505	195,327	213,284	185,233	189,043	219,931	203,459
Motor vehicles manufacturing	33610	521,541	399,125	476,726	539,595	541,730	615,136	539,139	646,110	693,548	616,741	700,801	618,116	458,784
Motor vehicle body and trailer manufacturing	33620	D	15,688	23,105	15,325	34,284	25,913	32,719	23,229	63,232	20,086	26,219	45,941	30,296
Motor vehicle parts manufacturing	33630	163,993	126,638	242,201	224,450	228,418	269,022	379,492	294,414	238,521	270,643	284,735	291,175	235,737
Aircraft manufacturing	33641	97,635	75,960	89,235	121,480	97,484 i	154,241	139,924	148,986	136,497	128,861	190,692	144,845	120,779
Aircraft engine and engine parts manufacturing	33642	42,829	37,086	34,925	42,514	40,376	54,024	48,134	D	38,176	42,340	60,557	54,264	42,793
Other aircraft parts and auxiliary equipment manufacturing	33643	30,319	36,714	41,704	56,509	44,556	60,520	84,966	97,198	85,111	103,682	67,880	58,258	68,917
Guided missiles, space vehicles, and related parts manufacturing	33644	D	51,326	D	D	16,554	17,200	30,237	31,776	30,600	37,204	51,013	35,217	43,696

TABLE 62

**Worldwide sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Railroad rolling stock manufacturing	33651	7,248	3,639	9,075 i	8,870	14,255	12,639	19,679	19,353	14,852	13,416	14,083	13,505 i	16,854
Ship and boat building	33660	16,461	37,439 i	D	D	23,966 i	16,927 i	39,049	15,426	33,496 - 134,100	22,538	16,295	24,056	18,208
Motorcycle, bicycle, and parts manufacturing	33691	8,423	6,677	6,646	8,948	7,829	11,331	9,142	9,067	9,507	9,107	4,253 - 1,151,789	4,030 - 1,912,506	9,705
Military armored vehicle, tank, and tank components manufacturing	33692	13,341	10,136	D	6,239	4,893	4,354 i	7,502	D	77 - 229,474	11,306 i	18,524 i	15,404	10,766
All other transportation equipment manufacturing	33699	9,513	6,332	13,008	13,415	18,469	28,933	12,026	14,565	14,435	14,658	21,096	17,727	21,046
Furniture and related products manufacturing	33700	43,401	35,821	37,487	39,031	43,719	41,407	45,760	43,530	43,362	47,260	48,896	51,330	57,220
Medical equipment and supplies manufacturing	33910	164,066	159,611	243,406	304,215	217,549	237,729	234,177	235,706	244,748	250,637	271,188	301,591	515,125
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	122,669	114,088	101,526	D	118,660	140,793	134,415	D	131,728	135,910	170,909	117,115	149,045
Merchant wholesalers, durable goods	42300	412,269	313,095	334,004	214,772	246,702	378,550	180,014	260,038	221,852	165,345	247,956	163,818	185,285
Merchant wholesalers, nondurable goods	42400	340,956	273,118	280,982	496,309	587,019	571,742	698,182	547,921	512,867	506,120	633,916	593,435	645,419
Wholesale electronic markets and agents and brokers (business to business)	42500	2,600	8,684	3,347	4,722 i	115,452 i	53,497	86,215	41,905	60,197	50,155	435 - 1,147,971	5,355	20,637

TABLE 62

## Worldwide sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Retail trade (except electronic shopping and electronic auctions)	44000	NA	206,489	223,211	104,922	257,466	156,839	442,527	210,412	296,019	322,049	537,429	662,767	685,031
Electronic shopping and electronic auctions	45411	NA	NA	D	D	88,213	96,577	D	130,399	110,617 - 274,610	198,755	191,380 - 434,154	168,466 - 753,481	212,463 - 444,454
Transportation	48000	NA	D	182,535	109,842	139,615	95,821	117,267	D	0 - 373,524	278,263	277,801	387,962	223,100
Couriers, messengers, and express delivery services	49200	D	D	47,619	D	D	D	170,934	D	187,345	136,436	90,988	2,034	0 - 308,046
Warehousing and storage	49300	31,235	1,536	24,457	22,885	3,983	13,530	2,585	D	4,652	15,714	0 - 1,147,536	15,943	17,095
Newspaper, periodical, book, and directory publishers (except Internet)	51110	17,053	24,528	26,671	30,831	33,557	17,955	10,520	7,008	8,704	6,010	0 - 1,147,536	7,146	6,869
Software publishers (except Internet) <sup>e</sup>	51120	210,186	195,833	214,359	230,898	237,602	266,587	278,159	272,944	256,293	231,880	244,928	237,538	238,475
Motion picture and sound recording (except Internet)	51200	16,774	20,697	18,011	14,964	9,467	20,861	D	7,142	9,353	8,936	37,326	46,569	36,035
Broadcasting (except Internet)	51500	NA	39,734	53,313	44,029	67,429	81,499	D	74,473	84,879	88,160	151,227	185,522	168,015
Wired telecommunications carriers	51710	D	187,439	210,704	268,345	223,829	181,992	230,630	216,588	181,904	222,699	129,766	139,245	150,710
Wireless telecommunications carriers (except satellite)	51720	135,248	154,682	138,479	156,696	193,408	D	247,759	D	172,416	201,063	264,219	264,976	254,772
Satellite telecommunications	51740	19,330	12,662	16,021	2,783	3,056	D	3,581	44,400	61,927	57,588	53,333	51,337	45,199
Other telecommunications (not listed elsewhere)	51790	5,603	9,122	7,737	18,803	17,803	18,504	6,507	14,561	8,524	16,040	12,551 - 255,324	13,862 - 598,877	23,263

TABLE 62

**Worldwide sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Data processing, hosting, and related services <sup>e</sup>	51800	NA	36,196	38,523	60,641	95,872 i	58,502	81,059	79,017	76,345	77,859	141,006	97,846	102,570
Cloud computing applications and Internet-based software services	51801	NA	NA	NA	NA	NA	27,442	D	33,792	57,770	98,224	167,679	220,609	323,266
Other information services, including Internet publishing, broadcasting, and Web search portals <sup>e</sup>	51910	NA	41,660	77,319	39,551	45,729	65,134	102,254	94,541	113,123	160,826	191,042	215,354	390,595
Finance: banking and credit intermediation	52200	NA	D	1,068,703	631,129	673,238 i	347,139	364,224	377,622	400,369	472,203	536,280	629,461	637,872
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	NA	148,454	148,014	152,435	104,915	107,027	74,030	75,325	72,115	102,310	20,889 - 1,168,425	97,894	129,354
Insurance carriers and related activities	52400	NA	294,233	281,344	280,278	358,159	397,971	380,117	420,526	372,903	312,922	0 - 1,147,536	37,829 - 1,946,303	914,331
Real estate	53100	D	7,738	D	D	D	D	D	8,537	9,292	10,114	11,565	222 - 1,908,697	11,841
Rental and leasing services	53200	NA	32,231	36,299	23,830	29,033	35,488	21,986	29,238	14,235	21,642	3,607 - 1,151,143	12,718	10,127
Lessors of nonfinancial intangible assets, including patent licensing	53300	D	1,835	1,927	2,709	2,890	11,404 i	2,125	2,150	1,468	3,513	0 - 1,147,536	1,672	3,191 - 235,182
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	NA	D	16,188	D	11,315	14,588	22,315	22,259	19,526	21,336	24,044	28,797	29,108

TABLE 62

**Worldwide sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Architectural, engineering, and related services	54130	42,680	96,534	147,309	102,126	114,240	i 125,923	134,541	139,846	103,412	84,387	102,795	126,787	95,540
Specialized design services	54140	D	6,504	3,976	2,581	3,646	i 3,614	2,165	D	706	4,584	i 25,655	12,684	1,439 - 233,430
Computer systems design and related services <sup>e</sup>	54150	210,916	216,477	224,026	377,919	i 272,065	249,600	272,937	243,790	249,430	223,281	251,167	238,436	229,217
Management, scientific, and technical consulting services	54160	52,497	60,125	43,190	76,910	85,161	81,834	93,077	92,120	63,143	49,057	69,344	58,335	59,488
Research and development services in the social sciences and humanities	54172	NA	980	1,170	827	D	1,301	992	D	1,131	1,185	941	1,233	1,016
Research and development services in biotechnology <sup>c,f</sup>	54173	NA	22,354	i 8,493	8,657	11,316	12,390	17,543	10,962	9,026	9,340	3,772 - 1,151,308	4,159 - 1,912,634	13,779
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	NA	19,858	18,840	23,446	33,296	36,913	32,703	36,038	37,997	37,955	41,855	49,247	54,377
Research and development services in nanotechnology	54175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	362
Advertising and related services	54180	D	48,883	12,992	i D	52,764	D	D	D	44,669 - 208,661	107,640	140,254	84,187 - 669,202	101,585 - 333,576
Professional, scientific, and technical services (not listed elsewhere)	54190	19,146	30,323	35,320	50,949	63,254	47,353	32,811	30,775	12,204 - 176,196	31,239	21,496	23,047	34,696



TABLE 62

## Worldwide sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Management of companies and enterprises	55100	828	2,333	3,613	17,275	5,435	177,880	9,213	16,180	11,794	i	18,180	13,915	13,249	11,906	i
Administrative and support services	56100	NA	35,867	45,135	32,735	50,684	i	44,004	243,644	50,037	55,602	49,518	66,944	27,043 - 1,935,519	63,563	
Waste management and remediation services	56200	NA	6,242	14,172	8,182	6,564	6,245	4,766	24,985	27,470	22,609	88,502	11,624	2,613 - 234,604		
Offices of physicians	62110	7,492	25,752	24,133	23,844	35,513	36,233	19,041	36,724	40,586	61,118	50,891	102,827	65,797		
Medical and diagnostic laboratories	62150	20,968	15,216	37,950	17,047	21,038	17,914	5,919	20,904	27,539	i	28,636	39,514	i	38,605	52,328
Other ambulatory health care services (ambulance, dental, home health care)	62199	NA	8,127	8,487	D	3,361	i	10,919	5,274	5,651	0 - 229,395	10,819	176 - 1,147,712	22,636	30,615	
Hospitals and nursing care facilities	62200	NA	D	D	D	D	D	26,866	27,616	32,896	32,276	35,119	25,798	44,662		
Social assistance services	62400	D	286	448	326	249	1,065	1,338	63	77	112	0 - 1,147,536	0 - 1,908,473	1,825		
Arts, entertainment, and recreation	71000	NA	17,339	16,089	16,023	18,344	D	D	18,677	17,509 - 181,502	24,540	34,697	37,590	17,465		
Accommodation and food services	72000	NA	D	69,474	39,421	88,878	i	107,255	46,228	76,898	66,849	26,196	54,566	84,342	52,941	
Other services (not listed elsewhere)	81000	NA	15,585	43,778	129,084	57,612	142,029	78,365	70,781	237,671	0 - 413,972	0 - 1,147,536	18,845 - 1,927,321	86,353		
Less: intersegment eliminations	-	381,031	237,743	234,289	281,460	309,288	301,615	316,930	240,217	226,993	196,040	255,127	182,826	215,380		
Undistributed	-	1,092,275	1,590,109	516,754	598,369	i	167,240	i	4,602	9,547	i	0	0	8	i	0

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; NA = not available.

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System (NAICS) industry definitions.<sup>c</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 32543, Biotechnology-based pharmaceutical and biological products (except diagnostic substances).

<sup>d</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2014 and beyond: 33333, Digital cameras manufacturing.

<sup>e</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 51801, Cloud computing applications and Internet-based software services.

<sup>f</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2020 and beyond: 54175, Research and development services in nanotechnology.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. For survey year 2008, industry classification was based on the 2002 NAICS. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 63

## Domestic sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All business activities	21100–81000	7,796,340	7,448,495	8,831,739	9,059,299	9,260,168	9,663,848	9,785,269	9,084,789	9,151,764	9,583,098	10,680,515	11,279,821	11,296,552
Oil and gas extraction	21100	127,788	61,582	85,797	178,926	124,569	120,495	124,534	71,385	58,231	51,790	91,319	1,908,473	80,518
Mining	21200	NA	D	33,072	38,109	24,837	38,270	22,962	37,589	19,449	17,583	25,823	16,117	13,947
Support activities for mining, including oil and gas	21300	NA	23,022	34,840	42,645	51,327	72,553	97,302	47,711	25,825	39,547	54,528	52,894	28,322
Utilities	22100	NA	D	301,613	337,871	309,573	316,082	347,997	336,457	304,643	400,104	1,147,536	299,495	286,719
Construction	23000	NA	27,180	81,641	88,626	64,402	60,516	66,835	49,892	45,660	64,968	79,414	85,005	88,849
Food manufacturing	31100	394,404	503,047	501,332	494,683	503,915	693,438	608,765	541,557	520,546	617,230	527,904	570,617	583,067
Beverage manufacturing	31210	83,691	78,740	84,764	95,236	83,774	106,580	109,397	D	111,431	96,676	92,210	78,312	89,778
Tobacco manufacturing	31220	28,680	32,431	31,357	29,645	27,706	35,864	36,177	31,715	34,196	35,945	35,691	38,302	42,949
Textile, apparel, and leather products manufacturing	31990	NA	45,893	56,890	52,532	68,545	55,066	51,532	70,105	89,019	66,734	59,379	1,908,473	56,047
Wood products manufacturing	32100	28,183	26,213	25,241	22,344	28,764	36,703	44,706	28,998	0 - 229,395	31,890	34,871	35,769	40,526
Paper manufacturing	32200	100,057	80,030	99,820	103,867	101,033	106,399	106,178	108,659	95,481	110,534	118,261	1,908,473	104,681
Printing and related support activities	32300	22,678	33,532	32,163	26,809	26,267	26,281	29,178	35,056	26,808	39,492	31,019	55,231	32,542
Petroleum refineries	32401	NA	NA	540,612	581,297	578,075	639,569	521,504	336,271	245,323	325,035	332,542	362,266	235,776
Asphalt paving, roofing, and saturated materials manufacturing	32402	NA	NA	7,549	8,781	8,489	13,260	8,873	9,694	9,088	13,350	11,426	12,622	16,003
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	NA	NA	21,658	20,509	20,440	13,722	12,852	11,797	10,565	15,821	13,238	10,453	8,476
Basic chemicals manufacturing	32510	158,621	103,950	150,240	206,723	344,515	198,843	195,066	154,351	205,221	164,502	181,046	0 - 228,985	160,717
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	60,269	61,805	64,684	58,263	68,104	67,845	73,542	61,729	58,345	56,121	76,816	71,460	57,106
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	28,010	47,317	41,528	33,380	40,317	45,660	55,122	D	41,963	55,687	53,085	55,218	56,369

TABLE 63

**Domestic sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing <sup>c</sup>	32541	445,985	309,750	324,266	414,284	428,486	415,199	414,154	410,983	463,633	486,877	510,204	384,923	539,191
In vitro diagnostic substances manufacturing <sup>c</sup>	32542	15,353	9,805	12,835	13,735	14,646	8,141	14,006	6,219	7,893	9,215	8,119	9,161	12,134
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	NA	NA	NA	36,856	48,419	71,205	0 - 229,395	0 - 90,420	96,814	111,134	115,183
Soap, cleaning compound, and toilet preparations manufacturing	32591	69,942	71,452	81,151	70,851	82,518	87,034	101,458	94,015	83,083	94,133	107,951	98,948	100,581
Paint, adhesive, and other chemical manufacturing	32592	63,149	62,724	60,506	64,497	79,372	67,504	73,975	68,020	73,446	78,668	86,077	79,965	78,266
Plastics and rubber products manufacturing	32600	118,523	114,191	137,777	173,290	194,568	153,705	165,082	156,033	175,524	162,892	171,981	147,603	179,939
Clay and glass products manufacturing	32710	24,394	19,014	25,143	21,754	20,164	22,987	21,577	23,739	30,753	27,302	29,698	24,222	19,924
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	43,373	31,599	24,141	24,235	33,359	33,428	25,941	27,882	28,170	25,524	36,064	40,811	37,810
Primary metal manufacturing	33100	NA	97,493	161,558	148,670	153,926	137,000	104,419	90,956	105,884	82,674	124,934	124,538	79,274
Fabricated metal products manufacturing	33200	142,788	102,595	119,246	130,090	155,294	160,359	168,139	150,860	129,779	128,532	149,664	132,941	145,289
Agricultural machinery and equipment manufacturing	33311	27,543	25,669	29,904	29,258	35,667	45,717	36,857	32,054	30,092	38,891	37,208	36,555	36,219
Construction machinery manufacturing	33312	18,228	13,180	19,480	25,854	31,853	42,912	41,256	35,668	34,984	39,464	44,655	49,631	45,082
Mining, oil, and gas field machinery and equipment manufacturing	33319	NA	33,167	39,264	53,050	60,556	46,949	43,531	37,351	21,606	31,187	46,305	41,573	22,695
Semiconductor machinery manufacturing	33321	9,091	4,765	11,918	15,018	6,839	10,807	11,067	8,215	15,676	20,114	21,685	24,629	26,287
Industrial machinery manufacturing (except semiconductor machinery)	33322	19,452	15,372	21,762	29,736	31,127	29,265	35,077	32,599	25,317	27,103	31,884	28,414	38,435

TABLE 63

## Domestic sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Photographic and photocopying equipment manufacturing	33331	NA	5,392	3,927	4,791	D	6,885	7,246	7,124	6,776	5,993	0 - 1,147,536	710	1,442
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	NA	33,493	48,407	43,626	54,363	64,333	71,628	74,207	76,436	68,201	77,939	80,289	66,485
Digital cameras manufacturing	33333	NA	NA	NA	NA	NA	NA	15	D	0 - 5,580	1,423	0 - 1,147,536	1,762	0 - 76,100
Engine, turbine, and power transmission equipment manufacturing	33360	58,560	30,093	46,693	68,243	74,148	89,526	45,367	50,302	51,113	57,548	49,399	55,891	52,517
Metalworking and other general purpose machinery manufacturing	33390	54,007	43,998	58,532	71,081	86,258	81,492	98,230	99,506	78,310	78,019	86,306	75,128	69,055
Computers and peripheral equipment manufacturing and magnetic and optical media <sup>d</sup>	33412	NA	136,666	167,290	174,898	143,492	180,146	165,617	153,211	211,415	196,854	214,860	211,233	215,104
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	26,447	35,592	40,631	32,334	34,783	39,026	40,004	92,411	44,009	41,110	44,162	0 - 1,908,473	40,719
Radio, television, and wireless communication equipment manufacturing	33422	46,641	46,769	61,641	55,217	82,027	94,606	96,564	D	39,938	31,253	0 - 1,147,536	30,685	27,773
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	11,185	8,644	8,841	12,452	13,908	16,604	12,801	14,671	0 - 229,395	11,789	14,853	14,423	16,632
Audio and video equipment manufacturing	33430	10,969	10,929	19,142	7,296	14,633	14,832	13,162	D	25,739	0 - 413,972	6,363	7,797	13,107
Semiconductor and other electronic components manufacturing	33440	119,612	117,302	138,124	151,590	146,764	123,263	162,118	172,062	160,152	182,769	232,283	0 - 1,908,473	238,082
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	28,976	18,709	19,647	25,057	27,605	31,248	28,949	29,150	31,400	24,211	31,286	32,355	27,312

TABLE 63

## Domestic sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	33,348	46,237	57,639	40,372	53,425	52,990	55,142	48,787	47,874	53,371	63,110	62,411	62,502
Measuring and control instruments manufacturing (not listed elsewhere)	33459	37,609	42,753	50,643	49,752	58,909	52,984	55,954	61,158	62,658	60,242	52,440	56,172	62,669
Electrical equipment, appliances, and components manufacturing	33500	106,551	85,758	105,982	106,576	110,094	133,238	141,600	143,695	139,311	120,116	115,004	145,779	134,384
Motor vehicles manufacturing	33610	346,591	274,985	329,874	373,194	375,113	459,721	385,647	526,522	561,193	207,956 - 616,742	580,129	495,402	353,992
Motor vehicle body and trailer manufacturing	33620	9,363	15,184	22,168	14,423	31,982	25,726	32,146	23,083	62,848	19,322	25,616	42,353	25,704
Motor vehicle parts manufacturing	33630	97,433	77,528	146,257	125,593	130,372	155,179	244,948	192,928	148,781	185,890	202,526	195,569	149,479
Aircraft manufacturing	33641	97,973	69,001	81,666	111,748	91,545	145,641	132,472	139,909	130,676	121,866	181,703	139,087	114,603
Aircraft engine and engine parts manufacturing	33642	35,056	24,737	25,563	27,491	26,706	46,618	41,051	D	36,861	40,556	35,583	32,679	29,630
Other aircraft parts and auxiliary equipment manufacturing	33643	21,141	26,755	31,157	43,898	34,541	47,588	68,545	77,236	68,063	83,469	56,053	47,651	60,083
Guided missiles, space vehicles, and related parts manufacturing	33644	38,114	D	25,391	35,889	14,656	14,770	27,872	29,343	30,261	35,725	46,748	32,443	38,386
Railroad rolling stock manufacturing	33651	6,354	2,763	7,095	7,204	11,800	10,875	16,122	16,100	11,092	8,252	8,576	8,090	9,421
Ship and boat building	33660	14,880	D	10,531	11,647	22,778	15,008	32,077	13,569	33,497	20,861	14,316	21,987	16,342
Motorcycle, bicycle, and parts manufacturing	33691	8,078	6,282	6,081	7,422	7,067	10,406	7,777	7,687	6,276	5,423	0 - 1,147,536	0 - 1,908,473	5,548
Military armored vehicle, tank, and tank components manufacturing	33692	13,092	9,674	9,072	5,755	4,668	4,190	4,895	4,304	0 - 229,395	9,662	15,846	13,847	9,398
All other transportation equipment manufacturing	33699	7,131	5,438	11,079	11,066	16,258	15,809	D	11,472	11,940	11,554	17,803	16,188	19,166
Furniture and related products manufacturing	33700	36,218	31,479	32,876	32,881	37,447	35,446	39,675	38,024	37,737	43,394	44,459	46,013	49,950
Medical equipment and supplies manufacturing	33910	105,647	102,585	169,760	225,177	136,664	160,263	155,890	154,650	166,341	165,204	28,416 - 271,189	200,521	403,496

TABLE 63

## Domestic sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	80,689	84,846	71,000	78,674	80,879	93,078	90,517	95,353	86,197	96,947	104,968	87,408	100,331
Merchant wholesalers, durable goods	42300	238,101	196,341	206,240	171,815	221,488	353,401	161,500	232,112	194,976	142,659	225,389	147,049	159,409
Merchant wholesalers, nondurable goods	42400	274,190	239,385	247,311	266,388	349,833	362,965	457,745	387,489	359,871	349,751	454,966	438,340	513,510
Wholesale electronic markets and agents and brokers (business to business)	42500	2,481	D	3,331	3,008	65,076	33,264	65,562	21,530	59,653	49,844	0 - 1,147,536	5,104	19,901
Retail trade (except electronic shopping and electronic auctions)	44000	NA	D	195,958	70,424	214,728	128,479	400,192	196,896	278,755	305,293	481,549	582,400	607,899
Electronic shopping and electronic auctions	45411	NA	NA	32,624	40,254	53,712	59,174	43,787	D	110,618	0 - 198,757	191,381	168,467	212,464
Transportation	48000	NA	D	95,591	83,912	107,212	87,113	111,576	D	0 - 229,395	223,375	219,221	299,220	181,873
Couriers, messengers, and express delivery services	49200	D	D	36,420	D	D	D	123,456	D	141,429	103,001	68,939	2,014	0 - 76,100
Warehousing and storage	49300	28,723	1,296	23,982	21,910	3,157	12,235	1,971	2,305	3,358	9,877	0 - 1,147,536	8,407	11,394
Newspaper, periodical, book, and directory publishers (except Internet)	51110	12,383	16,369	18,917	22,488	26,549	15,003	8,481	5,743	7,263	4,383	0 - 1,147,536	5,584	5,379
Software publishers (except Internet) <sup>e</sup>	51120	121,028	118,001	129,649	132,970	136,905	154,237	163,059	159,688	155,068	133,983	148,758	142,948	149,734
Motion picture and sound recording (except Internet)	51200	10,053	14,356	11,375	9,824	7,281	13,722	D	5,203	6,863	6,353	32,874	43,304	33,955
Broadcasting (except Internet)	51500	NA	34,110	45,779	39,563	59,926	73,283	59,724	64,390	70,169	71,335	126,122	145,840	131,464
Wired telecommunications carriers	51710	99,917	D	209,490	261,484	216,736	181,127	227,778	213,921	179,239	220,350	127,438	137,019	146,787
Wireless telecommunications carriers (except satellite)	51720	134,162	153,937	138,473	156,525	193,254	205,148	247,714	210,820	172,357	200,979	264,216	264,970	253,127
Satellite telecommunications	51740	14,005	6,743	15,845	2,430	2,822	3,143	3,518	43,812	61,622	57,292	53,242	51,266	45,008

TABLE 63

## Domestic sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Other telecommunications (not listed elsewhere)	51790	4,374	8,108	7,222	15,929	14,610	16,325	5,973	13,669	7,684	14,142	12,552	13,863	17,041
Data processing, hosting, and related services <sup>e</sup>	51800	NA	29,903	31,417	51,197	82,997	i 49,201	67,167	64,916	59,491	57,183	114,191	69,067	69,438
Cloud computing applications and Internet-based software services	51801	NA	NA	NA	NA	NA	19,455	26,461	26,654	44,759	77,556	131,826	171,301	226,559
Other information services, including Internet publishing, broadcasting, and Web search portals <sup>e</sup>	51910	NA	27,907	47,397	28,424	28,760	36,613	57,405	53,823	75,332	100,436	114,010	121,756	275,283
Finance: banking and credit intermediation	52200	NA	D	992,651	601,628	631,902	i 305,994	317,147	312,954	342,319	399,822	479,807	577,362	574,077
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	NA	D	113,669	117,167	88,244	83,913	54,342	60,239	55,068	83,537	0 - 1,147,536	67,833	94,127
Insurance carriers and related activities	52400	NA	282,640	265,110	265,293	349,252	363,799	347,710	398,746	353,842	294,467	0 - 1,147,536	0 - 1,908,473	883,590
Real estate	53100	6,053	D	4,615	4,727	8,069	8,227	10,128	8,449	9,235	0 - 10,116	10,982	0 - 1,908,473	11,840
Rental and leasing services	53200	NA	D	27,719	18,597	21,801	26,614	15,330	23,848	0 - 14,237	13,623	0 - 1,147,536	8,245	6,941
Lessors of nonfinancial intangible assets, including patent licensing	53300	D	1,484	1,702	2,350	2,125	10,764	i 1,608	1,982	1,386	2,785	0 - 1,147,536	1,615	3,192
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	NA	D	14,565	7,394	9,093	11,974	18,498	i 18,538	16,708	18,581	21,142	25,650	26,798
Architectural, engineering, and related services	54130	37,749	81,565	113,603	65,209	94,868	i 80,859	85,535	90,666	76,622	65,138	84,645	110,265	81,207
Specialized design services	54140	3,325	D	3,522	2,353	3,301	i 2,714	1,487	769	638	2,356	i 7,284	3,763	1,440
Computer systems design and related services <sup>e</sup>	54150	124,832	140,234	143,787	224,144	167,759	158,858	168,793	165,417	176,418	152,680	154,615	152,057	145,903
Management, scientific, and technical consulting services	54160	33,588	36,811	28,351	52,489	57,925	59,508	84,830	75,668	55,608	42,098	49,590	50,339	54,222



TABLE 63

## Domestic sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Research and development services in the social sciences and humanities	54172	NA	978	1,168	820	934	1,297	969	1,042	1,124	1,179	934	1,144	1,003
Research and development services in biotechnology <sup>c,f</sup>	54173	NA	18,691 i	7,194	7,388	9,769	10,689	15,872	9,381	6,548	6,476	0 - 1,147,536	0 - 1,908,473	9,617
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	NA	16,041	15,845	19,094	27,670	32,098	27,450	30,843	30,737	28,218	31,661	38,345	41,331
Research and development services in nanotechnology	54175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	362 i
Advertising and related services	54180	14,574	D	11,336 i	21,227	27,500	34,889	34,379	38,454	44,670	52,884	72,957	84,188	101,586
Professional, scientific, and technical services (not listed elsewhere)	54190	15,690	28,298	33,134	46,048	53,969	38,936	24,808	28,026	12,205	29,190	16,673	19,059	32,008
Management of companies and enterprises	55100	752	2,310	3,347	11,847	4,131	176,993	8,497	D	11,172 i	16,588	12,189	13,209	11,700 i
Administrative and support services	56100	NA	29,045	25,660	22,146	38,874 i	26,981	214,331	23,581	27,504	26,915	38,514	0 - 1,908,473	55,353
Waste management and remediation services	56200	NA	D	13,971	7,223	6,080	5,650	4,152	23,159	25,561	21,206	84,142	11,343	2,614
Offices of physicians	62110	7,492	25,751	24,133	23,844	35,513	36,233	19,041	36,724	40,586	61,117	50,891	102,827	65,797
Medical and diagnostic laboratories	62150	19,930	14,359	36,288	15,778	19,655	17,027	5,024	19,415	25,614 i	27,361	35,193	34,474	48,069
Other ambulatory health care services (ambulance, dental, home health care)	62199	NA	D	8,333	D	3,334 i	10,919	5,274	5,651	0 - 229,395	10,363	0 - 1,147,536	22,444	26,979
Hospitals and nursing care facilities	62200	NA	D	7,831	16,084	870 i	1,227	26,866	27,485	32,609	32,276	35,118	25,798	44,662
Social assistance services	62400	D	D	448	326	249	1,036	1,336	63	77	112	0 - 1,147,536	0 - 1,908,473	1,825
Arts, entertainment, and recreation	71000	NA	14,265	12,920	12,727	15,248	13,180	12,903	16,137	17,510	18,945	26,563	31,860	14,352
Accommodation and food services	72000	NA	D	37,218	27,476	54,266 i	57,908	31,664	44,505	32,404	21,272	33,736	56,338	35,098
Other services (not listed elsewhere)	81000	NA	9,638	35,994	118,268	44,823	120,458	60,949	51,253	173,078	0 - 413,972	0 - 1,147,536	0 - 1,908,473	65,440

TABLE 63

**Domestic sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Less: intersegment eliminations	–	219,384	110,499	132,754	117,417	136,579	136,540	160,374	126,960	129,858	131,717	152,902	117,364	152,870
Undistributed	–	756,553	1,137,705	412,892	450,613 i	108,244 i	D	1,945	D	0	0	8 i	0	0

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; NA = not available.

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System (NAICS) industry definitions.

<sup>c</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 32543, Biotechnology-based pharmaceutical and biological products (except diagnostic substances).

<sup>d</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2014 and beyond: 33333, Digital cameras manufacturing.

<sup>e</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 51801, Cloud computing applications and Internet-based software services.

<sup>f</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2020 and beyond: 54175, Research and development services in nanotechnology.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. For survey year 2008, industry classification was based on the 2002 NAICS. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All business activities	21100–81000	3,180,177	2,773,429	3,373,035	3,814,885	3,715,718	3,615,226	3,624,553	3,116,806	3,095,167	3,294,934	3,812,880	3,647,303	3,566,968
Oil and gas extraction	21100	143,705	92,357	126,671	152,394	147,415	130,389	116,693	70,302	59,489	57,150	86,746	58,356	39,035
Mining	21200	NA	D	5,230	19,552	19,020	16,261	D	D	10,528	5,473	19,044	2,191	1,391
Support activities for mining, including oil and gas	21300	NA	22,162	26,223	25,878	28,461	27,621	32,686	26,711	18,880	24,865	29,837	36,898	24,950
Utilities	22100	NA	D	9,155	10,892	9,320	8,068	8,229	10,468	4,473	6,948	4,779	4,874	1,573
Construction	23000	NA	15,107	11,664	18,660	43,283	33,541	24,672	14,571	6,703	4,932	7,639	8,303	10,390
Food manufacturing	31100	81,184	127,453	193,432	196,015	184,889	247,871	235,909	202,761	184,474	172,554	190,856	214,757	212,900
Beverage manufacturing	31210	59,317	50,655	56,495	84,916	83,229	57,690	57,147	D	44,029	49,885	46,313	41,260	41,259
Tobacco manufacturing	31220	290	102,541	102,636	111,353	103,052	33,327	D	D	30,782	36,346	31,938	32,447	32,838
Textile, apparel, and leather products manufacturing	31990	NA	10,239	11,625	13,883	20,542	15,193	15,014	13,065	20,278	22,083	25,521	24,173	24,051
Wood products manufacturing	32100	6,381	1,613	3,101	1,821	4,144	5,769	7,172	4,715	0 - 163,991	4,290	6,131	6,111	3,136
Paper manufacturing	32200	39,895	30,504	36,481	40,196	41,303	40,349	42,619	D	33,888	36,393	39,708	0 - 585,012	33,357
Printing and related support activities	32300	3,748	4,212	5,234	6,013	5,885	3,296	5,049	7,829	4,501	8,418	4,995	10,337	3,617
Petroleum refineries	32401	NA	NA	297,333	372,811	333,710	328,477	266,321	175,953	170,110	0 - 408,784	254,128	203,583	143,144
Asphalt paving, roofing, and saturated materials manufacturing	32402	NA	NA	17	91	74	1,244	2,278	630	3,234	3,312	6,373	5,800	2,929
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	NA	NA	10,623	23,005	D	9,703	9,496	8,643	5,100	4,968	2,770	981	471
Basic chemicals manufacturing	32510	115,189	75,544	92,953	92,754	129,151	79,818	75,221	58,600	59,714	67,172	80,961	0 - 228,985	92,568

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	29,537	33,110	44,009	30,499	29,307	27,404	35,325	30,979	33,055	36,203	51,259	40,023	39,317
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	12,327	23,686	10,412	14,001	16,929	22,163 i	13,617	D	16,513	18,587	30,225	12,170	10,865
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing <sup>c</sup>	32541	136,925	128,937	147,497	163,323	165,908	162,730	155,814	153,415	144,820	149,280	159,641	170,480	167,833
In vitro diagnostic substances manufacturing <sup>c</sup>	32542	6,964	7,135	7,802	11,270	12,376	5,730	11,359	7,940	0 - 163,991	6,700	8,931 i	0 - 585,012	6,846
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	NA	NA	NA	3,553	8,035	13,232	0 - 163,991	0 - 90,420	13,346	15,602	11,222
Soap, cleaning compound, and toilet preparations manufacturing	32591	72,271	80,113	86,107	99,565	84,423	98,232	95,193	86,186	81,727	85,732	84,362	79,648	81,718
Paint, adhesive, and other chemical manufacturing	32592	49,968	41,584	42,946	55,746	49,627	45,604	54,754	39,126	45,439	45,358	45,691	42,428	43,281
Plastics and rubber products manufacturing	32600	43,878	46,866	55,694	70,156	71,055	65,315	76,697	45,131	56,942	66,455	55,679	60,034	62,999
Clay and glass products manufacturing	32710	12,023	8,789	12,710	12,430	16,796	16,378	13,287	15,938	16,850	14,053	18,837	15,547 i	14,420

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	5,307	3,931	7,648	8,629	6,833	9,164	9,381	7,494	6,333	4,163	5,504	5,799	6,192
Primary metal manufacturing	33100	NA	26,985	35,756	30,648	22,619	24,443	24,114	12,138	15,437	17,605	33,370	37,994	24,180
Fabricated metal products manufacturing	33200	45,571	29,870	42,347	49,138	52,129	39,319	67,646	43,238	35,404	47,454	53,830	50,382	49,623
Agricultural machinery and equipment manufacturing	33311	20,642	21,025	24,042	14,152	23,984	23,076	26,760	21,505	21,684	21,146	30,017	0 - 585,012	21,008
Construction machinery manufacturing	33312	13,881	10,015	11,205	17,120	11,502	20,431	24,092	20,423	14,283	21,099	29,451	30,626	25,549
Mining, oil, and gas field machinery and equipment manufacturing	33319	NA	35,907	36,300	48,499	49,800	37,434	32,935	36,375	26,418	34,098	40,208	27,371	32,500
Semiconductor machinery manufacturing	33321	10,928	5,740	9,670	10,941	3,134	13,613	16,266	16,438	15,074	18,206	25,323	0 - 585,012	22,992
Industrial machinery manufacturing (except semiconductor machinery)	33322	7,532	5,996	8,961	14,930	11,492	10,092	16,537	6,590	12,341	11,149	12,740	9,699	11,293
Photographic and photocopying equipment manufacturing	33331	NA	2,080	D	D	D	618	1,915	1,477	0 - 163,991	857	0 - 242,771	127	0 - 231,989
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	NA	16,053	28,404	30,270	36,451	33,652	40,045	27,712	37,396	32,672	38,473	35,358	26,969
Digital cameras manufacturing	33333	NA	NA	NA	NA	NA	NA	0	D	0 - 5,580	4,524	0 - 242,771	1,610	0 - 231,989

TABLE 64

**Foreign sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Engine, turbine, and power transmission equipment manufacturing	33360	28,100	16,787	37,994	44,319	45,968	56,604	D	35,258	36,775	48,658	45,700	0-585,012	51,138
Metalworking and other general purpose machinery manufacturing	33390	36,061	22,352	36,485	41,866	39,237	23,995	51,377	41,166	38,528	39,516	38,439	26,329	24,994
Computers and peripheral equipment manufacturing and magnetic and optical media <sup>d</sup>	33412	NA	136,763	162,729	167,518	160,818	127,377	131,576	129,679	203,226	255,629	264,980	242,284	239,608
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	22,369	30,531	46,528	32,477	29,869	36,859	32,417	109,988	32,209	32,943	36,643	0-585,012	29,345
Radio, television, and wireless communication equipment manufacturing	33422	29,526	18,039	18,034	37,667	54,443	54,074	72,211	15,183	0-163,991	5,839	0-242,771	6,439	7,068
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	6,791	4,680	4,015	8,552	2,041	6,695	1,747	1,326	0-163,991	2,019	0-242,771	1,476	2,225
Audio and video equipment manufacturing	33430	2,243	4,112	3,100	4,180	3,294	4,764	5,171	D	9,734	3,725	5,308	8,187	3,261
Semiconductor and other electronic components manufacturing	33440	100,661	79,098	157,934	185,199	186,007	197,516	188,661	D	163,360	191,123	232,485	0-585,012	179,681

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	12,419	8,728	9,394	13,503	11,985	11,882	14,588	15,589	14,752	20,106 i	22,814 i	18,118 i	18,006
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	5,126	9,629	11,268	7,329	10,300	13,337	12,013	9,882 i	11,779	12,359 i	9,889	10,658	16,005
Measuring and control instruments manufacturing (not listed elsewhere)	33459	20,381	35,476	37,663	34,616	40,865	44,169	46,955	39,940	39,568	30,855	28,163	28,865	32,428
Electrical equipment, appliances, and components manufacturing	33500	47,654	43,416	54,549	58,580	54,904	49,253	56,905	51,633	73,973	65,117	74,039	74,152	69,075
Motor vehicles manufacturing	33610	174,950	124,140	146,852	166,401	166,616	155,415	153,493	119,588	132,355	408,784 <sup>0-</sup>	120,673	122,714	104,792
Motor vehicle body and trailer manufacturing	33620	D	504	937	903	2,302	187	573	145	384	763	603	3,589	4,592
Motor vehicle parts manufacturing	33630	66,559	49,109	95,944	98,857	98,046	113,842	134,544	101,485	89,740	84,753	82,209	95,607 i	86,258
Aircraft manufacturing	33641	S	6,959	7,569	9,732 i	5,939	8,600 i	7,452	9,077	5,821	6,995	8,989	5,758	6,176
Aircraft engine and engine parts manufacturing	33642	7,773	12,349	9,361	15,023	13,670	7,406	7,083 i	D	1,316	1,784	24,974	21,585	13,164
Other aircraft parts and auxiliary equipment manufacturing	33643	9,178	9,959	10,547	12,611	10,015	12,933	16,421	19,962	17,048	20,212	11,827	10,607	8,835
Guided missiles, space vehicles, and related parts manufacturing	33644	D	D	D	D	1,899	2,431	2,366	2,434 i	339	1,480 i	4,265	2,774	5,309

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Railroad rolling stock manufacturing	33651	894	875	1,980	1,666	2,455	1,764	3,557 i	3,253	3,760	5,164	5,507	5,415 i	7,433
Ship and boat building	33660	1,581	D	D	D	1,188 i	1,919 i	6,971 i	1,858	0 - 100,602 i	1,677	1,979	2,069	1,866
Motorcycle, bicycle, and parts manufacturing	33691	345	395	565	1,526	762	926	1,365	1,381	3,231 i	3,684	4,254	4,031	4,157
Military armored vehicle, tank, and tank components manufacturing	33692	249	462	D	484	224	164	2,608	D	78	1,644 i	2,678	1,557	1,367
All other transportation equipment manufacturing	33699	2,382	895	1,929	2,349	2,212	13,125	D	3,093	2,495	3,104	3,294	1,539	1,880
Furniture and related products manufacturing	33700	7,183	4,342	4,610	6,151	6,272	5,960	6,085	5,506	5,625	3,866	4,438	5,317	7,270
Medical equipment and supplies manufacturing	33910	58,419	57,025	73,646	79,038	80,885	77,466	78,288	81,056	78,407	85,432	0 - 242,771	101,069	111,629
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	41,981	29,242	30,526	D	37,781	47,716	43,898	D	45,531 i	38,962	65,941 i	29,707	48,714
Merchant wholesalers, durable goods	42300	174,168	116,754	127,763	42,957	25,213	25,149 i	18,514	27,926	26,876	22,686	22,567	16,769	25,876
Merchant wholesalers, nondurable goods	42400	66,765	33,733	33,672	229,921	237,186	208,777	240,437	160,432	152,996	156,369	178,950	155,095	131,910
Wholesale electronic markets and agents and brokers (business to business)	42500	119	D	16	1,714 i	50,376 i	20,233	20,653	20,376	544	312	436	251	736



TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Retail trade (except electronic shopping and electronic auctions)	44000	NA	D	27,253	34,498	42,738	28,360	42,336	13,516	17,264	16,756	55,879	80,367	77,133
Electronic shopping and electronic auctions	45411	NA	NA	D	D	34,500	37,403	D	D	0 - 163,991	0 - 198,757	0 - 242,771	0 - 585,012	0 - 231,989
Transportation	48000	NA	D	86,945	25,930	32,403	8,708	5,691	D	163,991	54,889	58,580	88,742	41,227
Couriers, messengers, and express delivery services	49200	D	D	11,199	D	0	30,192	47,478	D	45,916	33,435	22,049	20	0 - 231,989
Warehousing and storage	49300	2,512	240	474	975	826	1,295	614	D	1,294	5,837	0 - 242,771	7,536	5,701
Newspaper, periodical, book, and directory publishers (except Internet)	51110	4,670	8,159	7,754	8,343	7,008	2,953	2,040	1,265	1,441	1,628	0 - 242,771	1,562	1,490
Software publishers (except Internet) <sup>e</sup>	51120	89,158	77,832	84,710	97,929	100,697	112,350	115,101	113,255	101,226	97,898	96,171	94,590	88,742
Motion picture and sound recording (except Internet)	51200	6,721	6,341	6,635	5,141	2,185	7,140	D	1,939	2,490	2,583	4,452	3,265	2,081
Broadcasting (except Internet)	51500	NA	5,624	7,533	4,466	7,504	8,215	D	10,083	14,710	16,825	25,106	39,683	36,550
Wired telecommunications carriers	51710	D	D	1,214	6,862	7,093	865	2,852	2,667	2,665	2,349	2,328	2,226	3,923
Wireless telecommunications carriers (except satellite)	51720	1,085	745	6	171	154	D	45	D	59	84	3	5	1,645
Satellite telecommunications	51740	5,325	5,919	176	353	234	D	63	587	305	296	90	70	192
Other telecommunications (not listed elsewhere)	51790	1,230	1,015	515	2,875	3,193	2,179	534	893	840	1,898	0 - 242,771	0 - 585,012	6,222

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Data processing, hosting, and related services <sup>e</sup>	51800	NA	6,292	7,107	9,443	12,874	9,301	13,891	14,101	16,853	20,676	26,815	28,779	33,132
Cloud computing applications and Internet-based software services	51801	NA	NA	NA	NA	NA	7,987 i	D	7,138	13,012	20,668	35,853	49,309	96,707
Other information services, including Internet publishing, broadcasting, and Web search portals <sup>e</sup>	51910	NA	13,753	29,921	11,126	16,969	28,521	44,849 i	40,718	37,792	60,390	77,032	93,598	115,312
Finance: banking and credit intermediation	52200	NA	45,027	76,052 i	29,501	41,335	41,144	47,077	64,668	58,050	72,381	56,472	52,099	63,795
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	NA	D	34,345	35,268	16,671	23,114	19,687	15,087 i	17,046	18,774	20,890	30,062	35,227
Insurance carriers and related activities	52400	NA	11,594	16,234	14,985	8,907	34,172 i	32,407 i	21,780 i	19,060 i	18,456 i	0 - 242,771 i	37,830 i	30,741 i
Real estate	53100	D	D	D	D	D	D	D	88	57	0 - 10,116	583	223	1
Rental and leasing services	53200	NA	D	8,580 i	5,232 i	7,232	8,873	6,656	5,390	0 - 14,237	8,019	3,608	4,473	3,186
Lessors of nonfinancial intangible assets, including patent licensing	53300	D	352	225	359	764	640	517	168	82	729	0 - 80,926 i	56	0 - 231,989
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	NA	864 i	1,623	D	2,222	2,614	3,816 i	3,720	2,818	2,755	2,902	3,148	2,311

TABLE 64

## Foreign sales for companies located in the United States that performed or funded R&amp;D, by business activity: 2008–20

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Architectural, engineering, and related services	54130	4,931	14,969	33,706	36,917	19,373	45,064	49,007	49,180	26,789	19,248	18,151	16,522	14,333
Specialized design services	54140	D	D	454	228	345	900	678	D	68	2,229 <sup>i</sup>	18,371	8,921	0 - 231,989
Computer systems design and related services <sup>e</sup>	54150	86,084	76,243	80,239	153,776 <sup>i</sup>	104,306	90,742	104,143	78,373	73,013	70,600	96,552	86,379	83,314
Management, scientific, and technical consulting services	54160	18,909	23,315	14,838	24,421	27,236	22,327	8,247	16,452	7,535	6,959	19,754	7,997 <sup>i</sup>	5,265
Research and development services in the social sciences and humanities	54172	NA	2	2	7	D	4	22	D	7	5	7	89	13
Research and development services in biotechnology <sup>c,f</sup>	54173	NA	3,663 <sup>i</sup>	1,299	1,269	1,547	1,701	1,671	1,581	2,478 <sup>i</sup>	2,864	3,773	4,160	4,162
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	NA	3,817	2,994	4,352	5,625	4,814	5,253	5,194	7,260	9,736	10,193 <sup>i</sup>	10,902 <sup>i</sup>	13,047 <sup>i</sup>
Research and development services in nanotechnology	54175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Advertising and related services	54180	D	D	1,656	D	25,263	D	D	D	0 - 163,991	54,756	67,297	0 - 585,012	0 - 231,989
Professional, scientific, and technical services (not listed elsewhere)	54190	3,456	2,025	2,186	4,901	9,285	8,417	8,004	2,749	0 - 163,991	2,049	4,823	3,988 <sup>i</sup>	2,688

TABLE 64

**Foreign sales for companies located in the United States that performed or funded R&D, by business activity: 2008–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Management of companies and enterprises	55100	76	23	266	5,428	1,304	887	716	D	622	1,592	1,726	40	206 i
Administrative and support services	56100	NA	6,821	19,476	10,588	11,810	17,023	29,314	26,456	28,098	22,603	28,430	27,044	8,211
Waste management and remediation services	56200	NA	D	201	959	484	595	614	1,827	1,910	1,402	4,360	281	0 - 231,989
Offices of physicians	62110	0	* i	0	0	0	0	0	0	0	1	0	0	0
Medical and diagnostic laboratories	62150	1,037	857	1,662	1,269	1,383	887	895	1,488 i	1,925 i	1,275	4,320 i	4,132 i	4,258 i
Other ambulatory health care services (ambulance, dental, home health care)	62199	NA	D	154	D	27	0	0	0	0	455	177	193	3,636
Hospitals and nursing care facilities	62200	NA	0	D	D	D	D	0	131	287	0	1 i	0	0
Social assistance services	62400	D	D	0	0	0	29	2	0	0	0	0	0	0
Arts, entertainment, and recreation	71000	NA	3,074	3,169	3,297	3,096	D	D	2,540	0 - 163,991	5,595	8,134	5,730	3,112
Accommodation and food services	72000	NA	9,891	32,256	11,945	34,612	49,347	14,564	32,394	34,445	4,924	20,830	28,004	17,843
Other services (not listed elsewhere)	81000	NA	5,946	7,784	10,816	12,789	21,571	17,416	19,528	64,593	0 - 408,784	0 - 242,771	18,846 i	20,913
Less: intersegment eliminations	-	161,647	127,244	101,536	164,044	172,709	165,075	156,556	113,257	97,136	64,324	102,225	65,462	62,510
Undistributed	-	335,723	452,404	103,862	147,756 i	58,997 i	D	2,657	D	0	0	0	0	0

\* = 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; NA = not available; S = negative value due to intersegment elimination.

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System (NAICS) industry definitions.

<sup>c</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 32543, Biotechnology-based pharmaceutical and biological products (except diagnostic substances).

<sup>d</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2014 and beyond: 33333, Digital cameras manufacturing.

<sup>e</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 51801, Cloud computing applications and Internet-based software services.

<sup>f</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2020 and beyond: 54175, Research and development services in nanotechnology.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. For survey year 2008, industry classification was based on the 2002 NAICS. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 65

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All business activities	21100–81000	290,240	302,759	323,107	340,539	355,671	378,590	396,979	443,633	491,434	537,619
Oil and gas extraction	21100	D	D	D	1,108	D	867	0 - 11,355 i	0 - 16,964	712	681
Mining	21200	83	88	80	54	68	58	121	92	121	104
Support activities for mining, including oil and gas	21300	D	1,860	1,871	2,349	2,076	1,544	1,599 i	836 i	1,364	723
Utilities	22100	298	434	343	343	485	349	323 i	272	274	275
Construction	23000	752	756	244 i	204 i	521	258 i	507	686	868	1,070
Food manufacturing	31100	3,769	3,565	5,156	4,934 i	4,388 i	4,966	4,809	4,678	4,756	5,112
Beverage manufacturing	31210	D	D	628	D	664	0 - 28,354 i	734	702	654	647
Tobacco manufacturing	31220	D	140	163	D	153	153	175	196	189	226
Textile, apparel, and leather products manufacturing	31990	623	688	687	662 i	794	1,244 i	904	934	831	768
Wood products manufacturing	32100	202	278	234	322 i	227	238	236	261	232	233
Paper manufacturing	32200	755	982	1,166	1,028	D	1,165	1,411	1,302	1,472	1,244
Printing and related support activities	32300	244	305 i	389	363	287	304	265	321	439	349
Petroleum refineries	32401	D	596	438	D	443	441	396	491	0 - 17,119	499 - 735
Asphalt paving, roofing, and saturated materials manufacturing	32402	38	41	117 i	66	52 i	75	124	107	110	199
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	285	218	312 i	279 i	268	202	223	133	106 - 2,076	120
Basic chemicals manufacturing	32510	3,099	3,228	2,925	3,144	3,071	2,946	2,897	2,897	2,638	3,036
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	815	1,093	999	1,054	1,213	930	825	1,262	1,293	1,339
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	D	1,951	2,114 i	2,057 i	D	1,900 i	1,977	2,384 i	2,094	1,507
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing <sup>c</sup>	32541	42,381	43,672	42,456	43,748	40,540	43,964	45,846	48,489	55,243	56,612
In vitro diagnostic substances manufacturing <sup>c</sup>	32542	1,110	1,044 i	831	729	801	987	1,308	1,151	1,380	1,552
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	7,118	10,337	14,071	16,440	18,629	23,591	29,477	32,436
Soap, cleaning compound, and toilet preparations manufacturing	32591	2,344	2,261	2,286	2,365	2,451	2,550	2,492	2,534	0 - 17,119	2,404
Paint, adhesive, and other chemical manufacturing	32592	1,552	1,630	1,489	1,562 i	D	0 - 28,354	1,636	1,361	1,423	1,473
Plastics and rubber products manufacturing	32600	2,669	3,277	3,010	3,072 i	2,910	3,396	3,264	3,128	2,997	2,941
Clay and glass products manufacturing	32710	801 i	987 i	973 i	1,003 i	948	987	1,199	1,333	1,326 i	1,385 i

TABLE 65

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	303	367	458 i	564 i	393 i	374	378	331	437	383
Primary metal manufacturing	33100	552	750	644	703	596 i	0 - 28,354	608	708	742	914
Fabricated metal products manufacturing	33200	D	2,236	2,535 i	2,280	2,541	2,321	2,650	2,764	3,278	3,901
Agricultural machinery and equipment manufacturing	33311	989	1,175	1,193	1,230	1,172	1,194	1,224	1,529	1,549	1,397 - 1,633
Construction machinery manufacturing	33312	655	675	1,340	1,309	1,210	1,209	1,203	1,316 i	1,276	1,257
Mining, oil, and gas field machinery and equipment manufacturing	33319	1,735	1,999	1,436 i	1,142	1,431	1,107	1,272	1,324	1,104	1,032
Semiconductor machinery manufacturing	33321	2,207	1,308 i	3,146	2,979	3,218	3,374	3,707	4,131	4,396	4,750
Industrial machinery manufacturing (except semiconductor machinery)	33322	945	850	878	1,158	1,143	900	1,049	971	1,386	1,044
Photographic and photocopying equipment manufacturing	33331	656	23 i	458	79	133	92	61	59 i	162	163
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	D	1,182	1,367	1,446	1,380	0 - 28,354	1,780	1,667	1,712	1,444
Digital cameras manufacturing	33333	NA	NA	NA	25	491 i	421 i	475	230	409	313 i
Engine, turbine, and power transmission equipment manufacturing	33360	3,257	3,603	2,373	1,847	2,304	2,365	2,543	2,273	2,550	2,467
Metalworking and other general purpose machinery manufacturing	33390	1,832	1,607	1,780	2,089	2,292	2,139	2,039	2,468	2,394	2,851
Computers and peripheral equipment manufacturing and magnetic and optical media <sup>d</sup>	33412	10,311	10,893	11,162	9,651	10,997	18,321	20,751	21,765	19,060 i	22,850
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	7,006	5,101	5,534	7,734	9,529	8,182	7,789	8,550	8,495	7,562
Radio, television, and wireless communication equipment manufacturing	33422	4,182	5,851	7,664	6,325 i	3,387 i	4,108 i	3,942 i	0 - 16,964 i	2,589 i	2,291
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	871	1,937	1,729	1,687	1,695 i	1,798	1,536	0 - 16,964	1,686	1,643
Audio and video equipment manufacturing	33430	798	865	876	1,018	1,071 i	972	1,058	1,084	1,270	1,285
Semiconductor and other electronic components manufacturing	33440	24,580	28,983	30,792	31,986	30,805	31,428	30,858	31,240	35,725	44,105
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	2,787	2,868 i	3,178 i	3,670	3,409	3,417 i	3,094	4,079	3,973	3,885
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	5,666	6,403	6,550	6,234	6,503	8,275	6,538	7,819	7,870	8,836 i
Measuring and control instruments manufacturing (not listed elsewhere)	33459	3,191	3,465	3,901	4,045	4,201	4,222	3,885	3,888	3,911	4,375

TABLE 65

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electrical equipment, appliances, and components manufacturing	33500	3,007	3,391	4,208	4,461	4,378	4,805	4,512	4,362	5,230	5,273
Motor vehicles manufacturing	33610	9,320	11,314	11,696	12,134	12,502	15,095	16,308	17,447	15,241	15,572
Motor vehicle body and trailer manufacturing	33620	69	91 i	98 i	96	156 i	113	44	93	155	82
Motor vehicle parts manufacturing	33630	3,010	D	4,554	6,022	6,158	6,401	6,946	7,800	8,146 i	7,384
Aircraft manufacturing	33641	5,853	15,380 i	16,607 i	15,632 i	14,757 i	28,354 i	9,704 i	14,488 i	10,720 i	15,641
Aircraft engine and engine parts manufacturing	33642	1,636	1,296	1,758	2,294 i	1,580	1,738	1,850	2,226	2,104	2,038
Other aircraft parts and auxiliary equipment manufacturing	33643	1,896	2,655	3,446	4,443	4,919	3,817	4,453	1,887	1,434	1,742
Guided missiles, space vehicles, and related parts manufacturing	33644	3,526	2,850	2,703	2,826 i	3,011	3,063 i	3,269	3,405	3,496	3,327
Railroad rolling stock manufacturing	33651	136	177	183	295	240	187	11,355	148	17,119 i	239
Ship and boat building	33660	D	D	1,106	1,568 i	D	28,354 i	1,289	16,964	17,119	964
Motorcycle, bicycle, and parts manufacturing	33691	212 i	176 i	214 i	251	282	286	11,355	372	368	417
Military armored vehicle, tank, and tank components manufacturing	33692	D	122	215	358	335	392	653 i	664 i	541	468
All other transportation equipment manufacturing	33699	415	D	362	428	D	368	564	465	465	552
Furniture and related products manufacturing	33700	300	382	383	389	458	364	438	428	458	539
Medical equipment and supplies manufacturing	33910	10,141	10,703	11,797	10,987	11,336	12,024	13,299	13,211	14,801	14,680
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	2,593	D	2,544	2,387	2,455 i	2,597 i	2,575	2,861	2,499	3,033
Merchant wholesalers, durable goods	42300	505	1,461 i	449 i	414 i	1,507 i	551 i	364	730 i	750	860
Merchant wholesalers, nondurable goods	42400	429	651 i	272 i	D	546 i	153 i	207	273 i	17,119	390
Wholesale electronic markets and agents and brokers (business to business)	42500	54	182 i	D	139	D	23	41 i	94 i	37 i	36 i
Retail trade (except electronic shopping and electronic auctions)	44000	52	101 i	96 i	58 i	87	149	69	190	280	216
Electronic shopping and electronic auctions	45411	940 i	1,239	993	1,051	1,543 i	28,354 i	11,355	16,964 i	17,119 i	0 - 15,222 i
Transportation	48000	123	D	D	388	205 i	100	691	2,045 i	9,398 i	4,078 i
Couriers, messengers, and express delivery services	49200	D	D	D	344	D	394	421	446	290	923
Warehousing and storage	49300	15	15	15	3	3	0	90	76	128 i	33
Newspaper, periodical, book, and directory publishers (except Internet)	51110	345 i	229 i	316 i	89 i	99 i	80 i	83	151	84	87
Software publishers (except Internet) <sup>e</sup>	51120	22,635	23,803	26,661	31,392	29,887 i	26,685	24,362	25,742	24,798	23,520



TABLE 65

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Motion picture and sound recording (except Internet)	51200	61	73 i	86	71 i	10	16	27 i	148	72	81
Broadcasting (except Internet)	51500	94	36	53	70 i	101 i	28,354 i	11,355	186	0 - 2,469	0 - 15,222 i
Wired telecommunications carriers	51710	867	1,482 i	951 i	945 i	1,229 i	1,067 i	924	469	424	505
Wireless telecommunications carriers (except satellite)	51720	391 i	739 i	1,768 i	2,481	1,176 i	1,477 i	1,920	2,147	2,306	2,022
Satellite telecommunications	51740	D	195	106	107	681 i	699 i	593	451	475	385
Other telecommunications (not listed elsewhere)	51790	495	383	322	255	459	448	413	691	0 - 17,119	427
Data processing, hosting, and related services <sup>e</sup>	51800	4,922	3,997	4,009	4,754	5,839	6,295	6,217	6,809	8,885	11,083
Cloud computing applications and Internet-based software services	51801	NA	NA	3,727 i	5,718	5,783	9,981	16,812	20,600	28,631	39,367
Other information services, including Internet publishing, broadcasting, and Web search portals <sup>e</sup>	51910	D	11,397	13,485	15,306	21,534	23,962	28,445	37,435	46,171	53,214
Finance: banking and credit intermediation	52200	1,365	1,601	1,834	2,451	2,708	4,474	4,819	4,309	4,924	7,932
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	1,148	893	1,153	937	1,352	1,516	1,587	1,248	1,445	1,815
Insurance carriers and related activities	52400	D	1,141	1,573	887	1,364	1,216	1,127	1,673	2,190	2,543
Real estate	53100	13	26 i	100	193	280	438	251	377	0 - 17,119	368
Rental and leasing services	53200	27	D	69	59	D	97 i	536 i	639	945	2,766
Lessors of nonfinancial intangible assets, including patent licensing	53300	319	369	74	78	79	40	58	23	59	0 - 76
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	578 i	417 i	514 i	826 i	1,283	892	875	1,148	1,901	2,478
Architectural, engineering, and related services	54130	2,028	4,206 i	3,398	3,392	4,143 i	3,259	2,664	4,293	4,421	4,358
Specialized design services	54140	271	207 i	101	97	83	77	198 i	0 - 16,964	163	212
Computer systems design and related services <sup>e</sup>	54150	11,129	12,390 i	11,472 i	13,216 i	13,647	14,159	12,607	16,346	19,604	16,759
Management, scientific, and technical consulting services	54160	1,745	2,280	2,030	1,958	1,761	2,137 i	1,903	2,796	2,561	2,676
Research and development services in the social sciences and humanities	54172	D	601	792	745	756	0 - 28,354	1,124	674	764	691
Research and development services in biotechnology <sup>c,f</sup>	54173	6,030	7,146	4,145	3,083 i	5,178 i	3,911 i	3,610	5,398	5,564	5,541
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	7,196	9,427	9,139	9,068	10,907	10,621	11,842	14,904	15,130 i	19,456 i
Research and development services in nanotechnology	54175	NA	NA	NA	NA	NA	NA	NA	NA	NA	180 i
Advertising and related services	54180	80	377 i	450 i	435	424	344	381	1,032 i	1,107 i	1,283 i

TABLE 65

**Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20**

(Millions of U.S. dollars)

Business activity <sup>a</sup>	Business code <sup>b</sup>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Professional, scientific, and technical services (not listed elsewhere)	54190	1,316	2,463 i	1,786	1,020	1,228	874	1,113	1,246	1,649	1,877
Management of companies and enterprises	55100	20	40	68	25 i	D	28	70	0 - 16,964	0 - 17,119	3 - 56
Administrative and support services	56100	338	436	556 i	401 i	202 i	418	1,405	2,302	3,285	3,521
Waste management and remediation services	56200	19 i	D	39 i	31	24 i	25	20	20	20	0 - 15,222
Offices of physicians	62110	24	73 i	74 i	88 i	79 i	106 i	190	155	508	235
Medical and diagnostic laboratories	62150	764	1,027	959	965	1,204	0 - 28,354 i	1,210	2,049	2,467	2,087
Other ambulatory health care services (ambulance, dental, home health care)	62199	11	41 i	51 i	35 i	42 i	24 i	65	46	148	93
Hospitals and nursing care facilities	62200	2	2 i	2	7 i	7	9	0 - 11,355	0 - 10,879	0 - 11,355	13 - 15,042
Social assistance services	62400	7	36	38	16	2	2	0 - 11,355	0 - 16,964	0 - 17,119	0 - 15,028
Arts, entertainment, and recreation	71000	105	108	31	91 i	D	44	48	44	415	0 - 15,028
Accommodation and food services	72000	74	131 i	123 i	57	87	61	49	120	80	121
Other services (not listed elsewhere)	81000	366	553	366	576	682	0 - 28,354	0 - 11,355	0 - 16,964	654	573
Undistributed	-	28,583 i	1,689 i	336 i	63	0	0	0	0	0	0

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; NA = not available.

<sup>a</sup> Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

<sup>b</sup> Business codes and descriptions are based on 2017 North American Industry Classification System (NAICS) industry definitions.

<sup>c</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 32543, Biotechnology-based pharmaceutical and biological products (except diagnostic substances).

<sup>d</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2014 and beyond: 33333, Digital cameras manufacturing.

<sup>e</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 51801, Cloud computing applications and Internet-based software services.

<sup>f</sup> Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2020 and beyond: 54175, Research and development services in nanotechnology.

**Note(s):**

Detail may not add to total because of rounding. 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 and are not comparable with estimates published for years prior to 2018. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. Most statistics for years prior to 2020 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

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

TABLE 66

## U.S. patent applications and patents issued to companies located in the United States that performed or funded R&amp;D, by industry and company size: 2020

(Number)

Industry and company size	NAICS code	Applications					Patents issued <sup>c</sup>
		Total	Nonprovisional utility patents				
			Total	To foreign jurisdictions <sup>a</sup>	From within organized R&D activity <sup>b</sup>		
All industries	21-23, 31-33, 42-81	163,300	112,959	53,553	89,324	116,651	
Manufacturing industries	31-33	117,387	76,360	41,719	63,873	74,404	
Food	311	2,212	1,585	564	1,523	1,045	
Beverage and tobacco products	312	544	431	406	429	554	
Textile, apparel, and leather products	313-16	480	236	166	220	160	
Wood products	321	60	52	23	45	17	
Paper	322	422	193	155	172	154	
Printing and related support activities	323	138	69	49	63	71	
Petroleum and coal products	324	1,003	478	360	460	532	
Chemicals	325	19,525	10,006	7,207	9,123	9,921	
Basic chemicals	3251	1,540	937	726	823	962	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	948	369	255	359	573	
Pesticide, fertilizer, and other agricultural chemicals	3253	538	331	201	310	184	
Pharmaceuticals and medicines	3254	13,353	6,586	4,857	6,148	6,150	
Soap, cleaning compound, and toilet preparation	3256	1,992	1,065	643	784	1,252	
Paint, coating, adhesive, and other chemicals	3255, 3259	1,154	718	525	699	800	
Plastics and rubber products	326	1,564	844	516	790	788	
Nonmetallic mineral products	327	1,773	1,472	1,076	1,440	1,023	
Primary metals	331	193	115	52	112	201	
Fabricated metal products	332	2,196	1,167	774	1,120	692	
Machinery	333	11,872	8,157	4,758	7,063	7,563	
Agricultural implement	33311	1,498	1,045	715	946	626	
Semiconductor machinery	333242	2,429	1,427	829	1,217	1,361	
Engine, turbine, and power transmission equipment	3336	677	448	162	285	436	
Other machinery	other 333	7,267	5,238	3,052	4,615	5,140	
Computer and electronic products	334	44,467	32,774	13,746	27,192	30,421	
Communications equipment	3342	6,213	3,431	1,392	3,248	3,607	
Semiconductor and other electronic components	3344	20,256	15,597	6,707	11,406	14,132	
Navigational, measuring, electromedical, and control instruments	3345	6,985	5,316	3,493	4,392	4,196	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	1,151	809	594	768	466	
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,451	2,824	1,818	2,384	2,159	

TABLE 66

## U.S. patent applications and patents issued to companies located in the United States that performed or funded R&amp;D, by industry and company size: 2020

(Number)

Industry and company size	NAICS code	Applications					Patents issued <sup>c</sup>
		Total	Nonprovisional utility patents			From within organized R&D activity <sup>b</sup>	
			Total	To foreign jurisdictions <sup>a</sup>			
Other measuring and controlling device	other 3345	2,383	1,683	1,081		1,240	1,571
Other computer and electronic products	other 334	11,013	8,430	2,154		8,146	8,487
Electrical equipment, appliances, and components	335	4,715	3,370	2,434		3,164	3,168
Transportation equipment	336	8,238	5,787	3,902		3,465	7,865
Motor vehicles, bodies, trailers, and parts	3361-63	5,215	3,625	2,907		2,200	4,794
Aerospace products and parts	3364	2,610	1,855	746		965	2,844
Aircraft, aircraft engine, and aircraft parts	336411-13	2,554	1,808	739		934	2,797
Guided missile, space vehicle, and related parts	336414-15, 336419	56	47	7		31	47
Military armored vehicle, tank, and tank component	336992	5	1	0	i	0	0
Other transportation	other 336	408	305	249		299	228
Furniture and related products	337	520	i 315	i 168	i	196	209
Miscellaneous	339	17,462	9,309	5,361		7,295	10,019
Medical equipment and supplies	3391	14,636	8,091	4,866		6,130	8,800
Other miscellaneous manufacturing	3399	2,826	1,219	495		1,166	1,218
Nonmanufacturing industries	21-23, 42-81	45,913	36,599	11,834		25,451	42,247
Mining, quarrying, oil and gas extraction, and support activities	21	1,230	510	293		472	698
Utilities	22	56	30	11		17	20
Wholesale trade	42	1,655	941	i 228		519	436
Electronic shopping and electronic auctions	454111-12	2,098	1,961	139		1,955	2,343
Transportation and warehousing	48-49	162	98	25		96	328
Information	51	21,584	17,355	7,014		11,906	21,021
Publishing	511	5,694	4,326	2,588		2,771	7,692
Newspaper, periodical, book, and directory publishers	5111	0	0	0		0	0
Software publishers	5112	5,694	4,326	2,588		2,771	7,692
Telecommunications	517	2,928	2,654	365		1,096	3,204
Data processing, hosting, and related services	518	6,669	5,692	1,319		4,472	5,212
Other information	other 51	6,293	4,683	2,743		3,567	4,914
Finance and insurance	52	4,080	3,613	504		2,446	2,907
Real estate and rental and leasing	53	268	i 258	i 214	i	258	i 103
Lessors of nonfinancial intangible assets (except copyrighted works)	533	207	i 203	i 201	i	203	i 71
Other real estate and rental and leasing	other 53	61	55	13		55	32

TABLE 66

**U.S. patent applications and patents issued to companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Number)

Industry and company size	NAICS code	Applications					Patents issued <sup>c</sup>
		Total	Nonprovisional utility patents			From within organized R&D activity <sup>b</sup>	
			Total	To foreign jurisdictions <sup>a</sup>			
Professional, scientific, and technical services	54	14,406	11,579	3,311	7,607	14,155	
Architectural, engineering, and related services	5413	506	238	112	192	149	
Computer systems design and related services	5415	9,111	8,438	1,939	4,874	12,239	
Scientific research and development services	5417	3,954	2,332	1,124	2,015	1,474	
Research and development in nanotechnology	541713	122	110	66	107	21	
Research and development in biotechnology (except nanobiotechnology)	541714	779	434	261	330	261	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	3,039	1,774	797	1,562	1,192	
Research and development in the social sciences and humanities	541720	14	14	0	14	0	
Other professional, scientific, and technical services	other 54	835	570	135	526	294	
Health care services	621-23	141	94	46	48	69	
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	232	160	48	127	167	
All companies (number of domestic employees)	-	163,300	112,959	53,553	89,324	116,651	
Small companies							
10-19 <sup>d</sup>	-	3,448	1,814	795	1,519	1,255	
20-49	-	6,345	3,708	1,741	3,133	2,309	
Medium companies							
50-99	-	5,924	3,354	1,727	2,892	1,992	
100-249	-	7,482	4,075	2,262	3,674	3,747	
Large companies							
250-499	-	5,127	3,472	1,727	3,098	2,974	
500-999	-	6,402	3,856	2,537	3,547	3,574	
1,000-4,999	-	24,107	16,319	8,004	13,602	14,994	
5,000-9,999	-	14,908	9,992	5,666	8,019	11,362	
10,000-24,999	-	34,978	23,467	13,844	21,708	22,471	
25,000 or more	-	54,579	42,904	15,250	28,132	51,975	

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

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Also includes patent applications for which company planned to apply in foreign jurisdictions.

<sup>b</sup> Includes patent applications in which the named inventor(s) were R&D employees.

<sup>c</sup> For a small number of companies issued more than 100 patents by the U.S. Patent and Trademark Office (USPTO), counts from USPTO.gov were used to supplement survey data.

<sup>d</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. These statistics include an adjustment to the weight to account for unit nonresponse.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 67

**Total patent licensing revenue of companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Revenue <sup>a</sup>
All industries	21-23, 31-33, 42-81	28,777
Manufacturing industries	31-33	26,521
Food	311	18
Beverage and tobacco products	312	*
Textile, apparel, and leather products	313-16	4
Wood products	321	1
Paper	322	6
Printing and related support activities	323	0
Petroleum and coal products	324	194 i
Chemicals	325	13,076
Basic chemicals	3251	87
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	292
Pesticide, fertilizer, and other agricultural chemicals	3253	5
Pharmaceuticals and medicines	3254	12,650
Soap, cleaning compound, and toilet preparation	3256	5
Paint, coating, adhesive, and other chemicals	3255, 3259	37
Plastics and rubber products	326	152
Nonmetallic mineral products	327	6
Primary metals	331	4
Fabricated metal products	332	26
Machinery	333	311
Agricultural implement	33311	2
Semiconductor machinery	333242	39
Engine, turbine, and power transmission equipment	3336	251
Other machinery	other 333	19
Computer and electronic products	334	10,604
Communications equipment	3342	0 - 1,913
Semiconductor and other electronic components	3344	8,627
Navigation, measuring, electromedical, and control instruments	3345	65 - 1,978
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	66
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	0 - 1,913
Other measuring and controlling device	other 3345	0 - 1,913
Other computer and electronic products	other 334	0 - 1,913
Electrical equipment, appliances, and components	335	281
Transportation equipment	336	1,503
Motor vehicles, bodies, trailers, and parts	3361-63	1,440 i
Aerospace products and parts	3364	51
Aircraft, aircraft engine, and aircraft parts	336411-13	51
Guided missile, space vehicle, and related parts	336414-15, 336419	*
Military armored vehicle, tank, and tank component	336992	0
Other transportation	other 336	12
Furniture and related products	337	5
Miscellaneous	339	331
Medical equipment and supplies	3391	322
Other miscellaneous manufacturing	3399	9
Nonmanufacturing industries	21-23, 42-81	2,256
Mining, quarrying, oil and gas extraction, and support activities	21	0 - 70
Utilities	22	*
Wholesale trade	42	2



TABLE 67

**Total patent licensing revenue of companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Millions of U.S. dollars)

Industry and company size	NAICS code	Revenue <sup>a</sup>
Electronic shopping and electronic auctions	454111-12	0
Transportation and warehousing	48-49	0
Information	51	1,751
Publishing	511	498
Newspaper, periodical, book, and directory publishers	5111	0
Software publishers	5112	498
Telecommunications	517	48
Data processing, hosting, and related services	518	1,203
Other information	other 51	3
Finance and insurance	52	17
Real estate and rental and leasing	53	0 - 70
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0 - 70
Other real estate and rental and leasing	other 53	0
Professional, scientific, and technical services	54	419
Architectural, engineering, and related services	5413	4
Computer systems design and related services	5415	280
Scientific research and development services	5417	133
Research and development in nanotechnology	541713	1 i
Research and development in biotechnology (except nanobiotechnology)	541714	85
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	47
Research and development in the social sciences and humanities	541720	0
Other professional, scientific, and technical services	other 54	3
Health care services	621-23	0
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	0 - 70
All companies (number of domestic employees)	-	28,777
Small companies		
10-19 <sup>b</sup>	-	76
20-49	-	155
Medium companies		
50-99	-	283
100-249	-	1,583
Large companies		
250-499	-	1,133
500-999	-	2,196
1,000-4,999	-	3,153
5,000-9,999	-	812
10,000-24,999	-	15,588
25,000 or more	-	3,798

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Amounts received from all patent licensing activities during 2020.<sup>b</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

**TABLE 68**  
**Importance of types of intellectual property protections to companies located in the United States that performed or funded R&D, by industry and company size: 2020**

(Percent)

Industry and company size	NAICS code	Utility patents			Design patents			Trademarks			Copyrights			Trade secrets			Mask works		
		Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important
All industries	21-23, 31-33, 42-81	25.4	18.5	56.1	15.5	21.2	63.3	33.6	29.0	37.3	23.0	27.3	49.7	44.7	23.3	32.1	4.6	8.9	86.5
Manufacturing industries	31-33	29.2	18.9	51.9	17.8	23.3	58.9	35.1	26.8	38.0	20.5	27.2	52.3	48.8	23.4	27.8	5.4	9.6	85.0
Food	311	12.9	20.0	67.1	22.4	14.1	63.5	47.7	18.6	33.7	33.3	17.3	49.4	53.6	20.2	26.2	8.3	6.0	85.7
Beverage and tobacco products	312	8.3	8.3	83.3	8.3	8.3	83.3	37.5	25.0	37.5	16.7	16.7	66.7	29.2	41.7	29.2	4.2	4.2	91.7
Textile, apparel, and leather products	313-316	23.8	33.3	42.9	23.8	33.3	42.9	47.8	26.1	26.1	22.7	31.8	45.5	47.6	23.8	28.6	4.5	13.6	81.8
Wood products	321	15.4	30.8	53.8	14.3	28.6	57.1	38.5	23.1	38.5	15.4	38.5	46.2	35.7	35.7	28.6	7.1	7.1	85.7
Paper	322	18.2	18.2	63.6	20.0	20.0	60.0	20.0	30.0	50.0	9.1	27.3	63.6	30.0	30.0	40.0	9.1	9.1	81.8
Printing and related support activities	323	15.0	20.0	65.0	15.0	25.0	60.0	20.0	30.0	50.0	15.8	21.1	63.2	26.3	31.6	42.1	5.3	10.5	84.2
Petroleum and coal products	324	27.3	18.2	54.5	18.2	18.2	63.6	45.5	27.3	27.3	20.0	30.0	50.0	70.0	10.0	20.0	0.0	10.0	90.0
Chemicals	325	42.9	19.5	37.6	14.7	21.9	63.4	44.9	31.7	23.3	22.7	31.6	45.8	63.4	20.5	16.1	4.9	9.7	85.4
Basic chemicals	3251	42.9	21.4	35.7	17.9	17.9	64.3	42.9	28.6	28.6	25.0	25.0	50.0	62.1	20.7	17.2	14.3	10.7	75.0
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	33.3	16.7	50.0	18.2	27.3	54.5	38.5	30.8	30.8	16.7	33.3	50.0	58.3	16.7	25.0	8.3	8.3	83.3
Pesticide, fertilizer, and other agricultural chemicals	3253	21.4	21.4	57.1	14.3	21.4	64.3	28.6	42.9	28.6	15.4	23.1	61.5	57.1	21.4	21.4	7.1	7.1	85.7
Pharmaceuticals and medicines	3254	55.8	21.2	23.0	14.3	22.3	63.4	45.9	33.3	20.7	21.4	38.4	40.2	61.6	24.1	14.3	4.5	11.7	83.8
Soap, cleaning compound, and toilet preparation	3256	22.2	18.5	59.3	17.9	25.0	57.1	40.7	37.0	22.2	33.3	18.5	48.1	63.0	11.1	25.9	3.7	11.1	85.2
Paint, coating, adhesive, and other chemicals	3255, 3259	27.5	17.5	55.0	15.8	21.1	63.2	48.8	24.4	26.8	22.5	30.0	47.5	68.4	18.4	13.2	2.6	5.1	92.3
Plastics and rubber products	326	29.5	17.9	52.6	17.7	22.9	59.4	29.5	27.4	43.2	15.2	29.3	55.4	43.8	22.9	33.3	4.3	10.6	85.1
Nonmetallic mineral products	327	31.8	18.2	50.0	18.2	22.7	59.1	31.8	27.3	40.9	22.7	27.3	50.0	40.9	22.7	36.4	9.1	9.1	81.8
Primary metals	331	20.0	16.0	64.0	12.5	16.7	70.8	16.7	25.0	58.3	8.7	17.4	73.9	33.3	29.2	37.5	4.3	4.3	91.3
Fabricated metal products	332	12.6	15.3	72.1	11.2	18.2	70.6	19.9	15.3	64.8	10.7	19.1	70.2	34.4	20.0	45.6	1.4	7.6	91.0
Machinery	333	34.7	16.6	48.7	20.6	23.6	55.8	38.2	27.1	34.7	21.2	27.8	51.0	44.3	27.4	28.4	3.6	9.3	87.0
Agricultural implement	33311	46.7	20.0	33.3	20.0	33.3	46.7	46.7	26.7	26.7	33.3	26.7	40.0	37.5	31.3	31.3	6.7	13.3	80.0
Semiconductor machinery	333242	33.3	33.3	33.3	16.7	33.3	50.0	33.3	33.3	33.3	33.3	33.3	33.3	42.9	28.6	28.6	16.7	33.3	50.0
Engine, turbine, and power transmission equipment	3336	44.4	11.1	44.4	33.3	33.3	33.3	37.5	25.0	37.5	22.2	22.2	55.6	44.4	22.2	33.3	11.1	11.1	77.8
Other machinery	other 333	32.6	16.3	51.2	20.2	22.5	57.2	37.6	27.2	35.3	19.9	28.1	52.0	44.3	27.6	28.2	3.0	8.9	88.1
Computer and electronic products	334	33.2	21.6	45.2	19.2	24.7	56.1	38.2	30.7	31.2	28.1	29.6	42.3	62.2	21.2	16.6	15.0	15.0	69.9
Communications equipment	3342	23.1	28.2	48.7	12.8	23.1	64.1	33.3	33.3	33.3	23.7	28.9	47.4	57.9	23.7	18.4	8.1	18.9	73.0
Semiconductor and other electronic components	3344	33.3	13.0	53.7	18.2	18.2	63.6	30.9	25.5	43.6	21.2	30.8	48.1	59.2	24.5	16.3	28.3	17.0	54.7

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(Percent)

Industry and company size	NAICS code	Utility patents			Design patents			Trademarks			Copyrights			Trade secrets			Mask works		
		Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important
Navigational, measuring, electromedical, and control instruments	3345	37.4	23.1	39.6	20.2	25.8	53.9	38.9	36.7	24.4	27.8	30.0	42.2	64.0	21.3	14.6	11.4	13.6	75.0
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	43.8	25.0	31.3	17.6	35.3	47.1	43.8	43.8	12.5	12.5	56.3	31.3	62.5	25.0	12.5	6.3	18.8	75.0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	28.6	21.4	50.0	14.3	21.4	64.3	33.3	33.3	33.3	28.6	35.7	35.7	69.2	15.4	15.4	7.1	14.3	78.6
Other measuring and controlling device	other 3345	38.1	22.2	39.7	23.8	25.4	50.8	38.1	36.5	25.4	33.3	22.2	44.4	61.9	22.2	15.9	14.5	12.9	72.6
Other computer and electronic products	other 334	36.8	26.3	36.8	35.0	40.0	25.0	70.0	15.0	15.0	55.0	25.0	20.0	68.4	10.5	21.1	15.8	10.5	73.7
Electrical equipment, appliances, and components	335	25.0	30.0	45.0	18.0	32.8	49.2	24.2	40.3	35.5	16.7	36.7	46.7	39.3	37.7	23.0	6.7	18.3	75.0
Transportation equipment	336	24.4	18.9	56.7	16.5	33.0	50.5	26.7	27.8	45.6	20.2	28.1	51.7	45.5	21.6	33.0	3.3	12.2	84.4
Motor vehicles, bodies, trailers, and parts	3361, 3362, 3363	25.0	18.2	56.8	14.0	34.9	51.2	28.9	28.9	42.2	23.3	27.9	48.8	38.6	22.7	38.6	4.5	13.6	81.8
Aerospace products and parts	3364	25.7	17.1	57.1	17.6	26.5	55.9	25.7	22.9	51.4	20.6	20.6	58.8	57.1	20.0	22.9	3.0	12.1	84.8
Aircraft, aircraft engine, and aircraft parts	336411-13	22.6	16.1	61.3	19.4	25.8	54.8	25.0	21.9	53.1	19.4	22.6	58.1	58.1	19.4	22.6	3.2	12.9	83.9
Guided missile, space vehicle, and related parts	336414-15, 336419	40.0	20.0	40.0	25.0	25.0	50.0	40.0	20.0	40.0	20.0	20.0	60.0	60.0	20.0	20.0	20.0	20.0	60.0
Military armored vehicle, tank, and tank component	336992	33.3	33.3	33.3	0.0	50.0	50.0	33.3	33.3	33.3	0.0	50.0	50.0	33.3	33.3	33.3	0.0	50.0	50.0
Other transportation	other 336	21.4	28.6	50.0	21.4	42.9	35.7	28.6	35.7	35.7	14.3	42.9	42.9	33.3	25.0	41.7	7.1	7.1	85.7
Furniture and related products	337	17.4	26.1	56.5	22.7	27.3	50.0	26.1	39.1	34.8	17.4	30.4	52.2	26.1	30.4	43.5	4.3	8.7	87.0
Miscellaneous	339	47.4	18.0	34.6	30.1	29.3	40.6	45.7	27.9	26.4	26.3	30.8	42.9	55.3	21.2	23.5	6.1	6.9	87.0
Medical equipment and supplies	3391	53.8	12.8	33.3	30.8	24.4	44.9	41.1	31.5	27.4	25.6	29.5	44.9	54.5	23.4	22.1	9.1	7.8	83.1
Other miscellaneous manufacturing	3399	38.6	26.3	35.1	29.8	36.8	33.3	50.0	24.1	25.9	28.1	33.3	38.6	54.4	19.3	26.3	3.6	7.1	89.3
Nonmanufacturing industries	21-23, 42-81	21.2	18.1	60.6	13.0	19.0	68.0	32.0	31.5	36.5	25.7	27.5	46.8	40.2	23.1	36.7	3.8	8.1	88.1
Mining, quarrying, oil and gas extraction, and support activities	21	38.7	9.7	51.6	21.9	18.8	59.4	36.4	12.1	51.5	31.3	12.5	56.3	48.4	19.4	32.3	3.2	6.5	90.3
Utilities	22	40.0	20.0	40.0	20.0	20.0	60.0	40.0	20.0	40.0	16.7	33.3	50.0	40.0	20.0	40.0	16.7	16.7	66.7
Wholesale trade	42	28.7	24.6	46.7	22.0	25.4	52.5	46.8	26.6	26.6	30.3	30.3	39.5	38.5	29.5	32.0	2.7	10.6	86.7
Electronic shopping and electronic auctions	454111-12	20.0	10.0	70.0	11.1	33.3	55.6	50.0	40.0	10.0	22.2	33.3	44.4	20.0	60.0	20.0	10.0	10.0	80.0
Transportation and warehousing	48-49	33.3	16.7	50.0	20.0	20.0	60.0	33.3	33.3	33.3	16.7	50.0	33.3	20.0	40.0	40.0	0.0	20.0	80.0
Information	51	21.7	19.9	58.4	15.2	21.0	63.8	46.1	32.4	21.5	38.9	31.1	30.0	49.0	25.4	25.7	5.4	8.3	86.3
Publishing	511	22.9	17.2	59.9	17.3	16.0	66.7	47.1	35.5	17.4	41.7	33.3	25.0	57.1	23.4	19.5	7.4	6.7	85.9

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		Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important
Newspaper, periodical, book, and directory publishers	5111	25.0	0.0	75.0	20.0	20.0	60.0	50.0	25.0	25.0	50.0	25.0	25.0	25.0	25.0	50.0	0.0	0.0	100.0
Software publishers	5112	22.7	17.5	59.7	17.1	15.8	67.1	47.4	35.5	17.1	41.8	33.3	24.8	57.9	23.0	19.1	7.5	6.8	85.6
Telecommunications	517	21.4	21.4	57.1	14.3	21.4	64.3	33.3	26.7	40.0	14.3	35.7	50.0	33.3	40.0	26.7	6.7	13.3	80.0
Data processing, hosting, and related services	518	20.8	22.9	56.3	13.3	26.6	60.1	46.6	30.4	23.0	38.8	29.9	31.3	46.2	28.0	25.9	4.2	9.2	86.6
Other information	other 51	22.9	20.0	57.1	15.2	21.2	63.6	45.7	28.6	25.7	36.1	25.0	38.9	27.8	19.4	52.8	2.9	14.3	82.9
Finance and insurance	52	20.0	15.0	65.0	10.5	10.5	78.9	42.1	21.1	36.8	22.2	22.2	55.6	36.8	15.8	47.4	5.3	5.3	89.5
Real estate and rental and leasing	53	16.7	16.7	66.7	16.7	33.3	50.0	42.9	28.6	28.6	28.6	28.6	42.9	33.3	16.7	50.0	16.7	0.0	83.3
Lessors of nonfinancial intangible assets (except copyrighted works)	533	33.3	0.0	66.7	33.3	33.3	33.3	50.0	25.0	25.0	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.0	66.7
Other real estate and rental and leasing	other 53	20.0	20.0	60.0	16.7	33.3	50.0	40.0	40.0	20.0	25.0	25.0	50.0	20.0	20.0	60.0	20.0	0.0	80.0
Professional, scientific, and technical services	54	22.6	18.3	59.1	11.9	18.7	69.5	23.7	32.0	44.3	22.3	29.1	48.6	41.7	22.6	35.7	4.4	9.1	86.5
Architectural, engineering, and related services	5413	17.6	16.0	66.4	12.9	18.5	68.5	14.6	25.2	60.2	18.5	24.2	57.3	32.3	28.2	39.5	5.6	9.7	84.7
Computer systems design and related services	5415	14.8	21.8	63.4	9.7	19.4	70.9	30.7	36.1	33.2	28.3	32.5	39.2	42.5	26.7	30.8	3.4	10.9	85.7
Scientific research and development services	5417	46.8	17.9	35.3	18.2	20.8	61.0	26.9	34.6	38.5	24.0	29.2	46.8	58.2	19.6	22.2	6.6	9.9	83.6
Research and development in nanotechnology	541713	63.6	9.1	27.3	50.0	10.0	40.0	50.0	20.0	30.0	45.5	18.2	36.4	63.6	18.2	18.2	30.0	10.0	60.0
Research and development in biotechnology (except nanobiotechnology)	541714	52.9	20.6	26.5	18.2	21.2	60.6	28.1	40.6	31.3	24.2	30.3	45.5	61.8	20.6	17.6	3.1	12.5	84.4
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	43.9	18.4	37.7	16.2	21.6	62.2	24.8	34.5	40.7	22.1	30.1	47.8	56.3	19.6	24.1	5.4	9.9	84.7
Research and development in the social sciences and humanities	541720	0.0	33.3	66.7	25.0	25.0	50.0	33.3	33.3	33.3	33.3	33.3	33.3	25.0	50.0	25.0	0.0	33.3	66.7
Other professional, scientific, and technical services	other 54	11.4	14.3	74.3	7.6	14.3	78.1	14.3	26.7	59.0	10.5	27.6	61.9	25.7	12.4	61.9	2.9	4.8	92.3
Health care services	621-23	8.5	5.1	86.4	3.4	6.8	89.8	8.6	6.9	84.5	6.9	6.9	86.2	12.1	5.2	82.8	1.7	3.4	94.8

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		Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important	Very important	Somewhat important	Not important
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	8.0	16.1	75.9	6.3	16.2	77.5	24.3	52.3	23.4	9.0	18.9	72.1	22.5	20.7	56.8	1.8	5.4	92.8
All companies (number of domestic employees)	-	25.4	18.5	56.1	15.5	21.2	63.3	33.6	29.0	37.3	23.0	27.3	49.7	44.7	23.3	32.1	4.6	8.9	86.5
Small companies <sup>a</sup>																			
10-19	-	31.2	17.8	51.0	17.2	17.7	65.1	32.7	30.9	36.5	25.4	27.2	47.4	48.2	28.3	23.5	6.6	7.7	85.7
20-49	-	20.3	20.0	59.7	14.3	18.7	66.9	32.3	26.7	41.0	22.7	27.4	49.9	46.6	19.3	34.1	4.5	7.9	87.7
Medium companies																			
50-99	-	20.3	14.6	65.1	11.9	19.1	69.0	23.0	33.0	44.0	15.6	24.7	59.7	36.6	21.1	42.2	2.9	8.2	88.9
100-249	-	24.3	17.9	57.7	15.3	25.5	59.2	36.7	27.3	36.0	24.8	23.5	51.7	42.1	24.8	33.0	5.4	10.3	84.3
Large companies																			
250-499	-	28.1	23.0	49.0	16.4	27.2	56.4	37.4	32.8	29.7	23.7	34.0	42.3	42.8	29.4	27.8	3.1	9.8	87.0
500-999	-	30.6	22.5	46.8	18.0	27.9	54.1	41.4	30.6	27.9	24.3	33.3	42.3	45.9	27.9	26.1	5.5	12.8	81.7
1,000-4,999	-	47.3	19.6	33.0	24.8	27.4	47.8	54.9	26.5	18.6	33.0	33.9	33.0	54.1	25.2	20.7	7.1	14.3	78.6
5,000-9,999	-	56.5	21.7	21.7	30.4	30.4	39.1	63.6	22.7	13.6	30.4	43.5	26.1	56.5	26.1	17.4	8.7	17.4	73.9
10,000-24,999	-	58.8	17.6	23.5	33.3	33.3	33.3	70.6	17.6	11.8	41.2	35.3	23.5	66.7	16.7	16.7	5.9	11.8	82.4
25,000 or more	-	58.3	16.7	25.0	33.3	33.3	33.3	75.0	8.3	16.7	45.5	36.4	18.2	66.7	16.7	16.7	8.3	16.7	75.0

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> 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 is 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 and are not comparable with estimates published for years prior to 2018. Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2020, the company counts used in the calculation of the percentage estimates reflect a change in rounding methodology. These statistics are also not comparable to estimates prior to 2012 because those estimates are representative of all companies in the United States.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 69

**Companies located in the United States that performed or funded R&D and engaged in intellectual property transfer activities, by type of activity and industrial sector: 2020**

(Number)

Type of intellectual property (IP) transfer activity	Industrial sector		
	All	Manufacturing	Nonmanufacturing
Transferred IP to others not owned by your company through participation in technical assistance or know-how agreements	1,020	600	430
Received IP from others not owned by your company through participation in technical assistance or know-how agreements	1,130	790	340
Transferred IP to a spin-off or spin-out of your company	250	120	140
Received IP from a parent company as part of a spin-off or spin-out	60	40	20
Acquired more than 50% ownership in another company for the primary purpose of acquiring its IP	350	180	180
Acquired any financial interest in another company in order to gain access to its IP	290	140	150
Participated in cross-licensing agreements—the agreements in which two or more parties grant a license to each other for the use of the subject matter claimed in one or more of the patents owned by each party	620	380	250
Allowed free use of patents or other IP owned by your company (e.g., allowing free use of software patents by the open-source community)	800	240	560
Made use of open-source patents or other freely available IP not owned by your company	2,460	730	1,740

**Note(s):**

Detail may not add to total because of rounding. Industrial sector is 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 and are not comparable with estimates published for years prior to 2018. Statistics are based on companies in the United States that reported to the survey. No systematic item imputation was applied. Beginning in survey year 2018, these statistics include an adjustment to the weight to account for unit nonresponse; beginning in survey year 2020, the company counts reflect a change in rounding methodology.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 70

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
								Amount	Percent
All industries	21-23, 31-33, 42-81	355,821	12,433		23,923	367,312	11,490	3.2	
Manufacturing industries	31-33	236,132	9,080		14,782	241,834	5,702	2.4	
Food	311	4,838	213	i	371	4,997	158	3.3	
Beverage and tobacco products	312	1,002	46		73	1,029	27	2.7	
Textile, apparel, and leather products	313-16	748	17		43	773	26	3.4	
Wood products	321	195	2		19	212	17	8.8	
Paper	322	766	8	i	174	932	166	21.7	
Printing and related support activities	323	196	9	i	61	249	53	26.8	
Petroleum and coal products	324	214	8		44	250	36	16.8	
Chemicals	325	68,196	3,022		3,997	69,171	975	1.4	
Basic chemicals	3251	3,042	252		422	3,211	169	5.6	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,201	78		147	1,271	70	5.8	
Pesticide, fertilizer, and other agricultural chemicals	3253	D	D		200	D	D	D	
Pharmaceuticals and medicines	3254	58,675	2,346		2,965	59,293	619	1.1	
Soap, cleaning compound, and toilet preparation	3256	1,398	D		212	D	D	D	
Paint, coating, adhesive, and other chemicals	3255, 3259	D	49		52	D	3	D	
Plastics and rubber products	326	2,541	61		479	2,960	419	16.5	
Nonmetallic mineral products	327	1,259	55	i	298	1,502	244	19.4	
Primary metals	331	628	29		135	734	106	16.9	
Fabricated metal products	332	2,261	37	i	169	2,394	133	5.9	
Machinery	333	13,426	493		619	13,552	126	0.9	
Agricultural implement	33311	1,531	53		63	1,540	10	0.6	
Semiconductor machinery	333242	3,214	203		52	3,063	-151	-4.7	
Engine, turbine, and power transmission equipment	3336	2,535	107		68	2,496	-39	-1.5	
Other machinery	other 333	6,146	129		436	6,453	306	5.0	
Computer and electronic products	334	72,110	3,534		5,456	74,032	1,923	2.7	
Communications equipment	3342	19,424	1,056		1,592	19,960	536	2.8	
Semiconductor and other electronic components	3344	30,451	1,635		2,510	31,327	876	2.9	
Navigational, measuring, electromedical, and control instruments	3345	14,128	316		603	14,416	288	2.0	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,758	76		185	2,867	109	4.0	
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,360	137		206	7,429	69	0.9	
Other measuring and controlling device	other 3345	4,011	103		212	4,120	109	2.7	
Other computer and electronic products	other 334	8,106	527		750	8,329	223	2.8	
Electrical equipment, appliances, and components	335	4,335	123		283	4,496	160	3.7	
Transportation equipment	336	49,274	861		1,805	50,218	944	1.9	
Motor vehicles, bodies, trailers, and parts	3361-63	19,078	585		1,089	19,581	504	2.6	
Aerospace products and parts	3364	27,464	222		597	27,840	375	1.4	



TABLE 70

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
								Amount	Percent
Aircraft, aircraft engine, and aircraft parts	336411-13	25,817		221		595	26,191	i 374	1.5
Guided missile, space vehicle, and related parts	336414-15, 336419	1,647	i	1	i	2	1,649	i 1	0.1
Military armored vehicle, tank, and tank component	336992	16		*		2	17	1	8.9
Other transportation	other 336	2,716		54	i	117	2,779	i 63	2.3
Furniture and related products	337	452		8		52	497	i 44	9.8
Miscellaneous	339	13,690		556		701	13,836	146	1.1
Medical equipment and supplies	3391	11,382		486		606	11,501	120	1.1
Other miscellaneous manufacturing	3399	2,309	i	70	i	96	2,334	i 26	1.1
Nonmanufacturing industries	21-23, 42-81	119,690		3,353		9,141	125,478	5,788	4.8
Mining, quarrying, oil and gas extraction, and support activities	21	4,012		103		1,298	5,207	i 1,195	29.8
Utilities	22	480		142		519	857	i 377	78.5
Wholesale trade	42	1,768	i	78	i	375	2,066	i 298	16.8
Electronic shopping and electronic auctions	454111-12	1,533	i	187	i	156	1,502	i -31	-2.0
Transportation and warehousing	48-49	403		10		144	538	i 135	33.4
Information	51	65,513		1,816		3,325	67,022	1,509	2.3
Publishing	511	33,346		743		1,433	34,035	690	2.1
Newspaper, periodical, book, and directory publishers	5111	98	i	6	i	25	117	i 19	19.2
Software publishers	5112	33,248		737		1,408	33,919	671	2.0
Telecommunications	517	3,607		35	i	485	4,057	i 451	12.5
Data processing, hosting, and related services	518	9,416		224		769	9,961	545	5.8
Other information	other 51	19,144		815		639	18,968	-177	-0.9
Finance and insurance	52	5,366		48		536	5,854	i 488	9.1
Real estate and rental and leasing	53	301		7		42	337	i 35	11.8
Lessors of nonfinancial intangible assets (except copyrighted works)	533	68		1		2	69	1	0.8
Other real estate and rental and leasing	other 53	233		6		40	268	i 35	14.9
Professional, scientific, and technical services	54	38,626		937		2,368	40,057	i 1,431	3.7
Architectural, engineering, and related services	5413	4,128	i	33	i	52	4,148	i 19	0.5
Computer systems design and related services	5415	14,333		412		1,472	15,393	1,060	7.4
Scientific research and development services	5417	16,329		354		569	16,543	i 214	1.3
Research and development in biotechnology	541711	5,693	i	86		271	5,877	i 184	3.2
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	9,931		259		290	9,962	31	0.3
Research and development in the social sciences and humanities	541720	705		9		8	704	-1	-0.1
Other professional, scientific, and technical services	other 54	3,835		138	i	275	3,972	i 137	3.6
Health care services	621-23	758	i	15	i	132	875	i 117	15.4

TABLE 70

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change			
									Amount	Percent		
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	930	11		246	i	1,164	i	235	i	25.3	
All companies (number of domestic employees)	–	355,821	12,433		23,923		367,312		11,490		3.2	
Micro companies <sup>a</sup>												
5–9	–	2,988	i	66	i	208	i	3,130	i	141	i	4.7
Small companies												
10–19	–	5,680	i	153	i	883	i	6,410	i	730	i	12.9
20–49	–	10,249	i	265	i	563	i	10,547	i	298	i	2.9
Medium companies												
50–99	–	11,509		284	i	683		11,909		400	i	3.5
100–249	–	13,602		323		1,004	i	14,284		681	i	5.0
Large companies												
250–499	–	13,553		498		1,321	i	14,376		823	i	6.1
500–999	–	15,217		519		1,300		15,998		781	i	5.1
1,000–4,999	–	58,094		2,162		4,038		59,970		1,876		3.2
5,000–9,999	–	38,838		1,527		3,146		40,456		1,618		4.2
10,000–24,999	–	59,328		2,507		3,575		60,396	i	1,068		1.8
25,000 or more	–	126,763		4,128		7,201		129,835		3,072		2.4

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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business R&D and Innovation Survey (BRDIS) did not include companies with fewer than 5 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. To enable comparisons between U.S. BRDIS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BRDIS domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BRDIS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business R&D and Innovation Survey, 2015.

TABLE 71

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	374,685	13,674	24,481	385,492	10,807	2.9
Manufacturing industries	31-33	250,553	10,138	15,047	255,462	4,909	2.0
Food	311	4,828	225	312	4,915	87	1.8
Beverage and tobacco products	312	D	55	112	D	57	D
Textile, apparel, and leather products	313-16	1,166	23	67	1,209	44	3.7
Wood products	321	188	3	32	218	30	15.8
Paper	322	851	D	67	D	D	D
Printing and related support activities	323	219	D	69	D	D	D
Petroleum and coal products	324	381	D	58	D	D	D
Chemicals	325	73,575	3,736	4,179	74,018	443	0.6
Basic chemicals	3251	2,545	147	214	2,612	67	2.6
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	711	D	88	D	D	D
Pesticide, fertilizer, and other agricultural chemicals	3253	D	D	101	D	D	D
Pharmaceuticals and medicines	3254	64,628	3,246	3,400	64,781	154	0.2
Soap, cleaning compound, and toilet preparation	3256	2,800	D	284	D	D	D
Paint, coating, adhesive, and other chemicals	3255, 3259	D	D	92	D	D	D
Plastics and rubber products	326	3,752	192	451	4,011	259	6.9
Nonmetallic mineral products	327	1,289	76	242	1,455	166	12.9
Primary metals	331	592	19	57	631	38	6.5
Fabricated metal products	332	2,239	38	130	2,331	92	4.1
Machinery	333	12,585	531	1,126	13,180	595	4.7
Agricultural implement	33311	1,565	46	64	1,583	18	1.2
Semiconductor machinery	333242	3,411	247	287	3,451	40	1.2
Engine, turbine, and power transmission equipment	3336	1,959	91	109	1,977	18	0.9
Other machinery	other 333	5,650	146	665	6,169	519	9.2
Computer and electronic products	334	77,385	3,716	5,024	78,693	1,308	1.7
Communications equipment	3342	13,112	560	477	13,029	-83	-0.6
Semiconductor and other electronic components	3344	31,391	1,691	2,567	32,267	875	2.8
Navigational, measuring, electromedical, and control instruments	3345	14,885	345	573	15,113	229	1.5
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,632	81	141	2,692	60	2.3
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,533	144	221	7,609	76	1.0
Other measuring and controlling device	other 3345	4,720	119	212	4,813	92	2.0
Other computer and electronic products	other 334	17,997	1,120	1,407	18,284	287	1.6
Electrical equipment, appliances, and components	335	4,771	125	160	4,806	36	0.7
Transportation equipment	336	51,275	872	2,181	52,585	1,309	2.6
Motor vehicles, bodies, trailers, and parts	3361-63	22,042	640	1,184	22,586	545	2.5

TABLE 71

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	26,645	191	871	27,326	680	2.6
Aircraft, aircraft engine, and aircraft parts	336411-13	25,221	190	853	25,884	664	2.6
Guided missile, space vehicle, and related parts	336414-15, 336419	1,424	1	18	1,441	17	1.2
Military armored vehicle, tank, and tank component	336992	D	*	*	D	*	D
Other transportation	other 336	D	41	125	D	84	D
Furniture and related products	337	366	3	52	415	49	13.4
Miscellaneous	339	D	473	726	D	253	D
Medical equipment and supplies	3391	11,668	436	611	11,844	176	1.5
Other miscellaneous manufacturing	3399	D	37	115	D	78	D
Nonmanufacturing industries	21-23, 42-81	124,132	3,536	9,434	130,030	5,898	4.8
Mining, quarrying, oil and gas extraction, and support activities	21	3,296	108	421	3,609	313	9.5
Utilities	22	351	68	D	D	D	D
Wholesale trade	42	452	4	2,682	3,130	2,678	592.0
Electronic shopping and electronic auctions	454111-12	1,569	182	136	1,523	-46	-2.9
Transportation and warehousing	48-49	488	0	112	600	112	22.9
Information	51	70,748	1,983	3,313	72,078	1,330	1.9
Publishing	511	33,574	619	1,352	34,307	733	2.2
Newspaper, periodical, book, and directory publishers	5111	79	7	21	93	14	17.3
Software publishers	5112	33,495	612	1,331	34,215	720	2.1
Telecommunications	517	D	D	584	D	D	D
Data processing, hosting, and related services	518	11,914	282	871	12,503	589	4.9
Other information	other 51	D	D	506	D	D	D
Finance and insurance	52	7,331	94	514	7,751	420	5.7
Real estate and rental and leasing	53	475	9	D	D	D	D
Lessors of nonfinancial intangible assets (except copyrighted works)	533	27	0	D	D	D	D
Other real estate and rental and leasing	other 53	449	9	56	495	47	10.5
Professional, scientific, and technical services	54	37,595	1,045	1,637	38,186	591	1.6
Architectural, engineering, and related services	5413	3,412	23	46	3,436	24	0.7
Computer systems design and related services	5415	15,747	591	929	16,084	337	2.1
Scientific research and development services	5417	14,842	380	375	14,838	-4	0.0
Research and development in biotechnology	541711	4,464	D	D	4,489	25	0.6
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	9,659	307	283	9,635	-24	-0.3
Research and development in the social sciences and humanities	541720	719	D	D	714	-5	-0.7
Other professional, scientific, and technical services	other 54	3,595	52	287	3,829	235	6.5
Health care services	621-23	848	34	68	882	35	4.1

TABLE 71

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	977 i	8 i	161 i	1,130 i	153 i	15.7
All companies (number of domestic employees)	–	374,685	13,674	24,481 i	385,492	10,807 i	2.9
Micro companies <sup>a</sup>							
5–9	–	1,581 i	37 i	132 i	1,675 i	95 i	6.0
Small companies							
10–19	–	4,958 i	94 i	643 i	5,507 i	549 i	11.1
20–49	–	9,662 i	193 i	537 i	10,006 i	344 i	3.6
Medium companies							
50–99	–	9,298	245	1,033 i	10,087	789 i	8.5
100–249	–	14,875	371	1,737 i	16,241	1,366 i	9.2
Large companies							
250–499	–	13,092	363	1,959 i	14,688	1,596 i	12.2
500–999	–	14,450	469	1,079	15,059	610	4.2
1,000–4,999	–	63,971	2,616	4,433	65,788	1,817	2.8
5,000–9,999	–	40,633	1,294	2,500	41,840 i	1,207 i	3.0
10,000–24,999	–	65,594	3,297	4,322 i	66,619 i	1,025 i	1.6
25,000 or more	–	136,571	4,696	6,106	137,981	1,410	1.0

\* = 0 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business R&D and Innovation Survey (BRDIS) did not include companies with fewer than 5 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. To enable comparisons between U.S. BRDIS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BRDIS domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BRDIS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business R&D and Innovation Survey, 2016.

TABLE 72

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
								Amount	Percent
All industries	21-23, 31-33, 42-81	400,100	15,072		25,882	410,910	10,810	2.7	
Manufacturing industries	31-33	257,227	10,815		15,158	261,569	4,343	1.7	
Food	311	4,697	216	i	578	5,059	362	7.7	
Beverage and tobacco products	312	1,076	58		133	1,151	75	7.0	
Textile, apparel, and leather products	313-16	920	18		108 - 250	1,011 - 1,153	91 - 232	D	
Wood products	321	175	3		11	184	9	5.0	
Paper	322	1,322	40		120	1,402	81	6.1	
Printing and related support activities	323	229	10	i	21	240	11	4.8	
Petroleum and coal products	324	316	12		70 - 219	373 - 522	57 - 206	D	
Chemicals	325	74,977	3,677		5,082	76,383	1,406	1.9	
Basic chemicals	3251	2,574	153		221	2,641	68	2.6	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	628	26		71	672	44	7.1	
Pesticide, fertilizer, and other agricultural chemicals	3253	1,376 - 1,475	161		201	1,215 - 1,627	40	D	
Pharmaceuticals and medicines	3254	66,202	3,180		4,353	67,374	1,172	1.8	
Soap, cleaning compound, and toilet preparation	3256	2,605 - 2,701	89		143	2,549 - 2,960	54	D	
Paint, coating, adhesive, and other chemicals	3255, 3259	1,495	67		95	1,522	27	1.8	
Plastics and rubber products	326	3,754	198		305	3,862	108	2.9	
Nonmetallic mineral products	327	1,334	104	i	70	1,300	-34	-2.5	
Primary metals	331	749	37		36 - 82	748 - 794	0 - 45	D	
Fabricated metal products	332	2,206	32		188	2,362	156	7.1	
Machinery	333	13,197	534		675 - 846	13,338 - 13,509	141 - 312	D	
Agricultural implement	33311	1,570	40		49 - 187	1,579 - 1,717	9 - 147	D	
Semiconductor machinery	333242	3,694	290		290 - 339	3,693 - 3,742	0 - 48	D	
Engine, turbine, and power transmission equipment	3336	2,080	79		90	2,090	10	0.5	
Other machinery	other 333	5,853	125		246 - 389	5,974 - 6,117	121 - 264	D	
Computer and electronic products	334	78,575	4,266	i	4,622	78,930	355	0.5	
Communications equipment	3342	12,687	576		755	12,866	179	1.4	
Semiconductor and other electronic components	3344	30,148	1,956	i	2,273	30,465	317	1.1	
Navigational, measuring, electromedical, and control instruments	3345	14,509	295		565	14,778	270	1.9	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,696	68		115	2,743	47	1.8	
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,297	130		302	7,469	173	2.4	

TABLE 72

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change	
									Amount	Percent
Other measuring and controlling device	other 3345	4,516	98		147		4,566	50	1.1	
Other computer and electronic products	other 334	21,231	1,439		1,028		20,821	-410	i -1.9	
Electrical equipment, appliances, and components	335	4,291	115	i	194		4,370	79	1.8	
Transportation equipment	336	53,292	923		1,781		54,149	857	1.6	
Motor vehicles, bodies, trailers, and parts	3361-63	23,881	657		1,186		24,411	529	2.2	
Aerospace products and parts	3364	26,383	208		486		26,661	278	1.1	
Aircraft, aircraft engine, and aircraft parts	336411-13	24,576	206	i	483		24,853	277	1.1	
Guided missile, space vehicle, and related parts	336414-15, 336419	1,807	2		3		1,808	1	0.1	
Military armored vehicle, tank, and tank component	336992	9	*	i	*		9	0	-0.3	
Other transportation	other 336	3,018	58	i	108		3,068	50	i 1.7	
Furniture and related products	337	422	4		37 - 49		455 - 467	33 - 45	D	
Miscellaneous	339	15,695	570		960		16,084	389	2.5	
Medical equipment and supplies	3391	13,589	535		819		13,873	284	2.1	
Other miscellaneous manufacturing	3399	2,106	35		140		2,211	105	5.0	
Nonmanufacturing industries	21-23, 42-81	142,874	4,257		10,724		149,341	6,467	i 4.5	
Mining, quarrying, oil and gas extraction, and support activities	21	3,150	98		403 - 410		3,455 - 3,462	305 - 312	i D	
Utilities	22	317	56		444	i	706	388	i 122.3	
Wholesale trade	42	534	5	i	32 - 46		560 - 575	26 - 41	i D	
Electronic shopping and electronic auctions	454111-12	9,318	544		213	i	8,987	-331	i -3.5	
Transportation and warehousing	48-49	1,147	32		291		1,407	260	22.6	
Information	51	80,252	2,214		5,135		83,172	2,921	3.6	
Publishing	511	34,338	571		1,209		34,976	638	1.9	
Newspaper, periodical, book, and directory publishers	5111	74	5		5	i	74	*	-0.4	
Software publishers	5112	34,264	566		1,204		34,902	638	1.9	
Telecommunications	517	3,682 - 3,806	15		595 - 989	i	4,391 - 4,617	580 - 974	i D	
Data processing, hosting, and related services	518	16,155	281		1,332 - 1,557		17,207 - 17,431	1,052 - 1,276	D	
Other information	other 51	25,954 - 26,077	1,347		1,604 - 1,775		26,373	257 - 427	i D	
Finance and insurance	52	7,616	156		1,182	i	8,642	1,026	i 13.5	
Real estate and rental and leasing	53	718	24		35		729	11	1.6	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	138	*	i	1	i	139	1	i 0.7	
Other real estate and rental and leasing	other 53	579	24		34		590	10	1.8	
Professional, scientific, and technical services	54	36,922	1,083		2,662		38,501	1,579	4.3	
Architectural, engineering, and related services	5413	2,708	18		62		2,752	44	i 1.6	

TABLE 72

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Computer systems design and related services	5415	13,327	451	1,683	14,558	1,231	9.2
Scientific research and development services	5417	17,321	579	665	17,408	87	0.5
Research and development in biotechnology	541711	4,449	156	238 - 244	4,531 - 4,537	82 - 88	D
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	11,913	411	417	11,920	7	0.1
Research and development in the social sciences and humanities	541720	959	12	5 - 9	951 - 956	-7 - -3	D
Other professional, scientific, and technical services	other 54	3,566	35	252	3,784	217	6.1
Health care services	621-23	1,101	29	147 - 175	1,219 - 1,247	118 - 146	D
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,799	16	155	1,938	139	7.7
All companies (number of domestic employees)	-	400,100	15,072	25,882	410,910	10,810	2.7
Small companies							
10-19 <sup>a</sup>	-	3,311	49	313	3,576	265	8.0
20-49	-	9,435	231	847	10,050	616	6.5
Medium companies							
50-99	-	10,141	220	845	10,767	626	6.2
100-249	-	17,216	407	1,672	18,481	1,265	7.3
Large companies							
250-499	-	14,103	324	924	14,703	600	4.3
500-999	-	17,871	541	1,645	18,975	1,104	6.2
1,000-4,999	-	65,112	2,477	4,385	67,020	1,908	2.9
5,000-9,999	-	40,198	1,616	2,741	41,324	1,126	2.8
10,000-24,999	-	73,485	3,524	5,127	75,088	1,603	2.2
25,000 or more	-	149,227	5,686	7,384	150,925	1,699	1.1

\* = -\$500,000 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business Research and Development Survey (BRDS) did not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BRDS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was included in U.S. BRDS domestic R&D, and adding capital expenditures relating to R&D operations, which was excluded from U.S. BRDS domestic R&D.



**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Research and Development Survey, 2017.

TABLE 73

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change	
									Amount	Percent
All industries	21-23, 31-33, 42-81	441,036	16,409		28,707		453,334	12,298	2.8	
Manufacturing industries	31-33	274,075	11,337		18,065		280,802	6,728	2.5	
Food	311	4,654	212		417		4,859	206	4.4	
Beverage and tobacco products	312	1,113	55		80		1,137	25	2.2	
Textile, apparel, and leather products	313-16	989	15		80		1,054	65	6.5	
Wood products	321	203	3		9		210	6	3.0	
Paper	322	934	6		60		988	54	5.8	
Printing and related support activities	323	242	13	i	19	i	248	6	2.5	
Petroleum and coal products	324	1,269	36		221		1,454	185	14.6	
Chemicals	325	84,137	3,913		5,230		85,454	1,317	1.6	
Basic chemicals	3251	2,443	142		227		2,528	85	3.5	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,653	111		194 - 215		1,736 - 1,757	83 - 104	D	
Pesticide, fertilizer, and other agricultural chemicals	3253	1,460	115	i	44 - 68		1,390 - 1,413	-70 - -47	D	
Pharmaceuticals and medicines	3254	74,592	3,398		4,430		75,624	1,032	1.4	
Soap, cleaning compound, and toilet preparation	3256	2,710	103		202		2,808	98	3.6	
Paint, coating, adhesive, and other chemicals	3255, 3259	1,278	43		110		1,345	67	5.3	
Plastics and rubber products	326	2,751	80		330		3,001	250	9.1	
Nonmetallic mineral products	327	1,385	74	i	137		1,448	62	4.5	
Primary metals	331	839	43		110		906	67	8.0	
Fabricated metal products	332	2,327	33		208		2,502	174	7.5	
Machinery	333	14,799	634		1,069		15,234	435	2.9	
Agricultural implement	33311	1,872	41		72		1,902	31	1.6	
Semiconductor machinery	333242	4,166	317		484		4,333	167	4.0	
Engine, turbine, and power transmission equipment	3336	2,483	97		138		2,524	41	1.6	
Other machinery	other 333	6,278	179		376		6,475	197	3.1	
Computer and electronic products	334	83,697	4,613		6,404		85,489	1,791	2.1	
Communications equipment	3342	13,107	622		873		13,358	251	1.9	
Semiconductor and other electronic components	3344	31,052	2,408	i	2,686	i	31,331	278	0.9	
Navigational, measuring, electromedical, and control instruments	3345	16,727	337		714		17,103	377	2.3	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,208	74		150	i	3,285	76	2.4	
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	8,843	153		346		9,036	193	2.2	
Other measuring and controlling device	other 3345	4,675	110		218		4,783	108	2.3	
Other computer and electronic products	other 334	22,811	1,247		2,132		23,697	885	3.9	
Electrical equipment, appliances, and components	335	4,487	113		354		4,729	241	5.4	
Transportation equipment	336	52,629	929		2,184		53,884	1,255	2.4	
Motor vehicles, bodies, trailers, and parts	3361-63	25,586	761		1,570		26,394	809	3.2	

TABLE 73

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	24,291	133	461	24,619	i 328	1.4
Aircraft, aircraft engine, and aircraft parts	336411-13	22,968	132	343	23,179	i 211	0.9
Guided missile, space vehicle, and related parts	336414-15, 336419	1,323	1	118	1,440	118	8.9
Military armored vehicle, tank, and tank component	336992	11	0 - 5	*	11 - 12	0 - 1	D
Other transportation	other 336	2,741	28 - 37	153	2,858 - 2,861	i 116 - 119	D
Furniture and related products	337	410	3	73	480	70	17.2
Miscellaneous	339	17,209	561	1,080	17,728	519	3.0
Medical equipment and supplies	3391	14,531	523	702	14,710	179	1.2
Other miscellaneous manufacturing	3399	2,678	38	i 378	i 3,018	i 340	i 12.7
Nonmanufacturing industries	21-23, 42-81	166,961	5,072	10,642	172,532	5,571	3.3
Mining, quarrying, oil and gas extraction, and support activities	21	1,905	51	351	2,205	i 300	i 15.8
Utilities	22	275	5	280	i 550	i 276	i 100.4
Wholesale trade	42	906	i 3	i 40	i 942	i 36	i 4.0
Electronic shopping and electronic auctions	454111-12	11,652	i 287 - 645	233	i 10,939 - 11,532	i -712 - -120	D
Transportation and warehousing	48-49	942	25	211	i 1,128	186	i 19.7
Information	51	94,349	2,721	5,110	96,738	2,389	2.5
Publishing	511	32,770	444	1,425	33,752	982	3.0
Newspaper, periodical, book, and directory publishers	5111	131	14	i 19	i 136	i 5	i 3.5
Software publishers	5112	32,639	429	1,406	33,616	977	3.0
Telecommunications	517	3,696	29	333	i 4,000	i 304	i 8.2
Data processing, hosting, and related services	518	23,306	451	1,503	24,358	1,052	4.5
Other information	other 51	34,576	1,797	1,848	34,628	51	0.1
Finance and insurance	52	7,471	290	1,865	i 9,046	i 1,575	i 21.1
Real estate and rental and leasing	53	1,022	44	55	1,033	11	1.1
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6	0	*	6	*	0.5
Other real estate and rental and leasing	other 53	1,016	44	55	1,027	11	1.1
Professional, scientific, and technical services	54	44,860	1,246	2,045	45,659	799	1.8
Architectural, engineering, and related services	5413	3,961	64	i 110	4,007	46	1.2
Computer systems design and related services	5415	15,923	501	1,008	16,430	507	3.2
Scientific research and development services	5417	20,185	621	557	20,121	-64	i -0.3
Research and development in biotechnology	541711	5,857	86 - 166	196 - 201	5,896 - 5,903	40 - 46	i D
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	13,657	456	351	13,552	i -104	i -0.8

TABLE 73

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change	
									Amount	Percent
Research and development in the social sciences and humanities	541720	671	0 - 79		6 - 9		666 - 672		-4 - 0	D
Other professional, scientific, and technical services	other 54	4,791	60	i	369		5,101		310	6.5
Health care services	621-23	1,476	47	i	171	i	1,600	i	124	8.4
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	2,103	0 - 348		280		2,102 - 2,694	i	0 - 591	D
All companies (number of domestic employees)	-	441,036	16,409		28,707		453,334		12,298	2.8
Small companies										
10-19 <sup>a</sup>	-	4,390	72		348		4,666		276	6.3
20-49	-	11,252	169		1,036		12,119		867	7.7
Medium companies										
50-99	-	12,321	218		1,030		13,133		811	6.6
100-249	-	18,547	459		1,266		19,354		807	4.3
Large companies										
250-499	-	19,645	466		1,729		20,908		1,263	6.4
500-999	-	17,657	494		1,256		18,419		762	4.3
1,000-4,999	-	68,578	2,438		5,263		71,403		2,825	4.1
5,000-9,999	-	45,337	1,920		3,462		46,879		1,542	3.4
10,000-24,999	-	84,420	4,173		5,679		85,926		1,506	i 1.8
25,000 or more	-	158,889	5,999		7,638		160,528		1,639	1.0

\* = 0 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business Research and Development Survey (BRDS) did not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BRDS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BRDS domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BRDS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Research and Development Survey, 2018.

TABLE 74

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	492,956	18,861	29,106	503,201	10,245	2.1
Manufacturing industries	31-33	285,674	12,419	17,674	290,928	5,255	1.8
Food	311	4,180	181	432	4,431	251	6.0
Beverage and tobacco products	312	1,082	52	160	1,190	108	10.0
Textile, apparel, and leather products	313-16	904	14	85	976	72	7.9
Wood products	321	186	2	7	191	5	2.6
Paper	322	1,064	8	65	1,121	57	5.3
Printing and related support activities	323	420	5	11	425	6	1.3
Petroleum and coal products	324	1,306	40 - 49	125	1,387 - 1,391	81 - 85	D
Chemicals	325	97,063	3,961	5,634	98,737	1,674	1.7
Basic chemicals	3251	2,360	167	358	2,551	191	8.1
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,172	73	225	1,324	152	13.0
Pesticide, fertilizer, and other agricultural chemicals	3253	1,822 - 1,846	104 - 133	57	1,761 - 1,784	-76 - -62	D
Pharmaceuticals and medicines	3254	87,619	3,451	4,476	88,644	1,025	1.2
Soap, cleaning compound, and toilet preparation	3256	2,760	97	170	2,833	73	2.6
Paint, coating, adhesive, and other chemicals	3255, 3259	1,305 - 1,333	42 - 71	347	1,601 - 1,623	296 - 306	D
Plastics and rubber products	326	2,856	85	393	3,164	309	10.8
Nonmetallic mineral products	327	1,508	61	69	1,516	8	0.5
Primary metals	331	665	27	89	727	62	9.4
Fabricated metal products	332	2,885	47	204	3,043	158	5.5
Machinery	333	15,184	605	953	15,532	348	2.3
Agricultural implement	33311	1,921	35	58	1,944	23	1.2
Semiconductor machinery	333242	4,459	351	419	4,526	68	1.5
Engine, turbine, and power transmission equipment	3336	1,301	50	85	1,336	35	2.7
Other machinery	other 333	7,503	168	391	7,726	223	3.0
Computer and electronic products	334	86,729	5,366	5,765	87,128	399	0.5
Communications equipment	3342	12,595	574	780	12,802	207	1.6
Semiconductor and other electronic components	3344	35,183	2,784	2,698	35,096	-87	-0.2
Navigational, measuring, electromedical, and control instruments	3345	17,562	333	899	18,128	566	3.2
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,342	73	222	3,492	150	4.5
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	9,662	162	448	9,949	286	3.0
Other measuring and controlling device	other 3345	4,558	98	228	4,688	130	2.8
Other computer and electronic products	other 334	21,388	1,675	1,388	21,101	-287	-1.3
Electrical equipment, appliances, and components	335	5,263	135	477	5,605	342	6.5
Transportation equipment	336	45,375	1,153	2,066	46,287	913	2.0

TABLE 74

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Motor vehicles, bodies, trailers, and parts	3361-63	24,117	967	1,454	24,604	488	2.0
Aerospace products and parts	3364	18,358 i	139 - 165	486 - 495	18,706 - 18,710 i	349 - 352	D
Aircraft, aircraft engine, and aircraft parts	336411-13	16,891 i	133	438	17,195 i	305	1.8
Guided missile, space vehicle, and related parts	336414-15, 336419	1,467	6 - 32	48 - 57	1,511 - 1,514	44 - 46	D
Military armored vehicle, tank, and tank component	336992	35	*	1	35	*	0.8
Other transportation	other 336	2,865	22 - 48	117 - 127 i	2,936 - 2,943 i	71 - 77 i	D
Furniture and related products	337	409	8	48	449	40	9.9
Miscellaneous	339	18,596	666 - 674	1,089	19,015 - 19,020	420 - 423	D
Medical equipment and supplies	3391	16,014	623	954	16,345	332 i	2.1
Other miscellaneous manufacturing	3399	2,582	43 - 52	135	2,670 - 2,674	88 - 92	D
Nonmanufacturing industries	21-23, 42-81	207,283	6,442	11,432	212,273	4,990	2.4
Mining, quarrying, oil and gas extraction, and support activities	21	2,717	92	441	3,066	349 i	12.8
Utilities	22	275	0 - 100	210	387 - 494 i	112 - 219 i	D
Wholesale trade	42	1,191	18	66 - 155 i	1,239 - 1,330 i	48 - 139 i	D
Electronic shopping and electronic auctions	454111-12	3,131 - 15,818 i	0 - 793 i	77 - 89 i	1,871 - 15,762 i	1,260 - -55 i	D
Transportation and warehousing	48-49	9,890 i	71 i	495	10,314 i	423 i	4.3
Information	51	110,227	3,099	5,270	112,398	2,171	2.0
Publishing	511	33,019	382	1,166	33,803	784	2.4
Newspaper, periodical, book, and directory publishers	5111	61	*	1	62	1	1.7
Software publishers	5112	32,958	382	1,165	33,741	783	2.4
Telecommunications	517	3,733	33	241	3,941 i	208 i	5.6
Data processing, hosting, and related services	518	30,558	492	2,260	32,325	1,767	5.8
Other information	other 51	42,917	2,191	1,603	42,328	-588	-1.4
Finance and insurance	52	8,917	534 i	1,548 i	9,931 i	1,014 i	11.4
Real estate and rental and leasing	53	1,371	2 - 258	5 - 78	1,380	9	0.7
Lessors of nonfinancial intangible assets (except copyrighted works)	533	45	3	*	42	-3	-6.4
Other real estate and rental and leasing	other 53	1,326	0 - 255	5 - 78	1,338	12	0.9
Professional, scientific, and technical services	54	53,233	1,801	2,371	53,804	571	1.1
Architectural, engineering, and related services	5413	4,207	21	153	4,338	131	3.1
Computer systems design and related services	5415	21,046	722	935	21,260	213	1.0
Scientific research and development services	5417	21,669	838 i	944	21,774	106 i	0.5

TABLE 74

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others		Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change	
										Amount	Percent
Research and development in biotechnology	541711	6,457		181		228	i	6,503		46	0.7
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	14,446	i	641	i	707		14,512	i	65	i 0.5
Research and development in the social sciences and humanities	541720	766		15		9		759		-6	-0.8
Other professional, scientific, and technical services	other 54	6,312		220		340		6,432		120	1.9
Health care services	621-23	2,265		35		385	i	2,616		351	i 15.5
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,380 - 14,067		0 - 794		480		1,380 - 15,265	i	0 - 1,201	D
All companies (number of domestic employees)	-	492,956		18,861		29,106		503,201		10,245	2.1
Small companies											
10-19 <sup>a</sup>	-	5,501		113		610		5,999		498	9.0
20-49	-	12,418		221		1,086		13,283		864	7.0
Medium companies											
50-99	-	14,021		270		958		14,709		688	4.9
100-249	-	19,793		466		1,492		20,819		1,025	5.2
Large companies											
250-499	-	18,883		413		1,502		19,972		1,089	5.8
500-999	-	23,969		739		1,612		24,842		874	3.6
1,000-4,999	-	75,671		2,745		5,382		78,308		2,637	3.5
5,000-9,999	-	50,811		2,268		3,100		51,642		832	1.6
10,000-24,999	-	88,263		4,058		4,606		88,811	i	548	i 0.6
25,000 or more	-	183,626		7,567		8,758		184,817		1,191	0.6

\* = 0 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development (BERD) Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BERD statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2019.

TABLE 75

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	537,619	20,972	32,494	549,141	11,522	2.1
Manufacturing industries	31-33	308,445	14,372	19,727	313,800	5,355	1.7
Food	311	5,239	249	449	5,439	200	3.8
Beverage and tobacco products	312	1,177 i	56	115	1,235 i	59 i	5.0
Textile, apparel, and leather products	313-16	822	15	43	849	27	3.3
Wood products	321	187	3	10	193	7	3.5
Paper	322	928	6	94	1,016 i	88 i	9.5
Printing and related support activities	323	283	17 i	66	333 i	50 i	17.5
Petroleum and coal products	324	1,311 - 1,324	56 - 78	115	1,348 - 1,376	36 - 52	D
Chemicals	325	101,079	4,674	5,311	101,716	637	0.6
Basic chemicals	3251	2,694	157	270	2,807	113	4.2
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,234	93	106	1,246	12	1.0
Pesticide, fertilizer, and other agricultural chemicals	3253	1,060 - 1,066	57	32 - 53	1,047 i	-18 - -12 i	D
Pharmaceuticals and medicines	3254	91,776	4,185	4,619	92,210	434	0.5
Soap, cleaning compound, and toilet preparation	3256	2,665	102	194	2,757	92 i	3.5
Paint, coating, adhesive, and other chemicals	3255, 3259	1,643 - 1,649	80	72 - 93	1,648	0 - 6	D
Plastics and rubber products	326	2,634	83	310	2,861	227	8.6
Nonmetallic mineral products	327	1,717 i	78 i	166 i	1,806 i	89	5.2
Primary metals	331	815	21	96	890	75	9.2
Fabricated metal products	332	3,396	85	278	3,590	193	5.7
Machinery	333	16,223	678	1,298	16,843	620	3.8
Agricultural implement	33311	1,769 - 1,811	40 - 54	152	1,877 - 1,923	105 - 112	D
Semiconductor machinery	333242	4,807	367	400	4,839	32	0.7
Engine, turbine, and power transmission equipment	3336	1,645	59	109	1,695 i	49	3.0
Other machinery	other 333	7,959 - 8,001	199 - 213	638	8,386 - 8,434	426 - 435	D
Computer and electronic products	334	99,535	6,133	7,578	100,980	1,445 i	1.5
Communications equipment	3342	12,103	516	742	12,329	226 i	1.9
Semiconductor and other electronic components	3344	43,181	3,079	3,850	43,952 i	771 i	1.8
Navigational, measuring, electromedical, and control instruments	3345	18,505	551	1,046 i	18,999	494 i	2.7
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,858	82	211 i	2,987	129 i	4.5
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,586	231	638 i	10,993 i	407 i	3.8
Other measuring and controlling device	other 3345	5,061	239	197	5,019	-42	-0.8
Other computer and electronic products	other 334	25,747	1,986	1,940	25,700	-46	-0.2
Electrical equipment, appliances, and components	335	4,998	150	638	5,485	487	9.7



TABLE 75

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others	Depreciation		Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
							Amount	Percent
Transportation equipment	336	48,796	1,286		1,924	49,434	638	1.3
Motor vehicles, bodies, trailers, and parts	3361-63	23,121	996		1,418	23,542	421	1.8
Aerospace products and parts	3364	22,914	232	i	403	23,086	171	0.7
Aircraft, aircraft engine, and aircraft parts	336411-13	21,291	199	i	318	21,410	119	0.6
Guided missile, space vehicle, and related parts	336414-15, 336419	1,623	33		85	1,675	52	3.2
Military armored vehicle, tank, and tank component	336992	11	0		1	12	1	6.6
Other transportation	other 336	2,750	57	i	102	2,795	45	i 1.6
Furniture and related products	337	496	9		35	521	25	5.1
Miscellaneous	339	18,791 - 18,809	755 - 776		1,201	19,234 - 19,255	443 - 447	D
Medical equipment and supplies	3391	16,116	700		1,020	16,437	320	2.0
Other miscellaneous manufacturing	3399	2,674 - 2,692	55 - 77		182	2,798 - 2,818	123 - 127	D
Nonmanufacturing industries	21-23, 42-81	229,174	6,600		12,767	235,341	6,167	2.7
Mining, quarrying, oil and gas extraction, and support activities	21	1,165	16		110	1,260	95	8.1
Utilities	22	264	10		362	617	353	133.4
Wholesale trade	42	1,058	18		181	1,222	164	i 15.5
Electronic shopping and electronic auctions	454111-12	3,840 - 19,390	0 - 775	i	3 - 1,643	3,853 - 19,403	5 - 15	D
Transportation and warehousing	48-49	4,957	0 - 210	i	220 - 311	5,120	163	i 3.3
Information	51	129,463	3,670		5,301	131,094	1,631	1.3
Publishing	511	35,025	438		1,091	35,678	653	1.9
Newspaper, periodical, book, and directory publishers	5111	60	*		6	67	6	i 10.2
Software publishers	5112	34,965	438		1,085	35,612	647	1.9
Telecommunications	517	3,425 - 3,437	13 - 20		205	3,612 - 3,629	187 - 193	i D
Data processing, hosting, and related services	518	41,551	843		2,130	42,839	1,288	3.1
Other information	other 51	49,449 - 49,463	2,370 - 2,377		1,874	48,946 - 48,966	-504 - -496	D
Finance and insurance	52	12,296	300		1,969	13,965	1,669	i 13.6
Real estate and rental and leasing	53	3,249	43		35	3,241	-8	-0.3
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	*		2	9	2	i 27.8
Other real estate and rental and leasing	other 53	3,242	43		33	3,232	-10	-0.3
Professional, scientific, and technical services	54	54,367	1,743		2,838	55,463	1,096	i 2.0
Architectural, engineering, and related services	5413	4,214	24		135	4,325	111	2.6
Computer systems design and related services	5415	17,935	626		1,148	18,457	522	2.9
Scientific research and development services	5417	25,600	1,018	i	1,063	25,644	44	i 0.2

TABLE 75

**Domestic R&D paid for by the company and others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by the company and others		Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change		
										Amount	Percent	
Research and development in nanotechnology	541713	179	i	7	i	14	i	186	i	7	i	3.8
Research and development in biotechnology (except nanobiotechnology)	541714	6,191		150		328		6,369		178		2.9
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	18,539	i	851	i	712	i	18,400	i	-139	i	-0.8
Research and development in the social sciences and humanities	541720	691		10		9		690		-1		-0.2
Other professional, scientific, and technical services	other 54	6,618		74		493	i	7,037		419	i	6.3
Health care services	621-23	1,477		29		83	i	1,530		54	i	3.6
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,491 - 17,041		0 - 775	i	29 - 1,669		2,430 - 17,980		939 - 944		D
All companies (number of domestic employees)	-	537,619		20,972		32,494		549,141		11,522		2.1
Small companies												
10-19 <sup>a</sup>	-	5,047		121		452		5,379		331		6.6
20-49	-	12,994		231		1,025		13,788		794		6.1
Medium companies												
50-99	-	12,993		286		1,152		13,859		866		6.7
100-249	-	25,411		513		1,593		26,491		1,080		4.2
Large companies												
250-499	-	20,878		728		1,295		21,445		567		2.7
500-999	-	21,264		819		1,559		22,004		740		3.5
1,000-4,999	-	88,238		2,996		6,406		91,648		3,410		3.9
5,000-9,999	-	48,397		2,246		2,803		48,953		557		1.2
10,000-24,999	-	88,567		4,534		6,249		90,282	i	1,715	i	1.9
25,000 or more	-	213,829		8,498		9,960		215,291		1,462		0.7

\* = 0 < 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 = 2017 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development (BERD) Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BERD statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 76

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change	
									Amount	Percent
All industries	21-23, 31-33, 42-81	296,677	11,348		23,923	309,252	12,574	4.2		
Manufacturing industries	31-33	195,792	8,268		14,782	202,305	6,513	3.3		
Food	311	4,644	207	i	371	4,808	164	3.5		
Beverage and tobacco products	312	885	37		73	921	36	4.1		
Textile, apparel, and leather products	313-16	715	17		43	741	26	3.6		
Wood products	321	188	2		19	205	17	9.3		
Paper	322	763	8	i	174	929	166	21.8		
Printing and related support activities	323	189	9	i	61	242	53	28.0		
Petroleum and coal products	324	200	7		44	237	37	18.7		
Chemicals	325	58,769	2,646		3,997	60,120	1,352	2.3		
Basic chemicals	3251	2,574	206		422	2,790	216	8.4		
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,172	77		147	1,242	70	6.0		
Pesticide, fertilizer, and other agricultural chemicals	3253	2,157	210		200	2,148	-9	-0.4		
Pharmaceuticals and medicines	3254	50,242	2,050		2,965	51,157	915	1.8		
Soap, cleaning compound, and toilet preparation	3256	1,283	54		212	1,441	158	12.3		
Paint, coating, adhesive, and other chemicals	3255, 3259	1,339	49		52	1,342	3	0.2		
Plastics and rubber products	326	2,390	60		479	2,809	419	17.5		
Nonmetallic mineral products	327	1,239	54	i	298	1,483	245	19.8		
Primary metals	331	579	29		135	686	106	18.3		
Fabricated metal products	332	2,039	36	i	169	2,172	133	6.5		
Machinery	333	12,544	475		619	12,688	143	1.1		
Agricultural implement	33311	1,516	52		63	1,526	10	0.7		
Semiconductor machinery	333242	2,917	191		52	2,778	-139	-4.8		
Engine, turbine, and power transmission equipment	3336	2,381	105		68	2,345	-37	-1.5		
Other machinery	other 333	5,731	127		436	6,039	309	5.4		
Computer and electronic products	334	63,765	3,295		5,456	65,926	2,161	3.4		
Communications equipment	3342	17,999	1,018		1,592	18,573	575	3.2		
Semiconductor and other electronic components	3344	28,597	1,521		2,510	29,585	989	3.5		
Navigational, measuring, electromedical, and control instruments	3345	9,218	233		603	9,589	370	4.0		
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,525	73		185	2,637	112	4.5		
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	2,881	63		206	3,024	143	5.0		
Other measuring and controlling device	other 3345	3,813	98		212	3,927	114	3.0		
Other computer and electronic products	other 334	7,951	523		750	8,179	228	2.9		
Electrical equipment, appliances, and components	335	3,852	114		283	4,021	169	4.4		
Transportation equipment	336	29,224	716		1,805	30,313	1,089	3.7		
Motor vehicles, bodies, trailers, and parts	3361-63	16,636	503		1,089	17,223	586	3.5		
Aerospace products and parts	3364	11,138	178		597	11,558	419	3.8		

TABLE 76

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
								Amount	Percent
Aircraft, aircraft engine, and aircraft parts	336411-13	10,754	177		595	11,172	418	3.9	
Guided missile, space vehicle, and related parts	336414-15, 336419	385 i	1 i		2 i	386 i	1 i	0.3	
Military armored vehicle, tank, and tank component	336992	5	0		2	6	2	39.3	
Other transportation	other 336	1,445	36		117	1,526	82 i	5.6	
Furniture and related products	337	443	8		52	487 i	44	10.0	
Miscellaneous	339	13,365	549		701	13,517	152	1.1	
Medical equipment and supplies	3391	11,211	485		606	11,332	121	1.1	
Other miscellaneous manufacturing	3399	2,154 i	65 i		96 i	2,185 i	31 i	1.4	
Nonmanufacturing industries	21-23, 42-81	100,885	3,080		9,141	106,947	6,061	6.0	
Mining, quarrying, oil and gas extraction, and support activities	21	3,393	97		1,298 i	4,594	1,201 i	35.4	
Utilities	22	446	142		519 i	822 i	377 i	84.5	
Wholesale trade	42	1,684 i	78 i		375 i	1,982 i	298 i	17.7	
Electronic shopping and electronic auctions	454111-12	1,517 i	187 i		156 i	1,486 i	-31 i	-2.0	
Transportation and warehousing	48-49	403	10		144 i	538 i	135 i	33.4	
Information	51	64,578	1,808		3,325	66,095	1,517	2.3	
Publishing	511	32,598	739		1,433	33,292	694	2.1	
Newspaper, periodical, book, and directory publishers	5111	98 i	6 i		25 i	117 i	19 i	19.2	
Software publishers	5112	32,500	732		1,408	33,175	675	2.1	
Telecommunications	517	3,537	33 i		485 i	3,989 i	452 i	12.8	
Data processing, hosting, and related services	518	9,314	221		769	9,862	547	5.9	
Other information	other 51	19,129	815		639	18,952	-176	-0.9	
Finance and insurance	52	5,329	47		536	5,817 i	488	9.2	
Real estate and rental and leasing	53	301	7		42 i	336 i	35 i	11.8	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	68	1		2 i	69	1	0.8	
Other real estate and rental and leasing	other 53	232	6		40 i	267 i	35 i	15.0	
Professional, scientific, and technical services	54	21,915	682		2,368	23,601	1,686	7.7	
Architectural, engineering, and related services	5413	2,247 i	28 i		52	2,272 i	24 i	1.1	
Computer systems design and related services	5415	12,418	409		1,472	13,481	1,063	8.6	
Scientific research and development services	5417	3,896	114		569	4,351 i	455 i	11.7	
Research and development in biotechnology	541711	1,536 i	46		271 i	1,762 i	225 i	14.7	
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	2,348	68		290	2,570	222	9.5	
Research and development in the social sciences and humanities	541720	12 i	* i		8	19 i	8	65.7	
Other professional, scientific, and technical services	other 54	3,354	131 i		275	3,498 i	144	4.3	
Health care services	621-23	460	12 i		132 i	580 i	119 i	25.9	

TABLE 76

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change			
									Amount	Percent		
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	861	10		246	i	1,096	i	236	i	27.4	
All companies (number of domestic employees)	–	296,677	11,348		23,923		309,252		12,574		4.2	
Micro companies <sup>a</sup>												
5–9	–	1,972	i	58	i	208	i	2,122	i	150	i	7.6
Small companies												
10–19	–	4,434	i	132	i	883	i	5,185	i	751	i	16.9
20–49	–	7,933	i	232	i	563	i	8,265	i	331	i	4.2
Medium companies												
50–99	–	8,803		231	i	683		9,255	i	452	i	5.1
100–249	–	11,037		288		1,004	i	11,753		716	i	6.5
Large companies												
250–499	–	11,368		375		1,321	i	12,314		946	i	8.3
500–999	–	13,194		468		1,300		14,027		832	i	6.3
1,000–4,999	–	48,264		1,852		4,038		50,450		2,186		4.5
5,000–9,999	–	34,660		1,472		3,146		36,333		1,673		4.8
10,000–24,999	–	48,450		2,224		3,575		49,801		1,351		2.8
25,000 or more	–	106,562		4,015		7,201		109,748		3,186		3.0

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

NAICS = 2012 North American Industry Classification System.

<sup>a</sup> The Business R&D and Innovation Survey (BRDIS) did not include companies with fewer than 5 domestic employees.**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. To enable comparisons between U.S. BRDIS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BRDIS domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BRDIS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business R&amp;D and Innovation Survey, 2015.

TABLE 77

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	317,731	12,520	24,481	329,692	11,961	3.8
Manufacturing industries	31-33	211,660	9,337	15,047	217,370	5,710	2.7
Food	311	4,611	218	312	4,705	94	2.0
Beverage and tobacco products	312	987	46	112	1,054	66	6.7
Textile, apparel, and leather products	313-16	1,156	23	67	1,200	44	3.8
Wood products	321	181	2	32	211	30	16.6
Paper	322	851	7	67	911	60	7.1
Printing and related support activities	323	219	10	69	279	60	27.3
Petroleum and coal products	324	367	34	58	391	24	6.5
Chemicals	325	64,165	3,371	4,179	64,972	808	1.3
Basic chemicals	3251	2,284	133	214	2,364	81	3.5
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	693	35	88	746	52	7.6
Pesticide, fertilizer, and other agricultural chemicals	3253	1,061	134	101	1,028	-33	-3.2
Pharmaceuticals and medicines	3254	55,983	2,927	3,400	56,456	473	0.8
Soap, cleaning compound, and toilet preparation	3256	2,660	91	284	2,853	194	7.3
Paint, coating, adhesive, and other chemicals	3255, 3259	1,484	51	92	1,525	41	2.8
Plastics and rubber products	326	3,584	189	451	3,845	261	7.3
Nonmetallic mineral products	327	1,274	76	242	1,441	166	13.1
Primary metals	331	583	19	57	621	38	6.6
Fabricated metal products	332	2,127	38	130	2,219	92	4.3
Machinery	333	11,699	506	1,126	12,319	620	5.3
Agricultural implement	33311	1,552	45	64	1,571	19	1.2
Semiconductor machinery	333242	3,028	227	287	3,088	60	2.0
Engine, turbine, and power transmission equipment	3336	1,901	91	109	1,919	18	1.0
Other machinery	other 333	5,218	143	665	5,741	522	10.0
Computer and electronic products	334	68,515	3,507	5,024	70,032	1,517	2.2
Communications equipment	3342	11,293	522	477	11,248	-45	-0.4
Semiconductor and other electronic components	3344	29,176	1,605	2,567	30,138	962	3.3
Navigational, measuring, electromedical, and control instruments	3345	10,131	262	573	10,443	312	3.1
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,466	78	141	2,529	63	2.5
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,121	70	221	3,271	151	4.8
Other measuring and controlling device	other 3345	4,544	114	212	4,642	98	2.2
Other computer and electronic products	other 334	17,914	1,118	1,407	18,203	289	1.6
Electrical equipment, appliances, and components	335	4,302	114	160	4,348	46	1.1
Transportation equipment	336	32,905	702	2,181	34,383	1,479	4.5
Motor vehicles, bodies, trailers, and parts	3361-63	19,293	525	1,184	19,952	659	3.4

TABLE 77

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
							Amount	Percent
Aerospace products and parts	3364	12,272	151	871		12,992	721	5.9
Aircraft, aircraft engine, and aircraft parts	336411-13	11,930	150	853		12,634	704	5.9
Guided missile, space vehicle, and related parts	336414-15, 336419	342	1	18	i	358	17	4.9
Military armored vehicle, tank, and tank component	336992	3	0	*		3	*	6.6
Other transportation	other 336	1,337	26	125		1,436	99	7.4
Furniture and related products	337	366	3	52	i	415	49	13.4
Miscellaneous	339	13,768	471	726		14,024	256	1.9
Medical equipment and supplies	3391	11,474	434	611		11,651	177	1.5
Other miscellaneous manufacturing	3399	2,294	i 36	i 115	i	2,373	i 79	3.4
Nonmanufacturing industries	21-23, 42-81	106,071	3,183	9,434	i	112,322	6,251	5.9
Mining, quarrying, oil and gas extraction, and support activities	21	2,897	97	421		3,220	323	11.2
Utilities	22	325	68	D		D	D	D
Wholesale trade	42	442	i 4	i 2,682	i	3,120	i 2,678	i 605.4
Electronic shopping and electronic auctions	454111-12	1,569	i 182	i 136	i	1,523	i -46	i -2.9
Transportation and warehousing	48-49	486	0	112	i	597	i 112	i 23.0
Information	51	70,075	1,967	3,313		71,420	1,346	1.9
Publishing	511	33,174	611	1,352		33,916	742	2.2
Newspaper, periodical, book, and directory publishers	5111	77	i 7	i 21	i	90	i 14	i 18.0
Software publishers	5112	33,098	603	1,331		33,825	728	2.2
Telecommunications	517	3,530	i 26	i 584	i	4,088	i 558	i 15.8
Data processing, hosting, and related services	518	11,776	279	871		12,368	592	5.0
Other information	other 51	21,594	1,051	506	i	21,049	-545	-2.5
Finance and insurance	52	7,237	94	514	i	7,657	i 420	i 5.8
Real estate and rental and leasing	53	475	9	D		D	D	D
Lessors of nonfinancial intangible assets (except copyrighted works)	533	27	0	D		D	D	D
Other real estate and rental and leasing	other 53	449	9	56	i	495	i 47	i 10.5
Professional, scientific, and technical services	54	20,845	721	1,637	i	21,761	i 916	i 4.4
Architectural, engineering, and related services	5413	1,816	19	46	i	1,844	i 28	i 1.5
Computer systems design and related services	5415	13,255	570	929		13,613	i 358	i 2.7
Scientific research and development services	5417	2,811	84	375		3,102	i 291	i 10.4
Research and development in biotechnology	541711	750	i 24	i D		D	D	D
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	2,029	58	283	i	2,254	225	11.1
Research and development in the social sciences and humanities	541720	32	3	D		D	D	D
Other professional, scientific, and technical services	other 54	2,962	47	287	i	3,202	i 239	i 8.1
Health care services	621-23	782	33	68		817	i 35	4.5



TABLE 77

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company		Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change		
		Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55– 56, 624, 71–72, 81	939	i	8	i	161	i	1,093	i	154	i	16.4
All companies (number of domestic employees)	–	317,731		12,520		24,481	i	329,692		11,961	i	3.8
Micro companies <sup>a</sup>												
5–9	–	1,044	i	31	i	132	i	1,146	i	101	i	9.7
Small companies												
10–19	–	3,887	i	81	i	643	i	4,449	i	562	i	14.5
20–49	–	7,473	i	172	i	537	i	7,837	i	364	i	4.9
Medium companies												
50–99	–	7,728		216		1,033	i	8,545	i	818	i	10.6
100–249	–	11,722		315		1,737	i	13,143		1,421	i	12.1
Large companies												
250–499	–	11,438		301		1,959	i	13,096		1,658	i	14.5
500–999	–	13,525		450		1,079		14,155		629		4.7
1,000–4,999	–	53,305		2,187		4,433		55,550		2,246		4.2
5,000–9,999	–	35,887		1,241		2,500		37,147	i	1,260		3.5
10,000–24,999	–	53,384		2,948		4,322	i	54,758	i	1,374	i	2.6
25,000 or more	–	118,339		4,578		6,106		119,867		1,528		1.3

\* = 0 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business R&D and Innovation Survey (BRDIS) did not include companies with fewer than 5 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. To enable comparisons between U.S. BRDIS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BRDIS domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BRDIS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business R&D and Innovation Survey, 2016.

TABLE 78

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	339,036	13,495	25,882	351,423	12,388	3.7
Manufacturing industries	31-33	216,155	9,760	15,158	221,552	5,398	2.5
Food	311	4,453	206	578	4,824	371	8.3
Beverage and tobacco products	312	968	48	133	1,053	84	8.7
Textile, apparel, and leather products	313-16	919	18	108 - 250	1,010 - 1,151	91 - 232	D
Wood products	321	170	2	11	179	9	5.2
Paper	322	1,292	39	120	1,373	81	6.3
Printing and related support activities	323	218	10	21	229	11	5.1
Petroleum and coal products	324	301	6 - 13	70 - 219	357 - 510	57 - 208	D
Chemicals	325	63,285	3,126	5,082	65,242	1,957	3.1
Basic chemicals	3251	2,393	143	221	2,471	78	3.3
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	612	25	71	657	45	7.4
Pesticide, fertilizer, and other agricultural chemicals	3253	1,092	136 - 162	201	1,150 - 1,158	58 - 66	D
Pharmaceuticals and medicines	3254	55,229	2,671	4,353	56,911	1,682	3.0
Soap, cleaning compound, and toilet preparation	3256	2,488	81	143	2,549	62	2.5
Paint, coating, adhesive, and other chemicals	3255, 3259	1,471	43 - 68	95	1,498 - 1,501	26 - 30	D
Plastics and rubber products	326	3,637	197	305	3,746	109	3.0
Nonmetallic mineral products	327	1,303	103	70	1,270	-33	-2.5
Primary metals	331	741	37	36 - 82	740 - 785	0 - 45	D
Fabricated metal products	332	2,099	32	188	2,255	156	7.4
Machinery	333	12,257	490	675 - 846	12,442 - 12,613	185 - 356	D
Agricultural implement	33311	1,511	36	49 - 187	1,524 - 1,662	13 - 151	D
Semiconductor machinery	333242	3,228	255	290 - 339	3,263 - 3,312	35 - 84	D
Engine, turbine, and power transmission equipment	3336	1,921	79	90	1,931	11	0.5
Other machinery	other 333	5,596	120	246 - 389	5,722 - 5,865	126 - 269	D
Computer and electronic products	334	69,942	4,044	4,622	70,520	578	0.8
Communications equipment	3342	10,972	545	755	11,183	211	1.9
Semiconductor and other electronic components	3344	27,859	1,839	2,273	28,293	434	1.6
Navigational, measuring, electromedical, and control instruments	3345	10,089	230	565	10,424	335	3.3
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,545	66	115	2,594	49	1.9
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,214	71	302	3,445	231	7.2
Other measuring and controlling device	other 3345	4,329	92	147	4,384	55	1.3

TABLE 78

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Other computer and electronic products	other 334	21,022	1,430	1,028	20,621	-402	-1.9
Electrical equipment, appliances, and components	335	4,110	98	194	4,206	96	2.3
Transportation equipment	336	34,629	727	1,781	35,682	1,054	3.0
Motor vehicles, bodies, trailers, and parts	3361-63	21,137	557	1,186	21,766	629	3.0
Aerospace products and parts	3364	11,903	110 - 171	486	12,197 - 12,279	294 - 376	D
Aircraft, aircraft engine, and aircraft parts	336411-13	11,473	108 - 171	483	11,764 - 11,848	292 - 375	D
Guided missile, space vehicle, and related parts	336414-15, 336419	430	0 - 3	3	430 - 433	0 - 3	D
Military armored vehicle, tank, and tank component	336992	4	0 - 1	*	3 - 6	0 - 1	D
Other transportation	other 336	1,585	0 - 59	108	1,634 - 1,714	49 - 129	D
Furniture and related products	337	419	4	37 - 49	452 - 464	33 - 45	D
Miscellaneous	339	15,410	560 - 568	960	15,801 - 15,805	391 - 395	D
Medical equipment and supplies	3391	13,348	533	819	13,635	287	2.1
Other miscellaneous manufacturing	3399	2,062	28 - 36	140	2,166 - 2,170	104 - 108	D
Nonmanufacturing industries	21-23, 42-81	122,881	3,734	10,724	129,871	6,990	5.7
Mining, quarrying, oil and gas extraction, and support activities	21	2,841	91	403 - 410	3,153 - 3,160	312 - 319	D
Utilities	22	281	56	444	669	388	138.1
Wholesale trade	42	503	5	32 - 46	529 - 544	26 - 41	D
Electronic shopping and electronic auctions	454111-12	9,318	544	213	8,987	-331	-3.5
Transportation and warehousing	48-49	1,116	31	291	1,376	260	23.3
Information	51	78,898	2,200	5,135	81,832	2,934	3.7
Publishing	511	33,276	564	1,209	33,921	645	1.9
Newspaper, periodical, book, and directory publishers	5111	74	5	5	74	*	-0.4
Software publishers	5112	33,201	558	1,204	33,847	646	1.9
Telecommunications	517	3,643	14	595 - 989	4,224 - 4,617	581 - 975	D
Data processing, hosting, and related services	518	16,037	281	1,332 - 1,557	17,089 - 17,313	1,052 - 1,276	D
Other information	other 51	25,943	1,342	1,604 - 1,775	26,205 - 26,374	261 - 431	D
Finance and insurance	52	7,565	156	1,182	8,591	1,026	13.6
Real estate and rental and leasing	53	708	24	35	719	11	1.6
Lessors of nonfinancial intangible assets (except copyrighted works)	533	138	*	1	139	1	0.7
Other real estate and rental and leasing	other 53	570	24	34	580	10	1.8
Professional, scientific, and technical services	54	18,972	584	2,662	21,050	2,078	11.0
Architectural, engineering, and related services	5413	1,561	9	62	1,614	53	3.4

TABLE 78

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
								Amount	Percent
Computer systems design and related services	5415	11,669	443		1,683		12,909	1,240	10.6
Scientific research and development services	5417	2,817	105		665		3,377	560	19.9
Research and development in biotechnology	541711	795	27		238 - 244		1,007 - 1,012	211 - 217	D
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	1,936	78		417		2,275	339	17.5
Research and development in the social sciences and humanities	541720	86	*		5 - 9		90 - 95	4 - 9	D
Other professional, scientific, and technical services	other 54	2,925	27		252		3,150 i	225	7.7
Health care services	621-23	958 i	28 i		147 - 175 i		1,077 - 1,104 i	119 - 147 i	D
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,722	14		155 i		1,863 i	141 i	8.2
All companies (number of domestic employees)	-	339,036	13,495		25,882		351,423	12,388	3.7
Small companies									
10-19 <sup>a</sup>	-	2,402	39		313		2,677	274 i	11.4
20-49	-	7,593	191		847		8,249	656	8.6
Medium companies									
50-99	-	8,070	171		845		8,744	674	8.4
100-249	-	13,514	340		1,672		14,845	1,332	9.9
Large companies									
250-499	-	11,773	272		924		12,424	651	5.5
500-999	-	16,295	484		1,645		17,455	1,160	7.1
1,000-4,999	-	52,341	1,950		4,385		54,776	2,435	4.7
5,000-9,999	-	32,701	1,352		2,741		34,091	1,390	4.2
10,000-24,999	-	63,415	3,250		5,127		65,292 i	1,877 i	3.0
25,000 or more	-	130,931	5,445		7,384		132,870	1,939	1.5

\* = -\$500,000 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business Research and Development Survey (BRDS) did not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BRDS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was included in U.S. BRDS domestic R&D, and adding capital expenditures relating to R&D operations, which was excluded from U.S. BRDS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Research and Development Survey, 2017.

TABLE 79

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	377,806	14,772	28,707	391,741	13,936	3.7
Manufacturing industries	31-33	234,682	10,359	18,065	242,388	7,706	3.3
Food	311	4,412	201	417	4,628	217	4.9
Beverage and tobacco products	312	1,004	47	80	1,037	33	3.3
Textile, apparel, and leather products	313-16	986	15	80	1,050	65	6.5
Wood products	321	199	3	9	206	6	3.1
Paper	322	932	6	60	985	54	5.8
Printing and related support activities	323	238	13	19	244	6	2.6
Petroleum and coal products	324	1,246	35	221	1,432	186	14.9
Chemicals	325	73,584	3,399	5,230	75,415	1,831	2.5
Basic chemicals	3251	2,251	131	227	2,346	95	4.2
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,568	94 - 112	194 - 215	1,651 - 1,692	83 - 124	D
Pesticide, fertilizer, and other agricultural chemicals	3253	1,135	94	44 - 68	1,085 - 1,108	-50 - -26	D
Pharmaceuticals and medicines	3254	64,800	2,933	4,430	66,297	1,497	2.3
Soap, cleaning compound, and toilet preparation	3256	2,573	84 - 104	202	2,670 - 2,688	97 - 115	D
Paint, coating, adhesive, and other chemicals	3255, 3259	1,257	43	110	1,324	67	5.3
Plastics and rubber products	326	2,667	79	330	2,918	251	9.4
Nonmetallic mineral products	327	1,361	73	137	1,425	64	4.7
Primary metals	331	817	43	110	884	67	8.2
Fabricated metal products	332	2,222	28	208	2,402	180	8.1
Machinery	333	13,765	588	1,069	14,247	482	3.5
Agricultural implement	33311	1,862	41	72	1,893	31	1.7
Semiconductor machinery	333242	3,623	274	484	3,833	210	5.8
Engine, turbine, and power transmission equipment	3336	2,310	95	138	2,353	43	1.9
Other machinery	other 333	5,970	178	376	6,168	198	3.3
Computer and electronic products	334	73,922	4,363	6,404	75,963	2,041	2.8
Communications equipment	3342	11,822	592	873	12,103	281	2.4
Semiconductor and other electronic components	3344	28,642	2,306	2,686	29,023	380	1.3
Navigational, measuring, electromedical, and control instruments	3345	10,864	228	714	11,349	485	4.5
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,046	71	150	3,125	80	2.6
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,388	69	346	3,665	277	8.2
Other measuring and controlling device	other 3345	4,430	89	218	4,559	129	2.9
Other computer and electronic products	other 334	22,594	1,238	2,132	23,488	894	4.0
Electrical equipment, appliances, and components	335	4,222	101	354	4,474	253	6.0
Transportation equipment	336	35,894	808	2,184	37,270	1,376	3.8
Motor vehicles, bodies, trailers, and parts	3361-63	23,080	682	1,570	23,968	888	3.8

TABLE 79

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	11,160	103	461	11,518	359	3.2
Aircraft, aircraft engine, and aircraft parts	336411-13	10,746	102	343	10,987	241 i	2.2
Guided missile, space vehicle, and related parts	336414-15, 336419	414	*	118	532	118	28.5
Military armored vehicle, tank, and tank component	336992	6	* i	*	6	*	1.4
Other transportation	other 336	1,649	23	153	1,779	130 i	7.9
Furniture and related products	337	404	3	73	475	71	17.4
Miscellaneous	339	16,807	554	1,080	17,332	526	3.1
Medical equipment and supplies	3391	14,267	521	702	14,448	181	1.3
Other miscellaneous manufacturing	3399	2,540	33	378 i	2,885 i	345 i	13.6
Nonmanufacturing industries	21-23, 42-81	143,123	4,413	10,642	149,353	6,229	4.4
Mining, quarrying, oil and gas extraction, and support activities	21	1,775	0 - 52	351	2,074 - 2,078	299 - 303	D
Utilities	22	224	5	280 i	500 i	276 i	123.0
Wholesale trade	42	881 i	0 - 4 i	40 i	916 - 920 i	35 - 39 i	D
Electronic shopping and electronic auctions	454111-12	11,557 i	199 - 645	233 i	10,878 - 11,470 i	-679 - -87 i	D
Transportation and warehousing	48-49	935	17 - 26	211 i	1,120 - 1,123	185 - 188 i	D
Information	51	93,487	2,706	5,110	95,891	2,404	2.6
Publishing	511	32,281	434	1,425	33,272	991	3.1
Newspaper, periodical, book, and directory publishers	5111	131	14 i	19 i	135 i	5 i	3.5
Software publishers	5112	32,150	420	1,406	33,136	986	3.1
Telecommunications	517	3,631	22 - 30	333 i	3,934 - 3,939 i	303 - 308 i	D
Data processing, hosting, and related services	518	23,115	451	1,503	24,168	1,052	4.6
Other information	other 51	34,459	1,790 - 1,798	1,848	34,511 - 34,518	52 - 58	D
Finance and insurance	52	7,426	290	1,865 i	9,001 i	1,575 i	21.2
Real estate and rental and leasing	53	1,022	44	55	1,033	11	1.1
Lessors of nonfinancial intangible assets (except copyrighted works)	533	6	0	*	6	*	0.5
Other real estate and rental and leasing	other 53	1,016	44	55	1,027	11	1.1
Professional, scientific, and technical services	54	22,374	601 - 691	2,045	23,772 - 23,818	1,398 - 1,444	D
Architectural, engineering, and related services	5413	2,277	0 - 65	110	2,348 - 2,396	71 - 120	D
Computer systems design and related services	5415	13,633	483	1,008	14,158	525	3.9
Scientific research and development services	5417	2,424	82	557	2,899	475	19.6
Research and development in biotechnology	541711	820	30	196 - 201	987 - 991	167 - 171	D

TABLE 79

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
								Amount	Percent
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	1,577	52		351		1,876	299	19.0
Research and development in the social sciences and humanities	541720	27	*		6 - 9		33 - 35	6 - 9	D
Other professional, scientific, and technical services	other 54	4,041	0 - 61	i	369		4,350 - 4,369	309 - 328	D
Health care services	621-23	1,401	26 - 48	i	171	i	1,524 - 1,527	123 - 126	i D
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	2,041	0 - 348		280		2,040 - 2,635	0 - 594	D
All companies (number of domestic employees)	-	377,806	14,772		28,707		391,741	13,936	3.7
Small companies									
10-19 <sup>a</sup>	-	3,340	46		348		3,642	302	9.0
20-49	-	9,556	145		1,036		10,448	891	9.3
Medium companies									
50-99	-	10,446	187		1,030		11,289	843	8.1
100-249	-	14,626	365		1,266		15,527	900	6.2
Large companies									
250-499	-	16,604	391		1,729		17,942	1,338	8.1
500-999	-	15,561	404		1,256		16,413	852	5.5
1,000-4,999	-	58,509	1,949		5,263		61,824	3,315	5.7
5,000-9,999	-	36,274	1,503		3,462		38,233	1,959	5.4
10,000-24,999	-	74,423	4,000		5,679		76,102	1,679	2.3
25,000 or more	-	138,465	5,781		7,638		140,322	1,857	1.3

\* = 0 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business Research and Development Survey (BRDS) did not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BRDS statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BRDS domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BRDS domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Research and Development Survey, 2018.



TABLE 80

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others	Change	
							Amount	Percent
All industries	21-23, 31-33, 42-81	428,968	17,058	29,106		441,016	12,048	2.8
Manufacturing industries	31-33	248,109	11,368	17,674		254,415	6,306	2.5
Food	311	3,937	169	432		4,200	263	6.7
Beverage and tobacco products	312	971	43	160		1,088	117	12.1
Textile, apparel, and leather products	313-16	873	14	85		945	72	8.2
Wood products	321	180	2	7		185	5	2.8
Paper	322	1,064	8	65	i	1,120	57	5.3
Printing and related support activities	323	420	5	11	i	425	6	1.3
Petroleum and coal products	324	1,203	41	125		1,287	84	7.0
Chemicals	325	87,288	3,475	5,634		89,448	2,160	2.5
Basic chemicals	3251	2,198	152	358		2,404	207	9.4
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,092	62	225		1,255	163	15.0
Pesticide, fertilizer, and other agricultural chemicals	3253	1,501	105	57		1,453	-48	-3.2
Pharmaceuticals and medicines	3254	78,652	3,028	4,476		80,100	1,448	1.8
Soap, cleaning compound, and toilet preparation	3256	2,596	86	170		2,681	85	3.3
Paint, coating, adhesive, and other chemicals	3255, 3259	1,249	43	347	i	1,554	305	24.4
Plastics and rubber products	326	2,770	83	393		3,080	310	11.2
Nonmetallic mineral products	327	1,473	59	69	i	1,483	10	0.7
Primary metals	331	649	27	89		711	62	9.6
Fabricated metal products	332	2,632	40	204		2,796	165	6.3
Machinery	333	13,930	556	953		14,327	397	2.9
Agricultural implement	33311	1,913	35	58		1,935	23	1.2
Semiconductor machinery	333242	3,854	308	419		3,965	111	2.9
Engine, turbine, and power transmission equipment	3336	1,096	46	85		1,134	39	3.5
Other machinery	other 333	7,067	166	391		7,292	226	3.2
Computer and electronic products	334	75,570	5,066	5,765		76,269	699	0.9
Communications equipment	3342	11,495	556	780		11,719	224	1.9
Semiconductor and other electronic components	3344	31,975	2,613	2,698	i	32,060	85	0.3
Navigational, measuring, electromedical, and control instruments	3345	10,912	229	899		11,582	670	6.1
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	3,117	68	222	i	3,271	154	5.0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,400	68	448	i	3,780	380	11.2
Other measuring and controlling device	other 3345	4,395	93	228		4,530	135	3.1
Other computer and electronic products	other 334	21,188	1,668	1,388		20,908	-280	-1.3
Electrical equipment, appliances, and components	335	4,886	118	477		5,245	359	7.3
Transportation equipment	336	31,505	990	2,066		32,581	1,076	3.4
Motor vehicles, bodies, trailers, and parts	3361-63	20,883	861	1,454		21,477	593	2.8

TABLE 80

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	8,900	107	486 - 495	9,281 - 9,287	382 - 387	D
Aircraft, aircraft engine, and aircraft parts	336411-13	8,341	100	438	8,679	338	4.0
Guided missile, space vehicle, and related parts	336414-15, 336419	559	7	48 - 57	603 - 608	44 - 48	D
Military armored vehicle, tank, and tank component	336992	25	0	1	25	1	2.1
Other transportation	other 336	1,697	23	117 - 127	1,790 - 1,799	93 - 101	D
Furniture and related products	337	407	8	48	447	40	9.9
Miscellaneous	339	18,352	664	1,089	18,777	425	2.3
Medical equipment and supplies	3391	15,812	620	954	16,146	334	2.1
Other miscellaneous manufacturing	3399	2,540	44	135	2,631	91	3.6
Nonmanufacturing industries	21-23, 42-81	180,858	5,690	11,432	186,601	5,743	3.2
Mining, quarrying, oil and gas extraction, and support activities	21	2,535	86	441	2,889	355	14.0
Utilities	22	237	0 - 96	210	351 - 456	113 - 220	D
Wholesale trade	42	1,104	16	66 - 155	1,153 - 1,244	49 - 140	D
Electronic shopping and electronic auctions	454111-12	3,088 - 15,775	0 - 793	77 - 89	1,828 - 15,719	-1260 - -55	D
Transportation and warehousing	48-49	9,504	71	495	9,928	424	4.5
Information	51	109,062	3,075	5,270	111,257	2,195	2.0
Publishing	511	32,447	372	1,166	33,241	794	2.4
Newspaper, periodical, book, and directory publishers	5111	61	*	1	62	1	1.7
Software publishers	5112	32,386	371	1,165	33,180	793	2.4
Telecommunications	517	3,700	33	241	3,909	209	5.6
Data processing, hosting, and related services	518	30,154	492	2,260	31,922	1,768	5.9
Other information	other 51	42,761	2,179	1,603	42,185	-576	-1.3
Finance and insurance	52	8,890	534	1,548	9,903	1,014	11.4
Real estate and rental and leasing	53	1,371	2 - 258	5 - 78	1,380	9	0.7
Lessors of nonfinancial intangible assets (except copyrighted works)	533	45	3	*	42	-3	-6.4
Other real estate and rental and leasing	other 53	1,326	0 - 255	5 - 78	1,338	12	0.9
Professional, scientific, and technical services	54	29,131	1,081	2,371	30,421	1,290	4.4
Architectural, engineering, and related services	5413	2,288	11	153	2,430	142	6.2
Computer systems design and related services	5415	18,395	707	935	18,623	228	1.2
Scientific research and development services	5417	3,265	161	944	4,049	783	24.0
Research and development in biotechnology	541711	1,083	60	228	1,252	168	15.5

TABLE 80

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	2,155	101	707	2,761	606	28.1
Research and development in the social sciences and humanities	541720	27	*	9	36	9	33.4
Other professional, scientific, and technical services	other 54	5,182	203	340	5,319	i 137	2.6
Health care services	621-23	1,928	34	385	i 2,279	351	i 18.2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,322 - 14,012	0 - 793	480	1,322 - 15,210	i 1,202	D
All companies (number of domestic employees)	-	428,968	17,058	29,106	441,016	12,048	2.8
Small companies							
10-19 <sup>a</sup>	-	4,432	102	610	4,940	508	11.5
20-49	-	10,040	187	1,086	10,939	899	9.0
Medium companies							
50-99	-	11,492	221	958	12,229	737	6.4
100-249	-	16,520	397	1,492	17,615	1,095	6.6
Large companies							
250-499	-	15,356	336	1,502	16,522	1,167	7.6
500-999	-	21,549	662	1,612	22,499	950	4.4
1,000-4,999	-	64,475	2,191	5,382	67,665	3,190	4.9
5,000-9,999	-	44,728	1,969	3,100	45,859	1,131	2.5
10,000-24,999	-	74,385	3,673	4,606	75,318	932	i 1.3
25,000 or more	-	165,991	7,320	8,758	167,429	1,439	0.9

\* = 0 < 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 = 2012 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development (BERD) Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BERD statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2019.

TABLE 81

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation		Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
							Amount	Percent
All industries	21-23, 31-33, 42-81	466,162	18,558		32,494	480,099	13,936	3.0
Manufacturing industries	31-33	264,596	12,946		19,727	271,377	6,781	2.6
Food	311	4,985	235		449	5,199	213	4.3
Beverage and tobacco products	312	1,056	49		115	1,121	66	6.2
Textile, apparel, and leather products	313-16	812	15		43	840	28	3.4
Wood products	321	183	3		10	190	7	3.6
Paper	322	927	6		94	1,015	88	9.5
Printing and related support activities	323	282	17	i	66	331	50	17.6
Petroleum and coal products	324	1,222	57		115	1,279	58	4.7
Chemicals	325	89,403	3,928		5,311	90,787	1,383	1.5
Basic chemicals	3251	2,523	146		270	2,647	124	4.9
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,161	84		106	1,182	21	1.8
Pesticide, fertilizer, and other agricultural chemicals	3253	775	39	i	32 - 53	774 - 781	0 - 6	D
Pharmaceuticals and medicines	3254	80,858	3,492		4,619	81,986	1,128	1.4
Soap, cleaning compound, and toilet preparation	3256	2,476	87		194	2,582	106	4.3
Paint, coating, adhesive, and other chemicals	3255, 3259	1,610	80		72 - 93	1,610 - 1,617	0 - 7	D
Plastics and rubber products	326	2,607	82		310	2,836	228	8.8
Nonmetallic mineral products	327	1,619	70	i	166	1,715	96	5.9
Primary metals	331	795	21		96	870	75	9.5
Fabricated metal products	332	3,336	84		278	3,530	194	5.8
Machinery	333	15,071	615		1,298	15,754	683	4.5
Agricultural implement	33311	1,760	41		152	1,871	111	6.3
Semiconductor machinery	333242	4,121	317		400	4,204	82	2.0
Engine, turbine, and power transmission equipment	3336	1,523	57		109	1,575	52	3.4
Other machinery	other 333	7,667	200		638	8,105	438	5.7
Computer and electronic products	334	88,505	5,828		7,578	90,254	1,749	2.0
Communications equipment	3342	11,107	505		742	11,345	238	2.1
Semiconductor and other electronic components	3344	40,801	2,949		3,850	41,702	901	2.2
Navigational, measuring, electromedical, and control instruments	3345	11,012	395		1,046	11,663	651	5.9
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	2,606	76		211	2,741	135	5.2
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	3,561	86		638	4,114	553	15.5
Other measuring and controlling device	other 3345	4,844	233		197	4,807	-37	-0.8
Other computer and electronic products	other 334	25,585	1,980		1,940	25,545	-40	-0.2
Electrical equipment, appliances, and components	335	4,492	130		638	5,000	507	11.3
Transportation equipment	336	30,232	1,045		1,924	31,111	879	2.9
Motor vehicles, bodies, trailers, and parts	3361-63	19,522	867		1,418	20,073	551	2.8

TABLE 81

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company	Depreciation	Capital expenditures related to R&D	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	9,111	144	403	9,370	259	2.8
Aircraft, aircraft engine, and aircraft parts	336411-13	8,281	112	318	8,487	207	2.5
Guided missile, space vehicle, and related parts	336414-15, 336419	831	33	85	882	52	6.3
Military armored vehicle, tank, and tank component	336992	4	0	1	5	1	16.2
Other transportation	other 336	1,594	34	102	1,663	68	4.3
Furniture and related products	337	492	9	35	518	26	5.2
Miscellaneous	339	18,576	750	1,201	19,027	451	2.4
Medical equipment and supplies	3391	15,944	694	1,020	16,269	325	2.0
Other miscellaneous manufacturing	3399	2,632	56	182	2,758	126	4.8
Nonmanufacturing industries	21-23, 42-81	201,566	5,612	12,767	208,721	7,155	3.5
Mining, quarrying, oil and gas extraction, and support activities	21	1,121	15	110	1,216	95	8.5
Utilities	22	224	10	362	577	353	157.4
Wholesale trade	42	1,001	15	181	1,167	166	16.6
Electronic shopping and electronic auctions	454111-12	3,837 - 19,343	i 0 - 772	i 1,643	3 - 19,357	i 14	D
Transportation and warehousing	48-49	4,954	i 0 - 209	220 - 311	5,117	i 164	i 3.3
Information	51	128,350	3,643	5,301	130,007	1,658	1.3
Publishing	511	34,516	418	1,091	35,188	672	1.9
Newspaper, periodical, book, and directory publishers	5111	60	*	6	67	6	i 10.2
Software publishers	5112	34,456	418	1,085	35,122	666	1.9
Telecommunications	517	3,371	14	205	3,563	192	i 5.7
Data processing, hosting, and related services	518	41,105	841	2,130	42,395	1,290	3.1
Other information	other 51	49,358	2,371	1,874	48,861	-496	-1.0
Finance and insurance	52	12,204	300	1,969	13,873	1,669	i 13.7
Real estate and rental and leasing	53	3,249	43	35	3,241	-8	-0.3
Lessors of nonfinancial intangible assets (except copyrighted works)	533	7	*	2	9	2	i 28.9
Other real estate and rental and leasing	other 53	3,242	43	33	3,232	-10	-0.3
Professional, scientific, and technical services	54	28,322	793	2,838	30,367	2,045	7.2
Architectural, engineering, and related services	5413	2,214	17	135	2,331	117	5.3
Computer systems design and related services	5415	14,293	539	1,148	14,902	609	4.3
Scientific research and development services	5417	6,246	166	1,063	7,143	896	14.4
Research and development in nanotechnology	541713	126	i 7	i 14	i 133	i 7	i 5.6
Research and development in biotechnology (except nanobiotechnology)	541714	1,176	37	328	1,468	291	24.8

TABLE 81

**Domestic R&D paid for and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for and performed by the company		Depreciation		Capital expenditures related to R&D		Adjusted domestic R&D paid for by the company and others		Change		
										Amount	Percent	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,906	i	122		712	i	5,496	i	589	i	12.0
Research and development in the social sciences and humanities	541720	38		*		9		46		9		23.1
Other professional, scientific, and technical services	other 54	5,570		71		493	i	5,992		423	i	7.6
Health care services	621-23	1,374		26		83	i	1,431		57	i	4.2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,429 - 16,934		0 - 772	i	29 - 1,669		2,371 - 17,878		943		D
All companies (number of domestic employees)	-	466,162		18,558		32,494		480,099		13,936		3.0
Small companies												
10-19 <sup>a</sup>	-	4,019		108		452		4,363		344		8.6
20-49	-	10,970		198		1,025		11,796		827		7.5
Medium companies												
50-99	-	11,177		251		1,152		12,078		901		8.1
100-249	-	22,132		444		1,593		23,281		1,149		5.2
Large companies												
250-499	-	18,067		656		1,295		18,706		639		3.5
500-999	-	18,458		718		1,559		19,299		841		4.6
1,000-4,999	-	75,917		2,359		6,406		79,963		4,047		5.3
5,000-9,999	-	42,451		1,869		2,803		43,385		934		2.2
10,000-24,999	-	72,827		3,817		6,249		75,260		2,433		3.3
25,000 or more	-	190,145		8,139		9,960		191,967		1,822		1.0

\* = 0 < 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 = 2017 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development (BERD) Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BERD statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE 82

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	59,144	1,084	0	58,060	-1,084	-1.8
Manufacturing industries	31-33	40,340	811	0	39,529	-811	-2.0
Food	311	194	6	0	188	-6	-2.9
Beverage and tobacco products	312	117	9	0	108	-9	-7.5
Textile, apparel, and leather products	313-16	32	*	0	32	*	-0.3
Wood products	321	8 i	* i	0	7 i	* i	-2.5
Paper	322	3 i	* i	0	3 i	* i	-3.0
Printing and related support activities	323	7 i	* i	0	7 i	* i	-3.9
Petroleum and coal products	324	14	1	0	13	-1	-9.3
Chemicals	325	9,427	376	0	9,051	-376	-4.0
Basic chemicals	3251	467	46 i	0	421 i	-46 i	-9.9
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	29 i	* i	0	29 i	* i	-0.5
Pesticide, fertilizer, and other agricultural chemicals	3253	D	D	0	D	D	D
Pharmaceuticals and medicines	3254	8,432	296	0	8,136	-296	-3.5
Soap, cleaning compound, and toilet preparation	3256	115	D	0	D	D	D
Paint, coating, adhesive, and other chemicals	3255, 3259	D	*	0	D	*	D
Plastics and rubber products	326	152 i	*	0	151 i	*	-0.2
Nonmetallic mineral products	327	20	1	0	19	-1	-4.4
Primary metals	331	49	0	0	49 i	0	0.0
Fabricated metal products	332	223 i	1 i	0	222 i	-1 i	-0.4
Machinery	333	881 i	18 i	0	864 i	-18 i	-2.0
Agricultural implement	33311	15 i	1	0	14 i	-1	-5.9
Semiconductor machinery	333242	297 i	12 i	0	285 i	-12 i	-4.0
Engine, turbine, and power transmission equipment	3336	154	2	0	151	-2	-1.6
Other machinery	other 333	416	2 i	0	413 i	-2 i	-0.5
Computer and electronic products	334	8,345	239	0	8,106	-239	-2.9
Communications equipment	3342	1,426 i	38 i	0	1,387 i	-38 i	-2.7
Semiconductor and other electronic components	3344	1,855	113	0	1,742	-113	-6.1
Navigational, measuring, electromedical, and control instruments	3345	4,910	83	0	4,827	-83	-1.7
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	233	3	0	230	-3	-1.3
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	4,480	74	0	4,405	-74	-1.7
Other measuring and controlling device	other 3345	197	5	0	192	-5	-2.7
Other computer and electronic products	other 334	154	4	0	150	-4	-2.8
Electrical equipment, appliances, and components	335	483 i	9 i	0	475 i	-9 i	-1.8
Transportation equipment	336	20,050 i	145	0	19,905 i	-145	-0.7

TABLE 82

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Motor vehicles, bodies, trailers, and parts	3361-63	2,441	83	0	2,359	-83	-3.4
Aerospace products and parts	3364	16,326 i	44	0	16,282 i	-44	-0.3
Aircraft, aircraft engine, and aircraft parts	336411-13	15,063 i	44	0	15,019 i	-44	-0.3
Guided missile, space vehicle, and related parts	336414-15, 336419	1,263 i	*	0	1,263 i	*	*
Military armored vehicle, tank, and tank component	336992	12	*	0	11	*	-3.1
Other transportation	other 336	1,271	19 i	0	1,253 i	-19 i	-1.5
Furniture and related products	337	9 i	*	0	9 i	*	-1.6
Miscellaneous	339	326 i	6 i	0	319 i	-6 i	-1.9
Medical equipment and supplies	3391	171	1	0	170	-1	-0.6
Other miscellaneous manufacturing	3399	155 i	5 i	0	149 i	-5 i	-3.5
Nonmanufacturing industries	21-23, 42-81	18,804	273	0	18,531	-273	-1.5
Mining, quarrying, oil and gas extraction, and support activities	21	619	6	0	613	-6	-1.0
Utilities	22	34	0	0	34	0	0.0
Wholesale trade	42	84 i	*	0	84 i	*	-0.2
Electronic shopping and electronic auctions	454111-12	16 i	0	0	16 i	0	0.0
Transportation and warehousing	48-49	* i	0	0	* i	0	0.0
Information	51	935	8	0	927	-8	-0.9
Publishing	511	747	4	0	743	-4	-0.6
Newspaper, periodical, book, and directory publishers	5111	* i	0	0	* i	0	0.0
Software publishers	5112	747	4	0	743	-4	-0.6
Telecommunications	517	70 i	1 i	0	68 i	-1 i	-2.0
Data processing, hosting, and related services	518	102	2 i	0	100	-2 i	-2.2
Other information	other 51	16	*	0	15	*	-2.8
Finance and insurance	52	38	* i	0	38	* i	-0.1
Real estate and rental and leasing	53	1 i	0	0	1 i	0	0.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0	0	0.0
Other real estate and rental and leasing	other 53	1 i	0	0	1 i	0	0.0
Professional, scientific, and technical services	54	16,710	255	0	16,455	-255	-1.5
Architectural, engineering, and related services	5413	1,881	5 i	0	1,876	-5 i	-0.3
Computer systems design and related services	5415	1,915 i	3 i	0	1,912 i	-3 i	-0.1
Scientific research and development services	5417	12,433	241	0	12,192	-241	-1.9
Research and development in biotechnology	541711	4,157 i	41	0	4,116 i	-41 i	-1.0
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	7,583	191	0	7,391	-191	-2.5
Research and development in the social sciences and humanities	541720	693	8	0	685	-8	-1.2
Other professional, scientific, and technical services	other 54	481	7	0	475	-7	-1.4
Health care services	621-23	298 i	2 i	0	296 i	-2 i	-0.7



TABLE 82

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2015**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	69	1	0	68	-1	-1.5
All companies (number of domestic employees)	–	59,144	1,084	0	58,060	-1,084	-1.8
Micro companies <sup>b</sup>							
5–9	–	1,016 i	8 i	0	1,008 i	-8 i	-0.8
Small companies							
10–19	–	1,246 i	21 i	0	1,226 i	-21 i	-1.7
20–49	–	2,316 i	33 i	0	2,282 i	-33 i	-1.4
Medium companies							
50–99	–	2,706	52	0	2,654	-52	-1.9
100–249	–	2,566	35	0	2,531	-35	-1.4
Large companies							
250–499	–	2,185	122 i	0	2,062	-122 i	-5.6
500–999	–	2,023 i	52	0	1,971 i	-52	-2.5
1,000–4,999	–	9,830	309	0	9,520	-309	-3.1
5,000–9,999	–	4,178	55	0	4,123	-55	-1.3
10,000–24,999	–	10,878	283	0	10,595	-283	-2.6
25,000 or more	–	20,201	114	0	20,087 i	-114 i	-0.6

\* =  $-\$500,000 < \text{amount} < \$500,000$  (or  $-0.05\% < \text{amount} < 0.05\%$ ); 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 = 2012 North American Industry Classification System.

<sup>a</sup> Capital expenditures related to R&D are assumed to be \$0 for domestic R&D paid for by others and performed by the company.

<sup>b</sup> The Business R&D and Innovation Survey did not include companies with fewer than 5 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. To enable comparisons between U.S. Business Enterprise Research and Development (BERD) Survey statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business R&D and Innovation Survey, 2015.

TABLE 83

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	56,954	1,154	0	55,800	-1,154	-2.0
Manufacturing industries	31-33	38,893	801	0	38,092	-801	-2.1
Food	311	217	7	0	210	-7	-3.1
Beverage and tobacco products	312	D	10	0	D	-10	D
Textile, apparel, and leather products	313-16	9	0	0	9	0	0.0
Wood products	321	7 i	* i	0	7 i	* i	-3.7
Paper	322	*	D	0	D	D	D
Printing and related support activities	323	* i	D	0	D	D	D
Petroleum and coal products	324	14	D	0	D	D	D
Chemicals	325	9,410	365	0	9,045 i	-365	-3.9
Basic chemicals	3251	261	14	0	247 i	-14 i	-5.2
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	18	D	0	D	D	D
Pesticide, fertilizer, and other agricultural chemicals	3253	D	D	0	D	D	D
Pharmaceuticals and medicines	3254	8,644	319	0	8,325 i	-319	-3.7
Soap, cleaning compound, and toilet preparation	3256	141	D	0	D	D	D
Paint, coating, adhesive, and other chemicals	3255, 3259	D	D	0	D	D	D
Plastics and rubber products	326	169	2	0	167 i	-2 i	-1.3
Nonmetallic mineral products	327	14	*	0	14	*	-2.9
Primary metals	331	10	0	0	10 i	0	0.0
Fabricated metal products	332	112 i	* i	0	112 i	* i	-0.3
Machinery	333	886	25	0	861	-25	-2.8
Agricultural implement	33311	12	1	0	11	-1	-8.0
Semiconductor machinery	333242	383	20	0	363	-20	-5.2
Engine, turbine, and power transmission equipment	3336	58 i	* i	0	58 i	* i	-0.5
Other machinery	other 333	432	4	0	428	-4	-0.8
Computer and electronic products	334	8,869	209	0	8,660	-209	-2.4
Communications equipment	3342	1,818 i	37 i	0	1,781 i	-37 i	-2.1
Semiconductor and other electronic components	3344	2,215	87	0	2,128	-87	-3.9
Navigational, measuring, electromedical, and control instruments	3345	4,753	83	0	4,670	-83	-1.7
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	165	3	0	162	-3	-1.7
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	4,412	74	0	4,338	-74	-1.7
Other measuring and controlling device	other 3345	176	6	0	170	-6	-3.3
Other computer and electronic products	other 334	82	2	0	80	-2	-2.3
Electrical equipment, appliances, and components	335	469 i	11 i	0	458 i	-11 i	-2.3
Transportation equipment	336	18,371	169	0	18,201	-169	-0.9

TABLE 83

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Motor vehicles, bodies, trailers, and parts	3361-63	2,749	114	0	2,634	-114	-4.2
Aerospace products and parts	3364	14,373	40	0	14,333	-40	-0.3
Aircraft, aircraft engine, and aircraft parts	336411-13	13,291	40	0	13,251	-40	-0.3
Guided missile, space vehicle, and related parts	336414-15, 336419	1,083 i	*	0	1,083 i	*	*
Military armored vehicle, tank, and tank component	336992	D	*	0	D	*	D
Other transportation	other 336	D	15 i	0	D	-15 i	D
Furniture and related products	337	*	0	0	*	0	0.0
Miscellaneous	339	D	2	0	D	-2	D
Medical equipment and supplies	3391	194	1	0	193	-1	-0.6
Other miscellaneous manufacturing	3399	D	1 i	0	D	-1 i	D
Nonmanufacturing industries	21-23, 42-81	18,061	353	0	17,708	-353 i	-2.0
Mining, quarrying, oil and gas extraction, and support activities	21	400	11	0	389	-11	-2.7
Utilities	22	26	0	0	26	0	0.0
Wholesale trade	42	10 i	*	0	10 i	*	-0.6
Electronic shopping and electronic auctions	454111-12	0	0	0	0	0	0.0
Transportation and warehousing	48-49	3	0	0	3	0	0.0
Information	51	674	16	0	658	-16	-2.4
Publishing	511	400	8	0	392	-8	-2.0
Newspaper, periodical, book, and directory publishers	5111	3 i	*	i	3 i	*	-1.8
Software publishers	5112	397	8	0	389	-8	-2.0
Telecommunications	517	D	D	0	D	D	D
Data processing, hosting, and related services	518	138	3	0	135	-3	-2.2
Other information	other 51	D	D	0	D	D	D
Finance and insurance	52	94	0	0	94	0	0.0
Real estate and rental and leasing	53	0	0	0	0	0	0.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0	0	0.0
Other real estate and rental and leasing	other 53	0	0	0	0	0	0.0
Professional, scientific, and technical services	54	16,750	325	0	16,425 i	-325 i	-1.9
Architectural, engineering, and related services	5413	1,596	4	0	1,592 i	-4	-0.2
Computer systems design and related services	5415	2,492 i	21	0	2,471 i	-21 i	-0.8
Scientific research and development services	5417	12,031	295 i	0	11,735	-295 i	-2.5
Research and development in biotechnology	541711	3,714	D	0	D	D	D
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	7,630	249 i	0	7,380 i	-249 i	-3.3
Research and development in the social sciences and humanities	541720	687	D	0	D	D	D
Other professional, scientific, and technical services	other 54	632	5	0	627	-5	-0.7
Health care services	621-23	66	*	0	66 i	*	-0.4

TABLE 83

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2016**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	38	1	0	37	-1	-1.9
All companies (number of domestic employees)	–	56,954	1,154	0	55,800	-1,154	-2.0
Micro companies <sup>b</sup>							
5–9	–	536 i	6 i	0	530 i	-6 i	-1.2
Small companies							
10–19	–	1,071 i	13 i	0	1,058 i	-13 i	-1.2
20–49	–	2,189	20 i	0	2,169 i	-20 i	-0.9
Medium companies							
50–99	–	1,570	29	0	1,541	-29	-1.9
100–249	–	3,153	55	0	3,098 i	-55	-1.8
Large companies							
250–499	–	1,654	62 i	0	1,592	-62 i	-3.8
500–999	–	924	20	0	905	-20	-2.1
1,000–4,999	–	10,666	428	0	10,238	-428	-4.0
5,000–9,999	–	4,746	53	0	4,693 i	-53	-1.1
10,000–24,999	–	12,210	349 i	0	11,861 i	-349 i	-2.9
25,000 or more	–	18,232	118	0	18,114	-118	-0.6

\* =  $-\$500,000 < \text{amount} < \$500,000$  (or  $-0.05\% < \text{amount} < 0.05\%$ ); 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 = 2012 North American Industry Classification System.

<sup>a</sup> Capital expenditures related to R&D are assumed to be \$0 for domestic R&D paid for by others and performed by the company.

<sup>b</sup> The Business R&D and Innovation Survey did not include companies with fewer than 5 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. To enable comparisons between U.S. Business Enterprise Research and Development (BERD) Survey statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business R&D and Innovation Survey, 2016.

TABLE 84

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	61,065	1,578	0	59,487	-1,578	-2.6
Manufacturing industries	31-33	41,072	1,055	0	40,017	-1,055	-2.6
Food	311	244	10	0	235	-10	-3.9
Beverage and tobacco products	312	107	9	0	98	-9	-8.5
Textile, apparel, and leather products	313-16	1	*	i 0	1	*	i -3.1
Wood products	321	5	*	0	5	*	-2.0
Paper	322	29	1	0	29	-1	-2.3
Printing and related support activities	323	11	*	i 0	11	*	i -1.1
Petroleum and coal products	324	15	0 - 5	0	D	D	D
Chemicals	325	11,692	551	0	11,141	-551	i -4.7
Basic chemicals	3251	181	10	0	170	i -10	i -5.6
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	16	1	0	15	-1	-5.1
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 383	0 - 25	0	D	D	D
Pharmaceuticals and medicines	3254	10,973	510	0	10,463	-510	i -4.6
Soap, cleaning compound, and toilet preparation	3256	118 - 213	8	0	D	-8	D
Paint, coating, adhesive, and other chemicals	3255, 3259	23	0 - 23	0	D	D	D
Plastics and rubber products	326	117	1	0	116	-1	-0.7
Nonmetallic mineral products	327	30	i *	0	30	i *	-1.3
Primary metals	331	8	*	i 0	8	*	i -0.3
Fabricated metal products	332	107	*	i 0	107	*	i -0.1
Machinery	333	940	44	0	896	-44	-4.7
Agricultural implement	33311	59	i 4	i 0	55	i -4	i -6.3
Semiconductor machinery	333242	465	35	0	430	-35	-7.6
Engine, turbine, and power transmission equipment	3336	159	*	0	159	*	-0.1
Other machinery	other 333	257	5	0	252	-5	-1.9
Computer and electronic products	334	8,633	222	0	8,410	-222	-2.6
Communications equipment	3342	1,715	i 31	i 0	1,683	i -31	i -1.8
Semiconductor and other electronic components	3344	2,289	117	0	2,172	-117	-5.1
Navigational, measuring, electromedical, and control instruments	3345	4,420	65	0	4,354	-65	-1.5
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	150	2	0	148	-2	-1.1
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	4,083	58	0	4,024	-58	-1.4
Other measuring and controlling device	other 3345	187	6	0	182	-6	-2.9
Other computer and electronic products	other 334	209	8	0	201	-8	-4.0
Electrical equipment, appliances, and components	335	181	16	0	165	-16	-9.1
Transportation equipment	336	18,663	i 196	0	18,467	i -196	-1.1
Motor vehicles, bodies, trailers, and parts	3361-63	2,745	100	0	2,644	-100	-3.6

TABLE 84

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	14,480 i	36 - 97	0	D	D	D
Aircraft, aircraft engine, and aircraft parts	336411-13	13,103 i	34 - 97	0	D	D	D
Guided missile, space vehicle, and related parts	336414-15, 336419	1,377	0 - 3	0	D	D	D
Military armored vehicle, tank, and tank component	336992	5	0 - 1	0	D	D	D
Other transportation	other 336	1,433	0 - 59 i	0	D	D	D
Furniture and related products	337	3	*	0	3	*	-3.9
Miscellaneous	339	285	2 - 9	0	D	D	D
Medical equipment and supplies	3391	240	3	0	238	-3	-1.2
Other miscellaneous manufacturing	3399	44	0 - 7	0	D	D	D
Nonmanufacturing industries	21-23, 42-81	19,993	522	0	19,470	-522	-2.6
Mining, quarrying, oil and gas extraction, and support activities	21	309	7	0	302	-7	-2.1
Utilities	22	36 i	0	0	36 i	0	0.0
Wholesale trade	42	31	*	0	31	*	-0.3
Electronic shopping and electronic auctions	454111-12	0	0	0	0	0	0.0
Transportation and warehousing	48-49	31	*	0	31	*	-1.5
Information	51	1,354	14	0	1,340	-14	-1.0
Publishing	511	1,062	8	0	1,055	-8	-0.7
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0.0
Software publishers	5112	1,062	8	0	1,055	-8	-0.7
Telecommunications	517	40 - 163	1	0	D	-1	D
Data processing, hosting, and related services	518	119	*	0	119	*	-0.2
Other information	other 51	11 - 134	5	0	D	-5	D
Finance and insurance	52	51	0	0	51	0	0.0
Real estate and rental and leasing	53	10	0	0	10	0	0.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0	0	0.0
Other real estate and rental and leasing	other 53	10	0	0	10	0	0.0
Professional, scientific, and technical services	54	17,951	499	0	17,452	-499	-2.8
Architectural, engineering, and related services	5413	1,147	9	0	1,139	-9	-0.8
Computer systems design and related services	5415	1,658	9 i	0	1,649	-9 i	-0.5
Scientific research and development services	5417	14,504	473	0	14,031	-473	-3.3
Research and development in biotechnology	541711	3,653	129	0	3,524	-129	-3.5
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	9,978	333	0	9,645	-333	-3.3
Research and development in the social sciences and humanities	541720	873	12	0	861	-12	-1.3
Other professional, scientific, and technical services	other 54	641	8	0	634	-8	-1.2
Health care services	621-23	144	1 i	0	143 i	-1 i	-0.8

TABLE 84

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2017**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	76	1	0	75	-1	-1.9
All companies (number of domestic employees)	–	61,065	1,578	0	59,487	-1,578	-2.6
Small companies							
10–19 <sup>b</sup>	–	909	9	0	900	-9	-1.0
20–49	–	1,842	40	0	1,802	-40	-2.2
Medium companies							
50–99	–	2,071	48	0	2,023	-48	-2.3
100–249	–	3,703	67	0	3,636	-67	-1.8
Large companies							
250–499	–	2,331	52	0	2,279	-52	-2.2
500–999	–	1,576	56	0	1,519	-56	-3.6
1,000–4,999	–	12,771	527	0	12,244	-527	-4.1
5,000–9,999	–	7,497	264	0	7,233	-264	-3.5
10,000–24,999	–	10,070	274	i	9,796	-274	i -2.7
25,000 or more	–	18,295	i 240	0	18,055	i -240	-1.3

\* =  $-\$500,000 < \text{amount} < \$500,000$  (or  $-0.05\% < \text{amount} < 0.05\%$ ); 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 = 2012 North American Industry Classification System.

<sup>a</sup> Capital expenditures related to R&D are assumed to be \$0 for domestic R&D paid for by others and performed by the company.

<sup>b</sup> The Business Research and Development Survey did not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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 R&D. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. Business Enterprise Research and Development (BERD) Survey statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Research and Development Survey, 2017.

TABLE 85

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	63,230	1,638	0	61,593	-1,638	-2.6
Manufacturing industries	31-33	39,393	979	0	38,414	-979	-2.5
Food	311	242	11	0	231	-11	-4.5
Beverage and tobacco products	312	109	8	0	100	-8	-7.5
Textile, apparel, and leather products	313-16	4	*	i 0	4	* i	-0.4
Wood products	321	4	*	0	4	*	-2.2
Paper	322	2	*	i 0	2	* i	-2.3
Printing and related support activities	323	4	*	i 0	4	* i	-0.1
Petroleum and coal products	324	23	1	0	22	-1	-4.4
Chemicals	325	10,553	514	0	10,038	-514	i -4.9
Basic chemicals	3251	192	10	0	182	i -10	i -5.4
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	85	0 - 16	0	D	D	D
Pesticide, fertilizer, and other agricultural chemicals	3253	326	21	0	305	i -21	i -6.4
Pharmaceuticals and medicines	3254	9,792	465	0	9,326	-465	i -4.8
Soap, cleaning compound, and toilet preparation	3256	137	0 - 20	0	D	D	D
Paint, coating, adhesive, and other chemicals	3255, 3259	21	*	0	21	*	-0.2
Plastics and rubber products	326	83	1	0	83	i -1	-1.1
Nonmetallic mineral products	327	24	1	0	23	-1	-6.1
Primary metals	331	22	i *	i 0	22	i *	i -0.4
Fabricated metal products	332	105	5	0	100	-5	-5.1
Machinery	333	1,034	47	0	987	-47	-4.5
Agricultural implement	33311	10	*	0	10	*	-2.6
Semiconductor machinery	333242	543	44	0	500	-44	-8.0
Engine, turbine, and power transmission equipment	3336	173	2	0	171	-2	-1.2
Other machinery	other 333	307	1	0	307	-1	-0.3
Computer and electronic products	334	9,775	250	0	9,525	-250	-2.6
Communications equipment	3342	1,285	i 30	i 0	1,254	i -30	i -2.4
Semiconductor and other electronic components	3344	2,410	102	0	2,308	-102	-4.2
Navigational, measuring, electromedical, and control instruments	3345	5,863	109	0	5,754	-109	-1.9
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	163	3	0	159	-3	i -2.0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	5,455	84	0	5,371	-84	-1.5
Other measuring and controlling device	other 3345	245	21	0	224	-21	-8.7
Other computer and electronic products	other 334	217	8	0	209	-8	-3.9
Electrical equipment, appliances, and components	335	266	12	0	254	-12	-4.4
Transportation equipment	336	16,735	121	0	16,614	i -121	-0.7



TABLE 85

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Motor vehicles, bodies, trailers, and parts	3361-63	2,506	79	0	2,426	-79	-3.2
Aerospace products and parts	3364	13,131 i	30	0	13,101 i	-30	-0.2
Aircraft, aircraft engine, and aircraft parts	336411-13	12,222 i	30	0	12,192 i	-30	-0.2
Guided missile, space vehicle, and related parts	336414-15, 336419	909	*	0	909	*	*
Military armored vehicle, tank, and tank component	336992	6	0 - 5	0	D	D	D
Other transportation	other 336	1,092	6 - 14 i	0	D	D	D
Furniture and related products	337	5	*	0	5	*	-3.2
Miscellaneous	339	402	6 i	0	396 i	-6 i	-1.6
Medical equipment and supplies	3391	264	2	0	262	-2	-0.6
Other miscellaneous manufacturing	3399	138 i	5 i	0	133 i	-5 i	-3.4
Nonmanufacturing industries	21-23, 42-81	23,838	659	0	23,179	-659	-2.8
Mining, quarrying, oil and gas extraction, and support activities	21	130	0 - 52 i	0	D	D	D
Utilities	22	51	0	0	51	0	0
Wholesale trade	42	25	0 - 4	0	D	D	D
Electronic shopping and electronic auctions	454111-12	94	0 - 88	0	D	D	D
Transportation and warehousing	48-49	7	0 - 8	0	D	D	D
Information	51	862	16	0	847	-16	-1.8
Publishing	511	489	9	0	480	-9	-1.9
Newspaper, periodical, book, and directory publishers	5111	*	0	0	*	0	0
Software publishers	5112	489	9	0	480	-9	-1.9
Telecommunications	517	65	0 - 7	0	D	D	D
Data processing, hosting, and related services	518	191	1	0	190	-1	-0.4
Other information	other 51	117	0 - 7	0	D	D	D
Finance and insurance	52	45	0	0	45	0	0
Real estate and rental and leasing	53	0	0	0	0	0	NA
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0	0	NA
Other real estate and rental and leasing	other 53	0	0	0	0	0	NA
Professional, scientific, and technical services	54	22,486	556 - 644	0	D	D	D
Architectural, engineering, and related services	5413	1,684	0 - 65 i	0	D	D	D
Computer systems design and related services	5415	2,291	18	0	2,273	-18	-0.8
Scientific research and development services	5417	17,761	539	0	17,222	-539	-3.0
Research and development in biotechnology	541711	5,037	57 - 137	0	D	D	D
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	12,080	403	0	11,677	-403	-3.3
Research and development in the social sciences and humanities	541720	644	0 - 78	0	D	D	D
Other professional, scientific, and technical services	other 54	750	0 - 61	0	D	D	D

TABLE 85

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2018**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Health care services	621-23	75	0 - 21	i	0	D	D
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62	0 - 63		0	D	D
All companies (number of domestic employees)	-	63,230	1,638		0	61,593	-1,638 -2.6
Small companies							
10-19 <sup>b</sup>	-	1,050	26		0	1,024	-26 -2.5
20-49	-	1,695	24		0	1,671	-24 -1.4
Medium companies							
50-99	-	1,875	32		0	1,844	-32 -1.7
100-249	-	3,921	94		0	3,828	-94 -2.4
Large companies							
250-499	-	3,041	75		0	2,965	-75 -2.5
500-999	-	2,096	90	i	0	2,006	-90 i -4.3
1,000-4,999	-	10,068	489		0	9,579	-489 -4.9
5,000-9,999	-	9,063	417		0	8,646	-417 -4.6
10,000-24,999	-	9,997	173	i	0	9,825	-173 i -1.7
25,000 or more	-	20,423	218		0	20,206	i -218 -1.1

\* = -\$500,000 < amount < \$500,000 (or -0.05% < amount < 0.05%); 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; NA = not available.

NAICS = 2012 North American Industry Classification System.

<sup>a</sup> Capital expenditures related to R&D are assumed to be \$0 for domestic R&D paid for by others and performed by the company.

<sup>b</sup> The Business Research and Development Survey did not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. This change has affected the comparability of these estimates with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. Business Enterprise Research and Development (BERD) Survey statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which was *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which was *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Research and Development Survey, 2018.

TABLE 86

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	63,989	1,803	0	62,185	-1,803	-2.8
Manufacturing industries	31-33	37,564	1,051	0	36,513	-1,051	-2.8
Food	311	243	12	0	231	-12	-4.8
Beverage and tobacco products	312	111	9	0	102	-9	-7.8
Textile, apparel, and leather products	313-16	31	*	0	30	*	-0.4
Wood products	321	6	*	0	6	*	-0.9
Paper	322	*	0	0	*	0	0
Printing and related support activities	323	0	0	0	0	0	NA
Petroleum and coal products	324	103	0-7	0	95-104	-7-0	D
Chemicals	325	9,775	486	0	9,289	-486	-5.0
Basic chemicals	3251	162	15	0	147	-15	-9.4
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	80	11	0	69	-11	-13.9
Pesticide, fertilizer, and other agricultural chemicals	3253	320-345	0-28	0	293-345	-28-0	D
Pharmaceuticals and medicines	3254	8,966	423	0	8,544	-423	-4.7
Soap, cleaning compound, and toilet preparation	3256	164	12	0	152	-12	-7.2
Paint, coating, adhesive, and other chemicals	3255, 3259	56-84	0-28	0	30-84	-28-0	D
Plastics and rubber products	326	85	1	0	84	-1	-1.5
Nonmetallic mineral products	327	35	2	0	33	-2	-6.2
Primary metals	331	16	*	0	16	*	-0.6
Fabricated metal products	332	254	7	0	247	-7	-2.8
Machinery	333	1,254	49	0	1,205	-49	-3.9
Agricultural implement	33311	9	0	0	9	0	0
Semiconductor machinery	333242	604	43	0	561	-43	-7.1
Engine, turbine, and power transmission equipment	3336	205	3	0	202	-3	-1.6
Other machinery	other 333	436	3	0	433	-3	-0.7
Computer and electronic products	334	11,159	301	0	10,859	-301	-2.7
Communications equipment	3342	1,100	18	0	1,083	-18	-1.6
Semiconductor and other electronic components	3344	3,208	172	0	3,036	-172	-5.3
Navigational, measuring, electromedical, and control instruments	3345	6,650	104	0	6,546	-104	-1.6
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	225	5	0	221	-5	-2.0
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	6,262	94	0	6,168	-94	-1.5
Other measuring and controlling device	other 3345	163	6	0	157	-6	-3.4
Other computer and electronic products	other 334	201	7	0	193	-7	-3.7
Electrical equipment, appliances, and components	335	377	16	0	360	-16	-4.4
Transportation equipment	336	13,870	163	0	13,707	-163	-1.2
Motor vehicles, bodies, trailers, and parts	3361-63	3,233	106	0	3,127	-106	-3.3

TABLE 86

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Aerospace products and parts	3364	9,458 i	32 - 58	0	9,400 - 9,426 i	-58 - -32	D
Aircraft, aircraft engine, and aircraft parts	336411-13	8,550 i	33	0	8,517 i	-33	-0.4
Guided missile, space vehicle, and related parts	336414-15, 336419	908	0 - 26	0	883 - 909	-26 - 0	D
Military armored vehicle, tank, and tank component	336992	10	*	0	10	*	-2.3
Other transportation	other 336	1,168	0 - 26 i	0	1,142 - 1,169 i	-26 - 0 i	D
Furniture and related products	337	2	*	0	2	*	-0.1
Miscellaneous	339	244	2 - 10	0	234 - 242	-10 - -2	D
Medical equipment and supplies	3391	202	3	0	199	-3	-1.4
Other miscellaneous manufacturing	3399	42	0 - 7	0	34 - 43	-7 - 0	D
Nonmanufacturing industries	21-23, 42-81	26,425	752 i	0	25,672	-752 i	-2.8
Mining, quarrying, oil and gas extraction, and support activities	21	183	6	0	177	-6	-3.1
Utilities	22	38	0 - 4	0	34 - 39	-4 - 0	D
Wholesale trade	42	87	1	0	86	-1	-1.5
Electronic shopping and electronic auctions	454111-12	43 - 61	0	0	43 - 61	0	0
Transportation and warehousing	48-49	386	*	0	386	*	-0.1
Information	51	1,165	23	0	1,141	-23	-2.0
Publishing	511	572	10	0	562	-10	-1.8
Newspaper, periodical, book, and directory publishers	5111	*	0	0	*	0	0
Software publishers	5112	572	10	0	562	-10	-1.8
Telecommunications	517	33	1	0	32	-1	-2.5
Data processing, hosting, and related services	518	404	1	0	404	-1	-0.1
Other information	other 51	155	12	0	144	-12	-7.7
Finance and insurance	52	28	0	0	28	0	0
Real estate and rental and leasing	53	0	0	0	0	0	NA
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0	0	0	0	NA
Other real estate and rental and leasing	other 53	0	0	0	0	0	NA
Professional, scientific, and technical services	54	24,103	719 i	0	23,384	-719 i	-3.0
Architectural, engineering, and related services	5413	1,919	11	0	1,909	-11	-0.6
Computer systems design and related services	5415	2,651	15	0	2,637	-15	-0.6
Scientific research and development services	5417	18,403	677 i	0	17,726	-677 i	-3.7
Research and development in biotechnology	541711	5,374	122	0	5,252	-122	-2.3
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	12,291 i	540 i	0	11,751 i	-540 i	-4.4

TABLE 86

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2019**

(Millions of U.S. dollars and percent)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
Research and development in the social sciences and humanities	541720	738	15	0	723	-15	-2.1
Other professional, scientific, and technical services	other 54	1,129	17	0	1,113	-17	-1.5
Health care services	621-23	337	1	0	337	-1	-0.2
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	34 - 58	0 - 4	0	31 - 58	-4 - 0	D
All companies (number of domestic employees)	-	63,989	1,803	0	62,185	-1,803	-2.8
Small companies							
10-19 <sup>b</sup>	-	1,070	11	0	1,059	-11	-1.0
20-49	-	2,378	35	0	2,343	-35	-1.5
Medium companies							
50-99	-	2,529	50	0	2,480	-50	-2.0
100-249	-	3,274	70	0	3,204	-70	-2.1
Large companies							
250-499	-	3,527	78	0	3,449	-78	-2.2
500-999	-	2,420	77	0	2,343	-77	-3.2
1,000-4,999	-	11,196	553	0	10,643	-553	-4.9
5,000-9,999	-	6,083	299	0	5,784	-299	-4.9
10,000-24,999	-	13,878	385	0	13,493	-385	-2.8
25,000 or more	-	17,635	247	0	17,388	-247	-1.4

\* =  $-\$500,000 < \text{amount} < \$500,000$  (or  $-0.05\% < \text{amount} < 0.05\%$ ); 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; NA = not available.

NAICS = 2012 North American Industry Classification System.

<sup>a</sup> Capital expenditures related to R&D are assumed to be \$0 for domestic R&D paid for by others and performed by the company.

<sup>b</sup> The Business Enterprise Research and Development (BERD) Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BERD statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2019.

TABLE 87

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation	Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
						Amount	Percent
All industries	21-23, 31-33, 42-81	71,457	2,414	0	69,043	-2,414	-3.4
Manufacturing industries	31-33	43,848	1,426	0	42,423	-1,426	-3.3
Food	311	254	13	0	241	-13	-5.2
Beverage and tobacco products	312	121	7	0	114	-7	-5.7
Textile, apparel, and leather products	313-16	9	1	0	9	-1	-5.6
Wood products	321	3	*	0	3	0	-0.8
Paper	322	1	0	0	1	0	0
Printing and related support activities	323	1	*	i	1	*	i
Petroleum and coal products	324	89 - 103	0 - 21	0	69 - 97	-22 - -5	D
Chemicals	325	11,675	746	0	10,929	-746	-6.4
Basic chemicals	3251	171	11	0	160	-11	-6.3
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	73	9	0	64	-9	-12.4
Pesticide, fertilizer, and other agricultural chemicals	3253	284 - 291	18	0	266 - 273	-18	D
Pharmaceuticals and medicines	3254	10,918	694	0	10,224	-694	-6.4
Soap, cleaning compound, and toilet preparation	3256	189	14	0	174	-14	-7.6
Paint, coating, adhesive, and other chemicals	3255, 3259	32 - 39	1	0	32 - 39	-1	D
Plastics and rubber products	326	26	1	0	25	-1	-3.3
Nonmetallic mineral products	327	98	8	0	91	-8	-7.6
Primary metals	331	20	*	0	20	0	-0.3
Fabricated metal products	332	60	1	0	59	-1	-1.5
Machinery	333	1,152	63	0	1,089	-63	-5.5
Agricultural implement	33311	10 - 52	0 - 13	0	6 - 52	-5 - 0	D
Semiconductor machinery	333242	686	50	0	635	-50	-7.3
Engine, turbine, and power transmission equipment	3336	122	2	0	120	-2	-2.0
Other machinery	other 333	292 - 334	0 - 13	i	281 - 329	-11 - -3	i
Computer and electronic products	334	11,030	305	0	10,726	-305	-2.8
Communications equipment	3342	996	i	12	i	984	i
Semiconductor and other electronic components	3344	2,380	130	0	2,250	-130	-5.5
Navigational, measuring, electromedical, and control instruments	3345	7,493	157	0	7,336	-157	-2.1
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	251	6	0	245	-6	-2.4
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	7,025	i	145	0	6,879	i
Other measuring and controlling device	other 3345	217	5	0	212	-5	-2.4
Other computer and electronic products	other 334	161	6	0	155	-6	-3.7
Electrical equipment, appliances, and components	335	506	20	0	485	-20	-4.0
Transportation equipment	336	18,564	241	i	0	18,323	i

TABLE 87

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation		Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change			
							Amount	Percent		
Motor vehicles, bodies, trailers, and parts	3361-63	3,599	130	i	0	3,469	i	-130	i	-3.6
Aerospace products and parts	3364	13,803	87	i	0	13,716	i	-87	i	-0.6
Aircraft, aircraft engine, and aircraft parts	336411-13	13,011	87	i	0	12,923	i	-87	i	-0.7
Guided missile, space vehicle, and related parts	336414-15, 336419	793	0		0	793		0		0
Military armored vehicle, tank, and tank component	336992	6	0		0	6		0		0
Other transportation	other 336	1,155	23	i	0	1,132	i	-23	i	-2.0
Furniture and related products	337	3	*		0	3		0		-5.8
Miscellaneous	339	215-233	5-26		0	208-227		-8--5		D
Medical equipment and supplies	3391	173	5		0	167		-5		-3.1
Other miscellaneous manufacturing	3399	42-60	0-21		0	40-60		-2-0		D
Nonmanufacturing industries	21-23, 42-81	27,608	988	i	0	26,620		-988	i	-3.6
Mining, quarrying, oil and gas extraction, and support activities	21	45	1	i	0	44		-1	i	-1.3
Utilities	22	40	0		0	40		0		0
Wholesale trade	42	58	3		0	55		-3		-4.9
Electronic shopping and electronic auctions	454111-12	2-50	0-7		0	2-49		-8-0		D
Transportation and warehousing	48-49	3	1		0	3		-1		-18.2
Information	51	1,113	27		0	1,087		-27		-2.4
Publishing	511	509	19		0	490		-19		-3.8
Newspaper, periodical, book, and directory publishers	5111	0	0		0	0		0		NA
Software publishers	5112	509	19		0	490		-19		-3.8
Telecommunications	517	54-66	0-7		0	50-66		-4-0		D
Data processing, hosting, and related services	518	446	2		0	444		-2		-0.4
Other information	other 51	91-105	0-7		0	86-105		-7-0		D
Finance and insurance	52	92	0		0	92		0		0
Real estate and rental and leasing	53	*	0		0	*		0		0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	*	0		0	*		0		0
Other real estate and rental and leasing	other 53	0	0		0	0		0		NA
Professional, scientific, and technical services	54	26,045	950	i	0	25,096		-950	i	-3.6
Architectural, engineering, and related services	5413	2,001	7		0	1,994		-7		-0.3
Computer systems design and related services	5415	3,643	87		0	3,555		-87		-2.4
Scientific research and development services	5417	19,354	852	i	0	18,501		-852	i	-4.4
Research and development in nanotechnology	541713	53	*	i	0	53	i	0	i	-0.4
Research and development in biotechnology (except nanobiotechnology)	541714	5,014	113		0	4,901		-113		-2.3
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	13,632	729	i	0	12,904	i	-729	i	-5.3

TABLE 87

**Domestic R&D paid for by others and performed by the company, depreciation, capital expenditures, and adjusted domestic R&D, by industry and company size: 2020**

(Millions of U.S. dollars and percent change)

Industry and company size	NAICS code	Domestic R&D paid for by others and performed by the company	Depreciation		Capital expenditures related to R&D <sup>a</sup>	Adjusted domestic R&D paid for by the company and others	Change	
							Amount	Percent
Research and development in the social sciences and humanities	541720	654	10		0	644	-10	-1.5
Other professional, scientific, and technical services	other 54	1,048	4		0	1,045	-4	-0.3
Health care services	621-23	103	3		0	99	-3	-3.1
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	62-109	0-7		0	59-106	-3-0	D
All companies (number of domestic employees)	-	71,457	2,414		0	69,043	-2,414	-3.4
Small companies								
10-19 <sup>b</sup>	-	1,029	13		0	1,016	-13	-1.3
20-49	-	2,025	33		0	1,992	-33	-1.6
Medium companies								
50-99	-	1,816	35		0	1,781	-35	-1.9
100-249	-	3,280	69		0	3,211	-69	-2.1
Large companies								
250-499	-	2,811	72		0	2,739	-72	-2.6
500-999	-	2,807	101		0	2,705	-101	-3.6
1,000-4,999	-	12,322	636		0	11,685	-636	-5.2
5,000-9,999	-	5,945	377		0	5,568	-377	-6.3
10,000-24,999	-	15,739 <sup>i</sup>	718 <sup>i</sup>		0	15,022 <sup>i</sup>	-718 <sup>i</sup>	-4.6
25,000 or more	-	23,684	360		0	23,324 <sup>i</sup>	-360	-1.5

\* =  $-\$500,000 < \text{amount} < \$500,000$  (or  $-0.05\% < \text{amount} < 0.05\%$ ); 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; NA = not available.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Capital expenditures related to R&D are assumed to be \$0 for domestic R&D paid for by others and performed by the company.

<sup>b</sup> The Business Enterprise Research and Development (BERD) Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Detail may not add to total because of rounding. Industry classification is 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. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies. To enable comparisons between U.S. BERD statistics and those of other nations, in this table an internationally comparable adjusted domestic R&D estimate is calculated by subtracting depreciation relating to R&D operations, which is *included* in U.S. BERD domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD domestic R&D.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.



## Technical Notes

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### Survey Overview

*Purpose.* The Business Enterprise Research and Development (BERD) Survey, successor to the Business Research and Development Survey (BRDS) (2017–18), the Business R&D and Innovation Survey (BRDIS) (2008–16), and the Survey of Industrial Research and Development (SIRD) (1953–2007), is the primary source of information on R&D expenditures and R&D employees of for-profit, publicly or privately held, nonfarm businesses with 10 or more employees in the United States that performed or funded R&D either domestically (in the 50 states and the District of Columbia) or abroad.

*Data collection authority.* The information collected by the BERD Survey is solicited under the authority of the National Science Foundation (NSF) Act of 1950, as amended, and the America COMPETES Reauthorization Act of 2010. Response to this annual survey is mandatory and confidential; the Census Bureau collects the data under the authority of Title 13, Section 8, of the United States Code. The Office of Management and Budget (OMB) control number is 0607-0912.

*Survey sponsors.* The BERD Survey is cosponsored by the National Center for Science and Engineering Statistics (NCSES) within NSF and the Census Bureau.

*Survey collection and tabulation agent.* The survey is conducted annually by the Census Bureau in accordance with an interagency agreement with NCSES.

### Key Survey Information

*Frequency.* Annual.

*Initial survey year.* BERD Survey data collection began for 2019. BRDS collected data for 2017–18, BRDIS collected data for 2008–16, and SIRD collected data for 1953–2007.

*Most recent reference period.* Calendar year 2020.

*Response unit.* Company.

*Sample or census.* Sample.

*Population size.* 1,139,000 companies.

*Sample size.* 47,500 companies; the actual number of companies that remained within the scope of the survey between sample selection and tabulation was 44,500.

### Survey Design

The survey is administered both to companies known to have performed R&D and to companies with no known history of R&D activity. The BERD Survey has been designed to provide detailed statistics on global and domestic R&D expenditures of companies located in the United States and on these companies' R&D employees.

The survey is sent to a single coordinator within each company, but it is organized into sections that help the coordinator collect specific types of information from different experts (human resources, accounting, R&D managers, etc.) in the company. Foreign-owned companies are instructed to report only for company operations owned by the U.S. subsidiary and, for purposes of the survey, to treat the U.S. subsidiary's foreign owners as if they were unrelated third parties.

## Target Population

The target population for the BERD Survey consists of all for-profit companies that have 10 or more paid employees in the United States, that have at least one establishment located in the United States that is in business during the survey year, and that are classified in certain industries based on the 2017 North American Industry Classification System (NAICS), with a particular focus on those companies that perform R&D in the United States.

The Business Register, a Census Bureau compilation that contains information on more than 7.3 million establishments with paid employees, serves as the primary input to the sampling frame from which the BERD Survey sample is selected. For a given company with more than one establishment, the prior year's annual payroll and employment data for its active establishments are summed to the company level.

## Sampling Frame

The scope of the 2020 BERD Survey is limited to companies that (1) are in business primarily to make a profit; (2) are classified within a specific set of NAICS industries; (3) have 10 or more paid employees in the United States, based on employment on 12 March 2019; (4) have at least one establishment that is physically located in the United States and is in business at the end of calendar year 2020 (the time at which the Census Bureau finished the 2019 Business Register Processing); and (5) are not federally funded R&D centers.

Single-unit company records were extracted from the 2019 Business Register if the company had at least 10 paid employees in 2019 or, when employment information was unavailable, if the company's 2019 payroll was greater than or equal to \$500,000. Companies were removed from the sampling frame if their NAICS codes were designated as Agriculture, forestry, fishing, and hunting (NAICS 11), Postal service (NAICS 491), Educational services (NAICS 61), Private households (NAICS 814), or Public administration (NAICS 92) or if they were no longer in business or were nonprofits. Companies were also removed from the sampling frame if they were not located in the 50 U.S. states or the District of Columbia.

Records for active establishments from multiunit companies were extracted from the 2019 Business Register if the given establishment's 2019 payroll was greater than zero or if the establishment employed at least one person in 2019. Prior to creating records for multiunit companies from these establishments, establishments classified as Postal service (NAICS 491), Private households (NAICS 814), or Public administration (NAICS 92) were removed, as were those that were not physically located in the 50 U.S. states or the District of Columbia. Unlike single-unit companies, establishments classified as Agriculture, forestry, fishing, and hunting (NAICS 11) or Educational services (NAICS 61) were not initially removed during the construction of multiunit company records. Establishments classified in NAICS 11 or NAICS 61 contributed to the classification of the multiunit companies, and their payroll could have been included in determining the company's measure of size. From the resulting set of multiunit companies, companies were removed from the sampling frame if they had fewer than 10 paid employees or if the payroll associated with their nonprofit establishments was greater than the payroll of their for-profit establishments.

For each company on the sampling frame, a measure of size was assigned. The measure of size for a given company was based on R&D, if R&D data from the last 5 years were available from (1) BERD, (2) online financial databases, (3) the Report of Organization conducted as part of the Company Organization Survey (in years not ending in "2" or "7") or as a supplement to the Economic Census (in years ending in "2" or "7"), or (4) qualified R&D expenses from the Internal Revenue Service (IRS). For all other companies, the measure of size was based on total annual payroll for 2019 from the Business Register.

## Industry Classification for Sampling

Each company was assigned to 1 of 60 industry sampling strata based on the reported business segment in which the company performed the largest amount of total domestic R&D, as reported within the previous 5 years (2015–16 BRDIS, 2017–18 BRDS, and 2019 BERD), if available. If these business segment data were not reported for a given company, assignment was based on the NAICS codes of its establishments in the Business Register using the following method, with some adjustments made to account for vertical integration of related business activities within the company. The company was first assigned to the economic sector, defined by a two-digit NAICS code that accounted for the highest percentage of its aggregated annual payroll. Then the company was assigned to a subsector, defined by a three-digit NAICS code that accounted for the highest percentage of its annual payroll within the economic sector. Next, the company was assigned a four-digit NAICS code within the subsector, again based on the highest percentage of its aggregated annual payroll within the subsector. Finally, the company was assigned a six-digit NAICS code within the four-digit NAICS code, based on the highest percentage of its aggregated annual payroll within the four-digit NAICS code. Companies with an assigned six-digit NAICS code beginning with “11” or “61” were removed from the sampling frame at this point, and their R&D and associated data are not included in the tabulations. The industry used for sampling purposes was not necessarily the same code used for publication; see section “[Postsampling Industry Classification.](#)”

## Stratification of the Sampling Frame

Each company in an industry sampling stratum was further assigned to one of three R&D groups based on information about its prior domestic R&D activity: (1) companies with a positive value for the measure of size based on R&D (*known positive R&D group*), (2) companies with a zero value for the measure of size based on R&D (*known zero R&D group*), and (3) companies with unknown R&D activity (*unknown R&D group*). For the 2020 BERD Survey, there were 31,500 companies in the first group, 36,500 companies in the second group, and 1,071,000 companies in the third group, for a total of 1,139,000 companies ([table A-1](#)).

## Sample Selection

In the known positive R&D group, Pareto probability-proportional-to-size (PPS) sampling was used within each noncertainty industry stratum, where the probability of selection was proportional to the company’s measure of size. In the unknown R&D group, Pareto PPS sampling was used within most industry strata; simple random sampling (SRS) was used instead of Pareto PPS for industries in which the number of companies in the sampling frame was high and the likelihood of R&D was low. For both the known positive and unknown groups, a separate stratum was created for companies with fewer than 25 employees, regardless of industry. Pareto PPS sampling was used within these strata. In the known zero R&D group, a single Pareto PPS sample was selected across all industry strata. Each sampling stratum had a certainty and noncertainty portion ([table A-2](#)). Across all three groups (known positive, known zero, and unknown), companies in select industries and companies that exhibited characteristics of having large R&D amounts, including those with the largest annual payroll, were selected for the sample with certainty (i.e., the probability of selection was equal to 1). The probability of selection for other companies in the known positive R&D and unknown R&D groups depended on their size, the number of companies selected, and the total size or number of companies in their strata. The number of companies selected was based on a coefficient of variation constraint on the estimated sample total for the stratum and was increased, if necessary, to ensure that the minimum probability of selection is 0.05 for the known positive R&D group and one of six values for the unknown R&D group: 0.004, 0.01, or 0.02 for Nonmanufacturing industries (NAICS other than 31–33) and Incomplete manufacturers (incomplete NAICS beginning with 3), depending on the population size and likelihood of R&D; 0.04 for Printing and related support activities manufacturing (NAICS 323), Furniture and related product manufacturing (NAICS 337), and Computer systems design and related services (NAICS 5415); 0.02 for the remaining Manufacturing (NAICS 31–33) industries; and 0.05 for the companies with fewer than 25 employees. For companies in the known zero R&D group, the probability of selection depended on their size and the number of companies selected. The number of companies selected was based on a coefficient of variation constraint and was increased, if necessary, to ensure that the minimum probability of selection is 0.02.

Once selected, each company was assigned a sampling weight equal to the reciprocal of its probability of selection for the sample. Companies that were selected for the sample with certainty were assigned sampling weights equal to 1, and companies that were selected using SRS or Pareto PPS sampling were assigned weights ranging from 1 to 250. A complete and detailed description of the sample design and estimation methodology is given in the annual BERD Survey methodology report available from the NCSSES project officer.

## Sample Size

Using the sample design parameters detailed above, a total of 47,500 companies were selected, of which 20,500 companies were in the known positive R&D group, 2,200 companies were in the known zero R&D group, and 24,500 companies were in the unknown R&D group ([table A-3](#) and [table A-4](#)). A complete and detailed description of the selection of additional sampling units is given in the annual BERD Survey methodology report available from the NCSSES project officer.

During the survey's annual contact update procedures, 150 large R&D performers from the 2019 sample were found that were not included on the 2020 sampling frame. The primary reasons for this are mergers, acquisitions, or other company structure changes that cause a difference between a company's current Business Register ID and its prior year survey ID—in this case, its ID in the 2019 BERD file. To follow up with these companies, they were added to the 2020 sample with certainty, and 150 companies were mailed a survey letter. Because it was expected that many of these records would not contribute to 2020 BERD Survey tabulations due to changes in company structure, these companies are not included in sampling frame counts or sample sizes ([table A-5](#)).

## Data Collection and Processing Methods

Starting in the 2017 cycle, an initial letter was mailed to all companies instructing them to report via the Census Bureau's Centurion data collection instrument. Paper questionnaires were mailed by respondent request only and during a later nonresponse follow-up for delinquent companies. For paper versus electronic response rates, see section "[Response by Mode](#)."

### Questionnaires

Beginning in the 2017 cycle, all companies completed the same questionnaire, BRD-1, which combined the standard form BRDI-1 and the abbreviated form BRDI-1(S) used in prior cycles ([table A-6](#)). Companies that reported less than \$1 million in R&D paid for by the company or less than \$1 million in R&D funded by others completed abbreviated worksheet(s) in lieu of more detailed questions asked of companies with \$1 million or more in R&D. As was the case in previous cycles, some companies with decentralized records requested a special reporting arrangement with the Census Bureau. Under this arrangement, the survey form was mailed to multiple operating units within the same company, and each Alternate Reporting Unit (ARU) completed the survey individually. The data for these ARUs were also tabulated separately in published estimates and were not consolidated at the company level ([table A-7](#)).

Because of the potential compartmentalization of organizational knowledge within companies (particularly in larger companies), the BERD Survey questionnaire was organized into sections based on the subject matter of the questions. These sections included the following:

**Section 1. Company information.** Includes basic questions about company ownership, lines of business, sales, and employee data.

**Section 2. R&D paid for by your company.** Includes geographic location and accounting questions about the company's R&D expenses.

**Section 3. Costs paid for by others.** Includes accounting questions about R&D paid for by others, such as the company's customers or grant-giving organizations.

**Section 4. Capital expenditures.** Includes questions on capital expenditures for R&D.

**Section 5. Management and strategy of R&D.** Includes questions related to the characteristics and focus of the company's R&D. This section was targeted toward company employees responsible for managing R&D departments or programs.

**Section 6. Human resources.** Includes questions related to the human resources involved in the company's R&D activities.

**Section 7. Intellectual property and technology transfer.** Includes questions on the company's production, use, acquisition, and disposition of intellectual property related to science and technology (S&T), with a focus on patents.

**Section 8. Tax topics.** Includes questions on filing federal and state tax credits for research activities.

For specific differences among the BERD Survey questionnaires, see section [“Data Comparability \(Changes\).”](#)

## Response Rates

### **Unit Response Rates**

Of the companies surveyed for the 2020 survey, 31% did not submit any response, and an additional 2% did not provide enough information to be treated as responses. Nonresponse studies are conducted periodically to assess reasons for nonresponse and possible nonresponse bias. Three metrics used by NCSSES and the Census Bureau to measure unit response to the BERD Survey were check-in rates, unit response rates (URRs), and coverage rates.

**Check-in rate.** The check-in rate is defined as the unweighted number of surveys that were either submitted online or mailed in by in-scope companies, divided by the unweighted total number of all in-scope companies in the sample. Response to individual questions did not factor into this metric.

**Coverage rate.** BERD Survey managers track a coverage rate that is a weighted measure of survey response based on the measure of size at the time of sample selection. The coverage rate measures how much of the weighted measure of size for in-scope companies in the sample is accounted for by respondents to the survey.

**Unit response rate (URR).** The URR is the unweighted number of responding companies with positive data for at least one of the survey's key items (i.e., worldwide R&D expenses or R&D costs funded by others, worldwide or domestic sales, or worldwide or domestic employees), divided by the unweighted total number of in-scope companies in the sample.

For the 2020 BERD Survey, the check-in rate was 69%, and the URR was 67%. The coverage rate for the 2020 BERD Survey was 92% for the known positive R&D group, 65% for the unknown R&D group, and 78% for the known zero R&D group ([table A-8](#) and [table A-9](#)).

### **Item Response Rates**

The BERD Survey collects data for over 500 variables, and the distribution of values reported by sample companies is highly skewed. Thus, rather than report unweighted item response rates, total quantity response rates are calculated, which are based on weighted data.

**Total quantity response rate (TQRR).** For a given published estimate other than count or ratio estimates, TQRR is the percentage of the weighted estimate based on data that were reported by units in the sample or on data that were obtained from other sources and were determined to be equivalent in quality to reported data. The TQRR for total R&D performed in the United States in 2020 was 70.

**Total quantity nonresponse rate (TQNR).** For a given published estimate, TQNR, defined as 100% minus TQRR, is calculated for each tabulation cell from the BERD Survey, except for cells that contain count or ratio estimates. TQNR measures the combined effect of the procedures used to handle unit and item nonresponse on the weighted BERD Survey estimate. TQNR tables giving imputation rates corresponding to each data table are available from the NCSSES project officer. Also see section “[Item Nonresponse](#).”

### **Response by Mode**

Overall, more than 99% of checked-in cases responded to the BERD Survey by using the online version of the survey and less than 1% responded by mailing in the paper form. Lastly, more than 97% of checked-in companies with account managers—that is, the top R&D companies (based on prior year reported or imputed data) that were assigned an analyst to act as a single point of contact for all communications—responded using the online version of the survey.

### **Data Editing**

Given the size and complexity of the BERD Survey, many survey responses included errors that required correction or had unusual patterns that required validation. Several hundred automated edit checks were programmed to improve the efficiency of analyst data review and correction ([table A-10](#)).

Approximately two-thirds of these edit checks were designed to catch arithmetic errors and logically inconsistent responses (*balance edits*). The remaining edit checks were designed to flag outliers for further analyst review (*analytical edits*). Descriptions of the data edits and edit failure rates are in annual methodology reports that are available from the NCSSES project officer.

During the editing and review process, several cases were identified where companies reported zero R&D or a relatively small amount of R&D, even though subject-matter experts expected large amounts of R&D to be reported. Some of these companies were contract research organizations or federal contractors that did not account for the costs they incurred while conducting customer-sponsored research as R&D; instead, they accounted for these as the cost of sales. The largest of these companies were contacted by analysts and asked to resubmit their surveys. In rare cases, if no response could be elicited from a company and public information was available related to costs for customer-sponsored R&D, those data were used to impute an R&D estimate for that company.

### **Techniques for Handling Unit and Item Nonresponse**

For various reasons, many firms chose to return the survey questionnaire with one or more blank items. For some firms, internal accounting systems and procedures may not have allowed quantification of specific expenditures. Others may have refused to answer any questions as a matter of company policy. Weighted estimates produced from the BERD Survey include adjustments to account for companies that did not respond to the survey (*unit nonresponse*) and for companies that did respond but left some questions blank (*item nonresponse*).

### **Unit Nonresponse**

The BERD Survey accounts for unit nonresponse by multiplying each company’s sampling weight by a nonresponse adjustment factor. To calculate the adjustment factors, each company in the sample that is eligible for tabulation is assigned to one (and only one) adjustment cell. The adjustment cells are based on the three R&D groups, which are subdivided according to R&D size and certainty status and also on the industry sampling strata described in the section “[Stratification of the Sampling Frame](#)” that are updated using information on industry classification reported in the BERD Survey. For a given adjustment cell, the nonresponse adjustment factor is the ratio of the sum of the weighted measure of size for all companies in the cell to the sum of the weighted measure of size for all companies in the cell with reported or imputed data. The measure of size used to select the sample for the 2020 BERD Survey (see section “[Sampling Frame](#)”) was also used to adjust for unit nonresponse. For companies in the known positive R&D stratum, the measure of size was based on R&D in the United States. For companies in the unknown R&D stratum, the measure of size was based on total

annual payroll in the United States. For companies in the known zero R&D stratum, a value of “1” was assigned as the measure of size so that a company’s sample weight alone would be part of each cell’s adjustment factor. Beginning in survey year 2018, this unit nonresponse adjustment was also applied to counts, patents, patent licensing agreements, and intellectual property protection. In previous survey years, no such adjustment was applied to those items.

R&D estimates for geographic areas outside the largest countries, states, and core-based statistical areas (CBSAs) that are dominated by a relatively small number of companies are particularly sensitive to changes in survey response because these areas may not be similarly represented by companies in the same adjustment cell.

### ***Item Nonresponse***

Item nonresponse for a given company is handled by item imputation. For account manager companies, large companies, and special cases, analysts impute these data using direct substitution of available company data (e.g., data from the company’s website, annual Form 10-K report, or administrative sources) or other methods determined appropriate by NCSSES’s and the Census Bureau’s subject-matter experts. For other cases, including cases where analysts were unable to provide a superior estimate, data are imputed by programmed item imputation procedures. Depending on the particular item being imputed for a company, these procedures are based on a combination of (1) direct substitution of available company data, (2) ratio imputation using the company’s survey data for both the current and prior year, and (3) ratio imputation using survey data from both the company and other similar companies, which reported both the survey item being imputed for the company and the other survey item used in the ratio. Tables of imputation rates corresponding to each data table are available from the NCSSES project officer.

### **Estimation**

The general methodology used to produce estimates from the BERD Survey involves sums of weighted data (reported or imputed) in which the weights are the product of the sampling weight and the nonresponse adjustment factor. However, there are some exceptions, which are described below.

### ***Weighting***

Estimates published for the BERD Survey are computed as sums of weighted data for sample companies that reported to the survey or for sample companies for which data could be reliably imputed based on prior reports or other information. Two types of weights are used for estimates of R&D: sampling weights, and nonresponse adjustment factors. The *sampling weight* for a given company is calculated as the reciprocal of the company’s probability of inclusion in the sample. *Nonresponse adjustment factors* are used to represent companies in the sample that did not provide sufficient response data to be directly tabulated and whose data could not be imputed. For information on the calculation of the nonresponse adjustment factors, see section “[Unit Nonresponse](#).”

Each value that contributes to a given BERD Survey estimate is multiplied by both its sampling weight and its nonresponse adjustment factor, and these weighted values are then summed to create the estimate. Beginning in survey year 2018, the nonresponse adjustment factor was also applied to estimates of counts, patents, and patent licensing agreements. In prior survey years, the adjustment was not applied to those items.

### ***Postsampling Industry Classification***

As mentioned in the section “[Industry Classification for Sampling](#),” the industry classification assigned to companies for sampling was based on either reported BERD Survey business segment data from prior years or annual payroll. To produce more accurate estimates for the current survey year, a company’s reported business code, if available for the current survey year, was used to assign an updated industry code for tabulations. The company’s response to the domestic R&D performance questions from the current survey year was used to classify each company into the business

code that accounted for the largest amount of total domestic R&D performance. The business codes reported by companies with large amounts of R&D were validated, and in some cases corrected, by survey staff. If no business code data were available for a company's domestic R&D performance, the industry code used for sampling was also used for tabulations.

### ***R&D, by Core-Based Statistical Area (CBSA) or State***

CBSA-level estimates of business R&D are modeled using BERD Survey data reported by companies on the address of each of their largest R&D locations and administrative data from the Census Business Register on the payroll for each business establishment in the United States. The weighted amount of company R&D is apportioned to CBSAs within states using the same hybrid estimator method used for state estimates (below). Current BERD Survey methodology cannot attribute all R&D to a specific location. For example, R&D reported by companies that did not respond to geographic questions and for whom no method was available to impute locations is not assigned to a location. This R&D was performed in one of the 50 U.S. states or the District of Columbia, but the specific location is not estimated and is reported as "undistributed" in BERD Survey tables.

The estimation methodology for state estimates 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.

R&D estimates for CBSAs and states that are dominated by a relatively small number of companies are particularly sensitive to changes in both unit and item response. Because companies rarely publish detailed information about the geographic location of their R&D operations, it is difficult to identify and correct erroneous responses to these questions. And, as noted earlier, the method used to correct for unit nonresponse relies on data from companies in the same industry or size category. These peer companies may report relatively less (or no) R&D in the geographic areas where a nonresponsive company performs R&D.

### ***R&D, by Business Segment Code***

To provide increased granularity on R&D activities, the BERD Survey includes questions asking companies to report data for business units below the company level. To support subcompany reporting, a list of business codes based on NAICS was provided in the BERD Survey for companies to use to categorize their business operations. The list of business codes for the 2020 cycle of the BERD Survey was based on the 2017 NAICS. To assist companies in selecting appropriate business codes, likely business codes were provided to respondents by prepopulating them on the online version of the survey and by printing them on the forms mailed to companies. For companies that reported to the 2017 BRDIS or 2018 BRDS, the most recent business codes reported by the company were used to provide the business codes. For companies that did not report to the 2017 BRDIS or 2018 BRDS, establishment payroll data from the Business Register were used to provide the business codes.

### ***Company Counts***

The BERD Survey is designed primarily to produce valid, useful estimates of *money amounts* related to the performance and funding of R&D. Because this is the survey's focus, estimation of meaningful *company counts* is difficult. Consequently, throughout the history of the survey there have been various efforts to calculate frequencies more precisely. The following is a summary of the results of recent efforts.

Beginning in survey year 2019, company count estimates reflect a change in rounding methodology. Beginning in survey year 2018, a weight adjustment to account for unit nonresponse was implemented for company counts; as a result, company count estimates are not comparable with survey years prior to 2018.



The company count estimates for 2017 are not comparable with those for 2016 for two reasons. First, the target population for 2017 was restricted to companies with 10 or more domestic employees, whereas the 2016 survey population included companies with 5 or more employees. Second, no adjustment is applied to count estimates to correct for unit nonresponse, and overall response to the survey declined from 2016 to 2017.

The company count estimates for 2014 and onward are not comparable with estimates published for previous years. BRDIS review and correction procedures were amended beginning in survey year 2014 to include a more systematic analysis of companies reporting small amounts of R&D (less than \$10,000) and no R&D employees. Many of these responses were determined to be reporting errors (false-positive R&D), and their R&D was set to zero. These corrections had a negligible impact on BRDIS R&D estimates compared to earlier years. But because these companies tended to have high sample weights, these corrections had a large impact on the estimate of R&D-active companies compared to prior years (when many fewer such corrections were made).

### ***Revision of Capital Expenditure Estimates***

Review of BERD capital expenditures data in calendar year 2021 uncovered cases where reported or imputed R&D capital expenditures (CAPEX) were unrealistically high, resulting in inflated overall survey estimates. As a result of this review, a number of changes were made to the editing and imputation of CAPEX and total domestic capital expenditures (TCPEX). Survey managers determined that the magnitude of these changes warranted the recalculation of CAPEX estimates for several prior statistical periods. The revised estimates are reflected in the internationally comparable [table 70](#) through [table 87](#).

In addition to an overall escalation in the priority placed on the review of these data by survey staff, the following specific procedures were implemented to improve the quality of BERD estimates of CAPEX and TCPEX:

1. Use of total domestic capital expenditures data from the Census Bureau's Annual Capital Expenditures Survey (ACES) when companies report TCPEX amounts significantly smaller than estimated in ACES.
2. Imputing values of CAPEX for respondents that report the same value for CAPEX as they do for either domestic R&D expenditures (DOEXP) or domestic R&D performance.
3. Flagging cases where reported CAPEX exceeds DOEXP for additional subject-matter expert review. Erroneous CAPEX values will be replaced with imputed values.
4. Excluding influential outliers from the imputation bases for CAPEX. Imputation for CAPEX relies on industry ratios of reported CAPEX to reported TCPEX. These ratios can be highly influenced by outliers.

### ***Tabulation Eligibility***

Beginning in survey year 2018, companies that performed or funded less than \$50,000 of R&D were excluded from tabulation. In prior years, companies that performed or funded any amount of R&D were tabulated. This change has affected the comparability of these estimates to those published for years prior to 2018. These companies in aggregate represented a very small share of total R&D expenditures in prior years, but they accounted for a larger share of count estimates. Had the companies under this threshold been included in the 2020 estimates, they would have contributed approximately \$130 million to overall R&D expenditures and would have added approximately 9,300 companies to the estimated count of U.S. companies with R&D expenditures.

## Survey Quality Measures

### Sampling and Nonsampling Errors

The estimates produced from the BERD Survey are subject to both sampling and nonsampling errors. Sampling error is the difference between estimates obtained from the sample and results theoretically obtainable from a comparable complete enumeration of the sampling frame. This error results because only a subset of the sampling frame is measured in a sample survey. For published estimates from the BERD Survey, standard errors are produced for estimated percentages, while relative standard errors (RSEs) are produced for all other estimates. Tables of the estimated measures of sampling variability corresponding to each data table are available from the NCSSES project officer.

Standard errors may be used to define confidence intervals about the corresponding estimates with a desired level of confidence. If a confidence interval were constructed for each possible sample that could be selected using the same sample design, then it would be expected that the percentage of confidence intervals containing the result of a complete enumeration of the sampling frame would equal the percentage of the level of confidence. For example, the interval defined by a margin of error of 2 standard errors yields a confidence interval of approximately 95%.

Because relatively few companies perform R&D in the United States, and because the amount of R&D they perform is quite variable, it is difficult to achieve control over the sampling error of survey estimates produced from the BERD Survey. This depends on the correlation between the measure of size on the sampling frame that was used to assign the selection probabilities and the actual data that are collected in the BERD Survey, which cannot be predicted accurately for all companies when the sample is designed. However, the companies known to perform the greatest amounts of R&D are included in the sample with certainty so that these companies will not contribute to the sampling error of the resulting estimates produced from the BERD Survey.

The sample size is sufficiently large that estimates based on the total sample are subject to low sampling error. However, because priority in designing the sample was given to industries that were identified in previous surveys as conducting large amounts of R&D expenditures, the sampling error may be larger for estimates for the lower-priority industries. The RSE for the estimate of total domestic R&D performed by the company was 0.66% in 2020.

Potential nonsampling errors include coverage error and various response and operational errors, such as errors during data collection, reporting errors, transcription errors, and bias due to nonresponse. These are errors that could also occur if a complete enumeration of the sampling frame had been conducted under the same conditions as the sample survey. Most of the important operational errors were detected and corrected during the course of reviewing the data for reasonableness and consistency. Though nonsampling error is not measured directly, quality control procedures were employed throughout the survey process to minimize this type of error.

### Measurement Error

Variations in respondent interpretations of the definitions of R&D activities and variations in accounting procedures are of particular concern—specifically, the characterization and reporting of R&D activities by large defense contractors funded by the U.S. federal government; the reporting of R&D activities by companies classified in the Scientific R&D services industry (NAICS 5417); and the method used by companies, in general, to count and report numbers of employees in various categories, such as the number of employees who work full time versus part time on R&D. The sophistication and comprehensiveness of a company's accounting and personnel tracking systems often depend on its size and activities and on its willingness to accommodate government-sponsored surveys. While no metric of measurement error is produced, ongoing efforts to minimize measurement error include questionnaire pretesting, improvement of questionnaire wording and format, inclusion of more cues and examples in the questionnaire instructions, in-person and telephone interviews and consultations with respondents, and post-survey evaluations.

## Data Comparability (Changes)

The statistics resulting from this survey are intended primarily as *indicators* of absolute levels of R&D spending and personnel. Nevertheless, the statistics are often taken to be a continuous time series prepared using the same collection, processing, and tabulation methods. Although estimating the business portion of the nation's R&D enterprise accurately has always been the goal, such strict uniformity has not been the case. Since the survey was first fielded, improvements have been made to increase the reliability of the statistics and to make the survey results more useful. To that end, past practices have been changed and new procedures instituted. Preservation of the comparability of the statistics has, however, been an important consideration in making these improvements. Nonetheless, changes to survey coverage and definitions, the industry classification system, estimation methods, and the procedure used to assign industry codes to multi-establishment companies, which are documented in the annual reports, may have affected the comparability of the statistics. Among the most demonstrable changes are those made to the questionnaires, and those changes are summarized below.

### Differences between the 2019 BERD and 2020 BERD Survey Questionnaires

The following changes were made to the 2020 BERD Survey from the 2019 BERD Survey:

- Questions on the contact information of the person primarily responsible for completing each section were added to the end of each section.
- A follow-up question was added to the ownership question asking whether the new owner of the sampled company is a holding company or a private equity firm.
- Question on details of R&D performed by others was cycled off.
- Question on activities with academia was cycled off.
- Question on business code(s) in which the company performed R&D and was paid for by others was cycled off.
- Question on federal R&D by government agency was cycled off.
- Question on federal R&D by types of agreements was cycled off.
- Question on source of funds for domestic R&D funded by others was added to the section 3 worksheet.
- Questions on R&D application areas were cycled off.
- Questions on patents, intellectual property, and technology transfer were rotated back on.

### Differences between the 2018 BRDS and 2019 BERD Survey Questionnaires

The following changes were made to the 2019 BERD Survey from the 2018 BRDS:

- Questions on patents, intellectual property, and technology transfer were cycled off.
- A question on filing for state tax credit for research activities in 2019 was added.

### Differences between the 2017 BRDS and 2018 BRDS Questionnaires

The following changes were made to the 2018 BRDS from the 2017 BRDS:

- A question on land acquisition capital expenditures for R&D operations was added.
- Questions related to R&D on artificial intelligence (AI) were added.
- Questions asking for country and state location of employees and R&D employees were added.

- A question asking for counts of temporary and leased employees working on R&D was added.

### Differences between the 2016 BRDIS and 2017 BRDS Questionnaires

The following changes were made to the 2017 BRDS from the 2016 BRDIS:

- Questions on product and process innovation were removed.
- A question on whether R&D paid for by the company included customer-sponsored R&D was added.
- Questions on R&D funded by foreign governments or agencies and R&D funded by universities and colleges located outside the United States were added.
- A question on whether any capital expenditures for R&D were funded, paid for, or reimbursed by others not owned by your company was added.

### Differences between the 2015 and 2016 BRDIS Questionnaires

The following changes were made to the 2016 BRDIS from the 2015 BRDIS:

- Questions on royalties and licensing fees were added to both the R&D paid for by the company and the R&D paid for by others type-of-cost sections.
- Questions on the type of worldwide R&D paid for by the company were added to Form BRDI-1(S).
- Questions on the type of worldwide R&D paid for by others were added to Form BRDI-1(S).
- A question on all other contract R&D services paid for by customers was added to Form BRDI-1(S).
- A question on R&D performed by universities, colleges, and academic researchers located inside the United States was added, while a question on R&D performed by foreign governments was removed.
- A question on R&D funded by universities, colleges, and academic researchers located inside the United States was added, while a question on R&D funded by foreign governments was removed.
- A question on whether utility patent sales and licensing revenues were received from companies or organizations outside the United States was added to Form BRDI-1.
- A question on whether utility patent purchases and licensing payments were made to companies or organizations outside the United States was added to Form BRDI-1.
- A question on whether the company filed for the tax credit for increasing research activities (IRS Form 6765) in tax year 2016 was added to Form BRDI-1.
- Questions on the importance of intellectual property protections were removed.

### Differences between the 2014 and 2015 BRDIS Questionnaires

The following changes were made to the 2015 BRDIS from the 2014 BRDIS:

- A question on phase IV clinical trials was added to Form BRDI-1.
- A question on R&D performed by others that was paid for by U.S. federal government agencies or laboratories was added to Form BRDI-1.
- Questions on the type of foreign R&D paid for and performed by the company were added to Form BRDI-1.
- Questions on the type of foreign R&D performed by the company but paid for by others were added to Form BRDI-1.

- A question on nonprovisional utility patents was added to Form BRDI-1.
- Questions related to R&D in photonics and optics application areas were removed from Form BRDI-1.

### Differences between the 2013 and 2014 BRDIS Questionnaires

The following changes were made to the 2014 BRDIS from the 2013 BRDIS:

- A question on monetary gifts to universities or colleges restricted to supporting R&D was added to Form BRDI-1.
- A question on revenue received from patent licensing was added to Form BRDI-1.
- A question on purchasing patents from others was added to Form BRDI-1.
- A question on licensing patents from others was added to Form BRDI-1.
- One business code was added to the list of business codes collected on the survey: 33333, Digital cameras manufacturing. In prior years, this line of business was included in the business code 33412, Computers and peripheral equipment manufacturing and magnetic and optical media.
- Questions related to patenting were removed from Form BRDI-1(S).
- Questions related to innovation were added to Form BRDI-1(S).

### Differences between the 2012 and 2013 BRDIS Questionnaires

The following changes were made to the 2013 BRDIS from the 2012 BRDIS:

- The list of countries for which foreign R&D performance data were collected was expanded by three: Hungary, Luxembourg, and Norway.
- A question was restored asking the amount of R&D that the company plans to recoup through indirect charges on U.S. federal government contracts (independent R&D). This question was last asked on the 2010 BRDIS.
- Questions on R&D for software products and R&D for embedded software were combined.
- A question on R&D for software products and embedded software paid for by the federal government was added.
- A question related to the educational attainment of scientists and engineers was restored. This question was last asked on the 2010 BRDIS.
- Two business codes were added to the list of business codes collected on the survey: 32542, Biotechnology-based pharmaceutical and biological products (except diagnostics), and 51801, Cloud computing applications and Internet-based software services.
- Delinquent companies in the known positive R&D stratum for the past two survey cycles were sent Form BRD-1(S) to see if they would report at least the high-level numbers.

### Differences between the 2011 and 2012 BRDIS Questionnaires

For 2012, a much shorter (8-page) version of the short form, BRD-1(S), was implemented. The form included 19 high-level-detail items on worldwide sales; domestic sales; R&D expenses funded both by the company and by others; employment both worldwide and domestic, including R&D employment; and patents applied for and issued. Companies that reported \$1 million or more of domestic R&D performance were then sent the long form (BRDI-1) for additional details. The BRD-1(S) form was sent to companies in the unknown and known zero R&D strata. In section 2, the questionnaire collected the additional detail categories for capital expenditures. In section 3, four agencies were added to the type of

agency question so as to reduce the amount reported in the All other category. In section 4, the percentage of R&D that was directed toward business areas or product lines new to the respondent's company and also the percentages that pertain to defense applications, health or medical applications, or agricultural applications were added for R&D funded by the company and R&D funded by others.

### Differences between the 2010 and 2011 BRDIS Questionnaires

For the 2011 data collection, the innovation questions and instructions in section 1 were changed based on the results of the 2010 experiment. Cycling continued for data items that were not needed every year. The survey was expanded in several ways to address data gaps: the list of countries in which companies could report foreign R&D performance was expanded, a question was added to collect intracompany R&D transactions, and questions were added about companies' second-largest R&D location. In addition, questions pertaining to full-time equivalent (FTE) R&D scientists and engineers were revised to improve respondent understanding of survey concepts.

### Differences between the 2009 and 2010 BRDIS Questionnaires

For the 2010 data collection, the most notable changes made to the questionnaire were the inclusion of a one-time section (section 7) on R&D time frame and R&D product life, the inclusion of an experiment testing the impact of different innovation questions and instructions, and the addition of a survey supplement to collect detailed information from companies reporting R&D paid for by others. In addition, questions and instructions about company ownership were expanded to clarify, especially for foreign-owned companies, the information that should be reported on the survey. Cycling began for data items that were not needed every year from every company. These items will be returned to the questionnaire cyclically, depending on the demand for and quality of the collected data. Finally, data items that were poorly reported during the first two cycles of BRDIS were deleted.

The section titled "R&D Time Frame and R&D Product Life" was added for the 2010 cycle to aid in estimating the depreciation of R&D when it is treated as an investment in the U.S. System of National Accounts.

An experiment testing the impact of different innovation questions and instructions used two versions of the BRDIS short form. The innovation questions on the 2010 Form BRDI-1A were identical to questions used on the 2009 Form BRDI-1A, and the 2010 Form BRDI-1B altered the questions and instructions to replicate innovation questions on the European Union's Community Innovation Survey. The experiment did not produce statistically significant differences in measured rates of innovation.

### Differences between the 2008 and 2009 BRDIS Questionnaires

Several changes were made to the 2009 BRDIS questionnaire—in part, to address reporting errors observed during the 2008 survey cycle. These changes included the following:

- A screening question at the beginning of the form asking companies whether they had R&D activity during the reporting period was removed.
- Exclusion instructions in the main R&D expense question were replaced with a series of targeted questions. This approach was based on the premise that the economic concepts requested by BRDIS do not always conform to the R&D measures tracked by companies. Rather than directly asking for concepts that may diverge from respondent preconceptions about R&D, the approach in 2009 guided respondents to derive amounts that conformed to the BRDIS definition of R&D.
- Instructions in the question about R&D paid for by others were replaced with a series of targeted questions.
- Data for R&D performed by others were derived rather than collected directly. For the 2009 cycle of BRDIS, R&D performed by others was the sum of two R&D costs known to be tracked by companies: payments to business partners for collaborative R&D and purchased R&D services.

- The order of the “Management and Strategy of R&D” and the “Financial Schedule B” (R&D paid for by others) sections was switched.

## Definitions

**Capital expenditure.** Capital expenditures are payments by a business for assets that usually have a useful life of more than 1 year, like buildings, equipment, or software. The value of assets acquired or improved through capital expenditures is recorded on a company’s balance sheet. 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 would be included in its R&D expense. Data are collected in the BERD Survey for capital expenditures for R&D operations for land acquisition, structures, equipment, capitalized software, and other items.

**Core-based statistical area (CBSA).** A CBSA is a U.S. geographic area that consists of one or more counties (or equivalents) anchored by an urban center of at least 10,000 people plus adjacent counties that are socioeconomically tied to the urban center by commuting. CBSAs are defined by OMB in the Executive Office of the President.

**Employment, total and R&D.** Involves the number of people employed by R&D-performing or R&D-funding companies in all locations, both foreign and domestic, during the pay period that included 12 March of the survey year. (The date 12 March is what most employers use when paying first-quarter employment taxes to IRS.) R&D employees are those who provide direct support to R&D, such as researchers, R&D managers, technicians, clerical staff, and others assigned to R&D groups. Those not included are employees who provide indirect support to R&D, such as corporate personnel, security guards, and cafeteria workers. In addition to providing head counts of total and R&D employees, the BERD Survey also produces estimates of FTE domestic R&D employment. This is 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.

**Employment, leased and temporary.** The number of people who work for R&D-performing or R&D-funding companies, but who are not considered employees of the reporting company. These workers perform tasks similar to the reporting companies’ own employees but are technically employed by another company (such as a temp or staffing agency or a consulting firm) or are independent on-site consultants.

**Expense and R&D expense.** Involves money spent or costs incurred in an organization’s efforts to generate revenue, representing the cost of doing business. Expenses may be in the form of actual cash payments (such as wages and salaries), a computed expired portion of an asset (depreciation), or an amount taken out of earnings (such as bad debts). Expenses are summarized and charged in the income statement as deductions from the income before assessing income tax. Whereas all expenses are costs, not all costs are expenses (e.g., costs incurred in acquisition of income-generating assets—see the definition of *capital expenditure* above). R&D expense is the cost of R&D funded by the company itself and performed within the respondent company’s facilities, both foreign and domestic, or performed by others outside of the company under contract, subcontract, grant, or other funding arrangement.

**R&D and business R&D.** 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*). R&D includes both *direct costs*, such as salaries of researchers, and *administrative and overhead costs* clearly associated with the company’s R&D. However, R&D does not include expenditures for routine product testing, quality control, and technical services unless they are an integral part of an R&D project. R&D also does not include market research; efficiency surveys or management studies; literary, artistic, or historical projects, such as films, music, or books and other publications; and prospecting or exploration for natural resources.

**R&D, artificial intelligence (AI).** AI is a branch of computer science and engineering devoted to making machines intelligent. Intelligence is that quality that enables an entity to perceive, analyze, determine response, and act appropriately in its environment.

Systems with AI perform functions including, but not limited to, speech recognition, machine vision, or machine learning:

- Speech recognition transforms human speech into a format useful for computer applications (e.g., a digital assistant).
- Machine vision uses sensors and software that allow images to be used as an input for computer applications (e.g., systems that sort or inspect objects or support navigation in mobile equipment).
- Machine learning uses statistical software and data to “learn” and make better predictions without reprogramming (e.g., recommender systems for websites, or sales and demand forecasting).

AI technologies also include virtual agents, deep learning platforms, decision management systems, biometrics, text analytics, and natural language generation and processing.

**R&D, biotechnology.** Biotechnology is the application of S&T to living organisms, as well as parts, products, and models thereof, to alter living or nonliving materials for the production of knowledge, goods, and services. The following list provides examples of areas of biotechnology in which R&D may be performed.

- DNA or RNA: genomics; pharmacogenomics; gene probes; genetic engineering; DNA or RNA sequencing, synthesis, or amplification; gene expression profiling; and use of antisense technology, large-scale DNA synthesis, genome editing and gene editing, and gene drive
- Proteins and other molecules: sequencing, synthesis, or engineering of proteins and peptides (including large-molecule hormones); improved delivery methods for large molecule drugs; proteomics; protein isolation and purification; signaling; and identification of cell receptors
- Cell and tissue culture and engineering: cell or tissue culture, tissue engineering (including tissue scaffolds and biomedical engineering), cellular fusion, vaccine or immune stimulants, embryo manipulation, marker-assisted breeding technologies, and metabolic engineering
- Process biotechnology techniques: fermentation using bioreactors, biorefining, bioprocessing, bioleaching, biopulping, bioleaching, biodesulfurization, bioremediation, biosensing, biofiltration and phytoremediation, and molecular aquaculture
- Gene and RNA vectors: gene therapy and viral vectors
- Bioinformatics: construction of databases on genomes, protein sequences, and modeling complex biological processes, including systems biology
- Nanobiotechnology: application of the tools and processes of nano- or microfabrication to build devices for studying biosystems and applications in, for example, drug delivery or diagnostics

**R&D, domestic.** R&D performed in the 50 U.S. states and the District of Columbia. *Adjusted* domestic R&D is calculated in tables designed to enable comparisons between U.S. BERD Survey statistics and those of other nations ([table 70](#) through [table 87](#)). There are three types of tables corresponding to the three principal measures of domestic R&D in the U.S. BERD Survey—that is, R&D paid for by the respondent company and others outside of the company and performed by the respondent company, R&D paid for and performed by the respondent company, and R&D paid for by others and performed by the company. In each table, an internationally comparable adjusted domestic R&D estimate is calculated by subtracting



depreciation relating to R&D operations, which is *included* in U.S. BERD Survey domestic R&D, and adding capital expenditures relating to R&D operations, which is *excluded* from U.S. BERD Survey domestic R&D. Also shown in each table are the differences between the U.S. BERD Survey estimates in this report and the adjusted internationally comparable estimates for domestic R&D.

**R&D intensity, or R&D-to-sales ratio.** R&D intensity is a ratio, expressed as a percentage, calculated by dividing the cost of R&D by sales. The ratio serves as an indicator of the relative incidence of R&D among groups of companies, primarily among industries and company size classifications. In this report, R&D intensity ratios are calculated in various ways, depending on the measure of R&D (R&D paid for by the respondent company, paid for by others outside of the company, or both) and whether the respondent company performs and funds or only performs R&D.

**R&D, nanotechnology.** The understanding of processes and phenomena and the application of S&T to organisms and to organic and inorganic materials—as well as parts, products, and models thereof—at the nanometer scale (but not exclusively below 100 nanometers) in one or more dimensions, where the onset of size-dependent phenomena usually enables novel applications. These applications utilize the properties of nanoscale material that differ from the properties of individual atoms, molecules, and bulk matter for the production of knowledge, goods, and services, like improved materials, devices, and systems that exploit these new properties. The following list provides examples of areas of nanotechnology in which R&D may be performed.

- Nanomaterial: material with any external dimension in the nanoscale or having internal structure or surface structure in the nanoscale
- Nanoelectronics: field of S&T concerned with the development and production of functional electronic devices with nanoscale components
- Nanophotonics: branch of photonics concerned with interaction of photons with nanomaterials aiming to design optical or optoelectronic components
- Nanomedicine: medical application of nanotechnology (e.g., medical application of nanomaterials and biological devices, nanoelectronics biosensors, and possible future applications of molecular nanotechnology, such as biological machines)
- Nanomagnetism: the study of the magnetic response of nanomaterials to an applied magnetic field and their applications
- Nanomechanics: a branch of nanoscience studying fundamental mechanical (elastic, thermal, and kinetic) properties of physical systems at the nanometer scale
- Nanofiltration: a membrane filtration process used for the softening of water and the removal of organic matter; includes nanomembranes
- Nanotools: multicomponent tools and devices used for manipulation, nanolithography, and nanofabrication
- Nanoinstruments or nanodevices: multicomponent instruments or devices used for observation, analysis, or control of matter at the nanometer scale
- Nanomanufacturing: intentional synthesis generation of control of nanomaterials, or fabrication steps in the nanoscale, for commercial purposes

**R&D paid for by others, worldwide and domestic.** The cost of R&D funded by others outside of the company, including the U.S. federal government, and performed within the respondent company's facilities, both foreign and domestic.

**R&D paid for by the company and others, worldwide and domestic.** The cost of R&D funded by the company or by others outside of the company and performed within the respondent company's facilities, both foreign and domestic, or performed by others outside of the company under contract, subcontract, grant, or other funding arrangement.

**R&D performed by the company, worldwide and domestic.** The cost of R&D performed within the respondent company's facilities, both foreign and domestic, funded by the company itself or by others outside of the company.

**R&D performed by the company and others, worldwide and domestic.** The cost of R&D performed within the respondent company's facilities, both foreign and domestic, or performed by others outside of the company under contract, subcontract, grant, or other funding arrangement.

**R&D performed by others, worldwide and domestic.** The cost of R&D funded by the company or by others outside of the company and performed by others outside of the company under contract, subcontract, grant, or other funding arrangement.

**R&D, software and Internet.** R&D activity in software and Internet applications refers only to activities that have an element of uncertainty and that are intended to close knowledge gaps and meet scientific and technological needs. This item is reported in this survey regardless of the eventual user (internal or external). R&D activity in software includes software development or improvement activities that expand scientific or technological knowledge and construction of new theories and algorithms in the field of computer science. R&D activity in software excludes software development that does not depend on a scientific or technological advance, such as supporting or adapting existing systems, adding functionality to existing application programs, routine debugging of existing systems and software, creating new software based on known methods and applications, converting or translating existing software and software languages, and adapting a product to a specific client, unless knowledge that significantly improved the base program was added in that process.

**Sales, worldwide and domestic.** Dollar values for goods sold or services rendered by R&D-performing or R&D-funding companies located in the 50 U.S. states and the District of Columbia to customers outside 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 companies are included. Excluded are intracompany transfers, returns, allowances, freight charges, and excise, sales, and other revenue-based taxes.

## Data Availability

### Publications

The data from the BERD Survey can be found online at <https://www.nsf.gov/statistics/industry/>. Detailed historical statistics from the predecessor survey, SIRD, can be obtained from NCSES's Industrial Research and Development Information System at <https://www.nsf.gov/statistics/iris/>. Information from the BERD Survey is also included in *Science and Engineering Indicators* and in *National Patterns of R&D Resources*.

### Electronic Access

BERD 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 Census, 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>.

## Disclosure Avoidance

*Disclosure* is the release of data that reveals information or permits deduction of information about a particular survey unit through the release of either tables or microdata. *Disclosure avoidance* is the process used to protect each survey unit's identity and data from disclosure. Using disclosure avoidance procedures, the Census Bureau modifies or removes the characteristics that put information at risk of disclosure. Although it may appear that a table shows information about a specific survey unit, the Census Bureau has taken steps to disguise or suppress a unit's data that may be "at risk" of disclosure while making sure the results are still useful.

The BERD Survey uses cell suppression and rounding to avoid disclosing information about a particular company. *Cell suppression* is a disclosure avoidance technique that protects the confidentiality of individual survey units by withholding cell values from release and replacing the cell value with a data code, usually a "D" or an estimate range. If the suppressed cell value were known, it would allow one to estimate an individual survey unit's value too closely.

The cells that must be protected are called *primary suppressions*. To make sure the cell values of the primary suppressions cannot be closely estimated by using other published cell values, additional cells may also be suppressed. These additional suppressed cells are called *complementary suppressions*. The process of suppression does not usually change the higher-level totals. Values for cells that are not suppressed remain unchanged. Before the Census Bureau releases data, computer programs and analysts ensure that primary and complementary suppressions have been correctly applied.

The Census Bureau has reviewed the data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied. For the 2020 tabular statistics, the approval ID was CBDRB-FY22-125, on 14 February 2022.

## Technical Tables

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Table	Title
A-1	Target population counts, by frame partition: 2008–20
A-2	Companies in the target population and selected for the sample, by industry and company size: 2020
A-3	Sample size, by frame partition: 2008–20
A-4	Companies sampled, by sampling stratum: 2020
A-5	Companies included in the survey that were not in the original sampling frame: 2008–20
A-6	Survey letters mailed, by sampling stratum: 2020
A-7	Survey letters mailed for companies with subcompany reporting units, by sampling stratum: 2020
A-8	Response measures: 2008–20
A-9	Unit response rates, by industry and company size: 2020
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TABLE A-1

**Target population counts, by frame partition: 2008–20**

(Number of companies)

Year	Total <sup>a</sup>	Known positive R&D	Known zero R&D	Unknown R&D
2008	1,926,012	16,059	75,923	1,834,030
2009	2,090,181	22,181	79,031	1,988,969
2010	2,013,399	24,723	67,281	1,921,395
2011	1,964,757	27,049	73,930	1,863,778
2012	1,971,731	29,512	73,004	1,869,215
2013	1,971,959	34,482	70,032	1,867,445
2014	1,998,858	35,532	79,343	1,883,983
2015	2,029,436	35,839	71,386	1,922,211
2016	1,485,151	34,958	11,355	1,438,838
2017	1,097,510	32,206	27,679	1,037,625
2018	1,115,834	33,215	34,158	1,048,461
2019	1,124,000	32,000	37,500	1,055,000
2020	1,139,000	31,500	36,500	1,071,000

<sup>a</sup> For each year, the estimate of the number of companies in the total target population is based on the original sampling frame that was created to select the sample. The target population estimates in this table do not include R&D performers from the previous year's sample, which were not on the original sampling frame but were found during the survey's annual contact update procedures. See [table A-5](#) for the counts of companies that were added to each year's sample.

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Companies were said to be known to conduct R&D (*known positive R&D*) if they reported positive R&D in any of the previous 5 survey years. For survey years 2008–2015, companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 5 survey years and no positive R&D in any of the 5 years. Beginning in survey year 2016, companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 3 survey years and no positive R&D in any of the previous 5 survey years. Companies were said to be *unknown* if no R&D information was available. For survey year 2016, the target population did not include companies in the Other nonmanufacturing industry with fewer than 10 domestic employees. Starting in survey year 2017, the target population no longer includes companies with fewer than 10 domestic employees.

**Source(s):**

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

TABLE A-2

**Companies in the target population and selected for the sample, by industry and company size: 2020**

(Number of companies)

Industry and company size	NAICS code	Companies in target population <sup>a</sup>	Companies selected for the sample		
			All companies	Noncertainties	Certainties
All industries	21-23, 31-33, 42-81	1,139,000	47,500	22,500	25,000
Manufacturing industries	31-33	97,000	18,500	8,600	10,000
Food	311	9,400	1,200	600	550
Beverage and tobacco products	312	3,600	450	300	150
Textile, apparel, and leather products	313-16	3,700	550	350	200
Wood products	321	4,900	600	400	200
Paper	322	1,500	400	200	200
Printing and related support activities	323	5,900	950	600	400
Petroleum and coal products <sup>b</sup>	324	350	200	30	150
Chemicals	325	5,200	2,200	550	1,600
Basic chemicals	3251	700	300	90	200
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	550	200	60	150
Pesticide, fertilizer, and other agricultural chemicals	3253	300	150	30	100
Pharmaceuticals and medicines	3254	1,600	900	100	800
Soap, cleaning compound, and toilet preparation	3256	800	200	100	100
Paint, coating, adhesive, and other chemicals	3255, 3259	1,200	400	150	250
Plastics and rubber products	326	4,800	1,000	500	550
Nonmetallic mineral products	327	3,900	550	300	200
Primary metals	331	1,700	450	200	250
Fabricated metal products	332	20,500	2,300	1,400	900
Machinery	333	9,400	2,100	900	1,100
Agricultural implement	33311	550	200	40	150
Semiconductor machinery	333242	90	90	0	90
Engine, turbine, and power transmission equipment	3336	400	150	30	150
Other machinery	other 333	8,400	1,600	850	800
Computer and electronic products	334	4,800	1,700	500	1,200
Communications equipment	3342	600	250	50	200
Semiconductor and other electronic components	3344	1,800	500	200	300
Navigational, measuring, electromedical, and control instruments	3345	1,800	750	250	500
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	350	200	30	150
Search, detection, navigation, guidance, aeronautical, and nautical systems and instruments	334511	250	100	D	100
Other measuring and controlling devices	other 3345	1,300	450	200	250
Other computer and electronic products	other 334	600	200	30	150
Electrical equipment, appliances, and components	335	2,200	600	350	300
Transportation equipment	336	4,800	1,200	350	850

TABLE A-2

**Companies in the target population and selected for the sample, by industry and company size: 2020**

(Number of companies)

Industry and company size	NAICS code	Companies in target population <sup>a</sup>	Companies selected for the sample		
			All companies	Noncertainties	Certainties
Motor vehicles, bodies, trailers, and parts	3361-63	3,000	650	200	450
Aerospace products and parts	3364	850	300	70	250
Aircraft, aircraft engine, and aircraft parts	336411-13	800	250	70	200
Guided missile, space vehicle, and related parts	336414, 336415, 336419	50	50	D	50
Military armored vehicle, tank, and tank component	336992	30	20	0	20
Other transportation equipment	other 336	900	200	70	150
Furniture and related products	337	4,300	850	450	400
Miscellaneous manufacturing	339	6,500	1,300	550	700
Medical equipment and supplies	3391	2,400	550	150	400
Other miscellaneous	3399	4,100	750	400	350
Unclassified	-	60	50	0	50
Nonmanufacturing industries	21-23, 42-81	1,040,000	26,500	14,000	12,500
Mining, extraction, and support activities	21	5,000	600	300	300
Utilities	22	800	200	40	150
Wholesale trade	42	67,000	5,400	3,700	1,700
Electronic shopping and electronic auctions	454111-12	5,300	500	350	150
Transportation and warehousing	48-49	36,000	750	150	600
Information	51	16,500	3,600	1,400	2,100
Publishing	511	5,500	1,300	600	750
Newspaper, periodical, book, and directory publishers	5111	2,400	400	200	200
Software publishers	5112	3,100	900	350	550
Telecommunications	517	2,600	500	300	250
Data processing, hosting, and related services	518	3,500	1,100	300	850
Other information	other 51	4,900	550	300	250
Finance and insurance	52	26,000	1,200	200	1,000
Real estate and rental and leasing	53	25,500	500	150	400
Lessors of nonfinancial intangible assets (except copyrighted works)	533	450	90	D	90
Other real estate and rental and leasing	other 53	25,000	450	150	300
Professional, scientific, and technical services	54	100,000	7,400	4,000	3,400
Architectural, engineering, and related services	5413	18,000	2,700	1,700	1,100
Computer systems design and related services	5415	16,500	3,000	1,700	1,300
Scientific research and development services	5417	2,600	2,600	0	2,600
Research and development in nanotechnology	541713	90	90	0	90
Research and development in biotechnology (except nanobiotechnology)	541714	700	700	0	700

TABLE A-2

**Companies in the target population and selected for the sample, by industry and company size: 2020**

(Number of companies)

Industry and company size	NAICS code	Companies in target population <sup>a</sup>	Companies selected for the sample		
			All companies	Noncertainties	Certainties
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,700	1,700	0	1,700
Research and development in the social sciences and humanities	541720	150	150	0	150
Other professional, scientific, and technical services <sup>c</sup>	other 54	66,000	1,700	700	1,000
Health care services	621-23	114,000	2,000	550	1,400
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	643,000	4,100	2,900	1,200
Unclassified	-	350	150	D	150
<b>Company size (number of domestic employees)</b>					
All companies	-	1,139,000	47,500	22,500	25,000
< 10 <sup>d</sup>	-	8,300	400	150	250
10-19	-	560,000	10,000	7,800	2,300
20-49	-	367,000	10,000	7,000	3,200
50-99	-	111,000	6,600	3,700	2,900
100-249	-	59,500	7,400	2,900	4,500
250-499	-	17,000	4,000	750	3,200
500-999	-	8,100	4,000	50	4,000
1,000-4,999	-	6,500	3,600	60	3,500
5,000-9,999	-	900	600	20	550
10,000-24,999	-	600	400	D	400
25,000 or more	-	350	300	D	250

D = suppressed to ensure confidentiality of individual companies.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Estimates of the number of companies in the target population are based on the original sampling frame that was created to select the 2020 Business Enterprise Research and Development (BERD) Survey sample. These estimates do not include 150 R&D performers from the previous year's sample, which were not on the original sampling frame but were found during the survey's annual contact update procedures. These companies were added to the 2020 sample with certainty but are not reflected in the number of certainties selected for the sample.

<sup>b</sup> Because of the widespread practice of the larger petroleum extraction and refining companies vertically integrating their activities, Petroleum refineries (NAICS 32411) and Oil and gas extraction (NAICS 211) were combined during sampling.

<sup>c</sup> Contains companies classified in Scientific research and development services (NAICS 5417) that, as of sampling, were not fully classified to the level of detail in Research and development in nanotechnology (NAICS 541713), Research and development in biotechnology (except nanobiotechnology) (NAICS 541714), Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology) (NAICS 541715), or Research and development in the social sciences and humanities (NAICS 541720).

<sup>d</sup> This category includes companies that are represented on the sampling frame as having missing data, but these companies are in scope to the BERD because they have at least \$500,000 in annual payroll.



**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Certainities are companies whose probability of selection is 1 based on prior year R&D expenditures equal to or greater than \$3 million as well as others included in the sample for analytical purposes (analytical certainities). Noncertainties are companies whose probability of selection is less than 1. Companies that were missing or had an incomplete NAICS code at the time of sampling were assigned to an Unclassified industry category temporarily. If an unclassified company reported R&D expenditures, its primary industrial activity was investigated and a NAICS code was assigned during statistical processing.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE A-3

**Sample size, by frame partition: 2008–20**

(Number of companies)

Year	Total	Known positive R&D	Known zero R&D	Unknown R&D
2008	39,553	11,103	3,156	25,294
2009	43,002	14,343	3,443	25,216
2010	42,965	14,399	3,150	25,416
2011	43,108	14,941	3,385	24,782
2012	43,655	16,188	3,527	23,940
2013	45,089	17,690	3,531	23,868
2014	44,162	16,959	3,861	23,342
2015	44,824	17,602	3,484	23,738
2016	44,861	18,184	1,058	25,619
2017	44,978	17,737	2,112	25,129
2018	45,690	20,115	2,265	23,310
2019	45,500	20,000	2,300	23,500
2020	47,500	20,500	2,200	24,500

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Companies were said to be known to conduct R&D (*known positive R&D*) if they reported positive R&D in any of the previous 5 survey years. For survey years 2008–2015, companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 5 survey years and no positive R&D in any of the 5 years. Beginning in survey year 2016, companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 3 survey years and no positive R&D in any of the previous 5 survey years. Companies were said to be *unknown* if no R&D information was available.

**Source(s):**

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

TABLE A-4

**Companies sampled, by sampling stratum: 2020**

(Number of companies)

Stratum	Total
Total	47,500
Known positive R&D	20,500
Certainties	16,000
Noncertainties	4,400
Known zero R&D	2,200
Certainties	1,500
Noncertainties	750
Unknown R&D	24,500
Certainties	7,400
Noncertainties	17,500

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Companies were said to be known to conduct R&D (*known positive R&D*) if they reported positive R&D in any of the previous 5 survey years. Companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 3 survey years and no positive R&D in any of the previous 5 survey years. Companies were said to be *unknown* if no R&D information was available.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE A-5

**Companies included in the survey that were not in the original sampling frame: 2008–20**

(Number of companies)

Year	Known positive R&D
2008	336
2009	18
2010	49
2011	42
2012	54
2013	44
2014	37
2015	52
2016	90
2017	93
2018	111
2019	150
2020	150

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. This table shows the counts of companies that were found during the update procedures, were added to each year's sample, and were mailed a survey letter. These company counts are not in [table A-2](#).

**Source(s):**

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

TABLE A-6

**Survey letters mailed, by sampling stratum: 2020**

(Number)

Stratum	Total
Total	47,000
Known positive R&D	20,500
Certainties	16,000
Noncertainties	4,300
Known zero R&D	2,200
Certainties	1,500
Noncertainties	750
Unknown R&D	24,500
Certainties	7,200
Noncertainties	17,500
Cases not in the frame	150

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Beginning in survey year 2017, an initial letter was mailed to all companies that instructed them to report online using the unique authentication code printed on the letter. Companies were said to be known to conduct R&D (*known positive R&D*) if they reported positive R&D in any of the previous 5 survey years. Companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 3 survey years and no positive R&D in any of the previous 5 survey years. Companies were said to be *unknown* if no R&D information was available.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE A-7

**Survey letters mailed for companies with subcompany reporting units, by sampling stratum: 2020**

(Number of companies)

Stratum	Sent one form	Sent multiple forms <sup>a</sup>
Total	47,000	100
Known positive R&D	20,500	100
Certainties	16,000	100
Noncertainties	4,300	D
Known zero R&D	2,200	0
Certainties	1,500	0
Noncertainties	750	0
Unknown R&D	24,500	0
Certainties	7,200	0
Noncertainties	17,500	0
Cases not in the frame	150	0

D = suppressed to ensure confidentiality of individual companies.

<sup>a</sup> Under special arrangement with the Census Bureau, and to facilitate reporting, the Business Enterprise Research and Development Survey used multiple survey forms to separately survey portions of some companies. This special arrangement extends to holding companies to facilitate reporting among the operating units. The number of companies does not include companies that made special reporting arrangements with the Census Bureau after the initial mailout.

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Beginning in survey year 2017, an initial letter was mailed to all companies that instructed them to report online using the unique authentication code printed on the letter. Companies were said to be known to conduct R&D (*known positive R&D*) if they reported positive R&D in any of the previous 5 survey years. Companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 3 survey years and no positive R&D in any of the previous 5 survey years. Companies were said to be *unknown* if no R&D information was available.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

TABLE A-8

**Response measures: 2008–20**

(Percent)

Measure	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Check-in rate <sup>a</sup>	79.5	74.9	75.1	73.7	78.6	74.3	73.3	80.1	80.5	75.6	74.0	72	69
Response rate (unweighted) <sup>b</sup>	74.2	73.1	71.4	71.1	77.1	73.6	72.5	79.6	80.2	74.5	72.8	69	67
Coverage rate for known positive sampling strata (using weighted R&D) <sup>c</sup>	91.4	91.5	87.7	86.0	91.4	90.4	91.0	93.0	92.6	92.4	90.5	92	92
Coverage rate for unknown sampling strata (using weighted payroll) <sup>c</sup>	79.9	75.0	76.2	76.7	84.2	77.7	78.1	84.3	73.4	73.6	71.6	68	65
Coverage rate for known zero sampling strata (using unweighted counts) <sup>c</sup>	77.2	78.7	74.5	76.0	82.7	80.7	80.4	83.4	88.0	80.0	80.3	79	78

<sup>a</sup> The number of survey responses from in-scope companies divided by the total number of in-scope companies in the sample.

<sup>b</sup> The number of responding companies with worldwide R&D expenses or costs funded by others or the number of responding companies with worldwide or domestic sales or worldwide or domestic employees (if R&D was zero) divided by the total number of in-scope companies in the sample.

<sup>c</sup> Based on the same numerator and denominator as the response rate, but each company's measure of size at the time of sample selection is taken into account.

**Note(s):**

Beginning in survey year 2019, these percentages reflect a change in rounding methodology.

**Source(s):**

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

TABLE A-9

## Unit response rates, by industry and company size: 2020

(Number and percent)

Industry and company size	NAICS code	Active reporting units <sup>a</sup>	Reporting units that met the response criteria <sup>b</sup>		Reporting units that met the response criteria and reported domestic R&D paid for by the company and others and performed by the company of \$1 million or more	
			Number	Percent	Number	Percent
All industries	21-23, 31-33, 42-81	44,500	30,000	67	7,400	17
Manufacturing industries	31-33	18,000	12,500	69	4,100	23
Food	311	1,100	800	73	200	18
Beverage and tobacco products	312	400	300	75	30	8
Textile, apparel, and leather products	313-16	550	350	64	50	9
Wood products	321	600	400	67	20	3
Paper	322	350	250	71	40	11
Printing and related support activities	323	900	600	67	20	2
Petroleum and coal products	324	150	100	67	30	20
Chemicals	325	2,200	1,700	77	1,000	45
Basic chemicals	3251	300	250	83	100	33
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	200	150	75	50	25
Pesticide, fertilizer, and other agricultural chemicals	3253	150	90	60	30	20
Pharmaceuticals and medicines	3254	1,000	800	80	700	70
Soap, cleaning compound, and toilet preparation	3256	200	150	75	50	25
Paint, coating, adhesive, and other chemicals	3255, 3259	400	250	63	90	23
Plastics and rubber products	326	1,000	700	70	200	20
Nonmetallic mineral products	327	500	350	70	50	10
Primary metals	331	450	300	67	60	13
Fabricated metal products	332	2,100	1,500	71	300	14
Machinery	333	2,000	1,400	70	500	25
Agricultural implement	33311	150	100	67	40	27
Semiconductor machinery	333242	80	50	63	30	38
Engine, turbine, and power transmission equipment	3336	150	100	67	30	20
Other machinery	other 333	1,600	1,100	69	400	25
Computer and electronic products	334	1,700	1,100	65	650	38
Communications equipment	3342	250	150	60	100	40



TABLE A-9

## Unit response rates, by industry and company size: 2020

(Number and percent)

Industry and company size	NAICS code	Active reporting units <sup>a</sup>	Reporting units that met the response criteria <sup>b</sup>		Reporting units that met the response criteria and reported domestic R&D paid for by the company and others and performed by the company of \$1 million or more	
			Number	Percent	Number	Percent
Semiconductor and other electronic components	3344	500	300	60	200	40
Navigational, measuring, electromedical, and control instruments	3345	750	500	67	300	40
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	150	100	67	70	47
Search, detection, navigation, guidance, aeronautical, and nautical systems and instruments	334511	100	70	70	40	40
Other measuring and controlling devices	other 3345	450	300	67	150	33
Other computer and electronic products	other 334	200	150	75	80	40
Electrical equipment, appliances, and components	335	600	450	75	200	33
Transportation equipment	336	1,200	800	67	350	29
Motor vehicles, bodies, trailers, and parts	3361-63	650	400	62	200	31
Aerospace products and parts	3364	300	200	67	100	33
Aircraft, aircraft engine, and aircraft parts	336411-13	250	150	60	90	36
Guided missile, space vehicle, and related parts	336414-15, 336419	50	40	80	20	40
Military armored vehicle, tank, and tank component	336992	20	20	100	D	D
Other transportation equipment	other 336	200	150	75	50	25
Furniture and related products	337	800	550	69	50	6
Miscellaneous manufacturing	339	1,300	900	69	400	31
Medical equipment and supplies	3391	550	400	73	250	45
Other miscellaneous	3399	700	500	71	150	21
Nonmanufacturing industries	21-23, 42-81	26,500	17,500	66	3,400	13
Mining, extraction, and support activities	21	600	400	67	30	5
Utilities	22	150	150	100	20	13
Wholesale trade	42	4,800	3,200	67	90	2
Electronic shopping and electronic auctions	454111-12	450	250	56	20	4
Transportation and warehousing	48-49	750	450	60	30	4
Information	51	3,500	2,300	66	1,100	31
Publishing	511	1,200	750	63	300	25
Newspaper, periodical, book, and directory publishers	5111	400	250	63	D	D

TABLE A-9

## Unit response rates, by industry and company size: 2020

(Number and percent)

Industry and company size	NAICS code	Active reporting units <sup>a</sup>	Reporting units that met the response criteria <sup>b</sup>		Reporting units that met the response criteria and reported domestic R&D paid for by the company and others and performed by the company of \$1 million or more	
			Number	Percent	Number	Percent
Software publishers	5112	850	500	59	300	35
Telecommunications	517	500	300	60	60	12
Data processing, hosting, and related services	518	1,300	950	73	700	54
Other information	other 51	500	300	60	80	16
Finance and insurance	52	1,100	850	77	100	9
Real estate and rental and leasing	53	500	300	60	D	D
Lessors of nonfinancial intangible assets (except copyrighted works)	533	70	40	57	D	D
Other real estate and rental and leasing	other 53	400	300	75	D	D
Professional, scientific, and technical services	54	8,800	5,900	67	1,600	18
Architectural, engineering, and related services	5413	2,600	2,000	77	350	13
Computer systems design and related services	5415	2,600	1,600	62	450	17
Scientific research and development services	5417	2,000	1,200	60	600	30
Research and development in nanotechnology	541713	90	50	56	20	22
Research and development in biotechnology (except nanobiotechnology)	541714	450	250	56	150	33
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,300	850	65	450	35
Research and development in the social sciences and humanities	541720	150	100	67	D	D
Other professional, scientific, and technical services	other 54	1,600	1,100	69	250	16
Health care services	621-23	1,900	1,200	63	70	4
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	3,800	2,600	68	200	5
All companies (number of domestic employees)	-	44,500	30,000	67	7,400	17
Small companies						
10-19 <sup>c</sup>	-	8,000	5,500	69	550	7
20-49	-	10,000	7,100	71	1,200	12
Medium companies						
50-99	-	6,500	4,400	68	1,000	15

TABLE A-9

**Unit response rates, by industry and company size: 2020**

(Number and percent)

Industry and company size	NAICS code	Active reporting units <sup>a</sup>	Reporting units that met the response criteria <sup>b</sup>		Reporting units that met the response criteria and reported domestic R&D paid for by the company and others and performed by the company of \$1 million or more	
			Number	Percent	Number	Percent
100–249	–	7,400	5,000	68	1,600	22
Large companies						
250–499	–	4,000	2,600	65	950	24
500–999	–	3,600	2,300	64	700	19
1,000–4,999	–	3,500	2,300	66	900	26
5,000–9,999	–	550	400	73	200	36
10,000–24,999	–	450	350	78	150	33
25,000 or more	–	250	200	80	100	40

D = suppressed to ensure confidentiality of individual companies.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Active reporting units are defined as reporting units of active companies that are in the scope of the survey (for-profit companies with locations in the United States, 10 or more employees, business activities in the survey year, and primary business activities in the NAICS codes listed above) after all of the data have been processed. Because of special handling requests made by company respondents, some sampled companies were mailed more than one form. A company having multiple reporting parts for data collection may contribute to the statistics for multiple industries, so detail may not add to total for number of companies.

<sup>b</sup> Reporting units were considered to have fulfilled the response criteria if they reported that they performed or funded R&D. If not, a reporting unit fulfilled the response criteria if it reported a value for worldwide sales or domestic sales, or if it reported a positive value for paid worldwide employees or paid domestic employees.

<sup>c</sup> The Business Enterprise Research and Development Survey does not include companies with fewer than 10 domestic employees.

**Note(s):**

Beginning in survey year 2019, these counts and percentages reflect a change in rounding methodology. 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, 2020.

TABLE A-10

**Companies that required an analyst action, by sampling stratum: 2020**

(Number)

Stratum	Total	Companies deleted <sup>a</sup>	Companies requiring action due to merger or acquisition <sup>b</sup>	Companies requiring action due to analyst review <sup>c</sup>
Total	3,000	2,900	100	D
Known positive R&D	800	750	60	D
Certainties	600	550	50	D
Noncertainties	250	250	D	0
Known zero R&D	70	70	D	0
Certainties	40	40	D	0
Noncertainties	30	30	D	0
Unknown R&D	2,100	2,000	40	D
Certainties	450	450	D	D
Noncertainties	1,600	1,600	30	D
Cases not in the frame	30	30	D	0

D = suppressed to ensure confidentiality of individual companies.

<sup>a</sup> Companies are deleted when they are found to be out of business or out of scope for the survey during the reporting period.

<sup>b</sup> Information regarding mergers and acquisitions comes from several sources. The information is collected on the form, and there is a presurvey contact that requests the information from top R&D-performing companies. Information may also come from the company profiles that are maintained by survey staff.

<sup>c</sup> These companies are added based on a review of historic R&D reported to the Business Enterprise Research and Development Survey and public information available on the companies' R&D expenses.

**Note(s):**

Beginning in survey year 2019, counts reflect a change in rounding methodology. Detail may not add to total because of rounding. Companies were said to be known to conduct R&D (*known positive R&D*) if they reported positive R&D in any of the previous 5 survey years. Companies were said to have *known zero R&D* if they reported zero R&D in at least 1 of the previous 3 survey years and no positive R&D in any of the previous 5 survey years. Companies were said to be *unknown* if no R&D information was available.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.

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