



National Center for Science and
Engineering Statistics

Annual Business Survey: 2023 (Data Year 2022)

Data Tables | NSF 25-303 | October 29, 2024

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General Notes

This report provides data from the 2023 Annual Business Survey (ABS) (data year 2022). The ABS is the primary source of data on research and development of for-profit, nonfarm businesses with one to nine employees operating in the 50 U.S. states and the District of Columbia. The ABS also collects data on innovation, technology, intellectual property, and business owner characteristics of businesses of all sizes. The ABS is designed to incorporate new content each survey year based on topics of relevance. The 2023 ABS is the sixth year of the ABS. The survey is conducted annually by the Census Bureau for the National Center for Science and Engineering Statistics within the U.S. National Science Foundation.

NCSES has reviewed this product for unauthorized disclosure of confidential information and approved its release (NCSES-DRN24-040).

This report is initially published with a selection of tables containing the core data of the survey. The report will be updated with additional tables as more detailed data become available. In some instances, the initial selection of tables may also be updated from a preliminary version to add further data.

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TABLE 1

Annual Business Survey aggregate R&D estimates, by questionnaire reference and company size, for companies with 1–9 employees in selected industries: 2022

(Thousands of U.S. dollars)

Company and financial information	All companies	1–4 employees	5–9 employees
Number of companies	14,353	9,012	5,341
Total R&D cost	7,616,415	3,573,847	4,042,568
Foreign R&D costs	900,658	537,958	362,700
Domestic R&D costs	6,715,757	3,035,889	3,679,867
Domestic R&D costs for salaries, wages, and fringe benefits	3,690,003	1,546,465	2,143,538
Domestic R&D costs for expensed machinery and equipment (not capitalized)	178,461	82,863	95,599
Domestic R&D costs for materials and supplies	610,277	245,127	365,150
Domestic R&D costs for payments to others for R&D	1,005,187	509,974	495,213
Domestic R&D costs for depreciation on R&D property and equipment	64,854	25,934	38,920
Domestic R&D costs for other costs	1,166,975	625,527	541,448
Domestic R&D performance	5,710,570	2,525,915	3,184,655
Domestic R&D performance paid for by the company	4,397,991	1,993,980	2,404,010
Domestic R&D performance paid for by foreign owner	194,028	89,382	104,646
Domestic R&D performance paid for by another U.S. business	297,357	93,867	203,490
Domestic R&D performance paid for by other businesses located outside the United States	40,302	18,773	21,528 r
Domestic R&D performance paid for by U.S. university or college	20,741	10,977	9,764
Domestic R&D performance paid for by U.S. nonprofit organization	13,423	6,137	7,286
Domestic R&D performance paid for by U.S. federal government	694,536	283,558	410,978
Domestic R&D performance paid for by U.S. state or local government	35,873	24,535	11,338
Domestic R&D performance paid for by all other organizations outside the United States	16,319	4,706	11,614
Domestic R&D performance for basic research	397,004	174,097	222,907
Domestic R&D performance for applied research	2,032,893	937,739	1,095,154
Domestic R&D performance for development	3,280,674	1,414,080	1,866,594
Domestic R&D performance paid for by U.S. federal government for basic research	45,077	18,968	26,109
Domestic R&D performance paid for by U.S. federal government for applied research	339,881	148,458	191,424
Domestic R&D performance paid for by U.S. federal government for development	309,578	116,132	193,446
Total capital expenditures	11,404,691	6,292,055 r	5,112,637
Total capital expenditures for R&D operations	340,811	163,402	177,409
Capital expenditures for R&D operations for land acquisition	327	238 r	89
Capital expenditures for R&D operations for buildings and land improvement	8,868	4,463	4,405
Capital expenditures for R&D operations for machinery and equipment	155,636	67,657	87,979
Capital expenditures for R&D operations for capitalized software	40,324	22,904	17,420
Capital expenditures for R&D operations for other intellectual property	37,277	19,589	17,688
Capital expenditures for R&D operations for all other costs	98,378	48,551	49,827

r = relative standard error > 50%.

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 R&D. Selected industries include the 2017 North American Industry Classification System sectors 31, 32, 33, 42, and 51 and industries 5413, 5415, and 5417.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 2

Total R&D cost, by selected industry and company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	14,353	7,616,415	9,012	3,573,847	5,341	4,042,568
Manufacturing industries	31–33	1,674	907,975	860	298,997	814	608,978
Food, beverage, and tobacco products	311–12	41	18,222	22	6,932	19	11,289
Textile, apparel, and leather products	313–16	13	9,268	8	1,264	5	8,005
Wood products	321	0	0	0	0	0	0
Paper	322	3	912	0	0	3	912
Printing and related support activities	323	0	0	0	0	0	0
Petroleum and coal products	324	1	202	1	202	0	0
Chemicals	325	275	269,478	149	105,857	126	163,621
Pharmaceuticals and medicines	3254	168	219,793	88	80,128	79	139,665
Chemicals, excluding pharmaceuticals	other 325	107	49,685	60	25,730	47	23,956
Plastics and rubber products	326	73	14,698	45	6,552	28	8,145
Nonmetallic mineral products	327	13	3,642	3	183	10	3,459
Primary metals	331	8	3,983	6	2,645	3	1,338
Fabricated metal products	332	99	46,559	51	10,043	47	36,516
Machinery	333	115	55,687	71	21,179	44	34,508
Computer and electronic products	334	624	198,193	325	74,439	299	123,754
Semiconductor and other electronic components	3344	134	52,464	79	24,163	55	28,300
Navigational, measuring, electromedical, and control instruments	3345	409	111,441	197	37,485	212	73,956
Other computer and electronic products	other 334	82	34,289	49	12,791	32	21,498
Electrical equipment, appliances, and components	335	90	17,504	41	6,195	49	11,309
Transportation equipment	336	68	44,175	25	12,672	43	31,503
Aerospace products and parts	3364	40	24,809	16	7,025	24	17,784
Other transportation equipment	other 336	28	19,366	9	5,647	19	13,719
Furniture and related products	337	3	212	0	0	3	212
Miscellaneous manufacturing	339	249	225,239	115	50,831	135	174,407
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	12,679	6,708,439	8,151	3,274,850	4,527	3,433,589
Wholesale trade	42	725	457,568	418	213,937	307	243,631
Information	51	2,134	907,155	1,192	419,883	942	487,271
Software publishers	5112	1,525	665,064	799	271,918	726	393,146
Information, excluding software publishers	51 less 5112	609	242,091	393	147,965	216	94,126
Architectural, engineering, and related services	5413	1,192	432,941	788	188,162	404	244,779
Computer systems design and related services	5415	5,194	1,739,815	3,529	904,152	1,665	835,663
Scientific research and development services	5417	3,433	3,170,961	2,225	1,548,716	1,209	1,622,245
Research and development in nanotechnology	541713	308	192,203	203	93,523	105	98,680

TABLE 2

Total R&D cost, by selected industry and company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)
Research and development in biotechnology (except nanobiotechnology)	541714	1,155	1,523,931	770	753,460	385	770,471
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,892	1,432,454	1,197	689,629	695	742,825
Social sciences and humanities research and development	541720	78	22,373	55	12,104	23	10,269

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 3

Total R&D cost, by selected industry and company size, for companies with 1–9 employees: 2019–22

(Thousands of U.S. dollars)

Industry	NAICS code	2019			2020			2021			2022		
		All companies	1–4 employees	5–9 employees	All companies	1–4 employees	5–9 employees	All companies	1–4 employees	5–9 employees	All companies	1–4 employees	5–9 employees
All selected industries	31–33, 42, 51, 5413, 5415, 5417	7,247,880	3,217,255	4,030,625	7,522,839	3,623,592	3,899,247	8,131,847	3,659,817	4,472,030	7,616,415	3,573,847	4,042,568
Manufacturing industries	31–33	891,188	415,797	475,391	822,687	359,533	463,154	990,325	415,218	575,107	907,975	298,997	608,978
Food, beverage, and tobacco products	311–12	6,315	4,218	2,096	20,378	r 16,061	r 4,317	r 19,097	r 7,987	r 11,109	r 18,222	r 6,932	r 11,289
Textile, apparel, and leather products	313–16	236	236	0	472	r 472	r 0	r 7,096	r 7,096	r 0	r 9,268	r 1,264	r 8,005
Wood products	321	4,065	0	4,065	0	0	0	138	138	0	0	0	0
Paper	322	0	0	0	0	0	0	0	0	0	912	r 0	r 912
Printing and related support activities	323	555	141	414	0	0	0	0	0	0	0	0	0
Petroleum and coal products	324	0	0	0	0	0	0	739	0	739	202	202	0
Chemicals	325	345,503	163,854	181,649	201,214	96,869	104,345	224,348	113,915	110,433	269,478	105,857	163,621
Pharmaceuticals and medicines	3,254	259,782	110,653	149,129	104,539	64,689	39,850	178,387	93,401	84,986	219,793	80,128	139,665
Chemicals, excluding pharmaceuticals	other 325	85,721	53,201	32,520	96,675	32,181	64,495	45,962	20,514	25,447	49,685	25,730	23,956
Plastics and rubber products	326	6,397	3,340	3,057	23,004	18,051	4,953	6,700	2,703	r 3,997	14,698	6,552	8,145
Nonmetallic mineral products	327	12,945	216	12,729	133	133	0	3,935	r 3,485	r 450	3,642	183	3,459
Primary metals	331	2,568	2,568	0	9,299	r 9,299	r 0	2,240	591	1,648	r 3,983	2,645	1,338
Fabricated metal products	332	20,594	9,950	10,644	59,474	r 387	r 59,087	r 16,827	r 10,196	r 6,631	r 46,559	r 10,043	r 36,516
Machinery	333	33,020	23,556	9,464	94,664	37,612	r 57,052	85,202	34,750	50,452	55,687	21,179	34,508
Computer and electronic products	334	279,725	146,657	133,068	237,090	101,714	135,376	372,243	109,934	262,308	198,193	74,439	123,754
Semiconductor and other electronic components	3,344	44,841	26,337	18,504	40,558	24,002	16,556	124,080	35,134	88,946	r 52,464	24,163	28,300
Navigational, measuring, electromedical, and control instruments	3,345	205,358	115,084	90,274	175,504	67,481	108,022	194,535	51,119	143,416	111,441	37,485	73,956
Other computer and electronic products	other 334	29,526	5,235	24,291	21,029	10,231	10,798	53,628	23,681	29,947	r 34,289	12,791	21,498
Electrical equipment, appliances, and components	335	13,243	8,404	4,839	32,026	r 27,642	r 4,383	42,416	8,593	33,824	17,504	6,195	11,309
Transportation equipment	336	31,730	24,976	6,754	40,780	12,035	28,745	36,232	21,551	14,681	44,175	12,672	31,503
Aerospace products and parts	3,364	15,341	10,107	5,234	21,446	11,007	10,439	13,976	8,486	5,489	24,809	7,025	r 17,784
Other transportation equipment	other 336	16,389	14,869	1,520	19,333	r 1,028	r 18,305	r 22,257	r 13,065	r 9,192	19,366	5,647	r 13,719
Furniture and related products	337	0	0	0	124	0	124	1,471	r 1,094	r 377	212	0	212
Miscellaneous manufacturing	339	134,291	27,680	106,611	104,028	39,257	64,770	r 171,640	93,184	r 78,456	225,239	50,831	174,407
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	6,356,692	2,801,458	3,555,234	6,700,152	3,264,059	3,436,093	7,141,522	3,244,599	3,896,923	6,708,439	3,274,850	3,433,589
Wholesale trade	42	407,800	105,774	302,027	517,963	188,633	329,331	r 172,456	40,464	131,992	457,568	213,937	243,631
Information	51	708,356	314,081	394,274	829,283	373,836	455,448	961,919	295,126	666,793	907,155	419,883	487,271
Software publishers	5,112	396,626	204,864	191,763	571,286	242,501	328,785	657,405	219,923	437,482	665,064	271,918	393,146
Information, excluding software publishers	51 less 5112	311,729	109,218	202,512	257,998	131,335	126,663	304,514	75,204	229,310	242,091	147,965	94,126
Architectural, engineering, and related services	5,413	507,143	303,247	203,896	628,231	286,122	342,109	667,715	278,295	389,420	432,941	188,162	244,779
Computer systems design and related services	5,415	1,848,184	910,765	937,419	1,473,927	879,174	594,753	1,975,063	1,043,298	931,765	1,739,815	904,152	835,663
Scientific research and development services	5,417	2,885,208	1,167,591	1,717,617	3,250,748	1,536,295	1,714,453	3,364,369	1,587,415	1,776,953	3,170,961	1,548,716	1,622,245
Research and development in nanotechnology	541,713	208,662	96,559	112,103	196,107	91,949	104,158	216,133	99,765	116,368	192,203	93,523	98,680

TABLE 3

Total R&D cost, by selected industry and company size, for companies with 1–9 employees: 2019–22

(Thousands of U.S. dollars)

Industry	NAICS code	2019			2020			2021			2022		
		All companies	1–4 employees	5–9 employees	All companies	1–4 employees	5–9 employees	All companies	1–4 employees	5–9 employees	All companies	1–4 employees	5–9 employees
Research and development in biotechnology (except nanobiotechnology)	541,714	1,174,789	496,758	678,031	1,548,115	757,706	790,409	1,491,139	731,902	759,238	1,523,931	753,460	770,471
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541,715	1,462,446	560,509	901,937	1,479,130	677,617	801,514	1,627,199	730,715	896,484	1,432,454	689,629	742,825
Social sciences and humanities research and development	541,720	37,089	11,544	25,546	27,396	9,023	18,373	19,297	14,434	4,864	22,373	12,104	10,269

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 4

Domestic R&D performed by the company, by selected industry and company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	13,868	5,710,570	8,698	2,525,915	5,170	3,184,655
Manufacturing industries	31–33	1,619	694,247	841	224,082	778	470,165
Food, beverage, and tobacco products	311–12	41	17,426	22	6,898	19	10,528
Textile, apparel, and leather products	313–16	13	9,268	8	1,264	5	8,005
Wood products	321	0	0	0	0	0	0
Paper	322	3	898	0	0	3	898
Printing and related support activities	323	0	0	0	0	0	0
Petroleum and coal products	324	1	159	1	159	0	0
Chemicals	325	265	168,564	146	71,854	119	96,710
Pharmaceuticals and medicines	3254	158	125,474	86	51,945	72	73,529
Chemicals, excluding pharmaceuticals	other 325	107	43,090	60	19,909	47	23,181
Plastics and rubber products	326	73	14,467	45	6,321	28	8,145
Nonmetallic mineral products	327	13	3,608	3	183	10	3,425
Primary metals	331	8	3,214	6	2,249	3	965
Fabricated metal products	332	99	44,875	51	10,043	47	34,832
Machinery	333	110	44,334	69	16,382	42	27,952
Computer and electronic products	334	614	171,928	318	60,842	296	111,087
Semiconductor and other electronic components	3344	131	46,427	79	20,910	52	25,517
Navigational, measuring, electromedical, and control instruments	3345	402	94,814	190	30,032	212	64,783
Other computer and electronic products	other 334	81	30,686	49	9,899	32	20,787
Electrical equipment, appliances, and components	335	88	14,597	40	5,395	48	9,201
Transportation equipment	336	65	36,738	25	9,792	41	26,946
Aerospace products and parts	3364	37	19,882	16	5,825	22	14,057
Other transportation equipment	other 336	28	16,856	9	3,967	19	12,889
Furniture and related products	337	3	212	0	0	3	212
Miscellaneous manufacturing	339	224	163,959	107	32,699	116	131,260
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	12,249	5,016,323	7,857	2,301,833	4,392	2,714,490
Wholesale trade	42	652	305,962	397	151,428	255	154,534
Information	51	1,972	653,665	1,046	271,111	926	382,554
Software publishers	5112	1,446	478,466	727	176,852	718	301,614
Information, excluding software publishers	51 less 5112	527	175,199	319	94,259	207	80,940
Architectural, engineering, and related services	5413	1,162	388,846	784	172,649	378	216,197
Computer systems design and related services	5415	5,082	1,414,970	3,447	672,996	1,635	741,974
Scientific research and development services	5417	3,380	2,252,879	2,182	1,033,648	1,198	1,219,231
Research and development in nanotechnology	541713	301	137,272	200	59,966	101	77,306

TABLE 4

Domestic R&D performed by the company, by selected industry and company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)
Research and development in biotechnology (except nanobiotechnology)	541714	1,138	1,010,361	753	483,401	385	526,960
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,863	1,085,263	1,174	479,979	689	605,284
Social sciences and humanities research and development	541720	78	19,984	55	10,303	23	9,682

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 5

Domestic R&D performed by the company, by selected industry and R&D program size, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	R&D program size (total)				
		Total	\$50,000–\$99,999	\$100,000–\$499,999	\$500,000–\$999,999	\$1 million or more
All selected industries	31–33, 42, 51, 5413, 5415, 5417	5,710,570	134,574	1,478,119	1,339,054	2,758,823
Manufacturing industries	31–33	694,247	21,328	162,931	123,657	386,331
Food, beverage, and tobacco products	311–12	17,426	0	3,568 r	13,859 r	0
Textile, apparel, and leather products	313–16	9,268 r	0	1,264 r	0	8,005 r
Wood products	321	0	0	0	0	0
Paper	322	898 r	0	898 r	0	0
Printing and related support activities	323	0	0	0	0	0
Petroleum and coal products	324	159	0	159	0	0
Chemicals	325	168,564	1,118	24,368	29,915	113,163
Pharmaceuticals and medicines	3254	125,474	493	13,495	12,122	99,364
Chemicals, excluding pharmaceuticals	other 325	43,090	625	10,873	17,793	13,799
Plastics and rubber products	326	14,467	3,263 r	7,555 r	3,648 r	0
Nonmetallic mineral products	327	3,608	0	616 r	2,992	0
Primary metals	331	3,214	113	857 r	965	1,280
Fabricated metal products	332	44,875	618 r	9,924 r	13,887 r	20,446 r
Machinery	333	44,334	951 r	16,270	5,287 r	21,827 r
Computer and electronic products	334	171,928	11,757	58,717	31,567	69,888
Semiconductor and other electronic components	3344	46,427	1,754	12,895	15,026	16,752
Navigational, measuring, electromedical, and control instruments	3345	94,814	8,875	39,296	8,222	38,421
Other computer and electronic products	other 334	30,686	1,128	6,525	8,318	14,715
Electrical equipment, appliances, and components	335	14,597	1,877	7,448	0	5,272
Transportation equipment	336	36,738	327 r	6,328	9,241	20,842
Aerospace products and parts	3364	19,882	79	1,895	6,367 r	11,541 r
Other transportation equipment	other 336	16,856	248 r	4,433	2,873 r	9,301 r
Furniture and related products	337	212	0	212	0	0
Miscellaneous manufacturing	339	163,959	1,305	24,747	12,297	125,610
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,016,323	113,246	1,315,188	1,215,397	2,372,492
Wholesale trade	42	305,962	3,020	51,592	82,410	168,940
Information	51	653,665	17,733	229,446	202,500	203,986
Software publishers	5112	478,466	13,642	160,016	166,765	138,043
Information, excluding software publishers	51 less 5112	175,199	4,091	69,429	35,736	65,943
Architectural, engineering, and related services	5413	388,846	11,656	144,991	148,668	83,531 r
Computer systems design and related services	5415	1,414,970	60,543	554,929	354,784	444,714
Scientific research and development services	5417	2,252,879	20,294	334,230	427,034	1,471,321
Research and development in nanotechnology	541713	137,272	1,653	32,065	31,670	71,883

TABLE 5

Domestic R&D performed by the company, by selected industry and R&D program size, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	R&D program size (total)				
		Total	\$50,000–\$99,999	\$100,000–\$499,999	\$500,000–\$999,999	\$1 million or more
Research and development in biotechnology (except nanobiotechnology)	541714	1,010,361	4,174	102,109	142,776	761,301
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,085,263	13,633	186,405	251,983	633,242
Social sciences and humanities research and development	541720	19,984	834	13,651	605	4,894

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 6

Domestic R&D costs, by selected industry and type of cost, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Salaries, wages, and fringe benefits	Expensed machinery and equipment	Materials and supplies	Payments to others for R&D	Depreciation on R&D property and equipment	All other costs
All selected industries	31–33, 42, 51, 5413, 5415, 5417	6,715,757	3,690,003	178,461	610,277	1,005,187	64,854	1,166,975
Manufacturing industries	31–33	871,014	343,316	42,082	139,093	176,767	11,744	158,012
Food, beverage, and tobacco products	311–12	18,162	7,296	3,628	1,416	736	35	5,052
Textile, apparel, and leather products	313–16	9,268	4,903	288	1,167	0	90	2,820
Wood products	321	0	0	0	0	0	0	0
Paper	322	912	670	38	21	13	0	169
Printing and related support activities	323	0	0	0	0	0	0	0
Petroleum and coal products	324	202	97	53	0	44	0	9
Chemicals	325	259,180	80,099	6,833	35,575	90,617	5,088	40,969
Pharmaceuticals and medicines	3254	210,352	54,308	3,922	29,689	84,878	3,177	34,379
Chemicals, excluding pharmaceuticals	other 325	48,828	25,791	2,912	5,885	5,739	1,911	6,590
Plastics and rubber products	326	14,698	7,299	1,408	3,141	231	229	2,390
Nonmetallic mineral products	327	3,642	2,782	215	484	34	101	26
Primary metals	331	3,709	1,453	447	467	496	27	818
Fabricated metal products	332	46,559	19,339	7,501	4,773	1,684	465	12,797
Machinery	333	44,908	25,046	2,649	7,649	574	189	8,801
Computer and electronic products	334	190,377	102,588	8,108	30,000	18,449	2,107	29,124
Semiconductor and other electronic components	3344	51,473	27,740	759	8,640	5,046	588	8,701
Navigational, measuring, electromedical, and control instruments	3345	107,299	57,354	4,448	15,960	12,484	1,019	16,034
Other computer and electronic products	other 334	31,605	17,494	2,902	5,400	919	500	4,389
Electrical equipment, appliances, and components	335	17,417	8,876	584	3,251	2,820	44	1,842
Transportation equipment	336	44,133	22,856	1,220	4,993	7,395	94	7,574
Aerospace products and parts	3364	24,767	12,036	1,072	2,105	4,885	52	4,616
Other transportation equipment	other 336	19,366	10,820	148	2,888	2,510	42	2,957
Furniture and related products	337	212	133	35	44	0	0	0
Miscellaneous manufacturing	339	217,634	59,879	9,074	46,111	53,675	3,275	45,620
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,844,743	3,346,687	136,379	471,184	828,420	53,110	1,008,963
Wholesale trade	42	382,712	183,835	7,665	38,741	76,750	3,741	71,980
Information	51	676,309	543,557	26,714	14,849	22,644	2,276	66,268
Software publishers	5112	495,336	418,082	6,098	10,630	16,870	1,362	42,294
Information, excluding software publishers	51 less 5112	180,973	125,475	20,616	4,219	5,774	915	23,974
Architectural, engineering, and related services	5413	412,244	264,122	14,118	43,252	23,398	1,164	66,191
Computer systems design and related services	5415	1,458,925	1,149,759	27,619	57,072	43,954	5,812	174,708
Scientific research and development services	5417	2,914,553	1,205,414	60,263	317,270	661,673	40,116	629,817
Research and development in nanotechnology	541713	171,764	84,760	4,773	18,271	34,492	2,029	27,438
Research and development in biotechnology (except nanobiotechnology)	541714	1,389,297	498,796	23,696	168,504	378,936	17,192	302,172

TABLE 6

Domestic R&D costs, by selected industry and type of cost, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Salaries, wages, and fringe benefits	Expensed machinery and equipment	Materials and supplies	Payments to others for R&D	Depreciation on R&D property and equipment	All other costs
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,331,941	606,424	31,614	129,598	246,678	20,477	297,149
Social sciences and humanities research and development	541720	21,551	15,433	180 r	896	1,567	418	3,058

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 7
Domestic R&D performed by the company, by selected industry and source of funds, for companies with 1–9 employees: 2022
 (Thousands of U.S. dollars)

Industry	NAICS code	Total	Paid for by the company	Foreign owner	Another U.S. company	Other businesses outside the United States	U.S. university or college	U.S. nonprofit organization	U.S. federal government	U.S. state or local government	All other organizations outside the United States
All selected industries	31–33, 42, 51, 5413, 5415, 5417	5,710,570	4,397,991	194,028	297,357	40,302	20,741	13,423	694,536	35,873	16,319
Manufacturing industries	31–33	694,247	565,191	5,420	21,436	3,087	2,105	2,374	91,538	3,008	88
Food, beverage, and tobacco products	311–12	17,426	15,187	0	0	0	0	279	1,857	103	0
Textile, apparel, and leather products	313–16	9,268	9,268	0	0	0	0	0	0	0	0
Wood products	321	0	0	0	0	0	0	0	0	0	0
Paper	322	898	898	0	0	0	0	0	0	0	0
Printing and related support activities	323	0	0	0	0	0	0	0	0	0	0
Petroleum and coal products	324	159	159	0	0	0	0	0	0	0	0
Chemicals	325	168,564	144,654	264	8,547	570	941	1,751	11,414	421	0
Pharmaceuticals and medicines	3254	125,474	107,319	264	7,732	226	761	1,751	6,998	421	0
Chemicals, excluding pharmaceuticals	other 325	43,090	37,335	0	815	344	180	0	4,416	0	0
Plastics and rubber products	326	14,467	14,319	0	148	0	0	0	0	0	0
Nonmetallic mineral products	327	3,608	3,428	0	0	90	90	0	0	0	0
Primary metals	331	3,214	1,647	0	0	0	0	0	1,567	0	0
Fabricated metal products	332	44,875	27,397	0	2,601	0	0	0	14,877	0	0
Machinery	333	44,334	33,487	0	3,702	145	0	0	7,001	0	0
Computer and electronic products	334	171,928	136,511	3,211	4,576	260	226	222	26,446	389	88
Semiconductor and other electronic components	3344	46,427	30,786	3,211	1,978	253	226	212	9,285	389	88
Navigational, measuring, electromedical, and control instruments	3345	94,814	77,366	0	676	6	0	11	16,756	0	0
Other computer and electronic products	other 334	30,686	28,359	0	1,922	0	0	0	405	0	0
Electrical equipment, appliances, and components	335	14,597	10,458	1,849	282	44	0	0	1,954	10	0
Transportation equipment	336	36,738	22,765	0	960	0	0	0	11,575	1,438	0
Aerospace products and parts	3364	19,882	16,718	0	891	0	0	0	2,273	0	0
Other transportation equipment	other 336	16,856	6,047	0	69	0	0	0	9,301	1,438	0
Furniture and related products	337	212	212	0	0	0	0	0	0	0	0
Miscellaneous manufacturing	339	163,959	144,802	95	620	1,978	848	121	14,847	647	0
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,016,323	3,832,799	188,608	275,920	37,215	18,636	11,049	602,999	32,865	16,232
Wholesale trade	42	305,962	233,624	18,378	4,944	12,901	1,197	0	33,300	417	1,202
Information	51	653,665	619,247	3,504	4,441	393	1,741	1,144	21,689	1,443	63
Software publishers	5112	478,466	451,836	1,629	3,186	393	1,736	0	18,740	945	0
Information, excluding software publishers	51 less 5112	175,199	167,411	1,875	1,255	0	5	1,144	2,949	498	63
Architectural, engineering, and related services	5413	388,846	267,509	3,434	49,089	1,405	837	510	60,927	3,532	1,604
Computer systems design and related services	5415	1,414,970	1,160,411	10,227	135,354	10,626	8,597	157	82,253	7,129	217
Scientific research and development services	5417	2,252,879	1,552,008	153,066	82,094	11,891	6,263	9,238	404,830	20,343	13,147
Research and development in nanotechnology	541713	137,272	83,879	10,585	6,108	689	1,370	31	33,462	1,147	0
Research and development in biotechnology (except nanobiotechnology)	541714	1,010,361	787,852	65,332	25,881	3,946	1,169	3,957	107,984	9,476	4,763

TABLE 7

Domestic R&D performed by the company, by selected industry and source of funds, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Paid for by the company	Foreign owner	Another U.S. company	Other businesses outside the United States	U.S. university or college	U.S. nonprofit organization	U.S. federal government	U.S. state or local government	All other organizations outside the United States
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,085,263	664,206	77,148	49,140	7,256	3,544	4,211	261,653	9,720	8,384 r
Social sciences and humanities research and development	541720	19,984	16,070	0	964 r	0	180 r	1,038 r	1,731	0	0

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 8
Domestic R&D performed by the company and funded by the federal government and selected industry, by company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Companies with federally funded R&D (number)	Amount (\$thousands)	Companies with federally funded R&D (number)	Amount (\$thousands)	Companies with federally funded R&D (number)	Amount (\$thousands)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	1,677	694,536	1,000	283,558	677	410,978
Manufacturing industries	31–33	241	91,538	111	30,696	130	60,842
Food, beverage, and tobacco products	311–12	11	1,857	9	600	3	1,257
Textile, apparel, and leather products	313–16	0	0	0	0	0	0
Wood products	321	0	0	0	0	0	0
Paper	322	0	0	0	0	0	0
Printing and related support activities	323	0	0	0	0	0	0
Petroleum and coal products	324	0	0	0	0	0	0
Chemicals	325	51	11,414	20	3,544	31	7,870
Pharmaceuticals and medicines	3254	25	6,998	9	2,116	16	4,883
Chemicals, excluding pharmaceuticals	other 325	26	4,416	11	1,429	15	2,988
Plastics and rubber products	326	0	0	0	0	0	0
Nonmetallic mineral products	327	0	0	0	0	0	0
Primary metals	331	7	1,567	4	857	3	710
Fabricated metal products	332	28	14,877	5	990	23	13,887
Machinery	333	21	7,001	17	5,389	4	1,611
Computer and electronic products	334	66	26,446	32	11,410	33	15,036
Semiconductor and other electronic components	3344	16	9,285	11	3,646	5	5,640
Navigational, measuring, electromedical, and control instruments	3345	49	16,756	22	7,764	27	8,991
Other computer and electronic products	other 334	1	405	0	0	1	405
Electrical equipment, appliances, and components	335	5	1,954	4	1,120	1	834
Transportation equipment	336	10	11,575	5	2,459	5	9,116
Aerospace products and parts	3364	3	2,273	3	862	1	1,411
Other transportation equipment	other 336	7	9,301	3	1,597	4	7,705
Furniture and related products	337	0	0	0	0	0	0
Miscellaneous manufacturing	339	42	14,847	14	4,328	28	10,519
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	1,436	602,999	889	252,862	546	350,136
Wholesale trade	42	121	33,300	111	25,993	10	7,307
Information	51	76	21,689	54	10,291	22	11,398
Software publishers	5112	64	18,740	46	8,185	18	10,555
Information, excluding software publishers	51 less 5112	12	2,949	8	2,105	4	843
Architectural, engineering, and related services	5413	160	60,927	81	26,654	79	34,273
Computer systems design and related services	5415	190	82,253	121	28,167	69	54,085
Scientific research and development services	5417	889	404,830	522	161,758	367	243,073
Research and development in nanotechnology	541713	72	33,462	48	19,379	24	14,083

TABLE 8

Domestic R&D performed by the company and funded by the federal government and selected industry, by company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Companies with federally funded R&D (number)	Amount (\$thousands)	Companies with federally funded R&D (number)	Amount (\$thousands)	Companies with federally funded R&D (number)	Amount (\$thousands)
Research and development in biotechnology (except nanobiotechnology)	541714	270	107,984	174	48,054	95	59,931
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	542	261,653	295	93,147	247	168,506
Social sciences and humanities research and development	541720	6	1,731	5	1,178	1	553

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 9

Domestic R&D performed by the company, by selected industry and type of R&D, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
All selected industries	31–33, 42, 51, 5413, 5415, 5417	5,710,570	397,004	2,032,893	3,280,674
Manufacturing industries	31–33	694,247	34,705	275,018	384,524
Food, beverage, and tobacco products	311–12	17,426	1,410 r	13,400	2,616 r
Textile, apparel, and leather products	313–16	9,268 r	602 r	2,002 r	6,665 r
Wood products	321	0	0	0	0
Paper	322	898 r	0	134 r	764 r
Printing and related support activities	323	0	0	0	0
Petroleum and coal products	324	159	0	159	0
Chemicals	325	168,564	11,202	54,145	103,217
Pharmaceuticals and medicines	3254	125,474	4,688	34,497	86,290
Chemicals, excluding pharmaceuticals	other 325	43,090	6,514	19,648	16,928
Plastics and rubber products	326	14,467	716	8,600 r	5,151
Nonmetallic mineral products	327	3,608	270	1,881 r	1,458
Primary metals	331	3,214	30	498	2,685
Fabricated metal products	332	44,875	0	13,255 r	31,620 r
Machinery	333	44,334	345 r	21,497 r	22,492
Computer and electronic products	334	171,928	8,612	61,998	101,318
Semiconductor and other electronic components	3344	46,427	2,787	17,496	26,144
Navigational, measuring, electromedical, and control instruments	3345	94,814	5,134	32,794	56,887
Other computer and electronic products	other 334	30,686	692 r	11,708	18,287
Electrical equipment, appliances, and components	335	14,597	743	7,739	6,114
Transportation equipment	336	36,738	158	13,379 r	23,201
Aerospace products and parts	3364	19,882	96	13,317 r	6,470
Other transportation equipment	other 336	16,856	62	62	16,731
Furniture and related products	337	212	0	212	0
Miscellaneous manufacturing	339	163,959	10,617 r	76,119	77,222
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,016,323	362,299	1,757,875	2,896,149
Wholesale trade	42	305,962	18,266	100,466	187,230
Information	51	653,665	49,958	204,326	399,382
Software publishers	5112	478,466	33,197	145,099	300,170
Information, excluding software publishers	51 less 5112	175,199	16,761	59,226	99,212
Architectural, engineering, and related services	5413	388,846	22,921	144,876	221,049
Computer systems design and related services	5415	1,414,970	102,039	371,904	941,028
Scientific research and development services	5417	2,252,879	169,115	936,304	1,147,461
Research and development in nanotechnology	541713	137,272	12,847	47,776	76,649
Research and development in biotechnology (except nanobiotechnology)	541714	1,010,361	62,507	403,151	544,702
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,085,263	90,235	475,771	519,256
Social sciences and humanities research and development	541720	19,984	3,526	9,605	6,853

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 10

Domestic R&D performed by the company that was paid for by the U.S. federal government, by selected industry and type of R&D, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	R&D paid for by the U.S. federal government	Basic research	Applied research	Development
All selected industries	31–33, 42, 51, 5413, 5415, 5417	694,536	45,077	339,881	309,578
Manufacturing industries	31–33	91,538	2,496	45,042	43,999
Food, beverage, and tobacco products	311–12	1,857 r	279 r	1,578 r	0
Textile, apparel, and leather products	313–16	0	0	0	0
Wood products	321	0	0	0	0
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	11,414	765	6,811	3,839
Pharmaceuticals and medicines	3254	6,998	445	4,387	2,166
Chemicals, excluding pharmaceuticals	other 325	4,416	319	2,424	1,673 r
Plastics and rubber products	326	0	0	0	0
Nonmetallic mineral products	327	0	0	0	0
Primary metals	331	1,567	0	0	1,567
Fabricated metal products	332	14,877 r	0	10,248 r	4,629 r
Machinery	333	7,001	0	4,288	2,713 r
Computer and electronic products	334	26,446	800	11,938	13,708
Semiconductor and other electronic components	3344	9,285	0	5,149	4,136
Navigational, measuring, electromedical, and control instruments	3345	16,756	800	6,586	9,369
Other computer and electronic products	other 334	405	0	203	203
Electrical equipment, appliances, and components	335	1,954	0	904	1,050
Transportation equipment	336	11,575 r	0	1,411	10,163 r
Aerospace products and parts	3364	2,273	0	1,411	862
Other transportation equipment	other 336	9,301 r	0	0	9,301 r
Furniture and related products	337	0	0	0	0
Miscellaneous manufacturing	339	14,847	652 r	7,864	6,331
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	602,999	42,581	294,839	265,578
Wholesale trade	42	33,300 r	425	25,266 r	7,610 r
Information	51	21,689	3,182	12,815	5,693
Software publishers	5112	18,740	1,491	11,971	5,279
Information, excluding software publishers	51 less 5112	2,949 r	1,691 r	843	414
Architectural, engineering, and related services	5413	60,927	2,947	30,090	27,890
Computer systems design and related services	5415	82,253	3,339 r	27,510	51,404 r
Scientific research and development services	5417	404,830	32,688	199,160	172,982
Research and development in nanotechnology	541713	33,462	1,772 r	13,278	18,411
Research and development in biotechnology (except nanobiotechnology)	541714	107,984	10,744	56,797	40,443
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	261,653	20,105	127,858	113,689
Social sciences and humanities research and development	541720	1,731	67 r	1,226	438

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 11

Domestic R&D performed by the company, by selected industry, for companies with 1–9 employees: 2019–22

(Thousands of U.S. dollars)

Industry	NAICS code	2019	2020	2021	2022
All selected industries	31–33, 42, 51, 5413, 5415, 5417	5,218,911	5,600,668	6,124,669	5,710,570
Manufacturing industries	31–33	622,220	627,387	747,124	694,247
Food, beverage, and tobacco products	311–12	5,896	9,614	18,270	17,426
Textile, apparel, and leather products	313–16	236	472	7,096	9,268
Wood products	321	4,065	0	134	0
Paper	322	0	0	0	898
Printing and related support activities	323	555	0	0	0
Petroleum and coal products	324	0	0	739	159
Chemicals	325	178,170	160,031	132,255	168,564
Pharmaceuticals and medicines	3,254	117,508	77,054	96,666	125,474
Chemicals, excluding pharmaceuticals	other 325	60,661	82,977	35,589	43,090
Plastics and rubber products	326	6,261	18,099	6,427	14,467
Nonmetallic mineral products	327	5,860	133	3,638	3,608
Primary metals	331	2,353	9,077	2,117	3,214
Fabricated metal products	332	20,518	37,292	11,983	44,875
Machinery	333	22,057	62,840	64,109	44,334
Computer and electronic products	334	227,158	189,225	279,203	171,928
Semiconductor and other electronic components	3,344	38,305	36,372	71,280	46,427
Navigational, measuring, electromedical, and control instruments	3,345	161,373	135,652	164,799	94,814
Other computer and electronic products	other 334	27,480	17,201	43,124	30,686
Electrical equipment, appliances, and components	335	9,592	24,958	40,032	14,597
Transportation equipment	336	24,577	38,247	33,911	36,738
Aerospace products and parts	3,364	11,859	19,307	13,003	19,882
Other transportation equipment	other 336	12,718	18,940	20,908	16,856
Furniture and related products	337	0	124	1,471	212
Miscellaneous manufacturing	339	114,922	77,276	145,741	163,959
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	4,596,691	4,973,281	5,377,544	5,016,323
Wholesale trade	42	225,813	392,416	143,063	305,962
Information	51	598,684	689,766	756,657	653,665
Software publishers	5,112	327,921	468,557	535,950	478,466
Information, excluding software publishers	51 less 5112	270,764	221,209	220,707	175,199
Architectural, engineering, and related services	5,413	454,913	574,367	606,186	388,846
Computer systems design and related services	5,415	1,435,159	1,122,622	1,616,190	1,414,970
Scientific research and development services	5,417	1,882,122	2,194,110	2,255,449	2,252,879
Research and development in nanotechnology	541,713	175,639	162,996	172,582	137,272
Research and development in biotechnology (except nanobiotechnology)	541,714	645,887	913,514	868,580	1,010,361
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541,715	1,026,911	1,099,371	1,193,678	1,085,263
Social sciences and humanities research and development	541,720	31,464	18,229	12,047	19,984

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 12
Domestic sales and domestic R&D performed by the company as a percentage of domestic sales, by selected industry and company size, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars and percent)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Total sales (\$thousands)	R&D as percentage of sales	Total sales (\$thousands)	R&D as percentage of sales	Total sales (\$thousands)	R&D as percentage of sales
All selected industries	31–33, 42, 51, 5413, 5415, 5417	13,457,203	42	6,158,829	41	7,298,374	44
Manufacturing industries	31–33	1,778,853	39	669,257	33	1,109,595	42
Food, beverage, and tobacco products	311–12	43,398	r 40	8,985	r 77	34,413	r 31
Textile, apparel, and leather products	313–16	1,262	r 735	1,262	r 100	0	0
Wood products	321	0	0	0	0	0	0
Paper	322	1,033	r 87	0	0	1,033	r 87
Printing and related support activities	323	0	0	0	0	0	0
Petroleum and coal products	324	254	63	254	63	0	0
Chemicals	325	254,888	66	88,378	81	166,509	58
Pharmaceuticals and medicines	3254	101,394	124	21,279	r 244	80,116	r 92
Chemicals, excluding pharmaceuticals	other 325	153,493	28	67,099	30	86,394	r 27
Plastics and rubber products	326	160,154	r 9	136,703	r 5	23,451	r 35
Nonmetallic mineral products	327	7,008	r 51	182	101	6,827	r 50
Primary metals	331	7,572	r 42	5,433	r 41	2,139	45
Fabricated metal products	332	60,271	r 74	32,746	r 31	27,525	r 127
Machinery	333	97,566	r 45	66,158	r 25	31,409	r 89
Computer and electronic products	334	736,513	23	255,560	24	480,953	23
Semiconductor and other electronic components	3344	161,473	r 29	60,794	r 34	100,679	r 25
Navigational, measuring, electromedical, and control instruments	3345	446,621	21	123,512	24	323,109	20
Other computer and electronic products	other 334	128,419	24	71,254	14	57,165	r 36
Electrical equipment, appliances, and components	335	72,558	20	25,428	r 21	47,130	20
Transportation equipment	336	70,317	52	14,955	65	55,362	49
Aerospace products and parts	3364	36,764	54	7,812	r 75	28,952	r 49
Other transportation equipment	other 336	33,553	50	7,143	r 56	26,410	r 49
Furniture and related products	337	1,944	11	0	0	1,944	11
Miscellaneous manufacturing	339	264,117	r 62	33,215	98	230,901	r 57
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	11,678,351	43	5,489,572	42	6,188,779	44
Wholesale trade	42	1,025,414	r 30	485,588	r 31	539,826	r 29
Information	51	1,901,767	34	875,290	31	1,026,477	37
Software publishers	5112	1,265,726	38	542,483	33	723,243	42
Information, excluding software publishers	51 less 5112	636,041	28	332,807	28	303,234	r 27
Architectural, engineering, and related services	5413	1,104,971	35	657,966	26	447,005	48
Computer systems design and related services	5415	5,445,668	26	2,436,868	28	3,008,799	25
Scientific research and development services	5417	2,200,531	102	1,033,859	100	1,166,672	105
Research and development in nanotechnology	541713	146,178	94	61,858	97	84,319	92

TABLE 12
Domestic sales and domestic R&D performed by the company as a percentage of domestic sales, by selected industry and company size, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars and percent)

Industry	NAICS code	All companies		1–4 employees		5–9 employees	
		Total sales (\$thousands)	R&D as percentage of sales	Total sales (\$thousands)	R&D as percentage of sales	Total sales (\$thousands)	R&D as percentage of sales
Research and development in biotechnology (except nanobiotechnology)	541714	653,428	155	340,191	142	313,238	168
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,360,356	80	616,435	78	743,922	81
Social sciences and humanities research and development	541720	40,569	49	15,376	67	25,193	38

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 13

Domestic R&D performed by the company, by state and company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

State	All companies		1–4 employees		5–9 employees	
	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)
All states	13,868	5,710,570	8,698	2,525,915	5,170	3,184,655
Alabama	174	51,198	144	28,358	30	22,839
Alaska	13	2,266	11	1,233	2	1,034
Arizona	264	73,342	186	36,746	78	36,596
Arkansas	27	5,610	18	3,454	9	2,156
California	3,674	1,820,632	2,384	793,968	1,290	1,026,664
Colorado	527	164,876	325	82,650	202	82,226
Connecticut	215	89,133	107	20,917	108	68,217
Delaware	142	54,824	78	28,132	63	26,692
District of Columbia	40	11,896	33	9,558	8	2,338
Florida	574	193,038	386	94,082	188	98,956
Georgia	309	91,533	195	39,534	114	51,999
Hawaii	25	5,627	17	1,667	8	3,961
Idaho	49	12,073	24	7,939	25	4,134
Illinois	386	89,869	262	52,409	123	37,460
Indiana	128	31,235	84	12,163	45	19,072
Iowa	97	24,498	55	11,073	42	13,426
Kansas	88	42,745	44	6,793	44	35,952
Kentucky	68	15,715	46	8,538	22	7,177
Louisiana	43	10,000	19	7,077	25	2,923
Maine	28	5,582	16	2,282	12	3,299
Maryland	339	136,339	243	59,105	96	77,233
Massachusetts	675	426,081	408	193,206	266	232,875
Michigan	299	111,092	192	49,118	107	61,974
Minnesota	200	68,927	101	26,151	100	42,776
Mississippi	26	7,800	10	1,299	16	6,501
Missouri	109	42,205	67	16,477	42	25,727
Montana	26	7,154	17	3,673	9	3,481
Nebraska	50	11,981	31	6,918	20	5,064
Nevada	171	40,849	128	24,652	43	16,197
New Hampshire	155	69,041	76	30,741	79	38,300
New Jersey	403	133,129	250	44,725	153	88,405
New Mexico	70	31,797	41	13,667	30	18,130
New York	660	249,247	402	135,022	258	114,225
North Carolina	421	175,418	309	111,558	113	63,859

TABLE 13

Domestic R&D performed by the company, by state and company size, for companies with 1–9 employees: 2022

(Number and thousands of U.S. dollars)

State	All companies		1–4 employees		5–9 employees		
	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	Companies (number)	Amount (\$thousands)	
North Dakota	7	2,317	2	r 544	5	1,774	
Ohio	314	112,155	244	54,124	71	58,030	
Oklahoma	36	12,267	30	7,376	7	4,891	
Oregon	245	94,917	135	42,062	110	52,855	
Pennsylvania	447	320,652	247	116,848	200	203,804	
Rhode Island	33	12,207	18	r 2,783	15	9,424	r
South Carolina	66	54,636	r 42	7,287	24	47,349	r
South Dakota	37	r 10,374	r 35	r 8,611	r 1	r 1,763	
Tennessee	107	29,129	53	15,188	54	13,941	
Texas	689	257,925	406	108,715	283	149,210	
Utah	142	48,445	105	23,107	37	25,337	
Vermont	9	2,292	6	652	3	1,640	
Virginia	466	155,932	263	52,881	203	103,051	
Washington	590	218,824	339	103,199	250	115,624	
West Virginia	8	1,531	8	1,531	0	0	
Wisconsin	136	51,428	44	12,931	91	38,497	
Wyoming	26	r 3,363	6	397	20	r 2,966	r
Undistributed	34	15,423	6	2,794	28	12,629	

r = relative standard error > 50%.

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 R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 14

Domestic R&D performed by the company, by state and source of funds, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

State	Total	Paid for by the company	Foreign owner	Another U.S. company	Other businesses outside the United States	U.S. university or college	U.S. nonprofit organization	U.S. federal government	U.S. state or local government	All other organizations outside the United States
All states	5,710,570	4,397,991	194,028	297,357	40,302	20,741	13,423	694,536	35,873	16,319
Alabama	51,198	41,843	0	512	0	254	18	7,681	890	0
Alaska	2,266	1,410	0	118	0	0	0	738	0	0
Arizona	73,342	60,649	0	4,747 r	153 r	2,077 r	419 r	4,962	337 r	0
Arkansas	5,610	3,718	0	43 r	0	0	0	1,254	595 r	0
California	1,820,632	1,460,381	119,248	26,731	20,275 r	1,446	3,194	176,510	12,424	423
Colorado	164,876	115,152	1,672 r	15,278	1,077 r	1,487 r	0	24,524	5,687	0
Connecticut	89,133	78,758	492 r	2,453	0	571 r	725	5,315	819	0
Delaware	54,824	41,071	4,000 r	1,713 r	80 r	0	0	7,960 r	0	0
District of Columbia	11,896	6,312	2,152 r	0	0	0	0	1,843	0	1,590 r
Florida	193,038	137,044	3,168 r	26,733 r	720 r	971	0	24,402	0	0
Georgia	91,533	62,084	0	2,738	705 r	13 r	0	25,994	0	0
Hawaii	5,627	2,836	0	426 r	0	0	0	2,365	0	0
Idaho	12,073	10,685	0	318	90	45	38	897 r	0	0
Illinois	89,869	57,189	2,716 r	11,932	0	2,934 r	1,508 r	13,592	0	0
Indiana	31,235	21,434	499 r	375	0	72	538 r	8,186	130 r	0
Iowa	24,498	19,143	0	406 r	0	0	0	4,950	0	0
Kansas	42,745	33,009	13 r	5,953 r	0	125	0	3,645	0	0
Kentucky	15,715	10,535	0	1,352 r	0	285	0	1,727	68	1,749
Louisiana	10,000	7,686	0	1,050 r	0	0	0	983	64	217
Maine	5,582	3,337	0	728 r	0	1,517 r	0	0	0	0
Maryland	136,339	98,212	3,002 r	3,908	108 r	127	478	29,973	531	0
Massachusetts	426,081	344,732	5,114	8,005	647	278	3,330	56,748	1,514 r	5,714 r
Michigan	111,092	62,172	4,677	26,935 r	943	214	0	16,011	140	0
Minnesota	68,927	54,335	3,522 r	3,262	442	0	0	6,164	0	1,202
Mississippi	7,800	7,544	0	0	0	0	0	256	0	0
Missouri	42,205	33,628	838 r	3,992 r	0	0	139 r	3,609	0	0
Montana	7,154	4,729	0	786	19	0	0	1,091 r	514	15
Nebraska	11,981	11,282	0	0	90	90	0	519	0	0
Nevada	40,849	29,840	1,833 r	1,310	1,526 r	130	0	6,210 r	0	0
New Hampshire	69,041	52,746	0	13,903 r	0	0	0	2,393 r	0	0
New Jersey	133,129	88,794	24,025	5,976	466 r	634 r	5	12,699	531 r	0
New Mexico	31,797	13,533	0	1,922	223	221	31 r	15,867	0	0
New York	249,247	225,221	0	1,458 r	990	178 r	273 r	17,091	4,036 r	0
North Carolina	175,418	131,668	521 r	7,727 r	794 r	957 r	1,115	32,204	431 r	0
North Dakota	2,317	1,425	0	513	109	19	0	251	0	0

TABLE 14

Domestic R&D performed by the company, by state and source of funds, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

State	Total	Paid for by the company		Foreign owner	Another U.S. company	Other businesses outside the United States		U.S. university or college	U.S. nonprofit organization	U.S. federal government	U.S. state or local government		All other organizations outside the United States	
Ohio	112,155	83,901		206 r	1,918	8,237 r		0	0	13,568	4,325		0	
Oklahoma	12,267	8,118		0	1,575	0		0	0	2,365 r	209 r		0	
Oregon	94,917	69,786		2,392 r	7,929 r	565 r		557 r	0	13,631	56		0	
Pennsylvania	320,652	201,636		8,595 r	77,505 r	0		2,919 r	218	26,580	830 r		2,369 r	
Rhode Island	12,207	3,683		0	0	0		0	0	8,396 r	128 r		0	
South Carolina	54,636 r	45,003 r		0	1,420	1,405 r		971 r	13	3,379	0		2,445	
South Dakota	10,374 r	10,223 r		0	0	0		0	151 r	0	0		0	
Tennessee	29,129	19,659		0	4,522	0		0	0	4,696	252 r		0	
Texas	257,925	219,368		1,061 r	5,537	0		311	0	31,372	0		276	
Utah	48,445	43,342		625	0	0		0	0	4,478	0		0	
Vermont	2,292	1,306		0	287	0		0	0	698	0		0	
Virginia	155,932	121,289		264	3,418	60 r		117 r	0	30,186	509 r		88 r	
Washington	218,824	194,201		3,395	1,733 r	53 r		1,222 r	378	17,284	323 r		234	
West Virginia	1,531	1,235		0	0	0		0	0	296	0		0	
Wisconsin	51,428	24,974		0	8,208	525 r		0	853	16,471	398 r		0	
Wyoming	3,363	3,363		0	0	0		0	0	0	0		0	
Undistributed	15,423	12,769		0	0	0		0	0	2,522	132		0	

r = relative standard error > 50%.

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 R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 15

Domestic R&D employees, by selected industry and company size, for companies with 1–9 employees: 2022

(Number)

Industry	NAICS code	All companies	1–4 employees	5–9 employees
All selected industries	31–33, 42, 51, 5413, 5415, 5417	36,324	14,938	21,386
Manufacturing industries	31–33	3,934	1,371	2,562
Food, beverage, and tobacco products	311–12	74	31 r	42 r
Textile, apparel, and leather products	313–16	43 r	13 r	30 r
Wood products	321	0	0	0
Paper	322	13 r	0	13 r
Printing and related support activities	323	0	0	0
Petroleum and coal products	324	2	2	0
Chemicals	325	690	247	442
Pharmaceuticals and medicines	3254	438	157	281
Chemicals, excluding pharmaceuticals	other 325	251	90	161
Plastics and rubber products	326	138	57	81
Nonmetallic mineral products	327	20	2	18
Primary metals	331	16	7	9
Fabricated metal products	332	166	76 r	90 r
Machinery	333	284	121	163
Computer and electronic products	334	1,496	508	987
Semiconductor and other electronic components	3344	348	131	217
Navigational, measuring, electromedical, and control instruments	3345	963	312	651
Other computer and electronic products	other 334	185	65	120
Electrical equipment, appliances, and components	335	162	61	102
Transportation equipment	336	271	53	218
Aerospace products and parts	3364	158	35	123
Other transportation equipment	other 336	113	18 r	95 r
Furniture and related products	337	2	0	2
Miscellaneous manufacturing	339	557	193	364
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	32,390	13,566	18,824
Wholesale trade	42	1,686	615	1,071
Information	51	5,079	1,811	3,268
Software publishers	5112	3,811	1,259	2,552
Information, excluding software publishers	51 less 5112	1,268	552	716
Architectural, engineering, and related services	5413	3,352	1,293	2,059
Computer systems design and related services	5415	12,167	5,708	6,459
Scientific research and development services	5417	10,107	4,139	5,968
Research and development in nanotechnology	541713	866	381	485
Research and development in biotechnology (except nanobiotechnology)	541714	3,338	1,379	1,959
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,726	2,290	3,436
Social sciences and humanities research and development	541720	177	89	87

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

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Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 16

Domestic R&D employees, by selected industry and sex, for companies with 1–9 employees: 2022

(Number)

Industry	NAICS code	Total	Male	Female
All selected industries	31–33, 42, 51, 5413, 5415, 5417	36,324	28,469	7,855
Manufacturing industries	31–33	3,934	3,162	772
Food, beverage, and tobacco products	311–12	74	63	10 r
Textile, apparel, and leather products	313–16	43 r	43 r	0
Wood products	321	0	0	0
Paper	322	13 r	11 r	3 r
Printing and related support activities	323	0	0	0
Petroleum and coal products	324	2	2	0
Chemicals	325	690	483	207
Pharmaceuticals and medicines	3254	438	298	141
Chemicals, excluding pharmaceuticals	other 325	251	185	66
Plastics and rubber products	326	138	112	26 r
Nonmetallic mineral products	327	20	20	0
Primary metals	331	16	14	2
Fabricated metal products	332	166	166	0
Machinery	333	284	210	74
Computer and electronic products	334	1,496	1,233	263
Semiconductor and other electronic components	3344	348	277	71 r
Navigational, measuring, electromedical, and control instruments	3345	963	793	170
Other computer and electronic products	other 334	185	163	22
Electrical equipment, appliances, and components	335	162	137	25 r
Transportation equipment	336	271	235	36 r
Aerospace products and parts	3364	158	141	16
Other transportation equipment	other 336	113	94	19 r
Furniture and related products	337	2	2	0
Miscellaneous manufacturing	339	557	431	127
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	32,390	25,307	7,083
Wholesale trade	42	1,686	1,392	293
Information	51	5,079	4,169	910
Software publishers	5112	3,811	3,143	668
Information, excluding software publishers	51 less 5112	1,268	1,026	242
Architectural, engineering, and related services	5413	3,352	2,801	550
Computer systems design and related services	5415	12,167	10,048	2,119
Scientific research and development services	5417	10,107	6,896	3,210
Research and development in nanotechnology	541713	866	624	242
Research and development in biotechnology (except nanobiotechnology)	541714	3,338	2,100	1,238
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,726	4,104	1,622
Social sciences and humanities research and development	541720	177	69	108

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 17

Domestic R&D employees, by selected industry and R&D work activity, for companies with 1–9 employees: 2022

(Number)

Industry	NAICS code	All R&D employees	Researchers (including R&D scientists, engineers, and their managers)	R&D technicians and equivalent staff	R&D support staff (clerical and other)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	36,324	25,769	7,962	2,593
Manufacturing industries	31–33	3,934	2,651	1,039	244
Food, beverage, and tobacco products	311–12	74	74	0	0
Textile, apparel, and leather products	313–16	43 r	36 r	7 r	0
Wood products	321	0	0	0	0
Paper	322	13 r	3 r	8 r	3 r
Printing and related support activities	323	0	0	0	0
Petroleum and coal products	324	2	0	0	2
Chemicals	325	690	519	136	35
Pharmaceuticals and medicines	3254	438	333	85	20
Chemicals, excluding pharmaceuticals	other 325	251	185	52	14
Plastics and rubber products	326	138	60	78	0
Nonmetallic mineral products	327	20	16	4	0
Primary metals	331	16	7	5	3
Fabricated metal products	332	166	116	27 r	23 r
Machinery	333	284	194	65	25
Computer and electronic products	334	1,496	965	420	110
Semiconductor and other electronic components	3344	348	212	101	34 r
Navigational, measuring, electromedical, and control instruments	3345	963	624	286	53
Other computer and electronic products	other 334	185	130	32	23
Electrical equipment, appliances, and components	335	162	107	48	7
Transportation equipment	336	271	175	85 r	11
Aerospace products and parts	3364	158	127	24	7
Other transportation equipment	other 336	113	49	61 r	4 r
Furniture and related products	337	2	2	0	0
Miscellaneous manufacturing	339	557	376	156	26
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	32,390	23,118	6,923	2,349
Wholesale trade	42	1,686	1,179	336	171
Information	51	5,079	3,287	1,422	370
Software publishers	5112	3,811	2,434	1,116	262
Information, excluding software publishers	51 less 5112	1,268	854	306	108
Architectural, engineering, and related services	5413	3,352	2,559	689	104
Computer systems design and related services	5415	12,167	8,422	2,761	984
Scientific research and development services	5417	10,107	7,672	1,715	720
Research and development in nanotechnology	541713	866	653	144	69
Research and development in biotechnology (except nanobiotechnology)	541714	3,338	2,554	579	205
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,726	4,325	968	433
Social sciences and humanities research and development	541720	177	140	24	13 r

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 18

Domestic R&D researchers with PhDs, by selected industry, for companies with 1–9 employees: 2022

(Number)

Industry	NAICS code	All researchers (including R&D scientists, engineers, and their managers)	Researchers with PhD (excluding MD, JD, and EdD)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	25,769	7,290
Manufacturing industries	31–33	2,651	710
Food, beverage, and tobacco products	311–12	74	46
Textile, apparel, and leather products	313–16	36 r	16 r
Wood products	321	0	0
Paper	322	3 r	3 r
Printing and related support activities	323	0	0
Petroleum and coal products	324	0	0
Chemicals	325	519	236
Pharmaceuticals and medicines	3254	333	175
Chemicals, excluding pharmaceuticals	other 325	185	61
Plastics and rubber products	326	60	0
Nonmetallic mineral products	327	16	0
Primary metals	331	7	4 r
Fabricated metal products	332	116	23 r
Machinery	333	194	41
Computer and electronic products	334	965	215
Semiconductor and other electronic components	3344	212	77
Navigational, measuring, electromedical, and control instruments	3345	624	115
Other computer and electronic products	other 334	130	23
Electrical equipment, appliances, and components	335	107	17
Transportation equipment	336	175	16 r
Aerospace products and parts	3364	127	11 r
Other transportation equipment	other 336	49	5 r
Furniture and related products	337	2	0
Miscellaneous manufacturing	339	376	92
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	23,118	6,580
Wholesale trade	42	1,179	188
Information	51	3,287	534
Software publishers	5112	2,434	335
Information, excluding software publishers	51 less 5112	854	199
Architectural, engineering, and related services	5413	2,559	713
Computer systems design and related services	5415	8,422	1,102
Scientific research and development services	5417	7,672	4,043
Research and development in nanotechnology	541713	653	395
Research and development in biotechnology (except nanobiotechnology)	541714	2,554	1,617
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,325	1,982
Social sciences and humanities research and development	541720	140	48

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

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Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 19

Domestic full-time equivalent R&D employees and researchers, by selected industry and work activity, for companies with 1–9 employees: 2022

(Number)

Industry	NAICS code	R&D employees: full-time equivalent	Researchers: full-time equivalent
All selected industries	31–33, 42, 51, 5413, 5415, 5417	28,845	20,715
Manufacturing industries	31–33	3,025	2,062
Food, beverage, and tobacco products	311–12	51	66
Textile, apparel, and leather products	313–16	43	36
Wood products	321	0	0
Paper	322	12	3
Printing and related support activities	323	0	0
Petroleum and coal products	324	1	0
Chemicals	325	577	449
Pharmaceuticals and medicines	3254	373	291
Chemicals, excluding pharmaceuticals	other 325	205	158
Plastics and rubber products	326	69	30
Nonmetallic mineral products	327	20	16
Primary metals	331	13	6
Fabricated metal products	332	122	62
Machinery	333	225	148
Computer and electronic products	334	1,040	688
Semiconductor and other electronic components	3344	274	182
Navigational, measuring, electromedical, and control instruments	3345	615	427
Other computer and electronic products	other 334	152	78
Electrical equipment, appliances, and components	335	136	82
Transportation equipment	336	236	156
Aerospace products and parts	3364	134	114
Other transportation equipment	other 336	102	42
Furniture and related products	337	0	0
Miscellaneous manufacturing	339	480	319
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	25,820	18,653
Wholesale trade	42	1,072	1,060
Information	51	4,319	2,766
Software publishers	5112	3,265	2,067
Information, excluding software publishers	51 less 5112	1,054	699
Architectural, engineering, and related services	5413	2,465	1,952
Computer systems design and related services	5415	9,386	6,322
Scientific research and development services	5417	8,578	6,553
Research and development in nanotechnology	541713	728	533
Research and development in biotechnology (except nanobiotechnology)	541714	2,937	2,226
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	4,773	3,676
Social sciences and humanities research and development	541720	140	118

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

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Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 20

Tax credit for research activities, by industry, for companies with R&D expenditures and 1–9 employees: 2022

(Number and percent)

Industry	NAICS code	Total (number)	Yes, filed Form 6765 in 2021 (%)	No, did not file Form 6765 in 2021 (%)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	14,353	22.4	77.6
Manufacturing industries	31–33	1,674	22.5	77.5
Food, beverage, and tobacco products	311–12	41	26.8 r	70.7
Textile, apparel, and leather products	313–16	13 r	0.0	100.0 r
Wood products	321	0	0.0	0.0
Paper	322	3 r	0.0	100.0 r
Printing and related support activities	323	0	0.0	0.0
Petroleum and coal products	324	1 r	0.0	100.0
Chemicals	325	275	25.5	74.5
Pharmaceuticals and medicines	3254	168	29.8	69.6
Chemicals, excluding pharmaceuticals	other 325	107	17.8	82.2
Plastics and rubber products	326	73	39.7 r	60.3
Nonmetallic mineral products	327	13	23.1	76.9
Primary metals	331	8	12.5	87.5 r
Fabricated metal products	332	99	18.2 r	81.8
Machinery	333	115	10.4 r	90.4
Computer and electronic products	334	624	22.3	77.7
Semiconductor and other electronic components	3344	134	23.9 r	76.1
Navigational, measuring, electromedical, and control instruments	3345	409	22.7	77.0
Other computer and electronic products	other 334	82	15.9	82.9
Electrical equipment, appliances, and components	335	90	27.8 r	73.3
Transportation equipment	336	68	38.2	61.8
Aerospace products and parts	3364	40	47.5 r	52.5 r
Other transportation equipment	other 336	28	25.0 r	75.0
Furniture and related products	337	3	0.0	100.0
Miscellaneous manufacturing	339	249	17.7	82.3
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	12,679	22.4	77.6
Wholesale trade	42	725	22.2	77.8
Information	51	2,134	32.8	67.2
Software publishers	5112	1,525	39.4	60.6
Information, excluding software publishers	51 less 5112	609	16.4	83.6
Architectural, engineering, and related services	5413	1,192	21.5	78.5
Computer systems design and related services	5415	5,194	17.0	83.0
Scientific research and development services	5417	3,433	24.4	75.6
Research and development in nanotechnology	541713	308	25.6	74.4
Research and development in biotechnology (except nanobiotechnology)	541714	1,155	30.4	69.6
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,892	21.2	78.8
Social sciences and humanities research and development	541720	78	6.4 r	93.6

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

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Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 21

Domestic employees, by selected industry and company size, for R&D-active companies with 1–9 employees: 2022

(Number)

Industry	NAICS code	All companies	1–4 employees	5–9 employees
All selected industries	31–33, 42, 51, 5413, 5415, 5417	58,122	21,516	36,606
Manufacturing industries	31–33	7,841	2,202	5,639
Food, beverage, and tobacco products	311–12	138	33 r	105 r
Textile, apparel, and leather products	313–16	50 r	15 r	35 r
Wood products	321	0	0	0
Paper	322	24 r	0	24 r
Printing and related support activities	323	0	0	0
Petroleum and coal products	324	2	2	0
Chemicals	325	1,193	368	825
Pharmaceuticals and medicines	3254	740	209	531
Chemicals, excluding pharmaceuticals	other 325	453	158	294
Plastics and rubber products	326	317	136 r	181
Nonmetallic mineral products	327	77	2	75
Primary metals	331	17	9	9
Fabricated metal products	332	447	132	316 r
Machinery	333	504	220	285
Computer and electronic products	334	2,964	832	2,132
Semiconductor and other electronic components	3344	597	199	398
Navigational, measuring, electromedical, and control instruments	3345	2,044	524	1,520
Other computer and electronic products	other 334	322	109	213
Electrical equipment, appliances, and components	335	456	91	365
Transportation equipment	336	406	77	328
Aerospace products and parts	3364	237	49 r	188
Other transportation equipment	other 336	169	28 r	140
Furniture and related products	337	11	0	11
Miscellaneous manufacturing	339	1,236	287	949
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	50,281	19,314	30,967
Wholesale trade	42	3,085	977	2,108
Information	51	9,388	2,904	6,485
Software publishers	5112	6,931	1,949	4,981
Information, excluding software publishers	51 less 5112	2,458	954	1,503
Architectural, engineering, and related services	5413	4,509	1,694	2,815
Computer systems design and related services	5415	20,119	8,610	11,509
Scientific research and development services	5417	13,180	5,129	8,051
Research and development in nanotechnology	541713	1,155	442	712
Research and development in biotechnology (except nanobiotechnology)	541714	4,350	1,755	2,595
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7,415	2,835	4,580
Social sciences and humanities research and development	541720	260	96	164

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

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Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 22

Product innovating companies, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation			
			Number		Percent	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,937,279	481,394	4,455,885	9.8	90.2
Manufacturing industries	31–33	206,906	29,625	177,282	14.3	85.7
Food	311	17,974	2,965	15,008	16.5	83.5
Beverage and tobacco products	312	9,341	2,029	7,312	21.7	78.3
Textile, apparel, and leather products	313–16	9,487	1,219	8,268	12.8	87.2
Wood products	321	9,802	694	9,108	7.1	92.9
Paper	322	1,822	196	1,626	10.8	89.2
Printing and related support activities	323	18,446	1,909	16,537	10.3	89.7
Petroleum and coal products	324	476	83	394	17.4	82.8
Chemicals	325	7,939	1,879	6,060	23.7	76.3
Pesticide, fertilizer, and other agricultural chemicals	3253	697	127	570	18.2	81.8
Pharmaceuticals and medicines	3254	1,694	411	1,284	24.3	75.8
Soap, cleaning compound, and toilet preparation	3256	1,742	506	1,236	29.0	71.0
Other chemicals	other 325	3,806	836	2,970	22.0	78.0
Plastics and rubber products	326	7,276	1,216	6,060	16.7	83.3
Nonmetallic mineral products	327	7,277	720	6,557	9.9	90.1
Primary metals	331	2,228	181	2,047	8.1	91.9
Fabricated metal products	332	46,437	4,234	42,203	9.1	90.9
Machinery	333	17,122	3,520	13,602	20.6	79.4
Computer and electronic products	334	8,383	2,378	6,006	28.4	71.6
Communications equipment	3342	936	270	666	28.8	71.2
Semiconductor and other electronic components	3344	2,817	594	2,223	21.1	78.9
Navigational, measuring, electromedical, and control instruments	3345	3,515	1,172	2,343	33.3	66.7
Other computer and electronic products	other 334	1,116	342	773	30.6	69.3
Electrical equipment, appliances, and components	335	3,828	858	2,970	22.4	77.6
Transportation equipment	336	7,567	1,620	5,948	21.4	78.6
Automobiles, bodies, trailers, and parts	3361–63	4,611	1,044	3,567	22.6	77.4
Aerospace products and parts	3364	1,020	151	869	14.8	85.2
Other transportation	other 336	1,936	425	1,512	22.0	78.1
Furniture and related products	337	12,282	1,149	11,133	9.4	90.6
Miscellaneous	339	19,220	2,776	16,444	14.4	85.6
Medical equipment and supplies	3391	6,640	1,036	5,605	15.6	84.4
Other miscellaneous manufacturing	3399	12,580	1,741	10,839	13.8	86.2
Nonmanufacturing industries	11, 21–23, 42–81	4,730,373	451,770	4,278,603	9.6	90.4
Agriculture, forestry, fishing, and hunting	11	18,247	682	17,565	3.7	96.3
Mining, extraction, and support activities	21	13,624	554	13,069	4.1	95.9
Utilities	22	3,109	288	2,821	9.3	90.7
Construction	23	649,534	35,162	614,372	5.4	94.6
Wholesale trade	42	236,287	28,074	208,212	11.9	88.1
Retail trade	44–45	541,989	64,099	477,890	11.8	88.2
Transportation and warehousing	48–49	179,812	8,453	171,359	4.7	95.3
Information	51	65,643	13,416	52,227	20.4	79.6
Publishing	511	19,207	5,487	13,720	28.6	71.4
Newspaper, periodical, book, and directory publishers	5111	9,126	1,252	7,874	13.7	86.3
Software publishers	5112	10,081	4,234	5,846	42.0	58.0
Telecommunications	517	6,789	1,050	5,739	15.5	84.5
Data processing, hosting, and related services	518	8,620	2,484	6,136	28.8	71.2

TABLE 22

Product innovating companies, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation			
			Number		Percent	
			Yes	No	Yes	No
Other information	other 51	31,028	4,396	26,632	14.2	85.8
Finance and insurance	52	201,040	13,805	187,235	6.9	93.1
Real estate and rental and leasing	53	286,285	13,292	272,993	4.6	95.4
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,639	168	1,471	10.3	89.7
Other real estate and rental and leasing	other 53	284,645	13,123	271,522	4.6	95.4
Professional, scientific, and technical services	54	718,939	84,634	634,305	11.8	88.2
Legal services	5411	153,526	6,090	147,437	4.0	96.0
Accounting, tax preparation, bookkeeping, and payroll services	5412	110,730	7,175	103,555	6.5	93.5
Architectural, engineering, and related services	5413	88,611	10,429	78,182	11.8	88.2
Specialized design services	5414	29,467	3,906	25,561	13.3	86.7
Computer systems design and related services	5415	98,027	21,676	76,351	22.1	77.9
Management, scientific, and technical consulting services	5416	148,822	21,959	126,863	14.8	85.2
Scientific research and development services	5417	11,451	2,656	8,796	23.2	76.8
Advertising, public relations, and related services	5418	26,409	3,541	22,868	13.4	86.6
Other professional, scientific, and technical services	5419	51,895	7,202	44,692	13.9	86.1
Management of companies and enterprises	55	2,437	197	2,240	8.1	91.9
Administrative and support and waste management and remediation services	56	299,091	24,605	274,486	8.2	91.8
Educational services	61	58,964	12,359	46,605	21.0	79.0
Health care and social assistance	62	534,195	58,769	475,426	11.0	89.0
Health care services	621–23	467,866	51,505	416,360	11.0	89.0
Social assistance	624	66,329	7,263	59,066	11.0	89.0
Arts, entertainment, and recreation	71	94,366	10,931	83,435	11.6	88.4
Accommodation and food services	72	472,416	50,247	422,168	10.6	89.4
Other services	81	354,397	32,204	322,193	9.1	90.9

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 23

Product innovating companies, by company size: 2020–22

(Number and percent)

Company size (number of employees)	Companies (number)	Product innovation			
		Number		Percent	
		Yes	No	Yes	No
All companies	4,937,279	481,394	4,455,885	9.8	90.2
Micro companies					
1–4	2,779,797	241,034	2,538,763	8.7	91.3
5–9	946,104	102,776	843,328	10.9	89.1
Small companies					
10–19	594,731	68,056	526,675	11.4	88.6
20–49	398,276	43,567	354,708	10.9	89.1
Medium companies					
50–99	119,685	14,032	105,653	11.7	88.3
100–249	65,462	7,081	58,381	10.8	89.2
Large companies					
250–499	17,184	2,278	14,906	13.3	86.7
500–999	7,741	1,046	6,695	13.5	86.5
1,000–4,999	6,351	1,046	5,306	16.5	83.5
5,000–9,999	894	211	683	23.6	76.4
10,000–24,999	692	161	531	23.3	76.7
25,000 or more	362	106	257	29.3	71.0

r = relative standard error > 50%.

Note(s):

Detail across rows may not add to total because of rounding. Detail across columns have been adjusted to add to total. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 24

Business process innovating companies, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Business process innovation			
			Number		Percent	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,937,279	983,747	3,953,532	19.9	80.1
Manufacturing industries	31–33	206,906	48,414	158,493	23.4	76.6
Food	311	17,974	4,711	13,262	26.2	73.8
Beverage and tobacco products	312	9,341	2,700	6,641	28.9	71.1
Textile, apparel, and leather products	313–16	9,487	1,842	7,645	19.4	80.6
Wood products	321	9,802	1,791	8,012	18.3	81.7
Paper	322	1,822	453	1,369	24.9	75.1
Printing and related support activities	323	18,446	3,489	14,957	18.9	81.1
Petroleum and coal products	324	476	136	341	28.6	71.6
Chemicals	325	7,939	2,568	5,371	32.3	67.7
Pesticide, fertilizer, and other agricultural chemicals	3253	697	213	484	30.6	69.4
Pharmaceuticals and medicines	3254	1,694	623	1,072	36.8	63.3
Soap, cleaning compound, and toilet preparation	3256	1,742	574	1,168	33.0	67.0
Other chemicals	other 325	3,806	1,159	2,647	30.5	69.5
Plastics and rubber products	326	7,276	2,074	5,203	28.5	71.5
Nonmetallic mineral products	327	7,277	1,354	5,923	18.6	81.4
Primary metals	331	2,228	618	1,610	27.7	72.3
Fabricated metal products	332	46,437	9,817	36,619	21.1	78.9
Machinery	333	17,122	4,349	12,773	25.4	74.6
Computer and electronic products	334	8,383	2,837	5,546	33.8	66.2
Communications equipment	3342	936	298	638	31.8	68.2
Semiconductor and other electronic components	3344	2,817	930	1,887	33.0	67.0
Navigational, measuring, electromedical, and control instruments	3345	3,515	1,250	2,264	35.6	64.4
Other computer and electronic products	other 334	1,116	359	757	32.2	67.8
Electrical equipment, appliances, and components	335	3,828	1,219	2,610	31.8	68.2
Transportation equipment	336	7,567	1,955	5,612	25.8	74.2
Automobiles, bodies, trailers, and parts	3361–63	4,611	1,283	3,329	27.8	72.2
Aerospace products and parts	3364	1,020	230	790	22.5	77.5
Other transportation	other 336	1,936	443	1,494	22.9	77.2
Furniture and related products	337	12,282	2,425	9,858	19.7	80.3
Miscellaneous	339	19,220	4,078	15,142	21.2	78.8
Medical equipment and supplies	3391	6,640	1,460	5,180	22.0	78.0
Other miscellaneous manufacturing	3399	12,580	2,618	9,961	20.8	79.2
Nonmanufacturing industries	11, 21–23, 42–81	4,730,373	935,333	3,795,039	19.8	80.2
Agriculture, forestry, fishing, and hunting	11	18,247	1,850	16,397	10.1	89.9
Mining, extraction, and support activities	21	13,624	1,434	12,189	10.5	89.5
Utilities	22	3,109	573	2,536	18.4	81.6
Construction	23	649,534	90,732	558,802	14.0	86.0
Wholesale trade	42	236,287	46,184	190,102	19.5	80.5
Retail trade	44–45	541,989	114,762	427,226	21.2	78.8
Transportation and warehousing	48–49	179,812	42,401	137,411	23.6	76.4
Information	51	65,643	17,206	48,437	26.2	73.8
Publishing	511	19,207	6,480	12,727	33.7	66.3
Newspaper, periodical, book, and directory publishers	5111	9,126	2,046	7,080	22.4	77.6
Software publishers	5112	10,081	4,434	5,647	44.0	56.0
Telecommunications	517	6,789	1,466	5,323	21.6	78.4
Data processing, hosting, and related services	518	8,620	3,014	5,606	35.0	65.0

TABLE 24

Business process innovating companies, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Business process innovation			
			Number		Percent	
			Yes	No	Yes	No
Other information	other 51	31,028	6,246	24,782	20.1	79.9
Finance and insurance	52	201,040	40,359	160,681	20.1	79.9
Real estate and rental and leasing	53	286,285	43,450	242,835	15.2	84.8
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,639	408	1,231	24.9	75.1
Other real estate and rental and leasing	other 53	284,645	43,042	241,604	15.1	84.9
Professional, scientific, and technical services	54	718,939	168,073	550,866	23.4	76.6
Legal services	5411	153,526	23,612	129,914	15.4	84.6
Accounting, tax preparation, bookkeeping, and payroll services	5412	110,730	22,873	87,857	20.7	79.3
Architectural, engineering, and related services	5413	88,611	17,753	70,858	20.0	80.0
Specialized design services	5414	29,467	7,580	21,887	25.7	74.3
Computer systems design and related services	5415	98,027	31,390	66,636	32.0	68.0
Management, scientific, and technical consulting services	5416	148,822	41,468	107,355	27.9	72.1
Scientific research and development services	5417	11,451	3,920	7,532	34.2	65.8
Advertising, public relations, and related services	5418	26,409	7,146	19,263	27.1	72.9
Other professional, scientific, and technical services	5419	51,895	12,331	39,564	23.8	76.2
Management of companies and enterprises	55	2,437	337	2,100	13.8	86.2
Administrative and support and waste management and remediation services	56	299,091	54,391	244,700	18.2	81.8
Educational services	61	58,964	17,351	41,613	29.4	70.6
Health care and social assistance	62	534,195	113,919	420,276	21.3	78.7
Health care services	621–23	467,866	97,547	370,318	20.8	79.2
Social assistance	624	66,329	16,372	49,957	24.7	75.3
Arts, entertainment, and recreation	71	94,366	16,635	77,731	17.6	82.4
Accommodation and food services	72	472,416	107,005	365,411	22.7	77.3
Other services	81	354,397	58,671	295,726	16.6	83.4

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 25

Business process innovating companies, by company size: 2020–22

(Number and percent)

Company size (number of employees)	Companies (number)	Business process innovation			
		Number		Percent	
		Yes	No	Yes	No
All companies	4,937,279	983,747	3,953,532	19.9	80.1
Micro companies					
1–4	2,779,797	468,139	2,311,659	16.8	83.2
5–9	946,104	204,438	741,667	21.6	78.4
Small companies					
10–19	594,731	144,149	450,582	24.2	75.8
20–49	398,276	102,720	295,555	25.8	74.2
Medium companies					
50–99	119,685	34,743	84,942	29.0	71.0
100–249	65,462	19,432	46,030	29.7	70.3
Large companies					
250–499	17,184	5,081	12,102	29.6	70.4
500–999	7,741	2,318	5,422	29.9	70.0
1,000–4,999	6,351	2,007	4,344	31.6	r 68.4
5,000–9,999	894	318	576	35.6	r 64.4
10,000–24,999	692	270	422	39.0	r 61.0
25,000 or more	362	131	231	36.2	r 63.8

r = relative standard error > 50%.

Note(s):

Detail across rows may not add to total because of rounding. Detail across columns have been adjusted to add to total. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 26

Companies with new-to-market product innovation, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation new to market			
			Number		Percent	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,937,279	182,276	4,755,003	3.7	96.3
Manufacturing industries	31–33	206,906	13,380	193,526	6.5	93.5
Food	311	17,974	1,242	16,731	6.9	93.1
Beverage and tobacco products	312	9,341	621	8,720	6.6	93.4
Textile, apparel, and leather products	313–16	9,487	580	8,906	6.1	93.9
Wood products	321	9,802	288	9,514	2.9	97.1
Paper	322	1,822	81	1,741	4.4	95.6
Printing and related support activities	323	18,446	488	17,958	2.6	97.4
Petroleum and coal products	324	476	38	438	8.0	92.0
Chemicals	325	7,939	1,043	6,896	13.1	86.9
Pesticide, fertilizer, and other agricultural chemicals	3253	697	77	620	11.0	89.0
Pharmaceuticals and medicines	3254	1,694	252	1,442	14.9	85.1
Soap, cleaning compound, and toilet preparation	3256	1,742	232	1,509	13.3	86.6
Other chemicals	other 325	3,806	481	3,325	12.6	87.4
Plastics and rubber products	326	7,276	542	6,734	7.4	92.6
Nonmetallic mineral products	327	7,277	351	6,926	4.8	95.2
Primary metals	331	2,228	84	2,144	3.8	96.2
Fabricated metal products	332	46,437	1,765	44,672	3.8	96.2
Machinery	333	17,122	1,790	15,331	10.5	89.5
Computer and electronic products	334	8,383	1,368	7,016	16.3	83.7
Communications equipment	3342	936	168	768	17.9	82.1
Semiconductor and other electronic components	3344	2,817	326	2,490	11.6	88.4
Navigational, measuring, electromedical, and control instruments	3345	3,515	703	2,811	20.0	80.0
Other computer and electronic products	other 334	1,116	170	946	15.2	84.8
Electrical equipment, appliances, and components	335	3,828	481	3,347	12.6	87.4
Transportation equipment	336	7,567	894	6,673	11.8	88.2
Automobiles, bodies, trailers, and parts	3361–63	4,611	528	4,083	11.5	88.5
Aerospace products and parts	3364	1,020	86	933	8.4	91.5
Other transportation	other 336	1,936	280	1,656	14.5	85.5
Furniture and related products	337	12,282	389	11,894	3.2	96.8
Miscellaneous	339	19,220	1,336	17,884	7.0	93.0
Medical equipment and supplies	3391	6,640	436	6,204	6.6	93.4
Other miscellaneous manufacturing	3399	12,580	899	11,680	7.1	92.8
Nonmanufacturing industries	11, 21–23, 42–81	4,730,373	168,896	4,561,477	3.6	96.4
Agriculture, forestry, fishing, and hunting	11	18,247	223	18,023	1.2	98.8
Mining, extraction, and support activities	21	13,624	159	13,465	1.2	98.8
Utilities	22	3,109	185	2,924	6.0	94.0
Construction	23	649,534	10,652	638,881	1.6	98.4
Wholesale trade	42	236,287	12,993	223,294	5.5	94.5
Retail trade	44–45	541,989	28,529	513,460	5.3	94.7
Transportation and warehousing	48–49	179,812	2,735	177,077	1.5	98.5
Information	51	65,643	6,447	59,196	9.8	90.2
Publishing	511	19,207	3,080	16,127	16.0	84.0
Newspaper, periodical, book, and directory publishers	5111	9,126	481	8,645	5.3	94.7
Software publishers	5112	10,081	2,599	7,482	25.8	74.2
Telecommunications	517	6,789	434	6,354	6.4	93.6
Data processing, hosting, and related services	518	8,620	1,254	7,366	14.5	85.5

TABLE 26

Companies with new-to-market product innovation, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation new to market			
			Number		Percent	
			Yes	No	Yes	No
Other information	other 51	31,028	1,679	29,349	5.4	94.6
Finance and insurance	52	201,040	4,529	196,511	2.3	97.7
Real estate and rental and leasing	53	286,285	4,142	282,143	1.4	98.6
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,639	83	1,557	5.1	r 95.0
Other real estate and rental and leasing	other 53	284,645	4,059	280,586	1.4	98.6
Professional, scientific, and technical services	54	718,939	32,435	686,504	4.5	95.5
Legal services	5411	153,526	1,216	152,310	0.8	99.2
Accounting, tax preparation, bookkeeping, and payroll services	5412	110,730	1,946	108,784	1.8	98.2
Architectural, engineering, and related services	5413	88,611	4,432	84,179	5.0	95.0
Specialized design services	5414	29,467	1,442	28,025	4.9	95.1
Computer systems design and related services	5415	98,027	9,278	88,749	9.5	90.5
Management, scientific, and technical consulting services	5416	148,822	8,859	139,963	6.0	94.0
Scientific research and development services	5417	11,451	1,865	9,587	16.3	83.7
Advertising, public relations, and related services	5418	26,409	1,253	25,156	4.7	95.3
Other professional, scientific, and technical services	5419	51,895	2,142	49,752	4.1	95.9
Management of companies and enterprises	55	2,437	81	2,356	3.3	96.7
Administrative and support and waste management and remediation services	56	299,091	7,588	291,503	2.5	97.5
Educational services	61	58,964	4,606	54,357	7.8	92.2
Health care and social assistance	62	534,195	17,664	516,531	3.3	96.7
Health care services	621–23	467,866	15,071	452,794	3.2	96.8
Social assistance	624	66,329	2,592	63,737	3.9	96.1
Arts, entertainment, and recreation	71	94,366	4,277	90,088	4.5	95.5
Accommodation and food services	72	472,416	21,081	451,335	4.5	95.5
Other services	81	354,397	10,569	343,828	3.0	97.0

i = > 50% of the estimate is a combination of imputation and reweighting to account for nonresponse; r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 27

Companies with new-to-market product innovation, by company size: 2020–22

(Number and percent)

Company size (number of employees)	Companies (number)	Product innovation new to market			
		Number		Percent	
		Yes	No	Yes	No
All companies	4,937,279	182,276	4,755,003	3.7	96.3
Micro companies					
1–4	2,779,797	89,775	2,690,023	3.2	96.8
5–9	946,104	40,762	905,343	4.3	95.7
Small companies					
10–19	594,731	25,788	568,943	4.3	95.7
20–49	398,276	16,204	382,072	4.1	95.9
Medium companies					
50–99	119,685	5,482	114,202	4.6	95.4
100–249	65,462	2,359	63,103	3.6	96.4
Large companies					
250–499	17,184	731	16,452	4.3	95.7
500–999	7,741	413	7,327	5.3	94.7
1,000–4,999	6,351	506	5,845	8.0	r 92.0
5,000–9,999	894	110	784	12.3	87.7
10,000–24,999	692	95	597	13.7	86.3
25,000 or more	362	50	312	13.8	86.2

r = relative standard error > 50%.

Note(s):

Detail across rows may not add to total because of rounding. Detail across columns have been adjusted to add to total. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 28

Companies with new-to-the-business product innovation, by industry: 2022–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation only new to the business			
			Number		Percent	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,937,279	348,976	4,588,303	7.1	92.9
Manufacturing industries	31–33	206,906	20,475	186,431	9.9	90.1
Food	311	17,974	2,162	15,812	12.0	88.0
Beverage and tobacco products	312	9,341	1,637	7,704	17.5	82.5
Textile, apparel, and leather products	313–16	9,487	811	8,675	8.5	91.4
Wood products	321	9,802	485	9,317	4.9	95.1
Paper	322	1,822	155	1,667	8.5	91.5
Printing and related support activities	323	18,446	1,639	16,807	8.9	91.1
Petroleum and coal products	324	476	58	418	12.2	87.8
Chemicals	325	7,939	1,136	6,803	14.3	85.7
Pesticide, fertilizer, and other agricultural chemicals	3253	697	59	637	8.5	91.4
Pharmaceuticals and medicines	3254	1,694	221	1,473	13.0	87.0
Soap, cleaning compound, and toilet preparation	3256	1,742	361	1,381	20.7	79.3
Other chemicals	other 325	3,806	494	3,312	13.0	87.0
Plastics and rubber products	326	7,276	860	6,416	11.8	88.2
Nonmetallic mineral products	327	7,277	458	6,819	6.3	93.7
Primary metals	331	2,228	118	2,110	5.3	94.7
Fabricated metal products	332	46,437	3,154	43,283	6.8	93.2
Machinery	333	17,122	2,220	14,902	13.0	87.0
Computer and electronic products	334	8,383	1,403	6,981	16.7	83.3
Communications equipment	3342	936	168	768	17.9	82.1
Semiconductor and other electronic components	3344	2,817	349	2,467	12.4	87.6
Navigational, measuring, electromedical, and control instruments	3345	3,515	664	2,851	18.9	81.1
Other computer and electronic products	other 334	1,116	222	894	19.9	80.1
Electrical equipment, appliances, and components	335	3,828	473	3,356	12.4	87.7
Transportation equipment	336	7,567	986	6,582	13.0	87.0
Automobiles, bodies, trailers, and parts	3361–63	4,611	695	3,917	15.1	84.9
Aerospace products and parts	3364	1,020	88	932	8.6	91.4
Other transportation	other 336	1,936	203	1,733	10.5	89.5
Furniture and related products	337	12,282	884	11,398	7.2	92.8
Miscellaneous	339	19,220	1,838	17,382	9.6	90.4
Medical equipment and supplies	3391	6,640	761	5,879	11.5	88.5
Other miscellaneous manufacturing	3399	12,580	1,077	11,502	8.6	91.4
Nonmanufacturing industries	11, 21–23, 42–81	4,730,373	328,501	4,401,872	6.9	93.1
Agriculture, forestry, fishing, and hunting	11	18,247	535	17,712	2.9	97.1
Mining, extraction, and support activities	21	13,624	429	13,195	3.1	96.9
Utilities	22	3,109	181	2,928	5.8	94.2
Construction	23	649,534	27,046	622,488	4.2	95.8
Wholesale trade	42	236,287	19,220	217,067	8.1	91.9
Retail trade	44–45	541,989	43,452	498,537	8.0	92.0
Transportation and warehousing	48–49	179,812	6,307	173,506	3.5	96.5
Information	51	65,643	8,758	56,885	13.3	86.7
Publishing	511	19,207	3,318	15,889	17.3	82.7
Newspaper, periodical, book, and directory publishers	5111	9,126	920	8,206	10.1	89.9
Software publishers	5112	10,081	2,398	7,683	23.8	76.2
Telecommunications	517	6,789	683	6,106	10.1	89.9

TABLE 28

Companies with new-to-the-business product innovation, by industry: 2022–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation only new to the business			
			Number		Percent	
			Yes	No	Yes	No
Data processing, hosting, and related services	518	8,620	1,611	7,009	18.7	81.3
Other information	other 51	31,028	3,147	27,881	10.1	89.9
Finance and insurance	52	201,040	10,578	190,462	5.3	94.7
Real estate and rental and leasing	53	286,285	10,021	276,263	3.5	96.5
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,639	96	1,543	5.9	94.1
Other real estate and rental and leasing	other 53	284,645	9,925	274,720	3.5	96.5
Professional, scientific, and technical services	54	718,939	60,593	658,346	8.4	91.6
Legal services	5411	153,526	5,225	148,302	3.4	96.6
Accounting, tax preparation, bookkeeping, and payroll services	5412	110,730	5,678	105,052	5.1	94.9
Architectural, engineering, and related services	5413	88,611	7,036	81,576	7.9	92.1
Specialized design services	5414	29,467	2,883	26,584	9.8	90.2
Computer systems design and related services	5415	98,027	15,375	82,652	15.7	84.3
Management, scientific, and technical consulting services	5416	148,822	15,069	133,753	10.1	89.9
Scientific research and development services	5417	11,451	1,178	10,273	10.3	89.7
Advertising, public relations, and related services	5418	26,409	2,593	23,816	9.8	90.2
Other professional, scientific, and technical services	5419	51,895	5,557	46,338	10.7	89.3
Management of companies and enterprises	55	2,437	133	2,304	5.5	94.5
Administrative and support and waste management and remediation services	56	299,091	18,789	280,302	6.3	93.7
Educational services	61	58,964	9,030	49,934	15.3	84.7
Health care and social assistance	62	534,195	45,209	488,986	8.5	91.5
Health care services	621–23	467,866	39,831	428,035	8.5	91.5
Social assistance	624	66,329	5,377	60,952	8.1	91.9
Arts, entertainment, and recreation	71	94,366	7,490	86,876	7.9	92.1
Accommodation and food services	72	472,416	35,964	436,452	7.6	92.4
Other services	81	354,397	24,767	329,630	7.0	93.0

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 29

Companies with new-to-the-business product innovation, by company size: 2020–22

(Number and percent)

Company size (number of employees)	Companies (number)	Product innovation only new to the business			
		Number		Percent	
		Yes	No	Yes	No
All companies	4,937,279	348,976	4,588,303	7.1	92.9
Micro companies					
1–4	2,779,797	173,946	2,605,851	6.3	93.7
5–9	946,104	74,035	872,069	7.8	92.2
Small companies					
10–19	594,731	49,310	545,421	8.3	91.7
20–49	398,276	32,207	366,069	8.1	91.9
Medium companies					
50–99	119,685	10,332	109,352	8.6	91.4
100–249	65,462	5,432	60,030	8.3	91.7
Large companies					
250–499	17,184	1,821	15,363	10.6	89.4
500–999	7,741	768	6,973	9.9	90.1
1,000–4,999	6,351	759	5,592	12.0	88.0
5,000–9,999	894	162	733	18.1	82.0
10,000–24,999	692	124	569	17.9	82.2
25,000 or more	362	81	282	22.4	77.9

r = relative standard error > 50%.

Note(s):

Detail across rows may not add to total because of rounding. Detail across columns have been adjusted to add to total. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 30

Product or business process innovating companies, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product or business process innovation			
			Number		Percent	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,937,279	1,130,039	3,807,240	22.9	77.1
Manufacturing industries	31–33	206,906	57,497	149,410	27.8	72.2
Food	311	17,974	5,629	12,345	31.3	68.7
Beverage and tobacco products	312	9,341	3,329	6,012	35.6	64.4
Textile, apparel, and leather products	313–16	9,487	2,234	7,253	23.5	76.5
Wood products	321	9,802	1,971	7,831	20.1	79.9
Paper	322	1,822	487	1,334	26.7	73.2
Printing and related support activities	323	18,446	4,136	14,310	22.4	77.6
Petroleum and coal products	324	476	150	327	31.5	68.7
Chemicals	325	7,939	3,129	4,810	39.4	60.6
Pesticide, fertilizer, and other agricultural chemicals	3253	697	257	440	36.9	63.1
Pharmaceuticals and medicines	3254	1,694	719	975	42.4	57.6
Soap, cleaning compound, and toilet preparation	3256	1,742	733	1,009	42.1	57.9
Other chemicals	other 325	3,806	1,420	2,387	37.3	62.7
Plastics and rubber products	326	7,276	2,426	4,850	33.3	66.7
Nonmetallic mineral products	327	7,277	1,563	5,714	21.5	78.5
Primary metals	331	2,228	654	1,574	29.4	70.6
Fabricated metal products	332	46,437	11,063	35,374	23.8	76.2
Machinery	333	17,122	5,437	11,685	31.8	68.2
Computer and electronic products	334	8,383	3,545	4,838	42.3	57.7
Communications equipment	3342	936	392	544	41.9	58.1
Semiconductor and other electronic components	3344	2,817	1,058	1,758	37.6	62.4
Navigational, measuring, electromedical, and control instruments	3345	3,515	1,621	1,894	46.1	53.9
Other computer and electronic products	other 334	1,116	473	642	42.4	57.5
Electrical equipment, appliances, and components	335	3,828	1,479	2,350	38.6	61.4
Transportation equipment	336	7,567	2,501	5,067	33.1	67.0
Automobiles, bodies, trailers, and parts	3361–63	4,611	1,634	2,977	35.4	64.6
Aerospace products and parts	3364	1,020	272	748	26.7	73.3
Other transportation	other 336	1,936	594	1,342	30.7	69.3
Furniture and related products	337	12,282	2,705	9,577	22.0	78.0
Miscellaneous	339	19,220	5,060	14,160	26.3	73.7
Medical equipment and supplies	3391	6,640	1,798	4,842	27.1	72.9
Other miscellaneous manufacturing	3399	12,580	3,262	9,318	25.9	74.1
Nonmanufacturing industries	11, 21–23, 42–81	4,730,373	1,072,542	3,657,830	22.7	77.3
Agriculture, forestry, fishing, and hunting	11	18,247	2,141	16,106	11.7	88.3
Mining, extraction, and support activities	21	13,624	1,633	11,991	12.0	88.0
Utilities	22	3,109	680	2,430	21.9	78.2
Construction	23	649,534	102,717	546,816	15.8	84.2
Wholesale trade	42	236,287	55,914	180,373	23.7	76.3
Retail trade	44–45	541,989	137,231	404,758	25.3	74.7
Transportation and warehousing	48–49	179,812	44,020	135,792	24.5	75.5
Information	51	65,643	20,792	44,851	31.7	68.3
Publishing	511	19,207	7,831	11,375	40.8	59.2
Newspaper, periodical, book, and directory publishers	5111	9,126	2,429	6,697	26.6	73.4
Software publishers	5112	10,081	5,402	4,679	53.6	46.4
Telecommunications	517	6,789	1,805	4,984	26.6	73.4

TABLE 30

Product or business process innovating companies, by industry: 2020–22

(Number and percent)

Industry	NAICS code	Companies (number)	Product or business process innovation			
			Number		Percent	
			Yes	No	Yes	No
Data processing, hosting, and related services	518	8,620	3,553	5,067	41.2	58.8
Other information	other 51	31,028	7,603	23,425	24.5	75.5
Finance and insurance	52	201,040	44,188	156,852	22.0	78.0
Real estate and rental and leasing	53	286,285	47,046	239,239	16.4	83.6
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,639	468	1,172	28.6	71.5
Other real estate and rental and leasing	other 53	284,645	46,578	238,067	16.4	83.6
Professional, scientific, and technical services	54	718,939	188,003	530,936	26.2	73.8
Legal services	5411	153,526	25,232	128,294	16.4	83.6
Accounting, tax preparation, bookkeeping, and payroll services	5412	110,730	24,641	86,089	22.3	77.7
Architectural, engineering, and related services	5413	88,611	20,370	68,241	23.0	77.0
Specialized design services	5414	29,467	8,602	20,865	29.2	70.8
Computer systems design and related services	5415	98,027	35,852	62,175	36.6	63.4
Management, scientific, and technical consulting services	5416	148,822	45,996	102,826	30.9	69.1
Scientific research and development services	5417	11,451	4,534	6,917	39.6	60.4
Advertising, public relations, and related services	5418	26,409	7,940	18,470	30.1	69.9
Other professional, scientific, and technical services	5419	51,895	14,836	37,059	28.6	71.4
Management of companies and enterprises	55	2,437	407	2,030	16.7	83.3
Administrative and support and waste management and remediation services	56	299,091	62,047	237,044	20.7	79.3
Educational services	61	58,964	21,235	37,729	36.0	64.0
Health care and social assistance	62	534,195	132,213	401,982	24.8	75.2
Health care services	621–23	467,866	113,683	354,183	24.3	75.7
Social assistance	624	66,329	18,530	47,799	27.9	72.1
Arts, entertainment, and recreation	71	94,366	20,861	73,504	22.1	77.9
Accommodation and food services	72	472,416	121,572	350,843	25.7	74.3
Other services	81	354,397	69,844	284,553	19.7	80.3

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail across rows may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Detail across columns have been adjusted to add to total. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 31

Product or business process innovating companies, by company size: 2020–22

(Number and percent)

Company size (number of employees)	Companies (number)	Product or business process innovation			
		Number		Percent	
		Yes	No	Yes	No
All companies	4,937,279	1,130,039	3,807,240	22.9	77.1
Micro companies					
1–4	2,779,797	545,506	2,234,291	19.6	80.4
5–9	946,104	235,927	710,177	24.9	75.1
Small companies					
10–19	594,731	162,998	431,733	27.4	72.6
20–49	398,276	114,801	283,475	28.8	71.2
Medium companies					
50–99	119,685	38,030	81,654	31.8	68.2
100–249	65,462	21,435	44,027	32.7	67.3
Large companies					
250–499	17,184	5,682	11,502	33.1	66.9
500–999	7,741	2,559	5,182	33.1	66.9
1,000–4,999	6,351	2,265	4,086	35.7	r 64.3
5,000–9,999	894	376	519	42.1	r 58.1
10,000–24,999	692	302	391	43.6	r 56.5
25,000 or more	362	159	203	43.9	r 56.1

r = relative standard error > 50%.

Note(s):

Detail across rows may not add to total because of rounding. Detail across columns have been adjusted to add to total. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 32

Total capital expenditures for R&D operations, by type of cost and selected industry, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Land acquisition	Buildings and land improvement	Machinery and equipment	Capitalized software	Other intellectual property	All other costs
All selected industries	31–33, 42, 51, 5413, 5415, 5417	340,811	327	8,868	155,636	40,324	37,277	98,378
Manufacturing industries	31–33	63,769	78	2,927	32,771	686	7,170	20,138
Food, beverage, and tobacco products	311–12	3,185	r 0	0	3,185	r 0	0	0
Textile, apparel, and leather products	313–16	198	r 0	0	144	r 0	0	54
Wood products	321	0	0	0	0	0	0	0
Paper	322	48	r 0	27	r 21	r 0	0	0
Printing and related support activities	323	0	0	0	0	0	0	0
Petroleum and coal products	324	0	0	0	0	0	0	0
Chemicals	325	16,374	78	1,387	7,420	246	2,660	4,585
Pharmaceuticals and medicines	3254	10,128	78	438	4,326	238	2,235	2,813
Chemicals, excluding pharmaceuticals	other 325	6,247	0	949	3,094	8	425	r 1,772
Plastics and rubber products	326	1,246	0	70	r 1,176	0	0	0
Nonmetallic mineral products	327	628	0	17	r 252	0	0	360
Primary metals	331	18	0	0	18	0	0	0
Fabricated metal products	332	642	r 0	0	179	0	463	r 0
Machinery	333	1,984	0	148	r 1,190	46	130	470
Computer and electronic products	334	23,188	0	305	8,474	272	1,588	12,548
Semiconductor and other electronic components	3344	10,160	r 0	75	2,900	84	59	7,043
Navigational, measuring, electromedical, and control instruments	3345	10,255	0	15	3,614	83	1,309	r 5,235
Other computer and electronic products	other 334	2,773	0	215	1,960	106	221	270
Electrical equipment, appliances, and components	335	1,405	0	63	912	18	231	r 181
Transportation equipment	336	972	r 0	0	715	r 0	0	256
Aerospace products and parts	3364	710	r 0	0	710	r 0	0	0
Other transportation equipment	other 336	262	r 0	0	5	r 0	0	256
Furniture and related products	337	0	0	0	0	0	0	0
Miscellaneous manufacturing	339	13,880	0	910	r 9,084	r 104	2,098	r 1,684
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	277,041	249	r 5,940	122,866	39,638	30,108	78,240
Wholesale trade	42	8,780	0	181	r 3,566	665	r 1,791	r 2,577
Information	51	36,766	0	237	r 7,098	10,064	7,414	11,952
Software publishers	5112	20,905	0	210	r 5,645	r 7,300	3,097	r 4,653
Information, excluding software publishers	51 less 5112	15,861	0	27	r 1,453	2,763	4,318	r 7,299
Architectural, engineering, and related services	5413	16,950	12	186	r 10,029	1,048	421	r 5,255
Computer systems design and related services	5415	68,819	0	2,798	r 10,599	24,341	6,500	r 24,581
Scientific research and development services	5417	145,727	238	r 2,538	91,574	3,521	13,981	33,876
Research and development in nanotechnology	541713	10,766	0	0	7,454	292	r 855	r 2,165
Research and development in biotechnology (except nanobiotechnology)	541714	76,869	0	1,119	53,284	1,411	3,158	17,897

TABLE 32

Total capital expenditures for R&D operations, by type of cost and selected industry, for companies with 1–9 employees: 2022

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Land acquisition	Buildings and land improvement	Machinery and equipment	Capitalized software	Other intellectual property	All other costs
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	57,474	238 r	1,419	30,666	1,710	9,787	13,654
Social sciences and humanities research and development	541720	618	0	0	170	108 r	180 r	159

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE 33

Total capital expenditures for R&D operations, by type of cost and company size, for companies with 1–9 employees in selected industries: 2022

(Thousands of U.S. dollars)

Company size (number of employees)	Total	Land acquisition	Buildings and land improvement	Machinery and equipment	Capitalized software	Other intellectual property	All other costs
All micro companies	340,811	327	8,868	155,636	40,324	37,277	98,378
1–4	163,402	238 r	4,463	67,657	22,904	19,589	48,551
5–9	177,409	89	4,405	87,979	17,420	17,688	49,827

r = relative standard error > 50%.

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 R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

Technical Notes

Survey Overview (2023 Survey Cycle: Data Year 2022)

Purpose. The Annual Business Survey (ABS) provides information on selected economic and demographic characteristics for businesses and business owners by sex, ethnicity, race, and veteran status. Further, the survey measures research and development (R&D) for microbusinesses, business topics, such as innovation and technology, and other business characteristics. The ABS is conducted jointly by the Census Bureau and the National Center for Science and Engineering Statistics (NCSES) within the U.S. National Science Foundation (NSF). The ABS replaces the quinquennial Survey of Business Owners for employer businesses, the Annual Survey of Entrepreneurs, the Business R&D and Innovation for Microbusinesses Survey, and the Innovation section of the Business R&D and Innovation Survey.

The ABS is designed to incorporate new and sometimes returning content each survey year based on topics of relevance. For the 2023 ABS, content includes company information, owner characteristics, R&D, technology and innovation, financing, and management practices. The ABS also collects various data regarding business owners, such as sex, ethnicity, race, veteran status, and other business owner demographic data. R&D data are collected on the ABS for businesses with a W-2 employment range between one and nine employees.

Data collection authority. Title 13, U.S. Code, Sections 8(b), 131, and 182; Title 42, U.S. Code, Sections 1861–76 (National Science Foundation Act of 1950, as amended); and Section 505 within the America COMPETES Reauthorization Act of 2010, authorize this collection. Sections 224 and 225 of Title 13 require mandatory response. Office of Management and Budget (OMB) control number 0607-1004, expiring 31 May 2025. The disclosure review number is NCSES-DRN24-040.

Survey sponsor. NCSES.

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. Calendar year 2017; for innovation, the reference period was 2015–17.

Reference period. Calendar year 2022; for innovation, the reference period is 2020–22.

Response unit. Nonfarm businesses in the United States.

Sample or census. Sample.

Population size. A total of 4.9 million employer firms; approximately 494,000 firms with one to nine employees and in North American Industry Classification System (NAICS) industries 31–33 (manufacturing), 42 (wholesale trade), 51 (information), 5413 (architectural, engineering, and related services), 5415 (computer systems design and related services), or 5417 (scientific research and development services) were in scope for the R&D module.

Sample size. In 2017 and every fifth year thereafter, the ABS sample size is approximately 850,000 employer businesses. In other years, the ABS sample size is about 300,000 employer businesses.

Survey Design

Target population. Included are all nonfarm businesses filing Internal Revenue Service (IRS) tax forms as individual proprietorships, partnerships, or any type of corporation and with receipts of \$1,000 or more. The target population included only companies that had paid employees according to the IRS Form 941 that covered 12 March 2023, are classified in an in-scope NAICS industry, were physically located in the United States, and were in business at the end of calendar year 2022. The ABS covers firms with paid employees only. The ABS is conducted on a company or firm basis rather than an establishment basis.

Sampling frame. The sampling universe was constructed from the final 2021 Business Register. The Business Register is the Census Bureau's comprehensive database of U.S. businesses. Business Register data are compiled from a combination of business tax returns, data collected from the economic census, and data from other Census Bureau surveys. The Business Register includes sole proprietorships, partnerships, and corporations reporting business activity to the IRS on any one of the following IRS tax forms: 1040 (Schedule C), "Profit or Loss from Business" (Sole Proprietorship); 1065, "U.S. Return of Partnership Income"; 941, "Employer's Quarterly Federal Tax Return"; 944, "Employer's Annual Federal Tax Return"; or any one of the 1120 corporate tax forms.

The Business Register contains establishments that are out of scope for the ABS sample. These establishments are removed from the sampling universe. They include the following:

- Establishments engaged in the following NAICS industries:
 - 111 or 112: Agriculture production
 - 482: Railroads
 - 491: Postal Service
 - 521: Monetary authorities—central bank
 - 525: Funds, trusts, and other financial vehicles
 - 541120: Offices of notaries
 - 813: Religious, grantmaking, civic, professional, and similar organizations
 - 814: Private households
 - 92: Public administration
- Unclassified NAICS industries with legal form of organization as tax-exempt or unknown
- Establishments located in American Samoa, Northern Mariana Islands, Guam, Puerto Rico, or the U.S. Virgin Islands
- Establishments belonging to foreign entities
- Government establishments
- Establishments with zero payroll and zero employment
- Establishments identified as out of business during prior-year data review
- Single-unit establishments modeled as likely to be out of business using administrative data from the most recent monthly Business Register data sets

Information on industry classification, receipts, payroll, and employment was extracted from the Business Register during the frame construction.

The sample is also designed to estimate demographic characteristics of the business owners. To efficiently sample for demographic characteristics, a variety of sources of information are used to estimate the likelihood that a business is a woman- or minority-owned business. Administrative sources include the Decennial Census, the American Community Survey (ACS), and the Numident file, which is the Social Security Administration's comprehensive database of information from Social Security applications. Individual business owners are identified through IRS K-1 filings for partnerships and corporations and from the Business Register for sole proprietorships. The owners are matched to the 2000 and 2010 Decennial Censuses to get race, sex, and ethnicity data; to the 2000–20 ACS; and to the Numident file (in that order) through a Protected Identification Key. Country of birth is also identified through the linkages to the ACS or Numident data. Each firm is then placed in one of the following eight strata for sampling: American Indian or Alaska Native, Asian, Black or African American, Hispanic, non-Hispanic White men, Native Hawaiian and Other Pacific Islander, publicly owned, and women owned. Businesses are assigned to one and only one stratum, with priority given to the less common race or ethnicity groups.

Sample design. The ABS frame is stratified by state, expected owner race or ethnicity, and industry and is systematically sampled within each stratum. A standard type of estimation for stratified systematic sampling is used. Large companies were selected with certainty based on volume of sales, payroll, or number of paid employees. Certainty cases have a selection probability of 1, a sampling weight of 1, and represent only themselves. Specifically for the 2023 ABS, firms were selected with certainty based on the following criteria:

- Firms in NAICS 5415 or 5417 with expected employment of fewer than 10 employees that reported at least \$500,000 in R&D expenses in a prior year ABS,
- Firms in NAICS 5413, 31, 32, 33, 42, or 51 with expected employment of fewer than 10 employees that reported at least \$50,000 in R&D expenses in a prior year ABS,
- Firms with more than 500 employees,
- Firms in the 2022 Business Enterprise Research and Development (BERD) Survey sample, or
- Firms larger than stratum-specific payroll and receipt cutoffs.

The certainty cutoffs vary by sampling stratum, and each stratum is sampled at varying rates, depending on the number and size of firms in a particular stratum.

The remaining frame is subjected to stratified systematic random sampling. Sampling rates vary by strata and are determined by the following calculations. Note that a systematic sample uses take rate to sample, and the sampling rate is $1 / \text{take rate}$.

The ABS sample consisted of 850,000 businesses. There were 184,000 selected with certainty. The certainty portion of the sample consisted of the following:

- 6,500 with sufficient R&D expenses in previous cycles of the ABS,
- 16,000 with employment ≥ 500 ,
- 38,000 in the BERD Survey sample,
- 91,000 with payroll above the stratum cutoff, and
- 32,500 with receipts above the stratum cutoff. (Note that payroll cutoffs are applied first so cases above both cutoffs appear in payroll count.)

The remaining 666,000 noncertainty cases were selected using the systematic stratified random sample selection. The maximum sample weight was 30.

Data Collection and Processing Methods

Data collection. Prior to mailing the survey, certain businesses selected were determined to be out of scope and were not contacted. The survey was mailed to 850,000 employer businesses in July 2023. Businesses were sent a letter informing them of their requirement to report. The letter also provided instructions on how to access the survey and submit online. Three mail follow-ups were conducted to increase response. Additionally, the Census Bureau conducted e-mail follow-ups to respondents who entered the electronic system but did not submit the questionnaire. The collection period closed in December 2023.

Mode. The 2023 ABS was collected using the electronic instrument.

Check-in rate. The check-in rate is defined as the unweighted number of surveys that were submitted online 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. At the close of the collection period in December 2023, 490,000 responses were submitted (58% of the sample).

An additional 1,854 businesses contacted the Census Bureau via the call center to indicate that the business was no longer in operation or had been sold for the reference year.

Businesses selected to report R&D represented 24% of those mailed. Of the businesses mailed and selected to report R&D, 122,000 businesses (or 60%) submitted responses.

Unit response rate (URR). The URR is the unweighted number of responding companies for the survey. For the ABS, *response* is defined as a company providing the number of owners, number of paid owners, and number of employees or a company responding that it ceased operations prior to 2022.

For the ABS, the URR was 62.0%. The URR for businesses eligible to report the R&D module was 63.1%.

Item response rates (IRR). The 2023 ABS collected data on approximately 650 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. The survey skip patterns vary for respondents; therefore, it can be impossible to know an exact denominator for item response calculations.

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 and weighted only by sampling but not nonresponse weights. The TQRR for total sales in the United States in 2022 was 68.2%.

Total quantity nonresponse rate (TQNR). For a given published estimate, TQNR, defined as 100% minus TQRR, is calculated for each tabulation cell from the ABS, 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 ABS estimate. Detailed imputation rates are available on request.

Data editing. Prior to tabulating the data, response data were reviewed and edited to correct reporting errors. R&D data were tabulated for records reporting \$50,000 or more in R&D expenditures.

Additionally, R&D data were only tabbed for records classified in the following NAICS industries:

- 31–33: Manufacturing
- 42: Wholesale trade
- 51: Information
- 5413: Architectural, engineering, and related services

- 5415: Computer systems design and related services
- 5417: Scientific research and development services

Survey analysts reviewed the R&D reported by the survey respondents. Research was done by evaluating the reported business descriptions, reported R&D-to-sales ratio, and company website information. The majority of corrections involved false-positive reports or data reported using incorrect units (such as whole dollars instead of thousands of dollars). For NAICS industries 5415 and 5417, it is difficult to differentiate R&D from other technical work based solely on company website information. Due to this difficulty and the large number of companies sampled in these industries, it was not feasible to review each case individually; thus, relatively few corrections were made for false-positive reports. Unlike years past, all cases in these industries that had greater than \$50,000 in R&D expenses were reviewed.

Additional data errors were detected and corrected through mass corrections and an automated data edit system designed to review the data for reasonableness and consistency. The editing process interactively performed corrections by using standard procedures to fix detectable errors. Quality control techniques were used to verify that operating procedures were carried out as specified.

Unit nonresponse. Unit nonresponse is handled by adjusting weighted reported data as follows. Each company's sampling weight is multiplied 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 employment size and NAICS sector. For employment size, there are five categories: 1–4 employees, 5–9 employees, 10–49 employees, 50–249 employees, and 250 or more employees. For a given adjustment cell, the nonresponse adjustment factor is the ratio of the sum of the sampling weights for all companies in the cell to the sum of the sampling weights for all companies in the cell with reported data. The nonresponse adjustment factor for adjustment cell h was calculated as follows:

$$NAF_h = \frac{\sum_{r+nr} wgt}{\sum_r wgt},$$

where

r is the respondents,

nr is the nonrespondents,

wgt is the original sampling weight value,

h is the nonresponse adjustment cell, and

NAF_h is the nonresponse adjustment factor for cell h .

For the nonresponse adjustment, a business is considered a respondent if it provided the number of owners, number of paid owners, and number of employees. Businesses that responded they ceased operations prior to 2022 are excluded from nonresponse adjustments as out of scope.

Tabulation. Although as many firms as possible were identified as out of scope during sampling, additional out-of-scope firms were identified with either response or updated administrative data not available at the time of sampling. These 110,000 firms were removed for tabulations and include the following:

- Firms reporting zero employment,
- Firms that responded as having gone out of business before 2022,
- Nonprofit organizations,

- Firms that responded as being owned by a domestic parent company, and
- Firms with unclassified NAICS industry.

Industry classification. The industry classifications of firms are based on the **2017 NAICS** (<https://www.census.gov/naics/>). Firms with more than one domestic establishment are assigned a single-industry classification using a hierarchical system based on the largest payroll sector, largest payroll 3-digit NAICS (within the largest sector), largest payroll 4-digit NAICS (within the largest 3-digit), and largest payroll 6-digit NAICS (within the largest 4-digit). For tabulation, industry classification was based on administrative data for 2017.

Geography. Firms with establishments operating in more than one state are tabulated as unclassified geography and counted only once in state and national totals.

Variance estimation. The ABS uses the delete-a-group jackknife variance estimator. Note that certainty cases do not contribute to the sampling variance. The delete-a-group jackknife variance estimator requires that every sampling stratum contains at least two sampled firms. Sampling strata that do not meet this requirement are collapsed as needed to create a new set of variance estimation strata that satisfies this requirement.

Data tables showing relative standard errors are available on request from the Survey Manager.

Survey Quality Measures

The estimates produced from the ABS are subject to both sampling and nonsampling errors.

Sampling error. The sampling error is described above in the “Variance estimation” section.

Coverage error. Coverage error occurs when the frame fails to completely enumerate the population of interest. There can be both *undercoverage error*, where units are not included in the frame, and *overcoverage error*, where units included in the frame are actually out of scope for the population of interest. The ABS uses the prior-year Business Register to construct the frame, so any changes in businesses that would change the inclusion or exclusion of the business to the survey scope could be sources of coverage error. Prior to tabulation, survey units’ information is updated with the most recent available Business Register data to mitigate this source of error.

Nonsampling error. All surveys and censuses have nonsampling errors. Nonsampling errors are attributable to various sources, such as the inability to obtain information for all cases in the universe, imputation for missing data, data errors and biases, mistakes in recording or keying data, errors in collection or processing, and coverage problems.

Although explicit measures of the effects of these nonsampling errors are not available, adjustments are made to the published relative standard errors to account for errors associated with imputation of missing data. It is believed that most of the important operational and data errors were detected and corrected through an automated data edit designed to review the data for reasonableness and consistency. Quality control techniques were used to verify that operating procedures were carried out as specified.

Measurement error. The most common source of measurement error was reporting in different units (e.g., reporting whole dollars rather than thousands of dollars). Variations in respondent interpretations of the definitions of R&D activities are of particular concern, and error can occur when respondents do not report dollar amounts correctly. Little public information exists for most of the small businesses surveyed by the ABS, so it is difficult to determine whether companies are reporting R&D that satisfies the survey’s definitions, particularly where the development of software and Internet applications are concerned. Although 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, telephone interviews and consultations with respondents, and post-survey evaluations.

Data Comparability

Some estimates from the 2023 ABS may not be directly comparable to prior ABS results due to changes in survey methodology. Sources of possible incomparability include changes to questionnaire wording and instructions, changes to data editing and tabulation, and changes to imputation and nonresponse adjustments.

Changes in survey coverage and population. The 2023 ABS target population was updated to more closely match the target population for the Census Bureau’s County Business Patterns program. This update excludes notaries and agricultural firms whose only payroll came from IRS Form 943.

Changes to questionnaire wording and instructions. The survey section that collected information on R&D from businesses (section D) had nearly identical question wording and instructions for both the ABS 2022 and the ABS 2021 questionnaires. The 2023 ABS collected additional detail from businesses on the location of R&D performance and explicitly highlighted the concept of “domestic R&D performance.” For the 2023 ABS, detailed questions about R&D expenditures (types of costs, funding sources, and R&D categories) were tied to domestic R&D performance (a subset of total R&D costs), whereas previous ABS questionnaires asked similar questions tied to total R&D costs.

In addition, the following are survey changes in the questionnaire from ABS 2022 to ABS 2023; question number references are in reference to the ABS 2023:

- New question: A.13 Moving Production to U.S. in 2022
- New question: A.14 Reasons for Moving Production to the U.S. in 2022
- New and revised question options: B.11 Field of Highest Degree (applies to all 4 owners when applicable)
 - Biological, agricultural, and environmental life sciences changed to Biological / agricultural sciences and natural resources
 - Computer and mathematical sciences and other technology and technical fields changed to Computer sciences and mathematics
 - Earth, atmospheric, and ocean sciences changed to Geosciences, atmospheric, and ocean sciences
 - Health changed to Health sciences
 - Economics, political science, psychology, sociology, and other social sciences changed to Psychology and social sciences
 - Business management and administration fields was added
 - Law and legal studies was added
 - Management and administration fields was removed
 - Social service and related fields was removed
 - Public administration and social service and related fields was added
- New and returning questions: E.5–E.8
- Question E.9: Removed option “Develop customer-specific solutions (i.e., customized goods or services)”
- New and returning questions: E.10–E.21
- Replaced Section F: Financing (removed Design and Intellectual Property section)
- Replaced Section G: Technology and Intellectual Property (removed Domestic and Foreign Transaction section)

- Replaced Section H: Sustainability and Climate Impact (removed Coronavirus Pandemic Impact on R&D and Business Activities section)

Changes in reporting procedures or classification. There were no changes to reporting procedures or classification for data year 2022.

Changes to data editing and tabulation. For data collected in the R&D section of the ABS, every response with \$50,000 or more in R&D costs was reviewed for reasonableness in 2023. For the 2023 ABS, all positive R&D cases were reviewed in industries with high rates of false-positive reports. Outside of the review for potential false-positive R&D cases, the editing of R&D data was performed similarly in 2021 and 2022. There have been no major changes to the edits from year to year.

Data collected in the innovation section of the ABS were edited similarly in 2020 and 2019, but the estimates for product innovation were tabulated differently in 2020 and 2019. For 2017, a business must have responded positively to both the product innovation question and the subsequent business product innovation question (new to market or new to business) to be considered a product innovator. For 2022 and 2023, only a positive response to the question regarding new or improved goods or services was required to be tabulated as a product innovator.

Changes in collection methods. During the 2023 ABS collection period, a single letter was mailed to respondents using Postal Service (USPS) Priority Mail. For the 2023 ABS, the third follow-up used First Class Mail. This was not a change from the 2022 ABS. For the 2021 ABS collection period, all initial and reminder letters were mailed to respondents using USPS. A paper questionnaire was discontinued during the 2021 ABS. All data are now collected electronically.

Definitions

Affiliated (company or business). An entity that is owned 10% or more (based on voting interest or an equivalent interest) directly or indirectly by your company.

Business processes. Business process includes the following: (1) methods for producing goods or providing services, (2) logistics, delivery, or distribution methods, (3) marketing methods or after-sales services, (4) information and communication systems, (5) administration and management activities, and (6) product and business process development (including activities to identify, develop, or adapt products or a firm's processes).

Core production activity. This term refers to your primary business activities. For manufacturing companies, core production typically involves production of physical goods. For service companies and other companies, core production refers to the main services or activities provided by your business, such as information and communications technology services or marketing services.

Domestic or U.S. located. Refers to a location in any of the U.S. 50 states and the District of Columbia.

Employment. Paid employment consists of full- and part-time employees, including salaried officers and executives of corporations who were on the payroll in the pay period including March 12. Included are employees on sick leave, holidays, and vacations; not included are proprietors and partners of unincorporated businesses.

Ethnicity. Based on OMB's guidance, there are two minimum categories for ethnicity: Hispanic or Latino and not Hispanic or Latino. OMB considers race and Hispanic origin to be two separate and distinct concepts. Hispanics and Latinos may be of any race.

Exported goods. Value of goods, including the value of equipment, supplies, materials, etc. This should equal the amounts reported in the Automated Export System's Electronic Export Information filed with Customs and Border Protection plus the cost of transporting the goods to customers located in foreign destinations (i.e., outside the United States).

Exported services. An exported service is a service-related product (i.e., services performed, including digital service, license agreement) that is sold or transferred to, or performed for, customers (individual, government, business establishment, etc.) located in foreign destinations (i.e., outside the United States).

Firm. A business organization or entity consisting of one or more domestic establishment locations under common ownership or control.

Foreign affiliate. A foreign affiliate is an entity located outside the United States that is owned at least 10% (based on voting interest or an equivalent interest) directly or indirectly by the U.S. reporter.

Foreign parent (of a U.S.-located business). The first entity outside the United States in an affiliate's ownership chain that has a direct or indirect investment interest of more than 50% of the affiliate's voting securities.

Goods. Usually a tangible object (such as a smartphone, furniture, or packaged software) but also includes digital goods (such as downloadable software, music, and film). Exclude the simple resale of new goods and changes of a solely aesthetic nature.

Imported goods. The value of goods purchased from customers located in foreign destinations (i.e., outside the United States) as indicated in import declarations filed with Customs and Border Protection.

Imported services. An imported service is a service-related product (i.e., service performed, including digital service, license agreement) that is purchased from customers located in foreign destinations (i.e., outside the United States).

Innovation. A business innovation is a new or improved product or business process (or combination thereof) that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm.

Intellectual property. Includes patents, processes, and trade secrets; books and music; trademarks; recorded performances and events, such as radio and television programs and motion pictures; broadcast and recorded live performances and events and their content; general use computer software; franchise fees; and other (e.g., digital media).

Noise infusion. A method of disclosure avoidance in which values are perturbed prior to tabulation by applying a random noise multiplier to the magnitude data, such as the sales and receipts for all firms. Disclosure protection is accomplished in a manner that causes the vast majority of cell values to be perturbed by, at most, a few percentage points.

North American Industry Classification System (NAICS). NAICS is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. This system is used by the United States, Canada, and Mexico.

Race. The data on race were derived from answers to the race question. Race data are collected in accordance with the guidelines provided by OMB, and these data are based on self-identification. The racial categories included in the questionnaire generally reflect a social definition of race recognized in this country and are not an attempt to define race biologically, anthropologically, or genetically. In addition, it is recognized that the categories of the race question include race and national origin or sociocultural groups. OMB requires that race data be collected for a minimum of five groups: White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander. Respondents may report more than one race.

Receipts. Includes the total sales, shipments, receipts, revenue, or grants for domestic operations, excluding foreign subsidiaries.

Research and development (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.

- *Basic research.* Activities aimed at acquiring new knowledge or understanding without specific immediate commercial applications or uses.
- *Applied research.* Activities aimed at solving a specific problem or meeting a specific commercial objective.
- *Development.* Systematic work, drawing on research and practical experience and resulting in additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.

R&D activity in software includes:

- Software development or improvement activities that expand scientific or technological knowledge
- 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, and
 - Creation of new software based on known methods and applications.
- Conversion or translation of existing software and software languages; and
- Adaptation of a product to a specific client, unless knowledge that significantly improved the base program was added in that process.

Services. Intangible activities, such as retailing, insurance, educational courses, air travel, and consulting; also includes digital services. (Exclude the simple resale of new services.)

Sex. For the purposes of the ABS, sex refers to a person's biological sex. The sex question wording very specifically intends to capture a person's biological sex and not gender.

Unaffiliated (company or business). Entity that is owned less than 10%, directly or indirectly, by your company (i.e., independent contractors and suppliers).

Worldwide sales. Worldwide and domestic sales and operating revenues, including grants.

Technical Tables

Table	Title
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A-1	Companies in the sampling frame and selected for the sample, by industry: 2022
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A-2	Response measures: 2022
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A-3	Unit response rates, by industry: 2022
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TABLE A-1

Companies in the sampling frame and selected for the sample, by industry: 2022

(Number of companies)

Industry	NAICS code	Companies in sampling frame	Companies selected for the sample		
			All companies	Noncertainties	Certainties
All industries	11, 21-23, 31-33, 42-81, 00	5,614,000	850,000	666,000	184,000
Manufacturing industries	31-33	229,000	84,500	53,000	31,500
Food	311	22,500	7,500	4,900	2,500
Beverage and tobacco products	312	10,500	4,400	3,300	1,100
Textile, apparel, and leather products	313-16	11,500	5,500	3,700	1,800
Wood products	321	11,000	4,400	3,100	1,300
Paper	322	2,100	1,300	650	600
Printing and related support activities	323	20,500	6,400	4,600	1,800
Petroleum and coal products	324	650	500	300	200
Chemicals	325	9,300	4,900	2,500	2,500
Pesticide, fertilizer, and other agricultural chemicals	3253	650	300	150	150
Pharmaceuticals and medicines	3254	2,000	1,400	700	650
Soap, cleaning compound, and toilet preparation	3256	2,000	1,000	650	400
Other chemicals	other 325	4,600	2,200	1,000	1,200
Plastics and rubber products	326	7,800	3,500	1,900	1,600
Nonmetallic mineral products	327	8,200	3,600	2,400	1,200
Primary metals	331	2,700	1,500	750	750
Fabricated metal products	332	46,000	11,000	6,900	3,900
Machinery	333	18,000	6,000	3,200	2,800
Computer and electronic products	334	9,200	5,100	2,400	2,600
Communications equipment	3342	950	550	250	300
Semiconductor and other electronic components	3344	2,900	1,500	750	750
Navigational, measuring, electromedical, and control instruments	3345	3,900	2,200	950	1,200
Other computer and electronic products	other 334	1,500	800	450	350
Electrical equipment, appliances, and components	335	4,100	2,100	1,100	950
Transportation equipment	336	8,500	4,100	2,300	1,800
Automobiles, bodies, trailers, and parts	3361-63	5,200	2,400	1,300	1,100
Aerospace products and parts	3364	1,200	800	400	400
Other transportation	other 336	2,100	950	550	350
Furniture and related products	337	13,000	5,000	3,500	1,500
Miscellaneous	339	21,500	7,300	5,000	2,300
Medical equipment and supplies	3391	7,800	2,700	1,800	950
Other miscellaneous manufacturing	3399	13,500	4,500	3,200	1,300
Nonmanufacturing industries	11, 21-23, 42-81	5,361,000	757,000	605,000	152,000
Agriculture, forestry, fishing, and hunting	11	25,500	8,300	6,900	1,500
Mining, extraction, and support activities	21	16,000	5,800	4,100	1,700
Utilities	22	3,500	1,800	1,200	550
Construction	23	733,000	75,000	62,500	12,500
Wholesale trade	42	264,000	46,000	31,500	14,500
Retail trade	44-45	613,000	131,000	108,000	22,500
Transportation and warehousing	48-49	211,000	46,000	35,500	10,000
Information	51	77,500	28,000	18,500	9,500
Publishing	511	20,500	8,000	4,800	3,200

TABLE A-1

Companies in the sampling frame and selected for the sample, by industry: 2022

(Number of companies)

Industry	NAICS code	Companies in sampling frame	Companies selected for the sample		
			All companies	Noncertainties	Certainties
Newspaper, periodical, book, and directory publishers	5111	8,900	3,200	2,400	800
Software publishers	5112	11,000	4,700	2,300	2,400
Telecommunications	517	11,000	4,300	2,900	1,400
Data processing, hosting, and related services	518	9,500	4,300	2,500	1,800
Other information	other 51	36,500	11,500	8,500	3,100
Finance and insurance	52	228,000	40,500	32,500	8,000
Real estate and rental and leasing	53	340,000	41,000	33,500	7,400
Lessors of nonfinancial intangible assets (except copyrighted works)	533	2,200	1,300	950	400
Other real estate and rental and leasing	other 53	338,000	39,500	32,500	7,000
Professional, scientific, and technical services	54	812,000	97,000	71,500	26,000
Legal services	5411	163,000	12,500	10,500	2,100
Accounting, tax preparation, bookkeeping, and payroll services	5412	115,000	8,600	7,600	1,000
Architectural, engineering, and related services	5413	90,500	18,500	12,500	6,200
Specialized design services	5414	33,500	2,300	2,100	200
Computer systems design and related services	5415	117,000	18,500	12,000	6,200
Management, scientific, and technical consulting services	5416	181,000	14,500	12,000	2,800
Scientific research and development services	5417	14,000	8,200	3,500	4,700
Advertising, public relations, and related services	5418	32,000	8,700	6,800	1,900
Other professional, scientific, and technical services	5419	65,500	5,000	4,200	750
Management of companies and enterprises	55	4,200	2,300	1,800	550
Administrative and support and waste management and remediation services	56	344,000	42,000	34,000	8,000
Educational services	61	65,500	13,500	11,000	2,400
Health care and social assistance	62	590,000	60,500	50,000	10,500
Health care services	621-23	500,000	47,000	39,000	8,200
Social assistance	624	87,500	13,500	11,000	2,400
Arts, entertainment, and recreation	71	111,000	25,000	20,500	4,300
Accommodation and food services	72	528,000	47,500	40,500	6,500
Other services	81	394,000	46,500	41,000	5,400
Unclassified	00	24,000	9,100	8,300	850

NAICS = 2017 North American Industry Classification System.

Note(s):

Certainties were companies with a probability of selection of one because they had previously reported R&D costs, had 500 or more employees, were in the Business Enterprise Research and Development Survey sample, or had high payroll or receipts defined by stratum specific cutoffs. Noncertainties are companies with a probability of selection of less than 1.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE A-2

Response measures: 2022

(Percent)

Measure	Percent
Check-in rate ^a	58.0
Response rate (unweighted) ^b	62.0

^a The number of survey responses from sampled companies divided by the total number of companies in the sample. Note this includes companies who contacted the Census Bureau to indicate they were out of business and companies who were later determined to be inactive or otherwise out of scope for tabulations.

^b The number of active and in-scope companies responding to the number of owners and number of W-2 employees, divided by the total number of in-scope and active companies in the sample.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2023 Annual Business Survey: Data Year 2022.

TABLE A-3

Unit response rates, by industry: 2022

(Number)

Industry	NAICS code	In-scope units ^a	Reporting units that met the response criteria (%) ^b
All industries	11, 21–23, 31–33, 42–81, 00	740,000	62
Manufacturing industries	31–33	74,500	62
Food	311	6,600	56
Beverage and tobacco products	312	3,800	63
Textile, apparel, and leather products	313–16	4,800	56
Wood products	321	4,000	60
Paper	322	1,100	59
Printing and related support activities	323	6,000	58
Petroleum and coal products	324	400	50
Chemicals	325	4,200	62
Pesticide, fertilizer, and other agricultural chemical	3253	300	50
Pharmaceuticals and medicines	3254	1,100	59
Soap, cleaning compound, and toilet preparation	3256	900	56
Other chemicals	other 325	1,900	63
Plastic and rubber products	326	3,100	65
Nonmetallic mineral products	327	3,200	59
Primary metals	331	1,200	58
Fabricated metal products	332	10,000	67
Machinery	333	5,400	65
Computer and electronic products	334	4,400	64
Communications equipment	3342	500	60
Semiconductor and other electronic components	3344	1,400	64
Navigational, measuring, and control instruments	3345	1,900	63
Other computer and electronic products	other 334	600	67
Electrical equipment, appliances, and components	335	1,800	61
Transportation equipment	336	3,600	61
Automobiles, bodies, trailers, and parts	3361–63	2,100	62
Aerospace products and parts	3364	650	62
Other transportation	other 336	800	63
Furniture and related products	337	4,600	61
Miscellaneous manufacturing	339	6,500	62
Medical equipment and supplies	3391	2,400	63
Other miscellaneous manufacturing	3399	4,100	61
Nonmanufacturing industries	11, 21–23, 42–81	665,000	62
Agriculture, forestry, fishing and hunting	11	6,000	63
Mining, extraction, and support activities	21	4,800	63
Utilities	22	1,500	60
Construction	23	67,000	63
Wholesale trade	42	41,000	61
Retail trade	44–45	115,000	60
Transportation and warehousing	48–49	39,000	56
Information	51	23,500	62
Publishing	511	7,100	62
Newspaper, periodical, book, and directory publishers	5111	3,100	65
Software publishers	5112	4,000	63
Telecommunications	517	3,600	47
Data processing, hosting, and related services	518	3,600	61
Other information	other 51	9,100	65

TABLE A-3

Unit response rates, by industry: 2022

(Number)

Industry	NAICS code	In-scope units ^a	Reporting units that met the response criteria (%) ^b
Finance and insurance	52	34,500	68
Real estate and rental and leasing	53	34,500	65
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,000	65
Other real estate and rental and leasing	other 53	33,500	64
Professional, scientific, and technical services	54	87,500	70
Legal services	5411	11,500	76
Accounting, tax preparation, bookkeeping, and payroll services	5412	7,900	75
Architectural, engineering, and related services	5413	16,500	76
Specialized design services	5414	2,200	73
Computer and electronic products	5415	16,000	66
Management, scientific, and technical consulting services	5416	13,500	67
Scientific research and development services	5417	7,100	65
Advertising, public relations, and related services	5418	7,500	67
Other professional, scientific, and technical services	5419	4,400	68
Management of companies and enterprises	55	1,300	58
Administrative and support and waste management and remediation services	56	37,000	62
Educational services	61	12,000	65
Health care and social assistance	62	54,500	64
Health care services	621–23	43,000	65
Social assistance	624	12,000	58
Arts, entertainment, and recreation	71	21,500	63
Accommodation and food services	72	42,500	53
Other services	81	42,000	60

NAICS = 2017 North American Industry Classification System.

^a In-scope units are determined using response data and final frame data after all data have been processed.^b Reporting units were considered to have fulfilled the response criteria if they provided the number of owners and number of W-2 employees.**Source(s):**

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