



InfoBrief

Microbusinesses Performed \$6.1 Billion of R&D in the United States in 2021

NSF 24-302 | October 2023

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This InfoBrief presents research and development (R&D) data on microbusinesses,¹ defined here as businesses with one to nine domestic employees. In 2021, microbusinesses in the United States reported a total of \$8.1 billion in R&D expenditures, of which \$7.3 billion (89%) was for domestic costs and \$6.1 billion (75%) was performed by the microbusinesses themselves ([table 1](#)). R&D costs include the amount that businesses spent of their own money and from other sources on R&D they perform, as well as the amount they paid others to perform R&D. This InfoBrief makes a distinction between all R&D costs and R&D performance costs, which are the costs only for R&D performed by the business.

Table 1

Annual Business Survey aggregate R&D estimates, by questionnaire reference and employment size, for companies with 1–9 employees in selected industries: 2021

(Thousands of U.S. dollars)

Company and financial information	All companies	1–4 employees	5–9 employees
Number of companies	15,855	9,993	5,861
Total R&D cost	8,131,847	3,659,817	4,472,030
Foreign R&D costs	877,630	489,208	388,422
Domestic R&D costs	7,254,217	3,170,609	4,083,608
Domestic R&D costs for salaries, wages, and fringe benefits	4,036,146	1,660,533	2,375,613
Domestic R&D costs for expensed machinery and equipment (not capitalized)	199,530	78,328	121,202
Domestic R&D costs for materials and supplies	573,007	230,443	342,565
Domestic R&D costs for payments to others for R&D	1,129,548	579,812	549,737
Domestic R&D costs for depreciation on R&D property and equipment	74,926	26,770	48,156
Domestic R&D costs for other costs	1,241,060	594,723	646,336
Domestic R&D performance	6,124,669	2,590,797	3,533,871
Domestic R&D performance paid for by the company	4,550,744	1,980,752	2,569,991
Domestic R&D performance paid for by foreign owner	179,119	59,662	119,457
Domestic R&D performance paid for by another U.S. business	270,888	135,905	134,983
Domestic R&D performance paid for by other businesses located outside the United States	16,580	11,384	5,196

Table 1**Annual Business Survey aggregate R&D estimates, by questionnaire reference and employment size, for companies with 1–9 employees in selected industries: 2021**

(Thousands of U.S. dollars)

Company and financial information	All companies	1–4 employees	5–9 employees
Domestic R&D performance paid for by U.S. university or college	7,685	6,383	1,302
Domestic R&D performance paid for by U.S. nonprofit organization	26,720	11,660	r 15,061
Domestic R&D performance paid for by U.S. federal government	1,004,852	340,324	664,528
Domestic R&D performance paid for by U.S. state or local government	63,157	42,372	20,785
Domestic R&D performance paid for by all other organizations outside the United States	4,923	2,355	r 2,568
Domestic R&D performance for basic research	715,225	329,829	385,395
Domestic R&D performance for applied research	2,221,924	869,487	1,352,437
Domestic R&D performance for development	3,187,520	1,391,481	1,796,039

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):

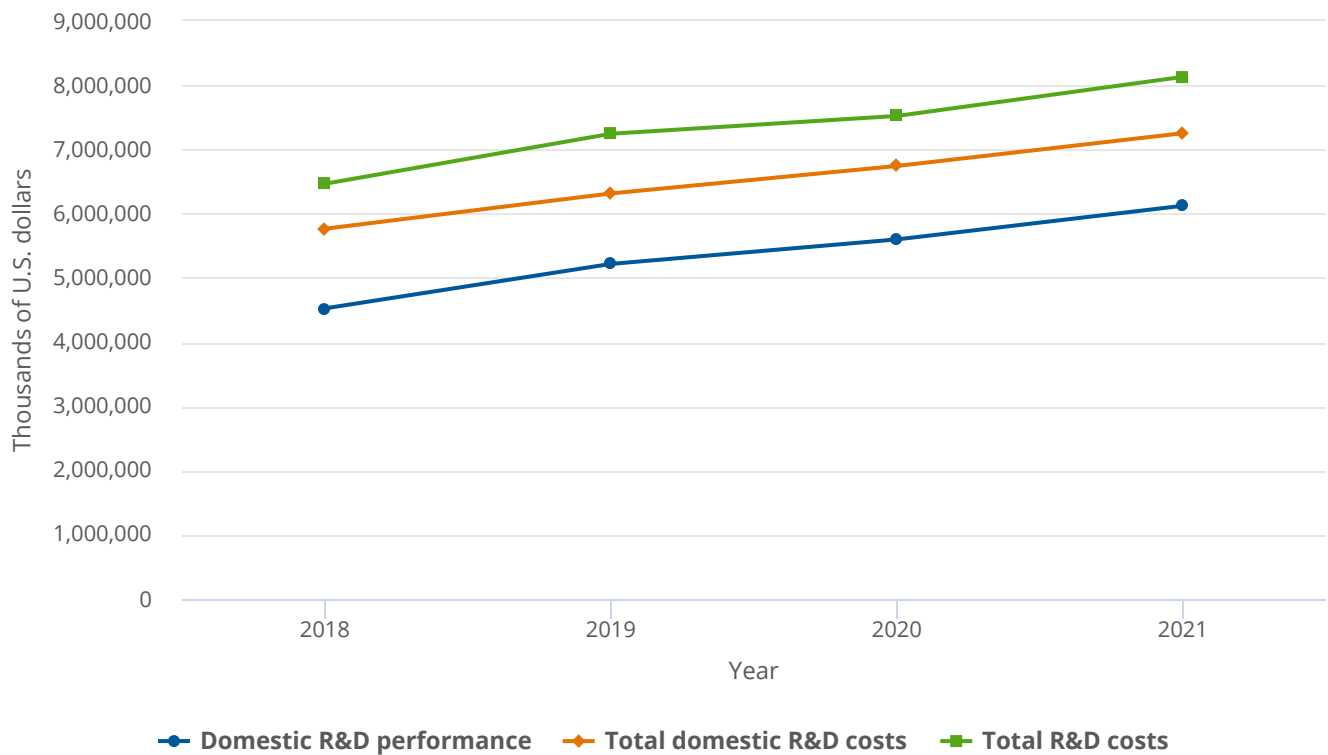
National Center for Science and Engineering Statistics and Census Bureau, 2022 Annual Business Survey: Data Year 2021.

Data for this InfoBrief are from the Annual Business Survey (ABS), developed and cosponsored by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation and by the Census Bureau. The ABS is the primary source of information on R&D expenditures by microbusinesses. Additionally, the ABS collects data related to innovation, intellectual property, technology, and business owner characteristics from both microbusinesses and companies with 10 or more employees. This InfoBrief reviews both the R&D totals for the microbusiness population and the specifics for selected industries.

The ABS is a single survey that combines efforts that have historically been from multiple separate business surveys: the Survey of Business Owners, the Annual Survey of Entrepreneurs, the 2016 Business R&D and Innovation Survey–Microbusiness (BRDI-M), and an innovation survey modeled on Eurostat’s Community Innovation Survey. This InfoBrief and the related full set of data tables result from the fifth year of a collaboration on the ABS between NCSES and the Census Bureau.

Microbusiness R&D Trends

Figure 1 presents the trajectory of total R&D costs, total domestic R&D costs, and R&D performance for microbusinesses for the 2018–21 time frame. Total domestic R&D performance increased 35% over the 3-year period (from \$4.5 billion in 2018 to \$6.1 billion in 2021), whereas total R&D costs and domestic R&D costs each increased 26% over the same period (from \$6.5 billion to \$8.1 billion and from \$5.8 billion to \$7.3 billion, respectively).

Figure 1**Total R&D costs, total domestic R&D costs, and R&D performance for companies with 1–9 employees: 2018–21****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, 2022 Annual Business Survey: Data Year 2021.

R&D by Type of Costs

Of the \$7.3 billion in domestic R&D costs (including performance and nonperformance costs) in 2021, 56% were for salaries, wages, and fringe benefits. Outsourced R&D—payments to others for R&D, including purchasing R&D services—was 16% of total domestic R&D costs. An additional 17% of microbusiness domestic R&D costs was for other expenses such as consultants, contractors, travel, or rent. Another 8% was spent on materials and supplies, 3% on machinery and equipment, and 1% on depreciation on R&D property and equipment ([table 2](#)).

Table 2**Domestic R&D costs, by selected industry and type of cost, for companies with 1–9 employees: 2021**

(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	7,254,217	4,036,146	199,530	573,007	1,129,548	74,926	1,241,060
Manufacturing industries	31–33	920,331	425,563	27,714	128,070	173,207	9,581	156,196
Food, beverage, and tobacco products	311–12	19,097	11,185	2,710	3,718	827	57	600
Textile, apparel, and leather products	313–16	7,096	2,523	39	493	0	16	4,024
Wood products	321	138	106	14	3	4	0	11
Paper	322	0	0	0	0	0	0	0
Printing and related support activities	323	0	0	0	0	0	0	0
Petroleum and coal products	324	739	444	30	148	0	0	118
Chemicals	325	208,440	59,578	8,664	25,060	76,185	3,357	35,595
Pharmaceuticals and medicines	3254	163,546	37,379	6,958	22,124	66,881	2,717	27,488
Chemicals, excluding pharmaceuticals	other 325	44,894	22,199	1,706	2,937	9,305	640	8,107
Plastics and rubber products	326	6,486	3,001	491	940	59	115	1,880
Nonmetallic mineral products	327	3,808	3,250	0	327	170	8	52
Primary metals	331	2,240	930	348	253	123	209	376
Fabricated metal products	332	15,819	5,495	1,130	2,569	3,836	367	2,422
Machinery	333	76,360	46,830	1,091	6,670	12,252	81	9,437
Computer and electronic products	334	330,785	172,865	7,014	50,420	51,582	4,163	44,741
Semiconductor and other electronic components	3344	105,362	48,223	3,199	7,767	34,082	2,006	10,084
Navigational, measuring, electromedical, and control instruments	3345	179,628	102,953	2,865	35,825	14,829	1,141	22,014
Other computer and electronic products	other 334	45,795	21,689	950	6,828	2,672	1,016	12,642
Electrical equipment, appliances, and components	335	41,714	25,638	1,707	6,881	1,682	426	5,381
Transportation equipment	336	36,042	20,951	1,703	9,961	2,131	185	1,112
Aerospace products and parts	3364	13,903	9,043	311	3,031	900	45	573
Other transportation equipment	other 336	22,139	11,907	1,391	6,930	1,231	139	540
Furniture and related products	337	1,471	273	286	54	0	36	821
Miscellaneous manufacturing	339	170,097	72,495	2,487	20,574	24,356	560	49,626
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	6,333,886	3,610,583	171,816	444,937	956,342	65,345	1,084,863
Wholesale trade	42	154,712	71,006	7,676	43,108	11,649	1,159	20,114
Information	51	784,850	617,001	39,065	17,102	28,193	6,171	77,319
Software publishers	5112	560,818	460,456	9,596	13,299	24,868	6,109	46,490

Table 2**Domestic R&D costs, by selected industry and type of cost, for companies with 1–9 employees: 2021**

(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
Information, excluding software publishers	51 less 5112	224,032	156,545	29,469	3,803	3,325	61	30,829
Architectural, engineering, and related services	5413	647,610	447,922	27,288	59,372	41,424	7,188	64,415
Computer systems design and related services	5415	1,690,254	1,226,739	27,900	40,717	74,064	5,269	315,566
Scientific research and development services	5417	3,056,460	1,247,915	69,886	284,639	801,012	45,559	607,450
Research and development in nanotechnology	541713	201,891	111,127	5,676	17,371	29,309	2,815	35,595
Research and development in biotechnology (except nanobiotechnology)	541714	1,288,461	441,338	18,479	115,229	419,881	20,267	273,267
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,538,246	677,439	45,557	151,157	344,568	22,421	297,103
Social sciences and humanities research and development	541720	17,262	9,856	174	474	5,215	56	1,485

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, 2022 Annual Business Survey: Data Year 2021.

Manufacturing industries spent 46% of their domestic R&D costs on salaries, wages, and fringe benefits, whereas selected nonmanufacturing industries spent 57% on salaries, wages, and fringe benefits; however, this difference is not statistically significant. Computer systems design and related services (NAICS 5415) and scientific research and development services (NAICS 5417)—the two largest industries by domestic R&D performance costs—spent 73% and 41% on salaries, wages, and fringe benefits, respectively.

Characteristics of Microbusiness R&D Performance

By Industry

As was the case in previous ABS surveys, microbusiness R&D is highly concentrated within a few industries.² In 2021, domestic R&D costs by microbusinesses in the United States were approximately \$7.3 billion (table 1), of which \$1.1 billion was for outsourced R&D and the remaining \$6.1 billion (or 84%) was R&D performed by the microbusinesses themselves. This proportion was nearly identical to findings from 2020, where 83% of domestic R&D was performed by microbusinesses.

Selected nonmanufacturing industries accounted for 88% of the domestic R&D performance costs in 2021. Scientific research and development services (NAICS 5417) accounted for 37% of domestic R&D performance, and just over one-half (53%) of this from R&D in the physical, engineering, and life sciences (except nanotechnology and biotechnology) (NAICS 541715) (table 2). One-quarter (26%) of domestic R&D performance costs were from the computer systems design and related services industry (NAICS 5415).

By Type of R&D

There are three types of R&D: basic research, applied research, and development.³ In 2021, just over one-half (52%) of microbusiness R&D performance was for development, 36% was for applied research, and 12% was for basic research (table 3). The allocation of R&D across the three types was similar between microbusinesses in manufacturing and nonmanufacturing industries.

Table 3

Domestic R&D performed by the company, by selected industry and type of R&D, for companies with 1–9 employees: 2021

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
All selected industries	31–33, 42, 51, 5413, 5415, 5417	6,124,669	715,225	2,221,924	3,187,520
Manufacturing industries	31–33	747,124	59,635	275,850	411,640
Food, beverage, and tobacco products	311–12	18,270 r	704	3,942	13,624 r
Textile, apparel, and leather products	313–16	7,096 r	1,425 r	1,980 r	3,691 r
Wood products	321	134	14	21	99
Paper	322	0	0	0	0
Printing and related support activities	323	0	0	0	0
Petroleum and coal products	324	739	0	148	592
Chemicals	325	132,255	14,608	52,897	64,750
Pharmaceuticals and medicines	3254	96,666	11,004	38,762	46,899
Chemicals, excluding pharmaceuticals	other 325	35,589	3,604	14,135	17,850
Plastics and rubber products	326	6,427	204	3,787	2,436 r
Nonmetallic mineral products	327	3,638 r	2,236 r	811 r	590
Primary metals	331	2,117	295	806 r	1,016 r
Fabricated metal products	332	11,983 r	3,864 r	3,509 r	4,609 r
Machinery	333	64,109	4,914	18,164	41,031
Computer and electronic products	334	279,203	21,513	87,924	169,765
Semiconductor and other electronic components	3344	71,280	8,498	29,458	33,324
Navigational, measuring, electromedical, and control instruments	3345	164,799	10,675	46,797	107,327
Other computer and electronic products	other 334	43,124	2,340	11,670	29,114
Electrical equipment, appliances, and components	335	40,032	1,809 r	16,157	22,065
Transportation equipment	336	33,911	1,208 r	6,696	26,007
Aerospace products and parts	3364	13,003	266	4,607	8,130
Other transportation equipment	other 336	20,908	942 r	2,090 r	17,876
Furniture and related products	337	1,471 r	0	559	912 r
Miscellaneous manufacturing	339	145,741	6,841	78,446 r	60,454
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,377,544	655,590	1,946,074	2,775,881
Wholesale trade	42	143,063	20,107 r	49,941	73,015
Information	51	756,657	80,314	217,708	458,635
Software publishers	5112	535,950	62,233	164,325	309,391
Information, excluding software publishers	51 less 5112	220,707	18,080	53,383	149,244
Architectural, engineering, and related services	5413	606,186	75,293	155,913	374,980
Computer systems design and related services	5415	1,616,190	170,785	595,870	849,535

Table 3**Domestic R&D performed by the company, by selected industry and type of R&D, for companies with 1–9 employees: 2021**

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
Scientific research and development services	5417	2,255,449	309,092	926,641	1,019,716
Research and development in nanotechnology	541713	172,582	27,987	73,792	70,804
Research and development in biotechnology (except nanobiotechnology)	541714	868,580	146,062	308,060	414,458
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,193,678	133,318	538,713	521,647
Social sciences and humanities research and development	541720	12,047	1,725	6,076	4,246

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, 2022 Annual Business Survey: Data Year 2021.

By Source of Funds

In 2021, three-fourths (74%) of microbusiness domestic R&D performance was paid from the companies' own funds; 17% was from federal, state, or local governments combined; 4% came from another U.S. company; and 3% was from a foreign owner (table 4). Few differences were found across industries. In the scientific research and development services industry (NAICS 5417), the industry with the most domestic R&D performance costs, 66% of microbusiness R&D performance was self-funded and 22% was funded by federal, state, or local governments combined. In 2021, 82% of all government funding (federal, state, or local) for microbusinesses went to three industries: architectural, engineering, and related services (NAICS 5413); computer systems design and related services (NAICS 5415); and scientific research and development services industry (NAICS 5417).

Table 4

Domestic R&D performed by the company, by selected industry and source of funds, for companies with 1–9 employees: 2021

(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	6,124,669		4,550,744	179,119	270,888	16,580	7,685	26,720	1,004,852	63,157	4,923
Manufacturing industries	31–33	747,124		533,030	41,326	13,745	2,068	1,444	2,178	142,418	10,098	818 r
Food, beverage, and tobacco products	311–12	18,270 r		16,920 r	0	0	0	484	0	865 r	0	0
Textile, apparel, and leather products	313–16	7,096 r		7,096 r	0	0	0	0	0	0	0	0
Wood products	321	134		134	0	0	0	0	0	0	0	0
Paper	322	0		0	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	739		739	0	0	0	0	0	0	0	0
Chemicals	325	132,255		105,357	12,466	2,993	404	26	1,323	9,686	0	0
Pharmaceuticals and medicines	3254	96,666		71,680	12,466	1,988 r	152 r	0	1,323	9,056	0	0
Chemicals, excluding pharmaceuticals	other 325	35,589		33,676	0	1,005	252	26	0	630	0	0
Plastics and rubber products	326	6,427		4,712	0	0	0	0	0	1,715	0	0
Nonmetallic mineral products	327	3,638 r		3,151 r	0	0	0	0	0	486 r	0	0
Primary metals	331	2,117		2,117	0	0	0	0	0	0	0	0
Fabricated metal products	332	11,983 r		11,687 r	0	296 r	0	0	0	0	0	0
Machinery	333	64,109		46,810	0	5,921 r	690 r	329 r	0	8,376	1,983 r	0
Computer and electronic products	334	279,203		218,156	7,113 r	1,818 r	973	186	855 r	48,733	552	818 r
Semiconductor and other electronic components	3344	71,280		63,840	0	0	0	161	129	6,159	173	818 r
Navigational, measuring, electromedical, and control instruments	3345	164,799		118,083	5,818 r	344	588	24	726 r	38,853	362	0
Other computer and electronic products	other 334	43,124		36,232	1,296	1,474 r	385 r	0	0	3,721 r	16	0
Electrical equipment, appliances, and components	335	40,032		24,452	10,662 r	0	0	345	0	468	4,105 r	0
Transportation equipment	336	33,911		26,796	0	559	0	74	0	3,219	3,264 r	0
Aerospace products and parts	3364	13,003		8,931	0	559	0	74	0	3,219	221	0
Other transportation equipment	other 336	20,908		17,865	0	0	0	0	0	0	3,043 r	0
Furniture and related products	337	1,471 r		1,185 r	0	0	0	0	0	286	0	0
Miscellaneous manufacturing	339	145,741		63,719	11,085 r	2,158 r	0	0	0	68,584 r	195	0
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,377,544		4,017,713	137,793	257,144	14,513	6,241	24,542	862,434	53,059	4,106

Table 4**Domestic R&D performed by the company, by selected industry and source of funds, for companies with 1–9 employees: 2021**

(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
Wholesale trade	42	143,063	120,053	507 r	0	1,488	183 r	0	20,777 r	54 r	0
Information	51	756,657	726,206	1,343 r	3,675	2,745	0	513	20,623	1,551	0
Software publishers	5112	535,950	511,079	471	3,307	2,745	0	280 r	16,517	1,551	0
Information, excluding software publishers	51 less 5112	220,707	215,127	872 r	368 r	0	0	233 r	4,107	0	0
Architectural, engineering, and related services	5413	606,186	461,332	2,580	61,996	1,021	1,233 r	4,544 r	70,603	2,877	0
Computer systems design and related services	5415	1,616,190	1,230,848	23,820 r	53,930	0	227 r	9,867 r	295,102 r	1,764 r	631 r
Scientific research and development services	5417	2,255,449	1,479,275	109,543	137,542	9,258	4,597	9,618	455,328	46,813	3,475
Research and development in nanotechnology	541713	172,582	116,927	5,374 r	6,006	267	659 r	2,046 r	40,900	404	0
Research and development in biotechnology (except nanobiotechnology)	541714	868,580	610,670	38,829	49,949	3,284	968 r	4,448	130,369	28,243 r	1,821 r
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,193,678	735,709	65,340	80,924	5,707	1,765	2,924	281,490	18,165	1,654
Social sciences and humanities research and development	541720	12,047	7,408	0	664 r	0	1,205 r	200 r	2,570	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, 2022 Annual Business Survey: Data Year 2021.

By State

In 2020, five states (California, New York, Massachusetts, Michigan, and Washington) accounted for 51% of all domestic microbusiness R&D performance cost.⁴ In 2021, the five states (California, Texas, Florida, Massachusetts, Washington) also accounted for 51% of all domestic microbusiness R&D performance cost (table 5). California made up nearly one-third of all domestic microbusiness R&D performance cost in 2021 and its estimated costs were more than six times the estimated costs of Texas (which had the next highest estimated costs).

Table 5

Domestic R&D performed by the company, by state and employment size, for companies with 1–9 employees in selected industries: 2021

(Number and thousands of U.S. dollars)

State	All companies		1–4 employees		5–9 employees	
	Companies (number)	Amount	Companies (number)	Amount	Companies (number)	Amount
All states	15,339	6,124,669	9,611	2,590,797	5,727	3,533,871
Alabama	80	27,599	68	18,036	13	9,563
Alaska	4	826	4	826	0	0
Arizona	256	88,693	162	38,821	93	49,871
Arkansas	56	19,073	19	5,784	38	13,289
California	3,953	2,012,984	2,547	701,550	1,407	1,311,433
Colorado	602	234,304	316	91,543	287	142,761
Connecticut	98	48,150	60	18,600	37	29,550
Delaware	165	69,107	109	44,344	57	24,763
District of Columbia	27	17,781	17	12,430	11	5,351
Florida	711	281,389	455	170,107	257	111,282
Georgia	337	96,196	272	46,919	64	49,277
Hawaii	11	2,953	10	1,828	2	1,125
Idaho	49	18,782	15	2,493	36	16,289
Illinois	429	150,100	289	54,633	139	95,467
Indiana	194	62,734	145	40,815	48	21,919
Iowa	78	18,990	56	11,902	23	7,088
Kansas	106	23,961	83	16,546	24	7,414
Kentucky	97	25,048	69	14,846	29	10,202
Louisiana	23	5,739	10	3,548	11	2,192
Maine	46	8,666	32	4,995	15	3,670
Maryland	422	172,731	305	92,600	117	80,131
Massachusetts	570	278,140	331	115,643	239	162,497
Michigan	310	102,184	153	40,265	157	61,919
Minnesota	430	128,300	300	52,184	129	76,117
Mississippi	31	7,556	20	4,695	10	2,862
Missouri	171	32,212	108	16,055	64	16,158
Montana	34	14,611	14	2,292	19	12,319
Nebraska	19	7,014	16	5,925	2	1,089
Nevada	111	43,669	75	25,364	35	18,305
New Hampshire	67	43,419	34	9,529	34	33,890
New Jersey	256	134,415	161	84,273	95	50,142
New Mexico	63	25,502	35	11,867	28	13,635
New York	665	226,485	424	83,783	242	142,702
North Carolina	431	144,595	280	71,987	150	72,608
North Dakota	12	3,068	5	1,491	8	1,577
Ohio	542	144,642	236	54,361	307	90,281
Oklahoma	107	30,764	89	19,605	20	11,159

Table 5**Domestic R&D performed by the company, by state and employment size, for companies with 1–9 employees in selected industries: 2021**

(Number and thousands of U.S. dollars)

State	All companies		1–4 employees		5–9 employees	
	Companies (number)	Amount	Companies (number)	Amount	Companies (number)	Amount
Oregon	238	80,522	147	43,015	92	37,507
Pennsylvania	527	183,302	348	131,770	178	51,532
Rhode Island	18	6,696	16	5,937	3	758
South Carolina	178	95,782	36	14,113	144	81,669
South Dakota	12	3,156	7	966	6	2,190
Tennessee	116	47,601	65	19,105	50	28,496
Texas	842	301,057	479	133,984	362	167,073
Utah	189	66,559	140	31,699	48	34,860
Vermont	71	17,876	3	948	67	16,928
Virginia	543	137,037	385	57,374	158	79,663
Washington	572	243,051	425	105,850	147	137,201
West Virginia	20	3,795	18	2,426	2	1,369
Wisconsin	348	147,494	165	39,997	182	107,497
Wyoming	73	30,242	40	5,834	34	24,408
Undistributed	18	8,117	8	5,295	9	2,822

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, 2022 Annual Business Survey: Data Year 2021.

Total Employment and R&D Employees

Just under 39,000 domestic R&D employees (78% male, 22% female) worked for microbusinesses in 2021, and 88% of those domestic R&D employees were in the selected nonmanufacturing microbusinesses (table 6). Among all domestic R&D employees, the largest percentages worked in the computer systems design and related services industry (NAICS 5415) and scientific research and development services industry (NAICS 5417) (30% and 26%, respectively), but these percentages are not significantly different.

Table 6**Domestic R&D employees, by selected industry, by sex and by R&D work activity, for companies with 1–9 employees: 2021**

(Number)

Industry	NAICS code	All companies	Male	Female	Researchers (including R&D scientists, engineers, and their managers)	R&D technicians and equivalent staff	R&D support staff (clerical and other)	Researchers with PhD (excluding MD, JD, and EdD)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	38,962	30,340	8,622	28,417	7,478	3,066	7,358
Manufacturing industries	31–33	4,686	3,735	951	3,432	882	372	945

Table 6**Domestic R&D employees, by selected industry, by sex and by R&D work activity, for companies with 1–9 employees: 2021**

(Number)

Industry	NAICS code	All companies		Male		Female		Researchers (including R&D scientists, engineers, and their managers)		R&D technicians and equivalent staff		R&D support staff (clerical and other)		Researchers with PhD (excluding MD, JD, and EdD)	
Food, beverage, and tobacco products	311–12	89	r	79	r	10	r	88	r	2		0		4	
Textile, apparel, and leather products	313–16	25		21		4		11		3		11	r	0	
Wood products	321	6		4		1		3		1		1		3	
Paper	322	0		0		0		0		0		0		0	
Printing and related support activities	323	0		0		0		0		0		0		0	
Petroleum and coal products	324	9		7		1		9		0		0		1	
Chemicals	325	607		438		169		387		138		82		175	
Pharmaceuticals and medicines	3254	296		201		95		227		50		19		120	
Chemicals, excluding pharmaceuticals	other 325	311		237		74		160		88		63		55	
Plastics and rubber products	326	29		26		3		15		3		12	r	1	
Nonmetallic mineral products	327	24		23		1		18		6	r	0		9	r
Primary metals	331	11	r	7		4	r	11	r	0		0		9	r
Fabricated metal products	332	159	r	156	r	3		57	r	59	r	43	r	2	r
Machinery	333	512		422		90		380		104		28		59	
Computer and electronic products	334	1,950		1,582		368		1,414		400		137		367	
Semiconductor and other electronic components	3344	509		440		69		329		136	r	44		127	
Navigational, measuring, electromedical, and control instruments	3345	1,110		852		258		878		176		56		211	
Other computer and electronic products	other 334	332		290		42		207		88		37		29	
Electrical equipment, appliances, and components	335	306		255		51		204		62	r	40		42	r
Transportation equipment	336	190		180		10		146		34		11		17	r
Aerospace products and parts	3364	95		88		7		69		21		5		1	
Other transportation equipment	other 336	96		93		3		77		13	r	6	r	16	r
Furniture and related products	337	3		3		0		3		0		0		0	
Miscellaneous manufacturing	339	765		531		233	r	687		70		7		253	
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	34,276		26,605		7,671		24,985		6,596		2,695		6,412	
Wholesale trade	42	1,119		954		165		860		191		68	r	137	
Information	51	5,859		4,631		1,228		3,954		1,333		571		630	
Software publishers	5112	4,299		3,382		917		2,911		892		496		499	
Information, excluding software publishers	51 less 5112	1,559		1,248		311		1,043		442		75		131	
Architectural, engineering, and related services	5413	5,330		4,454		876		4,067		920		343		505	
Computer systems design and related services	5415	11,653		9,670		1,983		8,364		2,444		845		936	
Scientific research and development services	5417	10,315		6,897		3,418		7,740		1,708		868		4,204	

Table 6**Domestic R&D employees, by selected industry, by sex and by R&D work activity, for companies with 1–9 employees: 2021**

(Number)

Industry	NAICS code	All companies	Male	Female	Researchers (including R&D scientists, engineers, and their managers)	R&D technicians and equivalent staff	R&D support staff (clerical and other)	Researchers with PhD (excluding MD, JD, and EdD)
Research and development in nanotechnology	541713	1,119	763	355	812	140	167	498
Research and development in biotechnology (except nanobiotechnology)	541714	3,199	1,955	1,244	2,355	579	266	1,504
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,878	4,113	1,765	4,474	975	429	2,171
Social sciences and humanities research and development	541720	110	60	50	91	13	6	27

r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

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, 2022 Annual Business Survey: Data Year 2021.

R&D employee occupations included researchers (e.g., R&D scientists, engineers, and their managers), R&D technicians and equivalent staff, and R&D support staff (clerical and other). Among domestic R&D employees in 2021, 73% (about 28,000 employees) were researchers; among these researchers, 26% had PhDs. Almost 7,500, or 19% of domestic R&D employees, were R&D technicians, and the remaining (about 3,000, or 8%) were R&D support staff.

Survey Information and Data Availability

In this InfoBrief, R&D costs and performance are expressed in current U.S. dollars and are not adjusted for inflation. For the ABS, a microbusiness is defined as a business organization located in the United States, either a U.S.-owned company or a U.S. affiliate of a foreign parent company, of one or more establishments under common ownership or control, with one to nine domestic employees.

The survey was administered to companies whether or not they were known to have R&D activity. The ABS collected detailed statistics from microbusinesses located in the United States on R&D expenditures, R&D employees, intellectual property, company and primary owner characteristics, and innovation activities.

Only microbusinesses (businesses with one to nine employees) are asked the R&D questions, and only those microbusinesses are presented in this InfoBrief.

The statistics from the survey are based on a sample; as such, they are subject to both sampling and nonsampling errors (see "Technical Notes" under the Methodology tab at <https://ncses.nsf.gov/surveys/annual-business-survey/>).

Microbusinesses with less than \$50,000 in R&D are excluded from the ABS national estimates and this InfoBrief.

For the full ABS 2022 (reference year 2021), 300,000 employer companies were sampled to represent the population of 4.9 million employer companies, and the unit response rate was 67.0%.

The full set of data tables on R&D, company demographics, innovation, technology, and patent and intellectual property protection from this survey will be listed under the Data tab at <https://ncses.nsf.gov/surveys/annual-business-survey/>. Individual data tables and tables with relative standard errors and imputation rates from the ABS 2022 are available from the Survey Manager upon request.

Notes

1 Microbusinesses are defined as having between one to nine domestic employees. Employees are defined as individuals who worked for the business and received a W-2 issued by the business for salary or wages.

2 R&D questions were asked only of manufacturers and certain selected nonmanufacturing industries that in previous NCSES surveys (2017 ABS, BRDI-M, and Business R&D Innovation Survey) represented almost all R&D of microbusinesses in the United States.

3 As defined by the *Frascati Manual*, basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view. Applied research is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily toward a specific, practical aim or objective. Experimental development is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes. See Organisation for Economic Co-operation and Development (OECD). 2015. *Frascati Manual: Guidelines for Collecting and Reporting Data on Research and Experimental Development*. The Measurement of Scientific, Technological and Innovation Activities. Paris: OECD Publishing.

4 Kindlon A; National Center for Science and Engineering Statistics (NCSES). 2022. *Microbusinesses Performed \$5.6 Billion of R&D in the United States in 2020*. NSF 23-305. Alexandria, VA: National Science Foundation. Available at <https://ncses.nsf.gov/pubs/nsf23305/>.

Suggested Citation

Kindlon A; National Center for Science and Engineering Statistics (NCSES). 2023. *Microbusinesses Performed \$6.1 Billion of R&D in the United States in 2021*. NSF 24-302. Alexandria, VA: National Science Foundation. Available at <https://ncses.nsf.gov/pubs/nsf24302>.

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