



National Center for Science and
Engineering Statistics

InfoBrief

Microbusinesses Performed \$5.2 Billion of R&D in the United States in 2019

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This InfoBrief presents research and development and other data on *microbusinesses*, defined here as those with one to nine domestic employees.¹ In 2019, microbusinesses spent \$6.3 billion on R&D costs in the United States ([table 1](#)), of which \$5.2 billion was performed by the microbusinesses themselves. R&D costs include the amount of money that businesses spent of their own money and from other sources on R&D performance, plus the amount that they paid others to perform R&D. This InfoBrief makes a distinction between all R&D costs and R&D performance costs that includes only the costs for the R&D performed by the business.

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 (NSF) 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 totals for the microbusiness population as a whole as well as the specifics for selected industries.

The ABS is a single survey that combines efforts that have historically been 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 into a single platform. This InfoBrief and the related full set of detailed statistical tables result from the third year of a 5-year collaboration between NCSES and the Census Bureau on the ABS.

Table 1**Annual Business Survey aggregate R&D estimates, by question and employment size, for companies with 1–9 employees in selected industries: 2019**

(Thousands of U.S. dollars)

Company information and question reference	All companies	1–4 employees	5–9 employees
Number of companies	15,400	9,774	5,627
Total R&D cost	7,245,649	3,215,024	4,030,625
Foreign R&D costs	929,337	363,152	566,185
Domestic R&D costs	6,316,312	2,851,872	3,464,440
Domestic R&D costs for salaries, wages, and benefits	3,494,058	1,496,901	1,997,157
Domestic R&D costs for expensed machinery and equipment (not capitalized)	169,003	88,012	80,991
Domestic R&D costs for materials and supplies	512,106	238,522	273,584
Domestic R&D costs for payments to others for R&D	1,097,401	501,550	595,851
Domestic R&D costs for depreciation on R&D property and equipment	73,745	23,391	50,354
Domestic R&D costs for other costs	969,999	503,496	466,503
Domestic R&D performance	5,218,911	2,350,322	2,868,589
Domestic R&D performance paid for by company	4,109,445	1,868,086	2,241,358
Domestic R&D performance paid for by foreign owner	114,719	50,600	64,119
Domestic R&D performance paid for by another U.S. business	211,608	122,427	89,181
Domestic R&D performance paid for by other businesses located outside the United States	22,991	9,628	r 13,363
Domestic R&D performance paid for by U.S. university or college	12,065	4,702	7,362
Domestic R&D performance paid for by U.S. nonprofit organization	9,387	4,244	5,143
Domestic R&D performance paid for by U.S. federal government	712,053	276,329	435,723
Domestic R&D performance paid for by U.S. state or local government	22,908	13,349	9,559
Domestic R&D performance paid for by all other organizations outside the United States	3,736	956	r 2,780
Domestic R&D performance for basic research	342,418	137,509	204,909
Domestic R&D performance for applied research	2,145,921	948,978	1,196,943
Domestic R&D performance for development	2,730,571	1,263,835	1,466,736

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 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, 2020 Annual Business Survey: Data Year 2019.

R&D by Type of Costs

Over half (55%) of microbusiness domestic R&D costs (which include performance and nonperformance expenditures) were for salaries, wages, and benefits. Outsourced R&D—payments to others for R&D, including purchasing R&D services—was 17% of total R&D costs. An additional 15% of microbusiness R&D costs was for other expenses, such as consultants, contractors, travel, or rent; 8% was for materials and supplies; 3% was for machinery and equipment; and 1% was for 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: 2019**

(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	6,316,312	3,494,058	169,003	512,106	1,097,401	73,745	969,999
Manufacturing industries	31–33	832,065	325,090	35,162	93,560	209,845	11,001	157,407
Food, beverage, and tobacco products	311–12	6,197	2,264 r	1,464 r	1,406 r	301	42 r	719 r
Textile, apparel, and leather products	313–16	236 r	226 r	-	-	-	10 r	-
Wood products	321	4,065 r	1,626 r	488 r	813 r	-	569 r	569 r
Paper	322	-	-	-	-	-	-	-
Printing and related support activities	323	555	555	-	-	-	-	-
Petroleum and coal products	324	-	-	-	-	-	-	-
Chemicals	325	334,289	89,770	7,626	25,634	156,120	4,899	50,240
Pharmaceuticals and medicines	3254	250,109	54,107	4,275	15,333	132,601 r	4,426	39,367
Chemicals, excluding pharmaceuticals	other 325	84,180	35,663	3,351	10,302	23,519	473	10,873
Plastics and rubber products	326	6,397	4,785	4	572	136	-	899
Nonmetallic mineral products	327	11,733 r	3,219 r	624 r	1,067 r	5,873 r	-	951 r
Primary metals	331	2,568 r	1,532 r	21 r	173 r	215 r	-	627 r
Fabricated metal products	332	20,594 r	11,610 r	298 r	8,314 r	76 r	29 r	267 r
Machinery	333	23,685	12,876	2,661	1,786	1,628 r	301 r	4,434
Computer and electronic products	334	249,740	119,103	15,397	28,837	22,583	2,287	61,534
Semiconductor and other electronic components	3344	40,200	21,395	5,808 r	5,799	1,895	313 r	4,990 r
Navigational, measuring, electromedical, and control instruments	3345	180,968	78,437	8,030	21,260	19,595	1,535	52,111 r
Other computer and electronic products	other 334	28,572	19,270	1,559	1,778	1,093	439 r	4,433 r
Electrical equipment, appliances, and components	335	9,977	5,688	1,647 r	983	385	23 r	1,249
Transportation equipment	336	29,712	10,699	1,005	7,751 r	5,134	1,465 r	3,657 r
Aerospace products and parts	3364	14,572	7,366	817 r	2,221	2,714 r	480 r	975
Other transportation equipment	other 336	15,139 r	3,333	188 r	5,529 r	2,421 r	985 r	2,683 r
Furniture and related products	337	-	-	-	-	-	-	-
Miscellaneous manufacturing	339	132,316	61,135	3,927 r	16,225	17,394 r	1,376	32,259
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,484,247	3,168,968	133,841	418,545	887,556	62,744	812,592
Wholesale trade	42	350,239	143,046	14,649	26,402	124,426 r	2,704	39,012
Information	51	615,346	475,021	12,777	16,215	16,662	10,125	84,547
Software publishers	5112	336,298	286,630	4,148	6,429	8,377	463	30,251
Information, excluding software publishers	51 less 5112	279,048	188,391	8,629 r	9,786	8,285	9,662	54,296

Table 2**Domestic R&D costs, by selected industry and type of cost, for companies with 1–9 employees: 2019**

(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
Architectural, engineering, and related services	5413	479,734	324,187	20,505	42,265	24,822	4,114	63,843
Computer systems design and related services	5415	1,469,862	1,122,814	25,022	68,920	34,702	10,412	207,991
Scientific research and development services	5417	2,569,066	1,103,900	60,888	264,744	686,944	35,389	417,200
Research and development in nanotechnology	541713	206,455	108,137	4,917	15,018	30,815	2,427	45,140
Research and development in biotechnology (except nanobiotechnology)	541714	1,049,044	344,673	19,778	104,125	403,158	11,934	165,377
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,276,681	625,272	36,087	144,763	249,770	20,953	199,835
Social sciences and humanities research and development	541720	34,665	23,939	106 r	742	3,202	76	6,601

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 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, 2020 Annual Business Survey: Data Year 2019.

Across industries, there is variation in the composition of R&D costs. Industries classified as manufacturing spent 39% of their R&D costs on salaries, wages, and benefits compared to 58% for the selected nonmanufacturing industries.

Microbusinesses in the software publishing sector (North American Industry Classification System [NAICS] 5112) spent 85% of their R&D expenses on salaries, wages, and benefits. Microbusinesses in pharmaceuticals and medicines (NAICS 3254) spent 22% of their R&D performance dollars on salaries, wages, and benefits, and they expended 53% on payments to others for R&D including purchasing R&D services. Scientific research and development services (NAICS 5417) spent 43% of their R&D dollars on salaries, wages, and benefits and expended 27% on payments to others for R&D (including purchasing R&D services).

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 2019, R&D costs by microbusinesses in the United States were approximately \$6.3 billion (table 2), of which \$1.1 billion was for outsourced R&D and \$5.2 billion (or 83%) was R&D performed by the microbusinesses themselves. Of this \$5.2 billion in microbusiness R&D performance, selected nonmanufacturing industries accounted for \$4.6 billion (table 3). Nearly three-fourths (72%) of all microbusiness R&D performance was done by microbusinesses classified by the following three R&D intensive industries: architectural, engineering, and related services (NAICS 5413), computer systems design and related services (NAICS 5415), and scientific research and development services (NAICS 5417).

By Type of R&D

There are three types of R&D: basic research, applied research, and development.³ Just over half (52%) of microbusiness R&D performance in 2019 was development, 41% was applied research, and 7% was basic research (table 3). This is compared to 2018, when almost two-thirds (65%) of microbusiness R&D performance was development, 30% was applied research, and 5% was basic research.⁴

Table 3

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

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
All selected industries	31–33, 42, 51, 5413, 5415, 5417	5,218,911	342,418	2,145,921	2,730,571
Manufacturing industries	31–33	622,220	17,647	298,567	306,007
Food, beverage, and tobacco products	311–12	5,896	747 r	2,704 r	2,445
Textile, apparel, and leather products	313–16	236 r	-	-	236 r
Wood products	321	4,065 r	-	3,252 r	813 r
Paper	322	-	-	-	-
Printing and related support activities	323	555	-	102 r	453
Petroleum and coal products	324	-	-	-	-
Chemicals	325	178,170	6,009	96,560	75,601
Pharmaceuticals and medicines	3254	117,508	2,745	67,870	46,893
Chemicals, excluding pharmaceuticals	other 325	60,661	3,264 r	28,689	28,708
Plastics and rubber products	326	6,261	372 r	5,124	765
Nonmetallic mineral products	327	5,860 r	-	2,994 r	2,866 r
Primary metals	331	2,353 r	526 r	316 r	1,511 r
Fabricated metal products	332	20,518 r	234 r	19,547 r	737 r
Machinery	333	22,057	870	11,013	10,174
Computer and electronic products	334	227,158	7,692	80,158	139,308
Semiconductor and other electronic components	3344	38,305	1,196	15,387	21,722
Navigational, measuring, electromedical, and control instruments	3345	161,373	5,902	52,551	102,921
Other computer and electronic products	other 334	27,480	595	12,219	14,666
Electrical equipment, appliances, and components	335	9,592	345	5,914	3,332
Transportation equipment	336	24,577	619	10,145	13,814
Aerospace products and parts	3364	11,859	510	5,145	6,204
Other transportation equipment	other 336	12,718 r	109 r	5,000 r	7,610 r
Furniture and related products	337	-	-	-	-
Miscellaneous manufacturing	339	114,922	234	60,737 r	53,951
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	4,596,691	324,772	1,847,354	2,424,565

Table 3**Domestic R&D performed by the company, by selected industry and type of R&D, for companies with 1–9 employees: 2019**

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
Wholesale trade	42	225,813	14,236	89,756	121,821
Information	51	598,684	26,224	192,524	379,937
Software publishers	5112	327,921	16,796	109,666	201,459
Information, excluding software publishers	51 less 5112	270,764	9,428	82,858	178,478
Architectural, engineering, and related services	5413	454,913	17,817	221,370	215,725
Computer systems design and related services	5415	1,435,159	139,008	469,354	826,797
Scientific research and development services	5417	1,882,122	127,488	874,350	880,284
Research and development in nanotechnology	541713	175,639	6,239	99,116	70,284
Research and development in biotechnology (except nanobiotechnology)	541714	645,887	42,293	296,229	307,365
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,026,911	77,886	462,552	486,473
Social sciences and humanities research and development	541720	31,464	975	14,877	15,612

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 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, 2020 Annual Business Survey: Data Year 2019.

By Source of Funds

In 2019, four-fifths (79%) of microbusiness R&D performance was paid from the companies' own funds, 14% was from federal, state, or local governments combined, 4% came from another U.S. company, and 2% was from a foreign owner (table 4). Manufacturing microbusinesses fund 84% of their R&D performance, and nonmanufacturing microbusinesses fund 78% of their R&D performance. In the scientific research and development services industry (NAICS 5417), 62% of microbusiness R&D performance was self-funded, and 29% was funded by federal, state, or local governments combined. Three-fourths (74%) of all government funding (\$735 million) spent on microbusiness R&D went to companies in the scientific research and development industry group (NAICS 5417).

Table 4

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

(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	5,218,911	4,109,445	114,719	211,608	22,991	12,065	9,387	712,053	22,908	3,736
Manufacturing industries	31–33	622,220	525,012	24,975	15,484	423	821	695	53,506	1,191	113
Food, beverage, and tobacco products	311–12	5,896	4,140	-	1,099	-	417	-	71	168	-
Textile, apparel, and leather products	313–16	236	236	-	-	-	-	-	-	-	-
Wood products	321	4,065	4,065	-	-	-	-	-	-	-	-
Paper	322	-	-	-	-	-	-	-	-	-	-
Printing and related support activities	323	555	555	-	-	-	-	-	-	-	-
Petroleum and coal products	324	-	-	-	-	-	-	-	-	-	-
Chemicals	325	178,170	149,053	-	3,045	106	127	40	25,452	346	-
Pharmaceuticals and medicines	3254	117,508	101,816	-	865	-	90	40	14,493	204	-
Chemicals, excluding pharmaceuticals	other 325	60,661	47,237	-	2,180	106	38	-	10,959	142	-
Plastics and rubber products	326	6,261	6,160	-	33	-	-	-	69.00	-	-
Nonmetallic mineral products	327	5,860	21	5,644	195	-	-	-	-	-	-
Primary metals	331	2,353	2,353	-	-	-	-	-	-	-	-
Fabricated metal products	332	20,518	20,518	-	-	-	-	-	-	-	-
Machinery	333	22,057	15,236	719	1,335	-	-	-	4,379	388	-
Computer and electronic products	334	227,158	186,392	18,612	3,161	317	261	655	17,494	153	113
Semiconductor and other electronic components	3344	38,305	26,901	5,888	1,480	32	1	-	3,920	82	-
Navigational, measuring, electromedical, and control instruments	3345	161,373	134,114	12,723	1,363	30	260	655	12,043	71	113
Other computer and electronic products	other 334	27,480	25,377	-	318	254	-	-	1,531	-	-
Electrical equipment, appliances, and components	335	9,592	6,970	-	-	-	-	-	2,622	-	-
Transportation equipment	336	24,577	21,408	-	1,513	-	-	-	1,520	135	-
Aerospace products and parts	3364	11,859	9,164	-	1,324	-	-	-	1,236	135	-
Other transportation equipment	other 336	12,718	12,244	-	190	-	-	-	285	-	-
Furniture and related products	337	-	-	-	-	-	-	-	-	-	-
Miscellaneous manufacturing	339	114,922	107,903	-	5,104	-	14	-	1,900	-	-
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	4,596,691	3,584,433	89,744	196,124	22,568	11,244	8,692	658,546	21,717	3,622
Wholesale trade	42	225,813	202,430	10,287	12,117	-	-	-	524	454	-
Information	51	598,684	560,895	4,033	20,906	-	1,578	-	10,136	660	475
Software publishers	5112	327,921	312,513	4,033	2,059	-	-	-	8,610	230	475

Table 4**Domestic R&D performed by the company, by selected industry and source of funds, for companies with 1–9 employees: 2019**

(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
Information, excluding software publishers	51 less 5112	270,764	248,382	-	18,847	-	1,578	-	1,526	430	-
Architectural, engineering, and related services	5413	454,913	321,235	12,905	44,862	2,850	1,789	54	70,383	266	570
Computer systems design and related services	5415	1,435,159	1,332,829	393	38,593	5,930	2,884	2,375	52,124	31	-
Scientific research and development services	5417	1,882,122	1,167,044	62,125	79,645	13,789	4,993	6,263	525,380	20,307	2,577
Research and development in nanotechnology	541713	175,639	130,833	6,111	8,800	851	1,730	76	26,345	894	-
Research and development in biotechnology (except nanobiotechnology)	541714	645,887	465,202	25,382	20,196	4,926	131	4,540	120,789	4,480	241
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	1,026,911	558,406	30,632	38,721	8,011	3,075	1,646	369,150	14,933	2,336
Social sciences and humanities research and development	541720	31,464	10,764	-	11,547	-	57	-	9,096	-	-

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 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, 2020 Annual Business Survey: Data Year 2019.

By State

Six states (California, Florida, Massachusetts, Texas, Colorado, and New York) accounted for 53% of all microbusiness R&D in 2019 ([table 5](#)). California led all states in microbusiness R&D activity, accounting for 27% of the U.S. microbusiness R&D performance with \$1.4 billion of microbusiness R&D performance.

Table 5

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

(Thousands of U.S. dollars)

State	Total
All states	5,218,911
Alabama	108,536
Alaska	535
Arizona	58,705
Arkansas	4,879
California	1,424,295
Colorado	263,950
Connecticut	108,367
Delaware	49,146
District of Columbia	15,224
Florida	284,522
Georgia	67,080
Hawaii	5,575
Idaho	20,342
Illinois	137,873
Indiana	47,889
Iowa	35,499
Kansas	22,344
Kentucky	12,993
Louisiana	16,467
Maine	12,988
Maryland	114,774
Massachusetts	281,009
Michigan	49,804
Minnesota	108,594
Mississippi	3,086
Missouri	28,500
Montana	18,083
Nebraska	7,961
Nevada	62,394
New Hampshire	44,332
New Jersey	117,119
New Mexico	31,141
New York	219,064
North Carolina	160,161
North Dakota	18,717
Ohio	134,799
Oklahoma	6,660
Oregon	124,320
Pennsylvania	188,263
Rhode Island	8,617
South Carolina	25,515
South Dakota	11,032
Tennessee	34,794

Table 5**Domestic R&D performed by the company, by state, for companies with 1–9 employees: 2019**

(Thousands of U.S. dollars)

State	Total
Texas	274,327
Utah	47,905
Vermont	12,890
Virginia	83,631
Washington	180,860
West Virginia	890
Wisconsin	93,940
Wyoming	3,685
Undistributed	24,836

Note(s):

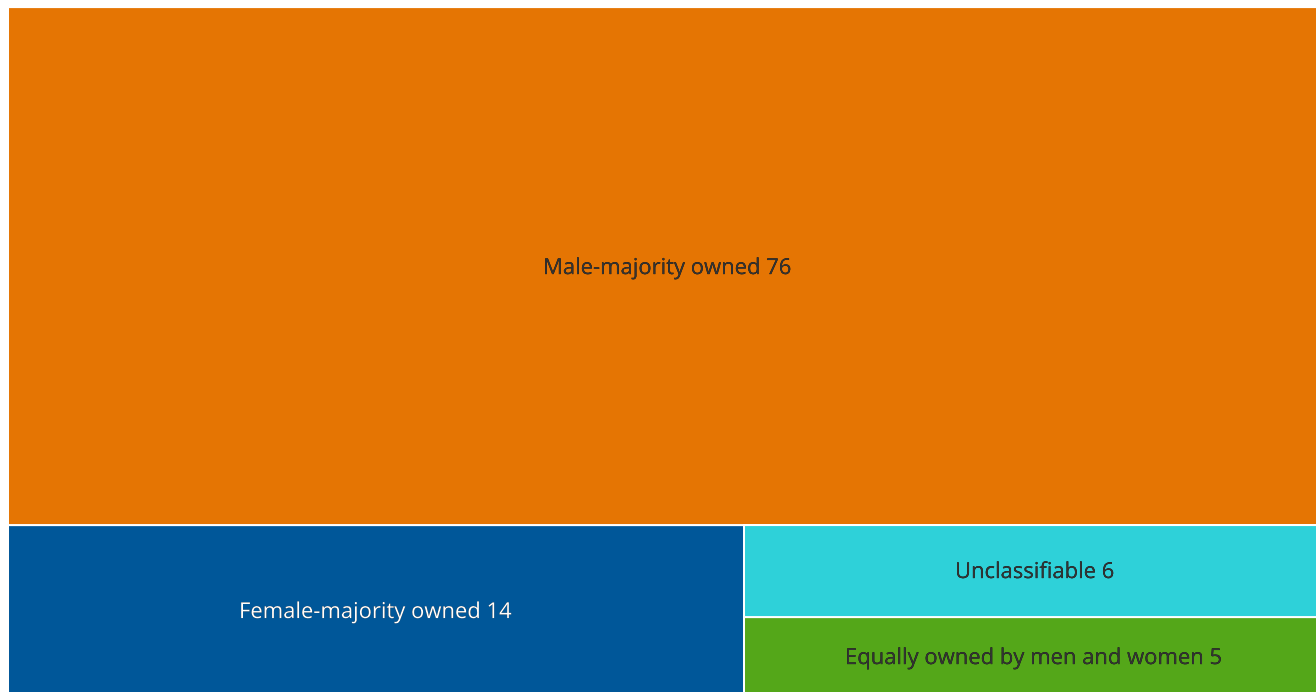
Detail may not add to total because of rounding. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2020 Annual Business Survey: Data Year 2019.

By Demographics

More than three-fourths (76%) of microbusiness R&D performance was by male-majority-owned ([figure 1](#)) companies. Female-majority-owned microbusinesses accounted for 14% of R&D performance, and microbusinesses that are equally owned by men and women accounted for 5% of R&D performance. Almost three-fourths (71%) of R&D performance is spent by microbusinesses that are primarily owned by nonminority owners ([figure 2](#)). Minority-owned companies accounted for 21% of microbusinesses R&D performance in 2019.

Figure 1**Companies with 1–9 employees that perform domestic R&D, by sex of primary owners: 2019**

Percent distribution

Note(s):

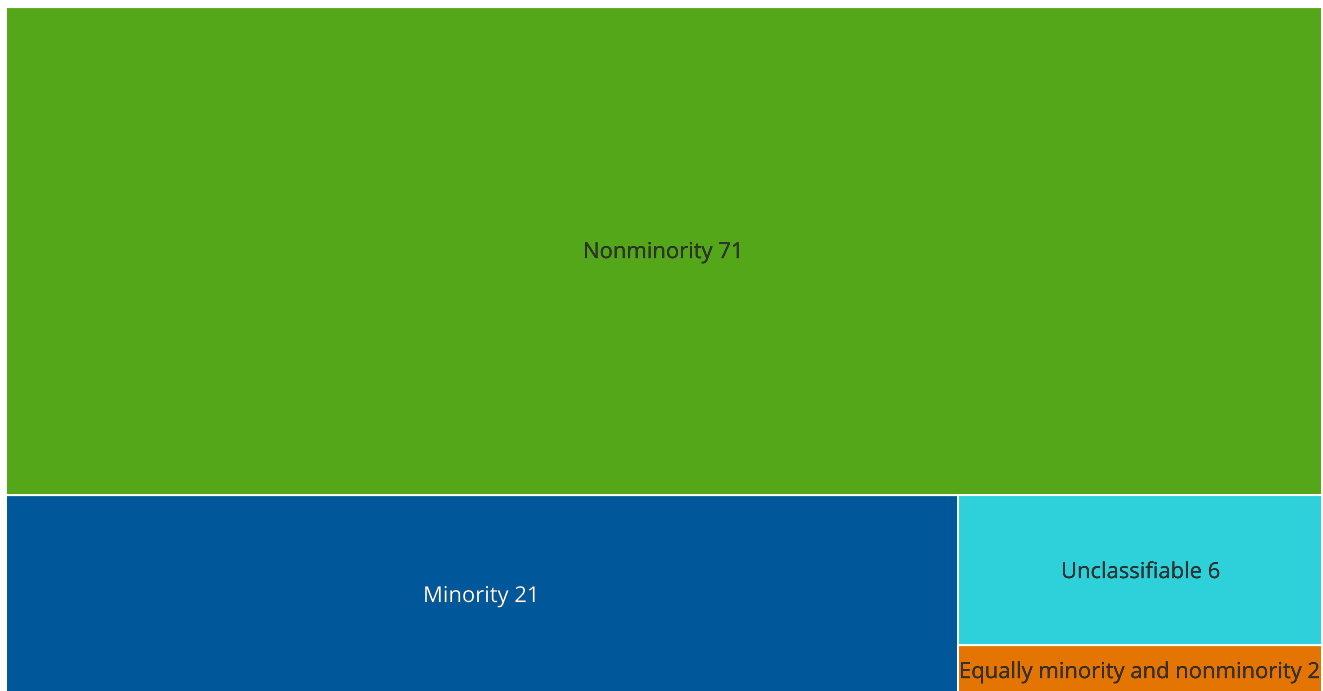
Detail may not add to total because of rounding. Statistics are representative of companies located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2020 Annual Business Survey: Data Year 2019.

Figure 2

Domestic R&D performed by the company, by firm classification of race and ethnicity, by employment size, for companies with 1–9 employees: 2019



Percent distribution

Note(s):

Detail may not add to total because of rounding. Companies may be included in one or more race and ethnicity categories. Companies classified as minority are those companies classified as any race and ethnicity combination other than White, not Hispanic. 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, 2020 Annual Business Survey: Data Year 2019.

Total Employment and R&D Employees

There were almost 38,000 domestic R&D employees (81% men, 19% women) working for microbusinesses in 2019 ([table 6](#)), and 90% of those domestic R&D employees were in the selected nonmanufacturing microbusinesses.⁵ Among all domestic R&D employees, the highest percentages worked in the computer systems design and related services industry (NAICS 5415) and in the scientific research and development services industry (NAICS 5417), 35% and 27%, respectively.

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 only, 74% were researchers, 20% were R&D technicians, and the remaining 6% were R&D support staff. More than a quarter (28%) of the domestic researchers had doctoral degrees.

Table 6**R&D domestic employees, by selected industry, sex, and R&D occupation, for companies with 1–9 employees: 2019**

(Number)

Industry	NAICS code	Total	Men	Women	Researchers		R&D technicians and equivalent staff	R&D support staff (clerical and other)
					Total (including R&D scientists, engineers, and their managers)	With PhD (excluding MD, JD, and EdD)		
All selected industries	31–33, 42, 51, 5413, 5415, 5417	37,694	30,617	7,078	27,762	7,881	7,725	2,208
Manufacturing industries	31–33	3,813	3,229	584	2,842	880	713	257
Food, beverage, and tobacco products	311–12	55	44	12 r	45	3	10	0
Textile, apparel, and leather products	313–16	3 r	3 r	0	3 r	0	0	0
Wood products	321	7 r	7 r	0	5 r	2 r	2 r	0
Paper	322	0	0	0	0	0	0	0
Printing and related support activities	323	5	5	0	5	0	0	0
Petroleum and coal products	324	0	0	0	0	0	0	0
Chemicals	325	808	588	219	652	312	118	38
Pharmaceuticals and medicines	3254	426	280	146	322	203	78	26
Chemicals, excluding pharmaceuticals	other 325	381	308	73	330	109	41	11
Plastics and rubber products	326	61	57	4 r	34	8 r	20 r	7 r
Nonmetallic mineral products	327	27 r	19 r	8 r	13 r	3	11 r	4 r
Primary metals	331	8 r	8 r	0	8 r	0	0	0
Fabricated metal products	332	72 r	72 r	0	63 r	5 r	9 r	0
Machinery	333	240	216	24	180	35	47	13
Computer and electronic products	334	1,623	1,415	208	1,156	351	373	94
Semiconductor and other electronic components	3344	269	221	48	180	65	56	33
Navigational, measuring, electromedical, and control instruments	3345	1,142	991	151	832	233	256	54
Other computer and electronic products	other 334	212	204	8	144	53 r	61 r	7
Electrical equipment, appliances, and components	335	146	127	20 r	106	11	36	4 r
Transportation equipment	336	189	179	11	143	10	34	13 r
Aerospace products and parts	3364	145	141	4	100	6	34	11 r
Other transportation equipment	other 336	45	37	7	43	5 r	0	2 r
Furniture and related products	337	0	0	0	0	0	0	0
Miscellaneous manufacturing	339	568	491	77 r	429	141 r	53	85 r
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	33,882	27,387	6,494	24,919	7,001	7,012	1,951
Wholesale trade	42	1,049	866	183 r	816	289	185	48 r
Information	51	5,644	4,754	891	4,103	402	1,164	378
Software publishers	5112	3,296	2,768	529	2,435	250	629	232
Information, excluding software publishers	51 less 5112	2,348	1,986	362	1,667	152	535	146
Architectural, engineering, and related services	5413	3,931	3,304	628	3,246	862	502	183
Computer systems design and related services	5415	13,026	11,280	1,745	8,906	1,359	3,600	520
Scientific research and development services	5417	10,231	7,184	3,047	7,848	4,089	1,561	821

Table 6**R&D domestic employees, by selected industry, sex, and R&D occupation, for companies with 1–9 employees: 2019**

(Number)

Industry	NAICS code	Total	Men	Women	Researchers		R&D technicians and equivalent staff	R&D support staff (clerical and other)
					Total (including R&D scientists, engineers, and their managers)	With PhD (excluding MD, JD, and EdD)		
Research and development in nanotechnology	541713	1,006	732	275	741	366	143	122
Research and development in biotechnology (except nanobiotechnology)	541714	3,053	1,972	1,081	2,321	1,531	517	215
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,961	4,371	1,590	4,636	2,121	875	450
Social sciences and humanities research and development	541720	192	102	90	136	61	26	30

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, 2020 Annual Business Survey: Data Year 2019.

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 ABS, a microbusiness is defined as a business organization located in the United States, either U.S. owned or a U.S. affiliate of a foreign parent company, of one or more establishments under common ownership or control, with one to nine domestic employees.

The survey was administered to companies whether or not they were known to have R&D activity. 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 (those 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" in the data tables at <https://www.nsf.gov/statistics/srvyabs/>). Microbusinesses with less than \$50,000 in R&D are excluded from the ABS national estimates and this InfoBrief.

For the full 2020 ABS, 300,000 companies were sampled to represent the population of 5.3 million companies. For the full 2020 ABS, the unit response rate was 71.3%.

The full set of data tables on R&D, company demographics, innovation, technology, and patent and intellectual property protection from this survey will be available in the report *Annual Business Survey: 2020 (Data Year 2019)* (<https://www.nsf.gov/statistics/srvyabs/>). Individual data tables and tables with relative standard errors and imputation rates from the ABS 2020 are available in advance of the full report.

Notes

- 1 Employees are 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 NCSSES 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* (OECD 2015), *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 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 (NCSSES). 2021. *Microbusinesses Performed \$4.5 Billion of R&D in the United States in 2018*. NSF 22-309. Alexandria, VA: National Science Foundation. Available at <https://ncses.nsf.gov/pubs/nsf22309/>.
- 5 The Business Enterprise Research and Development Survey found that in 2019 for businesses with 10 or more employees, there were approximately 1,384,000 domestic fulltime R&D employees. See table 61 in National Center for Science and Engineering Statistics (NCSSES). 2020. *Business Enterprise Research and Development: 2019*. NSF 22-329. Alexandria, VA: National Science Foundation. Available at <https://ncses.nsf.gov/pubs/nsf22329/>.

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