



InfoBrief

Microbusinesses Performed \$5.7 billion of R&D in the United States in 2022

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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 2022, microbusinesses reported a total of \$7.6 billion in R&D costs, of which 88%, or \$6.7 billion, was domestic and 75%, or \$5.7 billion, 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 R&D performance, which are the costs only for R&D performed by the business, and R&D nonperformance costs, which are payments to others for R&D, including purchased R&D.

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

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
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.

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 U.S. 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 specifics for selected industries.

This InfoBrief and the related full set of data tables result from a multi-year collaboration between NCSES and the Census Bureau on the ABS.

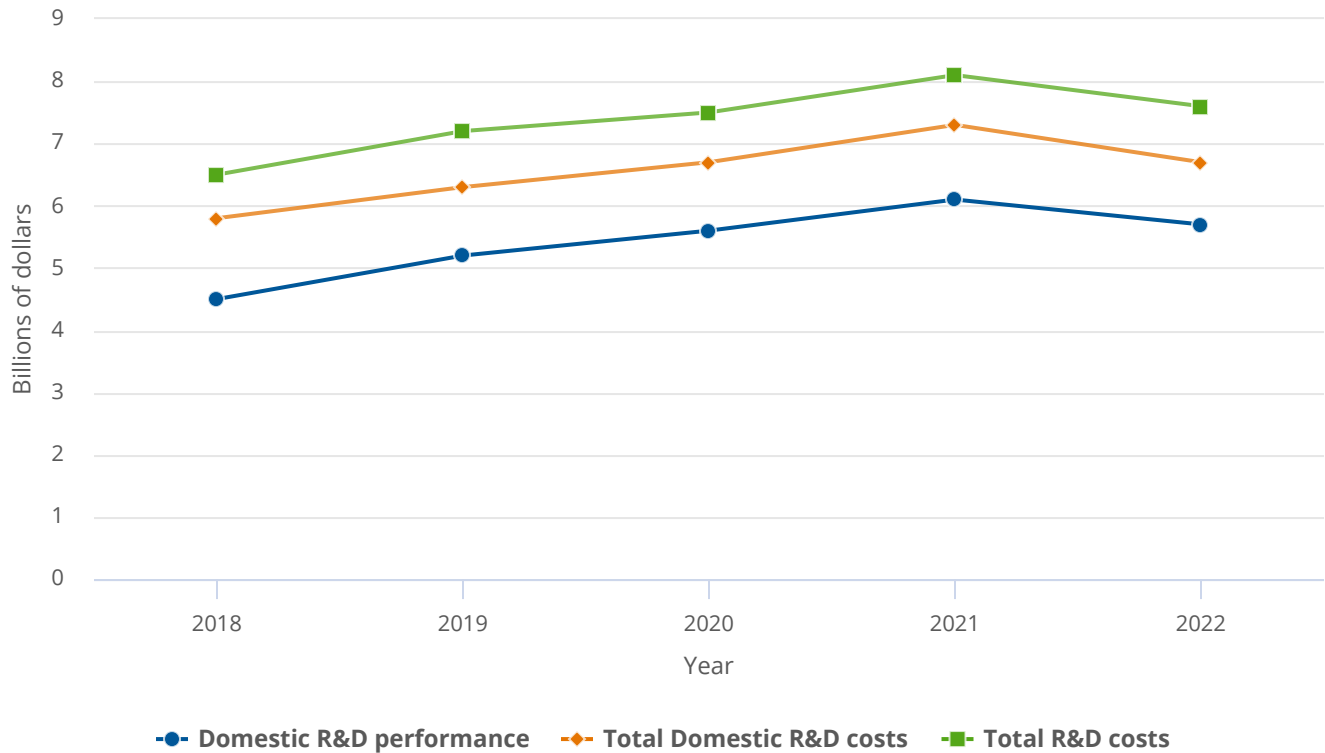
Microbusiness R&D Trend

Figure 1 presents the trajectory of total R&D costs, total domestic R&D costs, and R&D performance for microbusinesses for the 2018–22 timeframe. Although the estimated amounts decreased from 2021 to 2022, the differences were not statistically significant. Total domestic R&D performance increased 26% from 2018 to 2022 (\$4.5 billion to \$5.7 billion), although total R&D costs and domestic R&D costs increased 18% and 16%, respectively, over the same time period (from \$6.5 billion in 2018 to \$7.6 billion in 2022 and from \$5.8 billion in 2018 to \$6.7 billion in 2022, respectively).^{2,3} In 2022,

domestic R&D costs by microbusinesses in the United States were approximately \$6.7 billion ([table 1](#)), of which \$1 billion was for outsourced R&D and the remaining \$5.7 billion (or 85%) was for R&D performed by the microbusinesses themselves. This proportion is not significantly different from the ones found in 2021 and 2020, where 84% and 83%, respectively, of domestic R&D was performed by the microbusinesses.

Figure 1

Total R&D costs, total domestic R&D costs, and R&D performance for companies with 1–9 employees: 2018–22



Source(s):

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

R&D by Type of Costs

Of the \$6.7 billion in domestic R&D costs in 2022, 55% was for salaries, wages, and fringe benefits ([table 2](#)). For manufacturing businesses, 39% of domestic R&D costs was spent on salaries, wages, and fringe benefits; for selected nonmanufacturing businesses, it was 57%. The information sector (NAICS [North American Industry Classification System code] 51) spent an even larger proportion of its domestic R&D costs on salaries, wages, and fringe benefits (80%). Nearly identical to the information sector is the computer systems design and related services industry group (NAICS 5415), where 79% of domestic R&D costs was spent on salaries, wages, and fringe benefits.

Table 2**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

Table 2**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
Information, excluding software publishers	51 less 5112	180,973	125,475	20,616	r 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
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.

Other types of costs for domestic R&D included payments to others for R&D (15%), materials and supplies (9%), expensed machinery and equipment (3%), and depreciation on R&D property and equipment (1%). The remaining 17% was used for other expenses, such as consultants, contractors, travel, or rent.

Capital expenditures for R&D Operations

In 2022, microbusinesses spent \$11.4 billion on capital expenditures, but only 3% of capital expenditures was for R&D operations ([table 1](#)). Nearly half (46%) of the capital expenditures for R&D operations was for machinery and equipment, 12% was for capitalized software, 11% was for intellectual property, 3% was for buildings and land improvement, and less than 1% was for land acquisition. The remaining 29% of the capital expenditures for R&D operations was for other costs.

Characteristics of Microbusiness R&D Performance

By Industry

As was the case in findings from previous ABS surveys, microbusiness R&D was highly concentrated within a few industries in 2022.⁴ Selected nonmanufacturing industries accounted for 88% of the microbusiness domestic R&D performance costs (table 3). Almost half of that amount (45%), or 39% of all domestic R&D costs, was from scientific research and development services (NAICS 5417). Computer systems design and related services (NAICS 5415) accounts for 25% of all microbusiness domestic R&D performance costs. Among the manufacturing industries (12% of all microbusiness domestic R&D performance costs), chemicals (NAICS 325) and computer and electronic products (NAICS 334) each made up 3% of the total domestic R&D performed by microbusinesses.

Table 3

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 r	6,898 r	19 r	10,528 r
Textile, apparel, and leather products	313–16	13 r	9,268 r	8 r	1,264 r	5 r	8,005 r
Wood products	321	0	0	0	0	0	0
Paper	322	3 r	898 r	0	0	3 r	898 r
Printing and related support activities	323	0	0	0	0	0	0
Petroleum and coal products	324	1 r	159	1 r	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 r
Nonmetallic mineral products	327	13	3,608	3	183	10	3,425
Primary metals	331	8	3,214	6 r	2,249	3	965
Fabricated metal products	332	99	44,875	51 r	10,043 r	47 r	34,832 r
Machinery	333	110	44,334	69	16,382	42	27,952 r
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 r	5,825 r	22	14,057 r
Other transportation equipment	other 336	28	16,856	9 r	3,967	19	12,889 r
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

Table 3**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)
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
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):

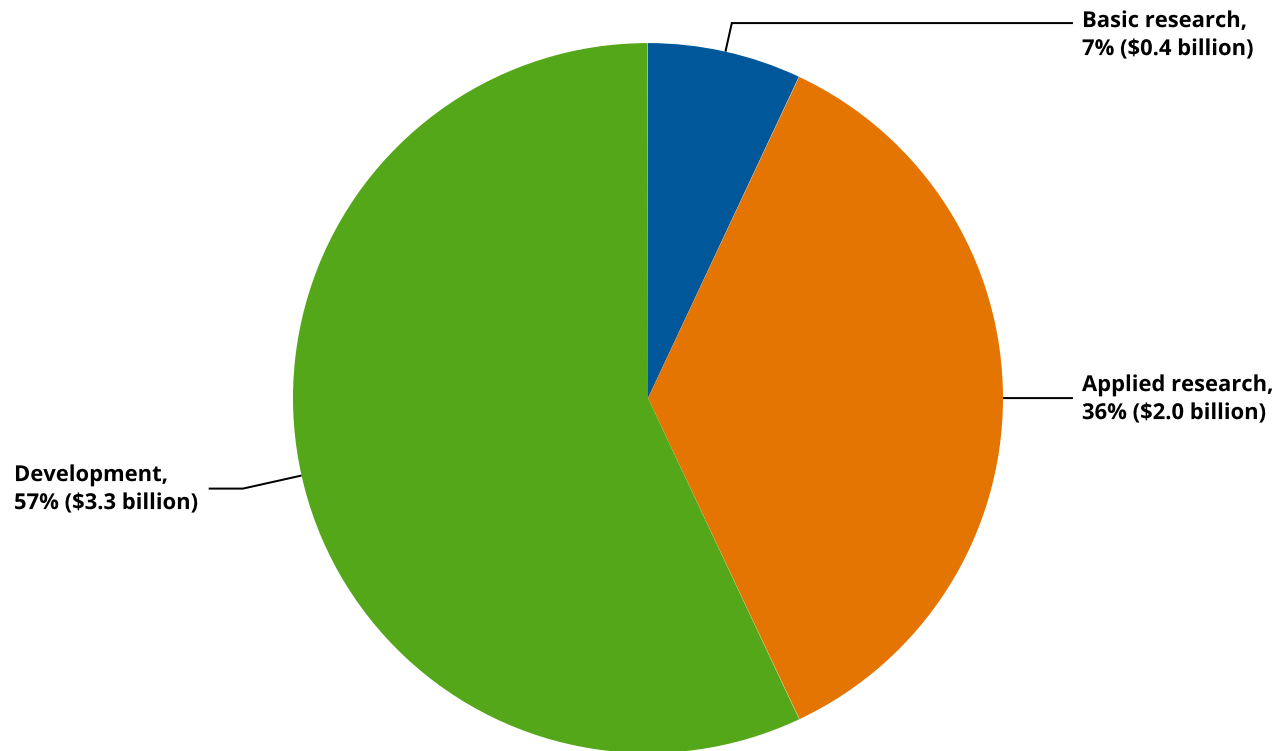
Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States that performed or funded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

Source(s):

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

By Type of R&D

There are three types of R&D: basic research, applied research, and experimental development.⁵ In 2022, 57% of microbusiness R&D performance was for development, 36% was for applied research, and 7% was for basic research ([figure 2](#)). The allocation of R&D across the three types was similar between microbusinesses in manufacturing and nonmanufacturing industries.

Figure 2**Domestic R&D performed by the company, by type of R&D, for companies with 1–9 employees: 2022****Source(s):**

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

By Source of Funds

In 2022, three-quarters (77%) of microbusiness R&D performance was paid for from the companies' own funds; 13% was from federal, state, or local governments combined; 5% was from another U.S. company; and 3% was from a foreign owner ([table 4](#)).

Table 4**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

Table 4**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
Architectural, engineering, and related services	5413	388,846	267,509	3,434	49,089	1,405 r	837	510 r	60,927	3,532 r	1,604 r
Computer systems design and related services	5415	1,414,970	1,160,411	10,227 r	135,354 r	10,626 r	8,597 r	157 r	82,253	7,129 r	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 r	6,108	689	1,370 r	31 r	33,462	1,147 r	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
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.

The information subsector (NAICS 51) had the highest percentage of self-funding for R&D (95%). In scientific research and development services (NAICS 5417), the industry with the most domestic R&D performance costs, 69% of microbusiness R&D performance was self-funded and 19% was funded by federal, state, or local governments combined.

Estimated federal and state government funding for microbusinesses changed from \$1.1 billion in 2021 to \$730 million in 2022, a decrease of 32%. However, the difference was not statistically significant. In 2022, 79% of all government funding 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 (NAICS 5417). These same industries received the highest percentage of government funding for microbusinesses in 2021.

By State

In 2022, five states (California, Massachusetts, Pennsylvania, Texas, and New York) accounted for 54% of all domestic microbusiness R&D performance cost. In 2021, California, Texas, and Massachusetts were also among the top five states (the other two were Florida and Washington). In 2021, the top five states accounted for 51% of all domestic microbusiness R&D performance cost.

Total Employment and R&D Employees

There were just over 36,000 domestic R&D employees (78% male and 22% female) working for microbusinesses in 2022 ([table 5](#)), and 89% of those domestic R&D employees were in the selected nonmanufacturing microbusinesses.

Table 5

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

(Number)

Industry	NAICS code	Total	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	36,324	28,469	7,855	25,769	7,962	2,593	7,290
Manufacturing industries	31–33	3,934	3,162	772	2,651	1,039	244	710
Food, beverage, and tobacco products	311–12	74	63	10 r	74	0	0	46
Textile, apparel, and leather products	313–16	43 r	43 r	0	36 r	7 r	0	16 r
Wood products	321	0	0	0	0	0	0	0
Paper	322	13 r	11 r	3 r	3 r	8 r	3 r	3 r
Printing and related support activities	323	0	0	0	0	0	0	0
Petroleum and coal products	324	2	2	0	0	0	2	0
Chemicals	325	690	483	207	519	136	35	236
Pharmaceuticals and medicines	3254	438	298	141	333	85	20	175
Chemicals, excluding pharmaceuticals	other 325	251	185	66	185	52	14	61
Plastics and rubber products	326	138	112	26 r	60	78	0	0
Nonmetallic mineral products	327	20	20	0	16	4	0	0
Primary metals	331	16	14	2	7	5	3	4 r
Fabricated metal products	332	166	166	0	116	27 r	23 r	23 r
Machinery	333	284	210	74	194	65	25	41
Computer and electronic products	334	1,496	1,233	263	965	420	110	215

Table 5**Domestic R&D employees, by selected industry and sex, for companies with 1–9 employees: 2022**

(Number)

Industry	NAICS code	Total	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)
Semiconductor and other electronic components	3344	348	277	71 r	212	101	34 r	77
Navigational, measuring, electromedical, and control instruments	3345	963	793	170	624	286	53	115
Other computer and electronic products	other 334	185	163	22	130	32	23	23
Electrical equipment, appliances, and components	335	162	137	25 r	107	48	7	17
Transportation equipment	336	271	235	36 r	175	85 r	11	16 r
Aerospace products and parts	3364	158	141	16	127	24	7	11 r
Other transportation equipment	other 336	113	94	19 r	49	61 r	4 r	5 r
Furniture and related products	337	2	2	0	2	0	0	0
Miscellaneous manufacturing	339	557	431	127	376	156	26	92
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	32,390	25,307	7,083	23,118	6,923	2,349	6,580
Wholesale trade	42	1,686	1,392	293	1,179	336	171	188
Information	51	5,079	4,169	910	3,287	1,422	370	534
Software publishers	5112	3,811	3,143	668	2,434	1,116	262	335
Information, excluding software publishers	51 less 5112	1,268	1,026	242	854	306	108	199
Architectural, engineering, and related services	5413	3,352	2,801	550	2,559	689	104	713
Computer systems design and related services	5415	12,167	10,048	2,119	8,422	2,761	984	1,102
Scientific research and development services	5417	10,107	6,896	3,210	7,672	1,715	720	4,043
Research and development in nanotechnology	541713	866	624	242	653	144	69	395
Research and development in biotechnology (except nanobiotechnology)	541714	3,338	2,100	1,238	2,554	579	205	1,617
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	5,726	4,104	1,622	4,325	968	433	1,982
Social sciences and humanities research and development	541720	177	69	108	140	24	13 r	48

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.

Among domestic R&D employees across all selected industries, the largest numbers of employees worked in the computer systems design and related services industry (NAICS 5415) and in the scientific research and development services industry (NAICS 5417), 33% and 28%, respectively.

R&D employee occupations include 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 2022, 71% were researchers, and among these approximately 26,000 researchers, 28% have PhDs.

Almost 8,000, or 22% of domestic R&D employees, were R&D technicians, and the remaining 2,600, or 7%, 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 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. 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 (those businesses with one to nine employees) are asked the R&D questions, and data for 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" at <https://nces.nsf.gov/surveys/annual-business-survey/2023#methodology>). Microbusinesses with less than \$50,000 in R&D are excluded from the ABS national estimates and this InfoBrief.

For the full ABS 2023 (reference year 2022), 850,000 employer companies were sampled to represent the population of 4.9 million employer companies, and the unit response rate was 62.0%.

The full set of data tables on R&D, company demographics, innovation, technology, and patent and intellectual property protection from this survey will be available in the report *Annual Business Survey: 2023 (Data Year 2022)* (<https://nces.nsf.gov/surveys/annual-business-survey/2023>). Individual data tables and tables with relative standard errors and imputation rates from the ABS 2023 are available from the Survey Manager upon request.

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

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 Reported percent changes are based on the data in the full set of tables (available at the [ABS homepage](#)) rather than the rounded values shown here.
- 3 The smallest companies on the Business Enterprise Research and Development Survey also experienced a decrease in domestic R&D performance over the same time period. Businesses with 10 to 19 employees experienced a decrease in domestic R&D performance from 2021 to 2022, from \$5.8 billion to \$5.5 billion. Businesses with 20 to 49 employees experienced a decrease in domestic R&D performance during that period, from \$15.9 billion to \$15.6 billion. But it is important to note that these decreases are not statistically significant.
- 4 R&D questions were asked only of manufacturers and certain selected nonmanufacturing industries. In previous NCSES surveys (2017 ABS, Business R&D and Innovation Survey-Microbusiness, and Business R&D Innovation Survey) these industries represented almost all R&D of microbusinesses in the United States.

5 As defined by the *Frascati Manual* (7th ed., 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 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*, 7th ed. Paris: OECD Publishing.

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