



InfoBrief

Microbusinesses Had More Than \$6.7 billion in R&D Costs in the United States in 2017, According to New Annual Business Survey

NSF 21-302 | November 2020

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Microbusinesses contribute to the U.S. economy by bringing growth and innovation and being more adaptable to changes.¹ However, relatively little is known about the R&D activities of these businesses. This InfoBrief presents R&D and other data on microbusinesses, defined here as those with one to nine domestic employees.² In 2017, microbusinesses spent \$6.7 billion on research and development costs in the United States ([table 1](#)), of which \$5.7 billion was performed by the microbusinesses themselves ([table 2](#)).³

Data for this InfoBrief are from the inaugural Annual Business Survey (ABS), developed and cosponsored by the National Center for Science and Engineering Statistics within the National Science Foundation and by the U.S. Census Bureau. The ABS is the primary source of information on R&D expenditures for microbusinesses. The ABS also collects data related to innovation, intellectual property, technology, and business owner characteristics from businesses with one or more employees. Data from selected industries are highlighted in this InfoBrief.

The ABS combines multiple surveys that were previously separate: the Survey of Business Owners, the Annual Survey of Entrepreneurs, the 2016 Microbusiness R&D and Innovation Survey, and an innovation survey modeled on Eurostat’s Community Innovation Survey. This InfoBrief and related data tables are the result of the collaboration on the ABS between the National Center for Science and Engineering Statistics and the U.S. Census Bureau.

Table 1

Total R&D cost for companies with 1–9 employees, by selected industry and type of R&D: 2017

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
All selected industries	31–33, 42, 51, 5413, 5415, 5417	6,655,717	921,124	2,230,773	3,503,820
Manufacturing industries	31–33	751,892	73,593	267,708	410,590
Food, beverage, and tobacco products	311–12	10,136	1,794 r	5,297	3,045 r
Textile, apparel, and leather products	313–16	2,225 r	0	1,779 r	447 r
Wood products	321	0	0	0	0

Table 1**Total R&D cost for companies with 1–9 employees, by selected industry and type of R&D: 2017**

(Thousands of U.S. dollars)

Industry	NAICS code	Total	Basic research	Applied research	Development
Paper	322	0	0	0	0
Printing and related support activities	323	0	0	0	0
Petroleum and coal products	324	S	S	S	S
Pharmaceuticals and medicines	3254	103,345	6,883	34,723	61,740
Chemicals, excluding pharmaceuticals	325 (excluding 3254)	89,130	9,823	49,709	29,598
Plastics and rubber products	326	9,654	r 765	6,118	r 2,771
Nonmetallic mineral products	327	1,836	r 122	490	r 1,224
Primary metals	331	1,080	r 0	216	r 864
Fabricated metal products	332	4,414	423	r 1,553	r 2,439
Machinery	333	49,607	9,640	16,822	23,145
Computer and electronic products	334	344,800	31,870	103,539	209,391
Electrical equipment, appliances, and components	335	40,142	3,131	20,152	16,859
Transportation equipment	336	14,281	2,097	3,792	8,392
Furniture and related products	337	0	0	0	0
Miscellaneous manufacturing	339	80,481	6,932	23,442	50,107
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,903,825	847,531	1,963,064	3,093,230
Wholesale trade	42	115,357	34,818	31,310	49,230
Information	51	738,905	122,680	158,111	458,114
Software publishers	5112	461,838	60,041	108,831	292,967
Information, excluding software publishers	51 (excluding 5112)	277,067	62,639	r 49,281	165,147
Architectural, engineering, and related services	5413	461,192	56,320	207,314	197,559
Computer systems design and related services	5415	2,240,695	305,244	667,947	1,267,505
Scientific research and development services	5417	2,347,675	328,470	898,383	1,120,822

r = relative standard error > 50%; S = data withheld to avoid disclosing operations of individual companies.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding. Industry classification based on dominant establishment payroll. Statistics are representative of microbusinesses located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

Table 2

Total R&D performance and cost for companies with 1–9 employees, by selected industry and type of cost: 2017

(Thousands of U.S. dollars)

Industry	NAICS code	Total R&D performance		Total R&D costs		Salaries, wages, and fringe benefits		Expensed machinery and equipment		Materials and supplies		Payments to business partners for collaborative R&D		Purchased R&D service		Depreciation on R&D property and equipment		Other	
All selected industries	31–33, 42, 51, 5413, 5415, 5417	5,690,367		6,655,717		3,656,750		256,952		583,126		361,014		604,337		91,733		1,101,806	
Manufacturing industries	31–33	646,384		751,892		351,801		54,542		128,516		34,108		71,400		10,118		101,407	
Food, beverage, and tobacco products	311–12	8,170		10,136		4,358		456	r	2,464		1,534	r	432	r	0		892	
Textile, apparel, and leather products	313–16	2,113	r	2,225	r	778	r	0		584	r	56	r	56	r	278	r	473	r
Wood products	321	0		0		0		0		0		0		0		0		0	
Paper	322	0		0		0		0		0		0		0		0		0	
Printing and related support activities	323	0		0		0		0		0		0		0		0		0	
Petroleum and coal products	324	S		S		S		S		S		0		0		0		S	
Pharmaceuticals and medicines	3254	80,254		103,345		31,659		13,209	r	18,871	i	5,923	r	17,168		2,067	r	14,448	
Chemicals, excluding pharmaceuticals	325 (excluding 3254)	82,971		89,130		34,927		5,266		33,312		1,954		4,205		1,229		8,237	
Plastics and rubber products	326	8,871	r	9,654	r	3,624		639	r	712		291	r	494	r	0		3,896	r
Nonmetallic mineral products	327	1,661	r	1,836	r	708		276	r	535	r	S		S		62	r	80	r
Primary metals	331	810	r	1,080	r	378	r	324	r	108	r	216	r	54	r	0		0	
Fabricated metal products	332	4,278		4,414		2,340		441	r	1,030	r	0		136		133	r	334	r
Machinery	333	48,104		49,607		27,688		4,213		10,327		315		1,189	r	297	r	5,579	
Computer and electronic products	334	295,166		344,800		182,195		19,709		44,075		14,397		35,237	r	2,559		46,628	
Electrical equipment, appliances, and components	335	34,344		40,142		20,360		3,556		5,544		4,365		1,434		808	r	4,076	
Transportation equipment	336	13,232		14,281		7,217		1,473		2,832		244		804		591		1,119	
Furniture and related products	337	0		0		0		0		0		0		0		0		0	
Miscellaneous manufacturing	339	65,653		80,481		35,082		4,859	r	8,046		4,642		10,186	r	2,095		15,571	
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,043,982		5,903,825		3,304,949		202,410		454,610		326,906		532,938		81,615		1,000,398	
Wholesale trade	42	83,828		115,357		54,299		3,140		8,760		11,544	r	19,987	r	898		16,731	
Information	51	690,142		738,905		493,464		18,264		21,849		23,872		24,890		2,117		154,448	
Software publishers	5112	430,587		461,838		335,042		13,279		15,550		9,905		21,346		1,802		64,914	
Information, excluding software publishers	51 (excluding 5112)	259,555		277,067		158,422		4,985		6,299		13,968	r	3,544		315		89,534	r

Table 2**Total R&D performance and cost for companies with 1–9 employees, by selected industry and type of cost: 2017**

(Thousands of U.S. dollars)

Industry	NAICS code	Total R&D performance	Total R&D costs	Salaries, wages, and fringe benefits	Expensed machinery and equipment	Materials and supplies	Payments to business partners for collaborative R&D	Purchased R&D service	Depreciation on R&D property and equipment	Other
Architectural, engineering, and related services	5413	428,386	461,192	240,126	32,890	59,695	18,123	14,683	7,760	87,915
Computer systems design and related services	5415	2,107,288	2,240,695	1,590,299	71,521	85,833	66,320	67,086	25,196	334,439
Scientific research and development services	5417	1,734,336	2,347,675	926,761	76,594	278,473	207,046	406,292	45,643	406,865

r = relative standard error > 50%; S = data withheld to avoid disclosing operations of individual companies.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding. Industry classification based on dominant establishment payroll. Statistics are representative of microbusinesses located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

Characteristics of Microbusiness R&D

By Industry

Microbusiness R&D is highly concentrated within a few industries.⁴ In 2017, microbusinesses in the United States spent \$6.7 billion on R&D costs (table 1). Of this total, nonmanufacturing industries accounted for \$5.9 billion in R&D (89% overall).

The ABS found that three-quarters (76%) of all microbusiness R&D costs in 2017 were incurred by microbusinesses classified as professional, scientific, and technical services (North American Industry Classification System [NAICS] code 54). The NAICS 54 sector includes 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

There are three types of R&D: basic research, applied research, and development.⁵ More than one-half (53%) of microbusiness R&D in 2017 was spent on development, 34% on applied research, and 14% on basic research (table 1). These proportions were nearly identical for both manufacturing and nonmanufacturing sectors. Only four industries spent more than one-half of their R&D on applied research: food, beverage, and tobacco products (52%, NAICS 311–12), chemicals, excluding pharmaceuticals (56%, NAICS 325 excluding 3254), plastics and rubber products (63%, NAICS 326), and electrical equipment, appliances, and components (50%, NAICS 335). Only wholesale trade (NAICS 42) spent more than one-quarter (30%) of their R&D on basic research.

By Source of Funds

Four-fifths (80%) of the funding for microbusiness R&D was from the companies' own funds; 11% was from federal, state, or local governments combined; and 5% came from other businesses (including businesses located within and outside the United States) (table 3). In the architectural, engineering, and related services industry (NAICS 5413), 61% of their R&D was self-funded and 24% was funded by federal, state, or local governments combined. In the scientific research and development services (NAICS 5417), 68% of their R&D was self-funded and 20% was funded by federal, state, or local governments combined. Almost two-thirds (64%) of all government funding (\$718 million) for microbusiness R&D went to companies in the scientific research and development industry group (NAICS 5417).

By State

Microbusiness R&D is concentrated within a small number of states. Five states (California, New York, Massachusetts, Texas, and Florida) accounted for one-half of all microbusiness R&D in 2017 (table 4). California led all states in R&D activity, accounting for 28% of the U.S. microbusiness R&D total. In each of these five states, self-funding accounted for approximately four-fifths of R&D sources of support. Self-funding accounted for 89% of R&D support for microbusinesses located in Florida.

Whereas \$1 out of every \$9 (11%) in microbusiness R&D in the United States is funded by federal, state, or local governments combined, microbusinesses in several states received a considerably larger share of its R&D dollars from government: Microbusinesses in Kentucky receive 31%, Montana 30%, and Indiana 29% of their R&D funding from these government sources combined. However, these states are not R&D-intensive states, with R&D in each state accounting for less than 1% of the \$6.7 billion in microbusiness R&D costs in the United States.

Table 3**Total R&D cost for companies with 1–9 employees, by selected industry and source of funds: 2017**

(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	6,655,717	5,345,991	195,846	235,492	73,188	17,742	15,548	697,014	21,483	53,412
Manufacturing industries	31–33	751,892	649,155	8,233	17,765	2,940	722	2,556	63,218	1,664	5,639
Food, beverage, and tobacco products	311–12	10,136	10,136	0	0	0	0	0	0	0	0
Textile, apparel, and leather products	313–16	2,225	2,225	0	0	0	0	0	0	0	0
Wood products	321	0	0	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	S	0	0	0	0	0	0	S	0	0
Pharmaceuticals and medicines	3254	103,345	90,699	1,793	5,598	S	S	2,556	1,466	S	S
Chemicals, excluding pharmaceuticals	325 (excluding 3254)	89,130	86,141	0	S	S	40	0	2,643	129	0
Plastics and rubber products	326	9,654	9,654	0	0	0	0	0	0	0	0
Nonmetallic mineral products	327	1,836	1,340	0	S	0	0	0	S	0	0
Primary metals	331	1,080	1,080	0	0	0	0	0	0	0	0
Fabricated metal products	332	4,414	4,414	0	0	0	0	0	0	0	0
Machinery	333	49,607	42,781	0	2,305	184	343	0	3,236	758	0
Computer and electronic products	334	344,800	283,410	5,074	6,813	1,985	263	0	41,571	408	5,276
Electrical equipment, appliances, and components	335	40,142	30,839	1,366	1,234	0	0	0	6,702	0	0
Transportation equipment	336	14,281	11,966	0	1,693	0	0	0	S	0	0
Furniture and related products	337	0	0	0	0	0	0	0	0	0	0
Miscellaneous manufacturing	339	80,481	74,467	0	0	0	0	0	5,735	S	249
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	5,903,825	4,696,836	187,613	217,727	70,248	17,020	12,992	633,796	19,819	47,773

Table 3**Total R&D cost for companies with 1–9 employees, by selected industry and source of funds: 2017**

(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	115,357	102,099	6,929	r	S	4,437	r	552	r	0	947	r	305	r	0			
Information	51	738,905	693,570	17,980	r	2,530	r	4,945	r	85	r	0	r	18,970	r	242	r	584	r
Software publishers	5112	461,838	438,435	7,860	r	1,624	r	4,031	r	85	r	0	r	8,977	r	242	r	584	r
Information, excluding software publishers	51 (excluding 5112)	277,067	255,135	10,119	r	906	r	914	r	0	r	0	r	9,993	r	0	r	0	r
Architectural, engineering, and related services	5413	461,192	279,823	15,939	r	27,604	r	8,426	r	3,406	r	0	r	106,732	r	5,901	r	13,361	r
Computer systems design and related services	5415	2,240,695	2,015,120	13,750	r	95,499	r	27,349	r	1,973	r	4,746	r	57,481	r	2,252	r	22,527	r
Scientific research and development services	5417	2,347,675	1,606,224	133,015	r	92,006	r	25,093	r	11,005	r	8,246	r	449,666	r	11,120	r	11,302	r

r = relative standard error > 50%; S = data withheld to avoid disclosing operations of individual companies.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding. Industry classification based on dominant establishment payroll. Statistics are representative of microbusinesses located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

Table 4**Total R&D cost for companies with 1–9 employees, by state and source of funds: 2017**

(Thousands of U.S. dollars)

State	Total	Paid for by the company	Foreign owner	Another U.S. company	Other businesses outside the United States	U.S. university or college	U.S. nonprofit organization	U.S. federal government	U.S. state or local government	All other organizations outside the United States				
New Mexico	37,502	19,644	0	S	0	0	0	16,910	r	S	0			
New York	409,416	319,535	4,767	17,156	12,524	1,790	r	163	r	48,565	1,510	r	3,406	r
North Carolina	193,409	118,190	8,710	9,654	S	S	S	54,218	S	S	0			
North Dakota	10,060	6,652	0	0	S	0	0	S	0	0				
Ohio	149,355	130,218	S	2,849	S	S	S	9,376	S	S				
Oklahoma	14,671	12,186	0	S	0	0	0	S	S	0				
Oregon	198,541	146,717	S	8,184	1,412	S	0	32,293	193	r	0			
Pennsylvania	242,738	197,260	4,777	r	8,842	S	682	S	28,308	995	0			
Rhode Island	23,157	23,026	0	S	0	0	0	S	0	0				
South Carolina	58,175	52,919	0	S	0	0	S	S	S	0				
South Dakota	5,057	4,541	0	S	0	0	S	S	0	0				
Tennessee	49,173	36,493	S	S	S	S	S	S	S	0				
Texas	329,140	276,430	13,857	4,011	S	S	402	r	16,235	2,224	13,924	r		
Utah	79,606	66,048	0	S	0	S	S	8,053	S	3,700	r			
Vermont	7,375	5,087	0	S	0	S	0	2,151	r	S	0			
Virginia	161,665	118,605	1,643	r	7,463	r	1,398	S	0	31,997	S	S		
Washington	216,907	157,371	21,407	6,165	1,290	S	0	28,365	1,805	r	S			
West Virginia	1,355	1,173	0	S	0	0	0	0	0	0				
Wisconsin	62,366	43,579	S	2,319	r	0	1,639	r	S	12,675	652	r	0	
Wyoming	12,602	9,435	0	S	0	0	0	S	S	S				
Undistributed	10,717	r	7,299	r	S	S	0	0	0	0	0			

r = relative standard error > 50%; S = data withheld to avoid disclosing operations of individual companies.

Note(s):

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

Source(s):

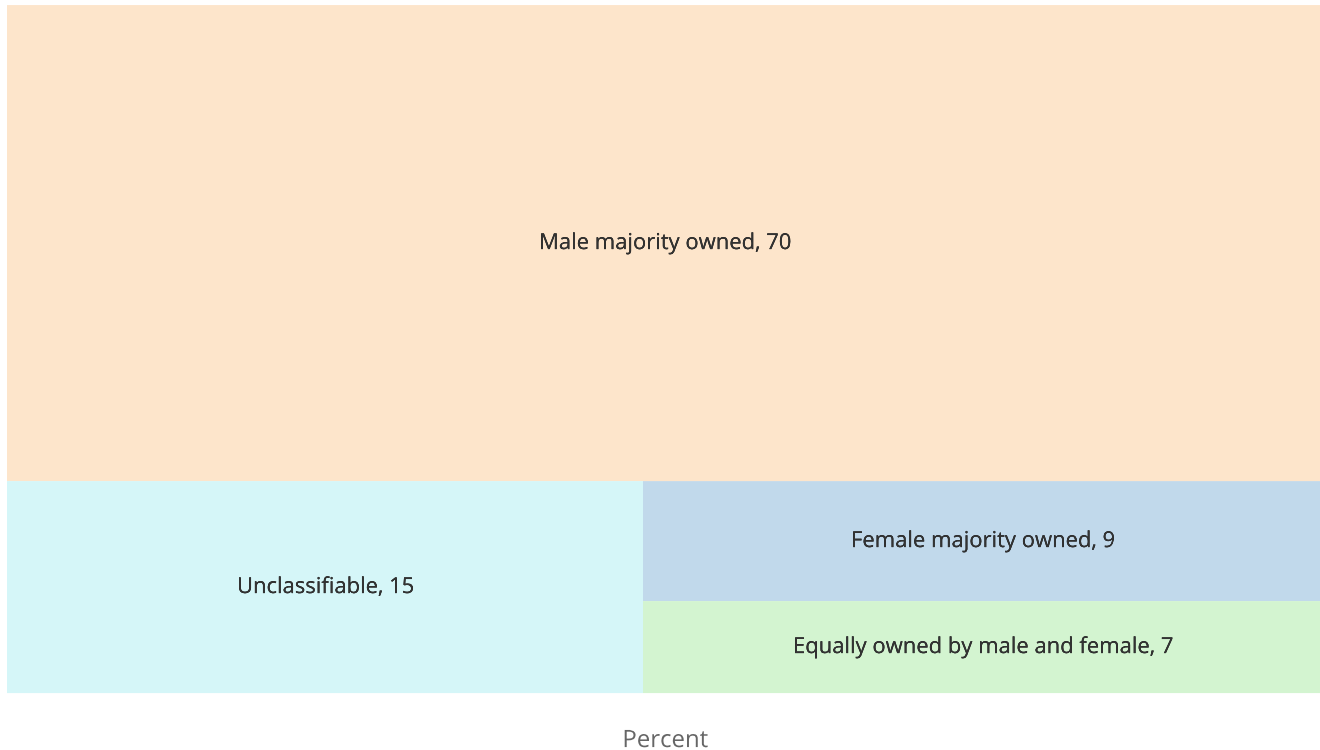
National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

By Demographics

Seventy percent of R&D costs were in microbusinesses that are male majority owned ([figure 1](#)). Female majority-owned microbusinesses accounted for 9% of R&D, and microbusinesses that are equally owned by men and women accounted for 7% of R&D costs. Almost two-thirds (62%) of R&D costs are spent by microbusinesses that are primarily owned by persons who are White and not Hispanic (non-minority owners) ([figure 2](#)). Companies that are primarily owned by persons of a racial or ethnic minority group (any race and ethnicity combination other than White and not Hispanic) accounted for 20% of microbusinesses R&D costs in 2017.

Figure 1

Distribution of total R&D costs among companies with 1–9 employees, by sex of primary owners: 2017

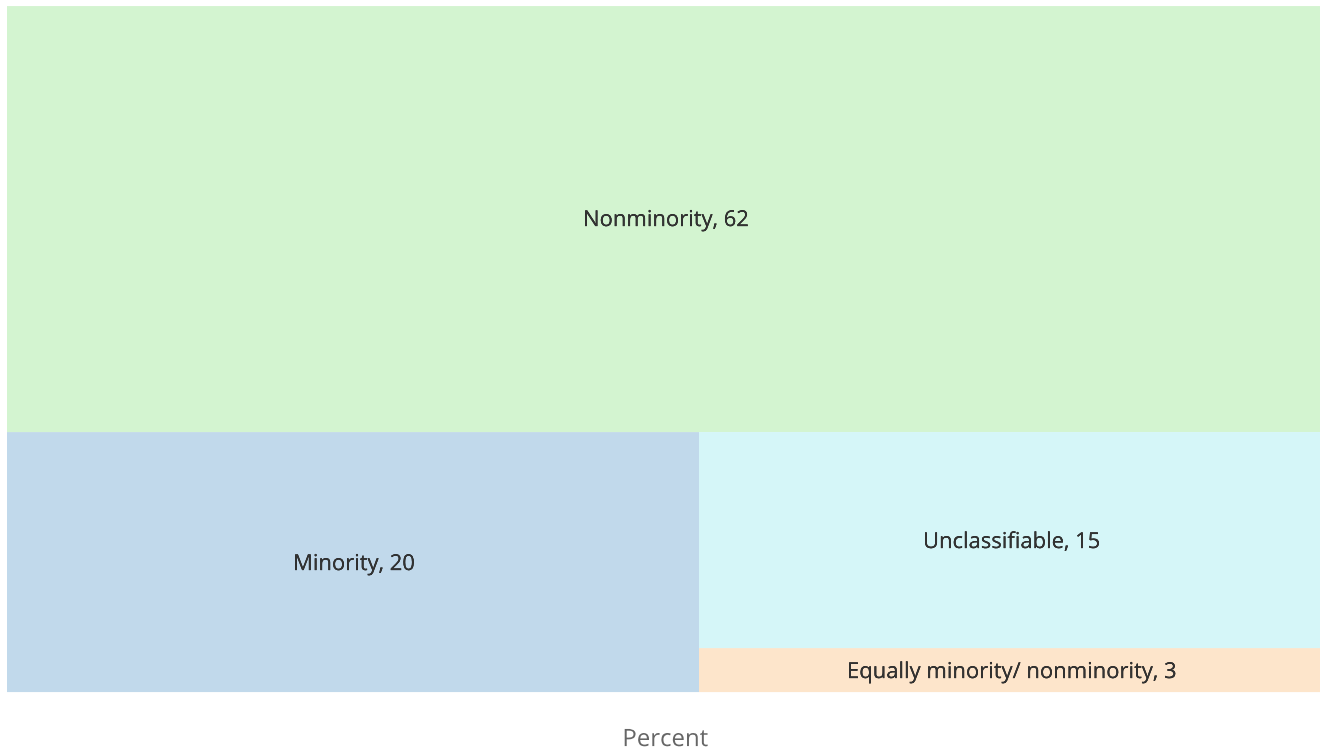


Note(s):

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

Source(s):

National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

Figure 2**Distribution of total R&D costs among companies with 1–9 employees, by racial and ethnic minority status of primary owners: 2017****Note(s):**

Companies classified as minority owned are those owned by persons of any race and ethnicity combination other than White and not Hispanic. Detail may not add to total because of rounding. Statistics are representative of microbusinesses located in the United States that performed or funded R&D.

Source(s):

National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

R&D by Type of Costs and R&D Performance

Over one-half (55%) of R&D costs were for salaries, wages, and fringe benefits; 9% each was used for materials and supplies and for purchasing R&D services; 5% was for payment to collaborative partners; and 4% was used for machinery and equipment (table 2). An additional 17% of R&D costs was for other expenses. Software publishers (NAICS 5112) and computer systems design and related services (NAICS 5415) spent 73% and 71%, respectively, of their R&D on salaries, wages, and fringe benefits. Pharmaceuticals and medicines (NAICS 3254) spent only 31% of their R&D dollars on salaries, wages, and benefits; 18% on materials and supplies; and 17% on purchasing R&D services.

Of the \$6.7 billion in R&D costs for microbusinesses, \$5.7 billion (85%) were for R&D performance by the companies themselves. R&D performance is equal to total R&D costs minus payments to other businesses partners for collaborative R&D and minus costs for purchased R&D services.

Total Employment and R&D Employees

There were approximately 45,000 domestic R&D employees working for microbusinesses in 2017 (table 5), and 87% of those employees were in nonmanufacturing microbusinesses. This proportion is close to the proportion of total R&D costs that were spent by nonmanufacturing businesses. Among all domestic R&D employees, 46% worked in the computer systems design and related services industry (NAICS 5415) and 23% worked in the scientific research and development services industry (NAICS 5417).

R&D employee occupations included the following: researchers (including 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, nearly two-thirds (64%) were researchers, 27% were R&D technicians, and the remaining 9% were R&D support staff. Almost one-quarter (23%) of the domestic researchers have doctoral degrees.

Table 5

Domestic R&D employees working for companies with 1–9 employees, by selected industry and R&D occupation: 2017

(Number)

Industry	NAICS code	R&D employees	Researchers (including R&D scientists, engineers, and their managers)	R&D technicians and equivalent staff	R&D support staff (clerical and other)
All selected industries	31–33, 42, 51, 5413, 5415, 5417	45,465	28,877	12,346	4,242
Manufacturing industries	31–33	5,860	3,715	1,416	728
Food, beverage, and tobacco products	311–12	61 r	34 r	20	7 r
Textile, apparel, and leather products	313–16	35 r	35 r	0	0
Wood products	321	0	0	0	0
Paper	322	0	0	0	0
Printing and related support activities	323	0	0	0	0
Petroleum and coal products	324	0	0	0	0
Pharmaceuticals and medicines	3254	349	153	132	63 r
Chemicals, excluding pharmaceuticals	325 (excluding 3254)	710	427	164	119
Plastics and rubber products	326	45	36	S	8 r
Nonmetallic mineral products	327	14 r	S	0	8 r
Primary metals	331	3 r	3 r	0	0
Fabricated metal products	332	69	41	23 r	5
Machinery	333	684	398	169	117 r
Computer and electronic products	334	2,687	1,871	532	284
Electrical equipment, appliances, and components	335	335	153	160	22 r
Transportation equipment	336	142	99	34	9 r
Furniture and related products	337	0	0	0	0
Miscellaneous manufacturing	339	727	460	180	87
Selected nonmanufacturing industries	42, 51, 5413, 5415, 5417	39,604	25,161	10,930	3,513
Wholesale trade	42	370	155	168	46 r
Information	51	5,176	3,438	1,343	394
Software publishers	5112	3,659	2,224	1,120	315
Information, excluding software publishers	51 (excluding 5112)	1,516	1,214	224	79
Architectural, engineering, and related services	5413	2,746	1,876	530	340
Computer systems design and related services	5415	20,944	12,697	6,476	1,770
Scientific research and development services	5417	10,369	6,995	2,411	963

r = relative standard error > 50%; S = data withheld to avoid disclosing operations of individual companies.

NAICS = 2017 North American Industry Classification System.

Note(s):

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

Source(s):

National Center for Science and Engineering Statistics and U.S. Census Bureau, Annual Business Survey, 2017.

Survey Information and Data Availability

In this InfoBrief, R&D costs are expressed in current U.S. dollars and are not adjusted for inflation. In 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 regardless of whether they were known to have R&D activity. The ABS collected detailed statistics from businesses 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 information from those microbusinesses are presented in this InfoBrief.

The statistics from the survey are based on a sample, and as such, they are subject to both sampling and nonsampling errors (see technical notes in the data tables report *Annual Business Survey: 2017* that will be available 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. This amounted to an estimated \$200 million being excluded.

For the microbusiness population, approximately 580,000 microbusinesses were sampled to represent the population of 3.5 million microbusinesses. The unit response rate for businesses eligible to report the R&D module was 69.4%. For the full 2017 Annual Business Survey, a total of 849,970 employer companies were sampled to represent the population of 5.3 million employer companies. For the full 2017 ABS, the unit response rate was 69.0%.

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: 2017* (<https://www.nsf.gov/statistics/srvyabs/>). Individual data tables and tables with relative standard errors and imputation rates from the 2017 survey are available in advance of the full report.

Notes

- 1 For a discussion of the relation among company size, R&D performance, and innovation, see Knott AM and Vieregger C. 2020. Reconciling the firm size and innovation puzzle. Center for Economic Studies. Available at <https://www2.census.gov/ces/wp/2016/CES-WP-16-20.pdf>.
- 2 Employees are individuals who worked for the business and received a W-2 issued by the business for salary or wages.
- 3 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. Most of the statistics reported here, and collected by the inaugural ABS survey, are for R&D costs. **Table 2** provides industry-specific R&D performance totals.
- 4 R&D questions were asked only of manufacturing industries and certain selected nonmanufacturing industries. Previous NCSSES surveys (Microbusiness R&D and Innovation Survey and Business R&D and Innovation Survey) found that these groups represented almost all R&D of microbusinesses in the United States.
- 5 As defined by the *Frascati Manual* (Organisation for Economic Co-operation and Development. 2015. *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities*. OECD Publishing, Paris.), 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. 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.

Suggested Citation

Kindlon A; National Center for Science and Engineering Statistics (NCSES). 2020. *Microbusinesses Had More Than \$6.7 billion in R&D Costs in the United States in 2017, According to New Annual Business Survey*. NSF 21-302. Alexandria, VA: National Science Foundation. Available at <https://nces.nsf.gov/pubs/nsf21302/>.

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