

TABLE 56

Worldwide, domestic, and foreign R&D paid for by the company and others and performed by the company, R&D employment, and R&D cost per R&D employee, by industry and company size: 2019

(Millions of U.S. dollars, number of employees in thousands, and cost per employee in thousands of U.S. dollars)

Industry and company size	NAICS code	Company-performed R&D (US\$millions)			R&D employment (thousands)			Company-performed R&D per R&D employee (US\$thousands per employee)		
		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
All industries	21-23, 31-33, 42-81	597,420	492,956	104,464	2,676	1,832	844	223.2	269.0	123.8
Manufacturing industries	31-33	350,024	285,674	64,351	1,409	962	447	248.4	297.0	143.8
Food	311	5,015	4,180	835	35	23	12	143.3	184.7	67.5
Beverage and tobacco products	312	1,755	1,082	674	8	6	3	209.1	190.5	248.0
Textile, apparel, and leather products	313-16	1,061	904	157	8	7	1	128.4	132.1	110.4
Wood products	321	193	186	7	3	3	*	66.1	66.0	69.4
Paper	322	1,165	1,064	101	7	5	2	157.4	195.6	51.5
Printing and related support activities	323	429 i	420 i	9 i	5 i	5 i	* i	93.8	93.1	144.4
Petroleum and coal products	324	1,477 - 1,481	1,306	171 - 176	9	6	3	D	202.1	D
Chemicals	325	115,631	97,063	18,568	255	186	70	452.7	523.1	265.8
Basic chemicals	3251	3,102	2,360	742	17	12	6	178.9	203.8	128.8
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	1,695	1,172	523	10	6	4	166.3	188.1	131.9
Pesticide, fertilizer, and other agricultural chemicals	3253	2,272 - 2,297	1,822 - 1,846	450	10	7	2	D	D	193.3
Pharmaceuticals and medicines	3254	103,487	87,619	15,868	184	139	45	561.0	630.1	349.5
Soap, cleaning compound, and toilet preparation	3256	3,517	2,760	757	17	11	6	210.5	253.1	130.5
Paint, coating, adhesive, and other chemicals	3255, 3259	1,532 - 1,560	1,305 - 1,333	227	17	10	7	D	D	34.5
Plastics and rubber products	326	3,359	2,856	503	31	25	6	109.1	115.7	82.5
Nonmetallic mineral products	327	1,701 i	1,508 i	192 i	7 i	7 i	1 i	227.2	223.0	266.6
Primary metals	331	740	665	76	9	8	1	85.3	83.6	103.9
Fabricated metal products	332	3,163	2,885	278	36	34	2	88.2	85.4	133.0
Machinery	333	19,435	15,184	4,251	138	95	43	140.4	159.8	98.0
Agricultural implement	33311	2,778	1,921	857	22	13	9	127.5	149.1	96.3
Semiconductor machinery	333242	5,374	4,459	915	20	12	8	264.7	356.9	117.2
Engine, turbine, and power transmission equipment	3336	1,931	1,301	630	12	7	5	157.6	183.7	121.8
Other machinery	other 333	9,353	7,503	1,850	84	63	22	111.3	120.0	86.0
Computer and electronic products	334	112,180	86,729	25,452 i	446	264	182	251.4	328.5	139.7
Communications equipment	3342	15,907 - 15,912	12,595	3,312 - 3,316	72	40	32	D	315.1	D
Semiconductor and other electronic components	3344	48,189 i	35,183 i	13,007 i	181	95	85	266.9	369.2	152.6
Navigational, measuring, electromedical, and control instruments	3345	21,512	17,562	3,950	110	75	35 i	195.2	234.2	112.2
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	4,621 i	3,342	1,280 i	24 i	16 i	8 i	192.1	206.9	161.9

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		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	10,541	9,662	878	40	i 33	7	i 262.4	294.2	119.9
Other measuring and controlling device	other 3345	6,350	4,558	1,792	46	26	20	138.1	175.3	89.7
Other computer and electronic products	other 334	26,567 - 26,571	21,388	5,179 - 5,183	i 84	54	30	D	397.8	D
Electrical equipment, appliances, and components	335	7,006	5,263	1,743	48	25	23	i 147.1	212.3	76.3
Transportation equipment	336	53,187	45,375	7,812	254	183	72	209.2	248.5	109.0
Motor vehicles, bodies, trailers, and parts	3361-63	31,110	24,117	6,993	169	108	61	184.2	223.2	115.0
Aerospace products and parts	3364	18,943	i 18,358	i 585	70	61	8	272.4	298.8	72.1
Aircraft, aircraft engine, and aircraft parts	336411-13	17,476	i 16,891	i 585	62	54	8	280.9	312.2	72.1
Guided missile, space vehicle, and related parts	336414-15, 336419	1,467	1,467	*	7	7	*	200.1	200.2	100.0
Military armored vehicle, tank, and tank component	336992	35	35	0	1	1	0	39.5	39.5	NA
Other transportation	other 336	3,099	2,865	234	15	12	3	i 207.3	234.4	85.9
Furniture and related products	337	444	409	35	4	4	*	101.7	104.1	79.7
Miscellaneous	339	22,077 - 22,084	18,596	3,482 - 3,488	104	78	26	D	237.4	D
Medical equipment and supplies	3391	19,083	16,014	3,069	82	59	23	232.6	270.7	134.0
Other miscellaneous manufacturing	3399	2,995 - 3,002	2,582	413 - 419	22	19	3	D	134.6	D
Nonmanufacturing industries	21-23, 42-81	247,396	207,283	40,113	1,267	870	396	195.3	238.1	101.2
Mining, quarrying, oil and gas extraction, and support activities	21	3,307	2,717	589	22	i 12	11	i 147.1	228.3	55.7
Utilities	22	284	275	9	0 - 35	0 - 23	0 - 12	D	D	D
Wholesale trade	42	1,304	1,191	113	16	13	2	84.0	89.4	51.4
Electronic shopping and electronic auctions	454111-12	3,200 - 20,013	i 3,131 - 15,818	i 69 - 4,198	i 42 - 114	38 - 64	3 - 52	D	D	D
Transportation and warehousing	48-49	9,952	i 9,890	i 62	19	i 18	i 1	i 532.9	550.9	86.0
Information	51	129,277	110,227	19,051	533	359	174	242.7	307.3	109.5
Publishing	511	39,968	33,019	6,949	181	110	71	220.9	300.8	97.7
Newspaper, periodical, book, and directory publishers	5111	61	61	0	1	1	*	97.4	99.6	0.0
Software publishers	5112	39,907	32,958	6,949	180	109	71	221.3	301.9	97.7
Telecommunications	517	3,856	3,733	124	20	19	1	194.0	196.4	141.8
Data processing, hosting, and related services	518	36,449	30,558	5,891	201	126	75	181.0	242.5	78.2
Other information	other 51	49,004	42,917	6,087	130	104	27	375.6	413.2	228.9
Finance and insurance	52	10,092	8,917	1,175	71	54	17	142.7	164.8	70.8

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		Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign	Worldwide	Domestic	Foreign
Real estate and rental and leasing	53	1,476	1,371	104	4	4	*	395.8	389.0	512.8
Lessors of nonfinancial intangible assets (except copyrighted works)	533	48	45	4	*	*	*	288.6	283.4	373.5
Other real estate and rental and leasing	other 53	1,427	1,326	101	4	3	*	400.8	394.0	519.8
Professional, scientific, and technical services	54	68,023	53,233	14,790	441	299	142	154.3	177.9	104.4
Architectural, engineering, and related services	5413	4,244	4,207	37	59	58	1	71.9	72.3	44.2
Computer systems design and related services	5415	26,416	21,046	5,370	154	99	55	171.5	213.5	96.9
Scientific research and development services	5417	30,675	21,669	9,006	178	98	80	172.3	220.5	112.9
Research and development in biotechnology	541711	9,250	6,457	2,793	59	30	29	156.7	211.9	97.8
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	20,651	14,446	6,205	110	59	51	188.2	246.1	121.6
Research and development in the social sciences and humanities	541720	774	766	8	9	9	*	83.6	84.2	49.5
Other professional, scientific, and technical services	other 54	6,688	6,312	376	50	44	6	134.6	143.0	67.8
Health care services	621-23	2,289	2,265	24	12	12	*	188.1	187.6	247.6
Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1,382 - 18,191	1,380 - 14,067	2 - 4,124	38 - 88	39	0 - 49	D	D	D
All companies (number of domestic employees)	-	597,420	492,956	104,464	2,676	1,832	844	223.2	269.0	123.8
Small companies										
10-19 ^a	-	5,639	5,501	138	37	35	2	152.5	156.0	80.5
20-49	-	12,875	12,418	457	92	83	9	140.1	149.5	51.7
Medium companies										
50-99	-	14,758	14,021	737	95	85	10	154.9	165.1	71.4
100-249	-	21,986	19,793	2,192	150	127	23	146.7	155.4	97.4
Large companies										
250-499	-	21,592	18,883	2,709	130	105	25	166.6	180.4	108.8
500-999	-	26,922	23,969	2,953	134	100	34	201.5	240.1	87.4
1,000-4,999	-	92,224	75,671	16,553	454	305	149	203.1	247.8	111.3
5,000-9,999	-	62,775	50,811	11,965	280	182	97	224.3	278.6	122.8
10,000-24,999	-	111,876	88,263	23,612	465	267	198	240.6	330.3	119.4
25,000 or more	-	226,773	183,626	43,148	840	542	298	270.0	338.7	144.9

* = amount < \$500,000 or < 500 employees; D = data withheld to avoid disclosing operations of individual companies; i = > 50% of the estimate is a combination of imputation and reweighting to account for nonresponse; NA = not available.

NAICS = 2012 North American Industry Classification System.

^a The Business Enterprise Research and Development Survey does not include companies with fewer than 10 domestic employees.

Note(s):

Detail may not add to total because of rounding. Ratios were calculated using unrounded data. Industry classification is based on the dominant business code for domestic R&D performance, where available. For companies that did not report business codes, the classification used for sampling was assigned. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. This change has affected the comparability of these estimates with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2019.