

TABLE 58

## Worldwide R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2009–21

(Millions of U.S. dollars)

Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
All industries	21–23, 31–33, 42–81	336,571	338,451	359,490	374,916	396,352	416,343	429,174	457,591	484,740	543,369	595,683	648,421	737,911
Manufacturing industries	31–33	236,858	243,611	253,821	261,697	276,110	285,661	287,895	303,044	314,167	339,076	348,904	375,180	404,449
Food	311	4,916	D	5,589	5,163	6,335	6,136	6,058	5,824	5,424	5,459	5,014	6,395	6,456
Beverage and tobacco products	312	933	D	D	D	1,358	1,423	1,529	1,076 - 1,654	1,769	1,628	1,755	1,901	2,139
Textile, apparel, and leather products	313–16	519	522	656	605	759	734	818	1,247	1,131	1,223	1,060	973	997
Wood products	321	283	254	211	282	222	341	198	166 - 751	174	206	193	193 - 200	447
Paper	322	NA	1,665	769	858	1,022	880	867	943	1,594	1,013	1,161	1,021	1,206
Printing and related support activities	323	217	269	212	291	258	238	198	223	236	246	422	297	231
Petroleum and coal products	324	NA	D	1,281	D	327	298	252	312	377	1,460 - 1,463	1,477 - 1,481	165 - 2,807	1,131
Chemicals	325	64,442	72,610	72,068	70,218	74,551	79,428	80,961	84,612	90,236	101,132	115,781	120,665	133,231
Basic chemicals	3251	NA	2,671	5,166	3,400	3,336	3,633	3,677	536 - 5,694	3,101	3,046	3,102	3,454	3,710
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	NA	1,038	1,117	D	1,794	1,842	1,780	332 - 5,490	805	2,435	1,695	1,745	1,969
Pesticide, fertilizer, and other agricultural chemicals	3253	NA	D	2,049	D	1,966	2,042	3,405	0 - 5,157	1,864	1,782 - 1,797	2,272 - 2,297	1,173	1,279
Pharmaceuticals and medicines	3254	53,456	60,537	58,866	58,920	62,480	66,731	D	73,193	79,004	88,776	103,636	108,843	121,157
Soap, cleaning compound, and toilet preparations	3256	NA	3,285	3,386	3,212	3,358	3,501	D	3,589	3,699	3,567	3,517	3,432	3,611
Paint, coating, adhesive, and other chemicals	3255, 3259	NA	D	1,485	D	1,617	1,679	1,664	1,806 - 1,830	1,764	1,508 - 1,529	1,531 - 1,562	2,017	1,505
Plastics and rubber products	326	2,982	2,515	2,640	4,446	4,576	4,519	2,906	4,583	4,626	3,170	3,348	3,143	3,752
Nonmetallic mineral products	327	1,153	1,596	1,428	1,588	1,578	1,599	1,487	1,474	1,485	1,567	1,699	1,902	1,731
Primary metals	331	993	802	763	818	700	770	711	662	862	990	721 - 747	848	963
Fabricated metal products	332	2,174	1,818	1,993	1,949	2,303	2,329	2,467	2,273	2,405	2,533	3,144	3,739	4,669
Machinery	333	11,156	12,403	18,312	17,462	15,420	15,089	16,827	15,958	16,626	19,279	19,283	20,529	23,073
Agricultural implement	33311	NA	D	1,570	2,142	2,243	D	2,152	2,189	2,132	2,730	2,777	2,451	2,774
Semiconductor machinery	333242	NA	2,469	2,727	1,357	3,645	3,434	3,812	4,138	4,530	5,077	5,374	5,836	6,648
Engine, turbine, and power transmission equipment	3336	NA	D	D	D	1,795	2,894	2,920	2,484	2,577	3,418 - 3,440	1,780	2,211	1,920
Other machinery	other 333	NA	6,566	D	D	7,736	D	7,943	7,147	7,387	8,030 - 8,057	9,352	10,031	11,731
Computer and electronic products	334	68,772	75,345	79,145	87,406	90,114	94,199	92,860	98,319	101,910	112,188	110,836	126,055	132,597
Communications equipment	3342	NA	17,069	15,197	18,877	20,392	22,048	23,049	16,124	15,568	16,467	15,814	15,483	15,968

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Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Semiconductor and other electronic components	3344	26,082	29,354	32,146	38,300	40,611	42,028	40,348	41,789	41,362	45,795	48,175	56,207	63,917
Navigational, measuring, electromedical, and control instruments	3345	16,498	17,905	18,242	18,640	18,046	18,993	17,020	18,112	17,965	20,828	21,596	21,616	17,220
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	NA	4,548	4,987	4,999	2,837	5,049	3,599	3,553	3,702	1,167 - 14,309	4,621	3,371	3,554
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments	334511	NA	8,769	8,641	8,312	8,753	8,486	8,033	8,372	8,347	0 - 13,142	10,541	11,271	5,895
Other measuring and controlling devices	other 3345	NA	4,588	4,615	5,329	6,456	5,458	5,387	6,187	5,916	6,520	6,434	6,975	7,771
Other computer and electronic products	other 334	NA	11,017	13,559	11,589	11,065	11,130	12,443	22,294	27,016	29,099	25,251	32,748	35,492
Electrical equipment, appliances, and components	335	4,475	4,767	5,319	4,140	5,738	5,705	5,710	6,207	6,154	6,179	7,025	6,864	7,374
Transportation equipment	336	56,183	51,362	49,030	50,415	51,547	56,597	57,698	60,161	59,432	59,850	53,518	55,736	58,423
Motor vehicles, bodies, trailers, and parts	3361–63	NA	17,764	D	D	23,610	D	25,735	6,671 - 54,230	30,069	31,869 - 31,899	31,440	29,308	33,111
Aerospace products and parts	3364	36,409	31,627	26,858	D	25,684	D	29,113	3,240 - 50,799	26,189	25,006	18,943	23,453	22,180
Aircraft, aircraft engine, and aircraft parts	336411–13	NA	D	D	D	D	D	27,463	1,812 - 49,371	24,666	23,683	17,476	21,791	20,538
Guided missile, space vehicle, and related parts	336414–15, 336419	NA	D	D	1,425	D	D	1,649	1,428	1,523	1,323	1,467	1,662	1,642
Military armored vehicle, tank, and tank components	336992	NA	D	52	D	9	D	16	3 - 38	9	11	35	11	24
Other transportation	other 336	NA	D	D	D	2,245	D	2,834	2,653 - 2,690	3,164	2,936 - 2,961	3,100	2,964	3,109
Furniture and related products	337	433	407	347	383	401	422	477	381	470	418 - 444	444	456	464
Miscellaneous	339	NA	9,528	D	D	18,900	14,951	15,869	18,045	19,257	20,515	22,005	21,650 - 24,298	25,564
Medical equipment and supplies	3391	NA	7,461	D	10,311	15,938	12,091	13,166	15,387 - 15,400	16,470	17,443	19,068	19,893	22,444
Other miscellaneous manufacturing	3399	NA	2,066	D	D	2,962	2,860	2,703	2,646 - 2,657	2,788	3,072	2,937	1,758 - 4,406	3,120
Nonmanufacturing industries	21–23, 42–81	99,713	94,840	105,669	113,220	120,242	130,682	141,279	154,547	170,574	204,293	246,779	273,240	333,462
Mining, quarrying, oil and gas extraction, and support activities	21	NA	2,785	2,597	D	4,452	D	4,348	3,604	3,647	1,990	3,306	1,290	1,339

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Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Utilities	22	NA	442	396	368	317	314	483	353	336	283	284	271	168 - 19,125
Wholesale trade	42	NA	1,145	1,697 i	2,165 i	459 i	D	1,723 i	489 i	12,105	883 i	1,298	1,098	1,855 i
Electronic shopping and electronic auctions	454111-12	NA	D	D	D	1,845	D	D	14,624	12,105	11,715 - 15,515 i	69 - 21,372 i	18,875 - 25,758 i	10,538 - 29,503 i
Transportation and warehousing	48-49	NA	124	159	186	D	692	416	495	1,221	2,562 i	9,952 i	6,217 i	7,282
Information	51	43,197	45,099	52,341	56,815	68,375	78,013	77,965	84,400	94,412	111,653	129,742	152,284	177,113
Publishing	511	33,171	33,883	36,310	36,947	43,821	46,806	42,190	42,156	42,368	39,890	39,918	42,677 - 42,710	49,085
Newspaper, periodical, book, and directory publishers	5111	NA	826	401	221 i	348 i	92 i	107 i	84 i	72	150	61	30 - 63	103
Software publishers	5112	NA	33,058	35,910	36,726	43,473	46,714	42,083	42,073	42,296	39,739	39,857	42,647	48,981
Telecommunications	517	1,609	2,043	2,267	2,787 i	3,112	3,830	3,648	3,617 - 3,659	3,828	3,827 - 3,833	119 - 46,668	3,505 - 3,538	3,912
Data processing, hosting, and related services	518	3,008	2,895	5,450	5,574	7,787	10,356	10,600	14,051 - 14,099	18,893	28,214 - 28,226	37,071	49,620	55,072
Other information	other 51	5,410	6,278	8,313	11,506	13,654	17,022	21,526	24,530	29,323	39,713	6,086 - 52,635	56,449	69,044
Finance and insurance	52	NA	2,568	3,943	4,159	4,999	4,748	6,359	8,468	8,582	8,347	10,081	13,820	23,409
Real estate and rental and leasing	53	NA	367	D	400	202	268	313	477	892	1,072	1,472	3,412	2,199
Lessors of nonfinancial intangible assets (except copyrighted works)	533	NA	NA	365	379	D	58	D	27	77	6	48	6 - 13	7
Other real estate and rental and leasing	other 53	NA	NA	D	21 i	D	210	D	450	814	1,066	1,423	3,399 - 3,406	2,192
Professional, scientific, and technical services	54	47,709	37,108	39,731	40,843	37,345	37,995 i	46,255	39,585 - 54,209	46,587	58,333	66,987	67,606	85,259
Architectural, engineering, and related services	5413	3,384	4,156	D	2,541 i	3,173	3,374	4,158 i	56 - 9,557	2,575	4,005	4,192	4,223	4,598
Computer systems design and related services	5415	15,310	12,458	13,181	13,404 i	10,535 i	12,579 i	17,227	15,483 - 20,617	17,190	20,378	26,357	21,242	25,041
Scientific research and development services	5417	19,307	16,408	19,295	20,225	18,478	17,870	20,630	20,194	22,635	28,620	30,131	35,171 i	47,772 i
Research and development in nanotechnology	541713	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	179 i	244
Research and development in biotechnology (except nanobiotechnology)	541714	8,492	6,266	7,985	8,364	5,889	4,898	7,114 i	6,062	6,076	8,428 - 8,442	8,884	8,745 - 9,233	13,441

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Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	10,129	9,591	10,697	11,261	11,794	12,291	12,807	13,409	15,680	19,507	20,473 i	25,569 i	33,519 i
Research and development in the social sciences and humanities	541720	686	551	613	600	795	682	709	723	879	672 - 683	774	190 - 678	568
Other professional, scientific, and technical services	other 54	9,708	4,086	D	4,674	5,158	4,172 i	4,240	3,852	4,188	5,330	6,307	6,970	7,847
Health care services	621–23	NA	D	D	708 i	535 i	501 i	771 i	1,002	1,132	1,497	2,290	1,485	2,140
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	NA	NA	D	D	D	D	D	1,054 - 6,188 i	1,665	2,162 - 5,963	0 - 21,303	0 - 6,883	3,200
All companies (number of domestic employees) <sup>a</sup>	–	336,571	338,451	359,490	374,916	396,352	416,343	429,174	457,591	484,740	543,369	595,683	648,421	737,911
Micro companies														
5–9	–	NA	3,792	4,143	3,025 i	3,442 i	3,409 i	3,101 i	1,728 i	NA	NA	NA	NA	NA
Small companies														
10–19	–	NA	NA	NA	NA	NA	NA	5,750 i	5,031 i	3,532	4,511	5,647	5,352	5,836
20–49	–	NA	NA	NA	NA	NA	NA	10,654 i	9,972	9,513	11,825	12,753	13,542	15,969
Medium companies														
50–99	–	13,785	9,470	9,834	9,728	9,289	10,677	11,946	9,639	10,635	13,095	14,566	13,810	15,406
100–249	–	14,365	12,989	13,354	13,665	14,980	15,081	14,964	16,160	18,584	20,486	21,707	27,382	26,406
Large companies														
250–499	–	12,315	11,439	14,573	12,693	13,379	13,675	14,837	14,751	16,522	21,971	21,517	23,862	27,592
500–999	–	12,124	11,794	11,388	12,955	13,663	15,422	17,442	16,601	20,173	20,309	26,988	24,460	31,961
1,000–4,999	–	54,600	60,782	63,801	62,729	69,212	71,679	71,259	79,017	79,494	83,959	92,592	107,102	115,278
5,000–9,999	–	27,461	34,453	32,578	41,006	43,087	51,305	48,399	49,479	54,572	61,047	62,772	61,221	78,388
10,000–24,999	–	61,681	50,710	61,593	60,544	60,844	63,818	70,864	81,547	87,965	108,249	111,685	111,585	133,088
25,000 or more	–	118,424	125,067	132,719	144,097	152,547	155,180	159,959	173,666	183,750	197,916	225,456	260,105	287,987

D = data withheld to avoid disclosing operations of individual companies; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse; NA = not available.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> The Business Enterprise Research and Development Survey did not include companies with fewer than 5 domestic employees from 2008 to 2016 and does not include fewer than 10 domestic employees beginning in 2017.

**Note(s):**

Detail may not add to total because of rounding. 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. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D and are not comparable with estimates published for years prior to 2018. For survey years 2009–13, industry classification was based on the 2007 NAICS. For survey years 2014–19, industry classification was based on the 2012 NAICS. For survey years beginning in 2020, classification was based on the 2017 NAICS. Beginning with survey year 2011, the composition of the Other nonmanufacturing industry changed. Most statistics for years prior to 2021 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. 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.