

TABLE 60

## Foreign R&amp;D paid for by the company and others and performed by the company, by industry and company size: 2008–21

(Millions of U.S. dollars)

Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
All industries	21–23, 31–33, 42–81	61,475	54,066	59,162	69,251	72,157	73,245	75,804	73,503	79,001	87,761	99,736	104,248	109,551	135,412	
Manufacturing industries	31–33	46,572	40,417	44,464	51,458	53,120	53,392	53,955	51,725	53,045	58,565	64,761	64,230	66,159	78,389	
Food	311	596	817	1,006	1,195	1,076	1,315	1,282	1,231	994	835	865	835	1,150 - 1,161	1,190	
Beverage and tobacco products	312	123	455	783	i 599	532	531	503	523	0 - 555	671	516	674	732	893	
Textile, apparel, and leather products	313–16	367	80	39	49	52	98	103	70	81	172	218	157	152	169	
Wood products	321	4	2	3	1	2	2	5	i 3	0 - 555	1	3	7	8	4	
Paper	322	274	257	324	93	106	103	158	102	89	267	80	101	93	67	
Printing and related support activities	323	9	7	38	30	35	6	3	2	4	5	4	9	i 10	27	
Petroleum and coal products	324	D	156	D	D	D	46	64	38	44	53	192 - 194	171 - 176	165	175	
Chemicals	325	13,990	9,689	14,267	16,215	13,470	12,464	13,294	12,929	12,809	14,503	16,766	18,601	19,305	23,741	
Basic chemicals	3251	1,198	797	861	D	695	716	784	636	537	557	603	742	758	997	
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	224	260	255	319	D	597	688	579	333	264	774 - 798	523	512	580	i
Pesticide, fertilizer, and other agricultural chemicals	3253	371	D	D	D	D	275	i 299	i D	0 - 5,157	396	321 - 337	i 450	0 - 212	123	
Pharmaceuticals and medicines	3254	10,862	7,041	11,068	12,557	11,069	9,690	10,249	D	5,688 - 10,846	12,133	13,962	15,900	16,793	20,936	
Soap, cleaning compound, and toilet preparations	3256	965	873	884	910	870	924	952	D	789	839	847	757	767	871	
Paint, coating, adhesive, and other chemicals	3255, 3259	370	D	D	195	210	263	321	i D	307	314	235 - 259	227	264 - 477	234	
Plastics and rubber products	326	341	595	386	362	861	929	905	358	831	904	428	491	527	607	
Nonmetallic mineral products	327	106	54	282	i 253	261	249	i 155	i 228	185	181	181	i 192	i 205	i 198	
Primary metals	331	114	130	121	108	77	82	94	86	69	116	151	58 - 85	32	50	i
Fabricated metal products	332	188	117	91	135	122	109	222	194	179	171	216	278	349	378	
Machinery	333	1,929	1,930	2,143	3,587	3,710	2,833	2,984	3,288	3,239	3,285	4,509	4,101	4,286	5,343	
Agricultural implement	33311	399	391	D	293	596	646	D	621	625	566	i 858	857	640 - 644	907	
Semiconductor machinery	333242	366	285	296	376	66	451	493	599	727	793	911	915	1,027	1,299	
Engine, turbine, and power transmission equipment	3336	92	83	D	D	D	347	537	405	424	0 - 1,928	935 - 958	479	554 - 558	546	
Other machinery	other 333	1,072	1,170	1,254	D	D	1,389	D	1,664	1,464	1,928	0 - 1,781 - 1,807	1,850	2,062	2,591	
Computer and electronic products	334	15,774	12,917	13,722	16,708	21,117	21,485	20,943	20,678	20,868	23,907	28,240	25,264	i 26,531	31,535	
Communications equipment	3342	2,951	2,862	3,194	2,863	4,525	4,730	3,702	3,625	2,967	3,076	3,377	3,312 - 3,316	3,387	3,411	

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Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Semiconductor and other electronic components	3344	7,075	6,058	6,343	7,909	10,082	10,434	10,360	9,896	10,377	10,989	2,418 - 15,563	12,996 i	13,023	16,521
Navigational, measuring, electromedical, and control instruments	3345	2,308	2,180	2,158	2,390	2,722	2,927	3,122	2,819	3,227	3,640	3,015 - 16,157	3,952	3,112	3,576
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	838	522	360	557	586	202	1,073	923	922	1,069	1,168 i	1,280 i	497	467
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments	334511	D	508	475	575	578	647	625	673	840	968	0 - 13,142	878	684	594
Other measuring and controlling devices	other 3345	D	1,149	1,324	1,258	1,557	2,077	1,423	1,222	1,465	1,603	1,848	1,794	1,931	2,516
Other computer and electronic products	other 334	3,440	1,817	2,027	3,546	3,788	3,395	3,759	4,338	4,297	6,202 i	6,287	4,997 - 5,007 i	7,010	8,027
Electrical equipment, appliances, and components	335	1,162	1,158	1,447	1,695	1,062	1,605	1,382	1,351	1,436	1,835	1,692	1,742	1,835	1,880
Transportation equipment	336	10,267	7,974	8,422	7,936	8,075	7,899	9,621	8,412	8,592	8,734	7,404	8,036	6,513	7,663
Motor vehicles, bodies, trailers, and parts	3361–63	8,448	6,023	D	D	D	6,877	D	6,622	6,672	6,527	6,476 - 6,506	7,217	5,787 - 5,792	6,720
Aerospace products and parts	3364	1,816	1,846	1,770	772	D	901	D	1,672	1,817	2,035	705	585	509	711
Aircraft, aircraft engine, and aircraft parts	336411–13	1,742	1,760	D	D	D	D	D	1,670	1,813	511 - 2,036	705	585	500	693
Guided missile, space vehicle, and related parts	336414–15, 336419	74	85	D	D	5	D	D	2	4	0 - 1,524	1	*	10	18
Military armored vehicle, tank, and tank components	336992	0	D	D	1	0	0	D	0	0	0	0	0	0	0 - 3
Other transportation	other 336	3	D	D	D	D	121	D	118	104	171	195 - 221	234	211 - 216	228 - 233
Furniture and related products	337	27	38	33	28	23	28	45	25	22	40	9 - 33	35	39	37
Miscellaneous	339	D	4,044	D	D	D	3,608	2,194	2,207	3,057	2,888	3,271	3,459	4,215 - 4,226	4,431
Medical equipment and supplies	3391	766	3,813	1,003	D	1,978	3,197	1,782	1,813	2,739	2,539	2,884	3,046	3,821	4,007
Other miscellaneous manufacturing	3399	D	231	D	D	D	411	412	394 i	317 i	348	386	413	393 - 404	424
Nonmanufacturing industries	21–23, 42–81	14,903	13,648	14,698	17,792	19,037	19,853	21,849	21,778	25,956	29,196	34,975	40,018	43,391	57,024
Mining, quarrying, oil and gas extraction, and support activities	21	D	D	239	232	D	452	D	336	308	355 i	163	589	123 - 125 i	5 - 79
Utilities	22	6	13	17	38	21	23	1	3	1	10	8	9	6	0 - 1,129
Wholesale trade	42	509	D	53	141 i	112 i	7	D	25 i	21 i	0 - 2,590	32	112	45	0 - 109 i

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Industry and company size	NAICS code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Electronic shopping and electronic auctions	454111–12	NA	NA	D	D	D	490	D	D	0 - 5,132	0 - 2,590	63 - 3,863	69 - 4,198	4,345 - 4,891	4,330 - 6,357
Transportation and warehousing	48–49	2	1	29	28	8	D	13	13	7	7	14	62	37	73
Information	51	7,657	7,243	8,011	9,644	9,915	11,767	13,736	12,508	13,454	14,292	17,146	19,077	22,905	29,258
Publishing	511	6,301	6,332	6,926	7,899	7,880	9,456	10,185	8,842	8,698	8,500	7,174	6,945	7,683	9,933
Newspaper, periodical, book, and directory publishers	5111	27	47	55	29	2	6	4	9	4	6	19	0	0	*
Software publishers	5112	6,274	6,285	6,871	7,870	7,878	9,450	10,181	8,833	8,693	8,494	7,154	6,945	7,683	9,933
Telecommunications	517	175	86	131	98	59	63	61	41	49	96	131 - 138	120	94	77
Data processing, hosting, and related services	518	1,089	266	142	339	661	631	1,294	1,245	0 - 4,710	2,270	4,742 - 4,753	5,924	8,152	9,881
Other information	other 51	93	559	812	1,308	1,316	1,616	2,196	2,378	0 - 4,710	3,427	5,090	6,087	6,976	9,367
Finance and insurance	52	74	518	467	496	628	587	625	950	1,136	971	923	1,175	1,540	2,461
Real estate and rental and leasing	53	65	28	37	D	38	11	6	13	2	40 - 120	51	104	163	103
Lessors of nonfinancial intangible assets (except copyrighted works)	533	NA	NA	NA	41	37	D	3	D	*	0 - 79	0	4	0 - 6	0 - 2
Other real estate and rental and leasing	other 53	NA	NA	NA	D	*	D	3	D	2	41	51	101	157 - 164	100 - 104
Professional, scientific, and technical services	54	6,150	5,328	5,309	6,424	6,723	6,418	6,534	7,653	5,744 - 10,877	10,563	12,758	14,669	13,668	18,763
Architectural, engineering, and related services	5413	200	126	148	D	57	41	65	58	57	50	0 - 542	37	20	39
Computer systems design and related services	5415	2,164	1,959	2,099	2,243	2,398	1,293	1,525	2,893	0 - 5,132	3,488	3,825	5,369	3,310	4,632
Scientific research and development services	5417	3,544	2,905	2,696	3,581	3,810	4,259	4,546	4,380	5,416	6,606	8,394	8,913	10,007	13,630
Research and development in nanotechnology	541713	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0 - 4	16
Research and development in biotechnology (except nanobiotechnology)	541714	NA	683	729	942	977	1,398	1,438	1,520	1,616	1,869	2,580 - 2,594	2,764	2,877	4,402
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	NA	2,213	1,962	2,638	2,830	2,859	3,103	2,858	3,796	4,733	5,801	6,140	7,124	9,207
Research and development in the social sciences and humanities	541720	NA	9	5	1	2	3	4	3	4	3	1 - 12	8	2 - 6	5

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Other professional, scientific, and technical services	other 54	241	338	366	D	458	825	398 i	322	273	418	0 - 542	349	331	463
Health care services	621–23	1	10	D	D	36	7	*	12 i	154	211	22	24	10 - 29	2 - 81
Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71–72, 81	NA	NA	NA	D	D	D	D	D	0 - 5,132	162	0 - 3,800	0 - 4,131	0 - 527	1 - 637
All companies (number of domestic employees) <sup>a</sup>	–	61,475	54,066	59,162	69,251	72,157	73,245	75,804	73,503	79,001	87,761	99,736	104,248	109,551	135,412
Micro companies															
5–9	–	NA	NA	178	83	99 i	52 i	95 i	118 i	145	NA	NA	NA	NA	NA
Small companies															
10–19	–	NA	NA	NA	NA	NA	NA	NA	76	101	142	128	138	288	359
20–49	–	NA	NA	NA	NA	NA	NA	NA	373	337	429	569	452	604	909
Medium companies															
50–99	–	976	509	688 i	539	628	351	547	407	364	471	684	737	796	866
100–249	–	1,735	1,574	1,358 i	1,051	1,212	1,276	1,475	1,378	1,300	1,379	1,875	2,040	2,052	2,382
Large companies															
250–499	–	1,178	985	1,245	1,561	1,306	1,359	1,446	1,151	1,773	2,210	2,196	2,718	2,884	3,660
500–999	–	1,753	1,992	1,741	1,396	1,455	1,650	2,293	2,437	2,159	2,437	2,557	2,925	3,187	4,528
1,000–4,999	–	11,350	10,403	11,674	12,691	12,419	13,238	14,343	13,261	15,587	14,656	15,195	16,602	18,518	20,663
5,000–9,999	–	7,000	5,692	6,907	8,126	10,298	11,430	12,979	9,541	8,949	14,232	15,538	11,919	11,845	15,571
10,000–24,999	–	11,785	10,442	8,856	12,485	10,317	9,741	9,366	11,534	15,515	14,425	21,787	23,541	23,073	28,481
25,000 or more	–	24,671	21,368	25,777	30,497	34,056	33,054	32,647	33,226	32,771	37,381	39,208	43,175	46,304	57,992

\* = amount < \$500,000; 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; r = relative standard error is more than 50%; 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 year 2008, industry classification was based on the 2002 NAICS. 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.