

TABLE 71

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2008–17

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2008 ^c	2009 ^d	2010 ^d	2011	2012	2013	2014	2015	2016	2017	
All business activities	21100–81000	NA	NA	NA	290,240	302,759	323,107	340,539	355,671	378,590	400,100	
Oil and gas extraction	21100	NA	NA	NA	D	D	D	1,108	D	867	738 - 2,072	i
Mining	21200	NA	NA	NA	83	88	80	54	68	58	117	
Support activities for mining, including oil and gas	21300	NA	NA	NA	D	1,860	1,871	2,349	2,076	1,544	1,474	i
Utilities	22100	NA	NA	NA	298	434	343	343	485	349	314	i
Construction	23000	NA	NA	NA	752	756	244	204	521	258	587	i
Food manufacturing	31100	NA	NA	NA	3,769	3,565	5,156	4,934	4,388	4,966	4,897	
Beverage manufacturing	31210	NA	NA	NA	D	D	628	D	664	0 - 28,354	722	i
Tobacco manufacturing	31220	NA	NA	NA	D	140	163	D	153	153	170	
Textile, apparel, and leather products manufacturing	31990	NA	NA	NA	623	688	687	662	794	1,244	866	i
Wood products manufacturing	32100	NA	NA	NA	202	278	234	322	227	238	238	
Paper manufacturing	32200	NA	NA	NA	755	982	1,166	1,028	D	1,165	1,386	
Printing and related support activities	32300	NA	NA	NA	244	305	389	363	287	304	262	
Petroleum refineries	32401	NA	NA	NA	D	596	438	D	443	441	395	
Asphalt paving, roofing, and saturated materials manufacturing	32402	NA	NA	NA	38	41	117	66	52	75	126	i
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	NA	NA	NA	285	218	312	279	268	202	214	i
Basic chemicals manufacturing	32510	NA	NA	NA	3,099	3,228	2,925	3,144	3,071	2,946	3,045	
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	NA	NA	NA	815	1,093	999	1,054	1,213	930	831	
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	NA	NA	NA	D	1,951	2,114	2,057	D	1,900	1,964	i
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing ^e	32541	NA	NA	NA	42,381	43,672	42,456	43,748	40,540	43,964	45,515	
In vitro diagnostic substances manufacturing ^e	32542	NA	NA	NA	1,110	1,044	831	729	801	987	1,324	
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	NA	NA	NA	7,118	10,337	14,071	16,440	18,330	
Soap, cleaning compound, and toilet preparations manufacturing	32591	NA	NA	NA	2,344	2,261	2,286	2,365	2,451	2,550	2,168 - 3,502	
Paint, adhesive, and other chemical manufacturing	32592	NA	NA	NA	1,552	1,630	1,489	1,562	D	0 - 28,354	1,663	i
Plastics and rubber products manufacturing	32600	NA	NA	NA	2,669	3,277	3,010	3,072	2,910	3,396	3,275	i
Clay and glass products manufacturing	32710	NA	NA	NA	801	987	973	1,003	948	987	1,234	i
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	NA	NA	NA	303	367	458	564	393	374	382	i

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Primary metal manufacturing	33100	NA	NA	NA	552	750	644	703	596 i	0 - 28,354	589
Fabricated metal products manufacturing	33200	NA	NA	NA	D	2,236	2,535 i	2,280	2,541	2,321	2,616
Agricultural machinery and equipment manufacturing	33311	NA	NA	NA	989	1,175	1,193	1,230	1,172	1,194	1,227
Construction machinery manufacturing	33312	NA	NA	NA	655	675	1,340	1,309	1,210	1,209	1,190
Mining, oil, and gas field machinery and equipment manufacturing	33319	NA	NA	NA	1,735	1,999	1,436 i	1,142	1,431	1,107	1,242
Semiconductor machinery manufacturing	33321	NA	NA	NA	2,207	1,308 i	3,146	2,979	3,218	3,374	3,663
Industrial machinery manufacturing (except semiconductor machinery)	33322	NA	NA	NA	945	850	878	1,158	1,143	900	1,019
Photographic and photocopying equipment manufacturing	33331	NA	NA	NA	656	23 i	458	79	133	92	61
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	NA	NA	NA	D	1,182	1,367	1,446	1,380	0 - 28,354	1,814
Digital cameras manufacturing	33333	NA	NA	NA	NA	NA	NA	25	491 i	421 i	431
Engine, turbine, and power transmission equipment manufacturing	33360	NA	NA	NA	3,257	3,603	2,373	1,847	2,304	2,365	2,489
Metalworking and other general purpose machinery manufacturing	33390	NA	NA	NA	1,832	1,607	1,780	2,089	2,292	2,139	2,066
Computers and peripheral equipment manufacturing and magnetic and optical media ^f	33412	NA	NA	NA	10,311	10,893	11,162	9,651	10,997	18,321	21,276
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	NA	NA	NA	7,006	5,101	5,534	7,734	9,529	8,182	7,918
Radio, television, and wireless communication equipment manufacturing	33422	NA	NA	NA	4,182	5,851	7,664	6,325 i	3,387 i	4,108 i	4,206 i
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	NA	NA	NA	871	1,937	1,729	1,687	1,695 i	1,798	1,551
Audio and video equipment manufacturing	33430	NA	NA	NA	798	865	876	1,018	1,071 i	972	982
Semiconductor and other electronic components manufacturing	33440	NA	NA	NA	24,580	28,983	30,792	31,986	30,805	31,428	30,629
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	NA	NA	NA	2,787	2,868 i	3,178 i	3,670	3,409	3,417 i	3,137
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	NA	NA	NA	5,666	6,403	6,550	6,234	6,503	8,275	7,271
Measuring and control instruments manufacturing (not listed elsewhere)	33459	NA	NA	NA	3,191	3,465	3,901	4,045	4,201	4,222	4,016
Electrical equipment, appliances, and components manufacturing	33500	NA	NA	NA	3,007	3,391	4,208	4,461	4,378	4,805	4,504
Motor vehicles manufacturing	33610	NA	NA	NA	9,320	11,314	11,696	12,134	12,502	15,095	16,546
Motor vehicle body and trailer manufacturing	33620	NA	NA	NA	69	91 i	98 i	96	156 i	113	44
Motor vehicle parts manufacturing	33630	NA	NA	NA	3,010	D	4,554	6,022	6,158	6,401	7,066

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Aircraft manufacturing	33641	NA	NA	NA	5,853	15,380	16,607	15,632	14,757	0 - 28,354	10,511
Aircraft engine and engine parts manufacturing	33642	NA	NA	NA	1,636	1,296	1,758	2,294	1,580	1,738	1,840
Other aircraft parts and auxiliary equipment manufacturing	33643	NA	NA	NA	1,896	2,655	3,446	4,443	4,919	3,817	4,378
Guided missiles, space vehicles, and related parts manufacturing	33644	NA	NA	NA	3,526	2,850	2,703	2,826	3,011	3,063	3,529
Railroad rolling stock manufacturing	33651	NA	NA	NA	136	177	183	295	240	187	169 - 1,503
Ship and boat building	33660	NA	NA	NA	D	D	1,106	1,568	D	0 - 28,354	1,299
Motorcycle, bicycle, and parts manufacturing	33691	NA	NA	NA	212	176	214	251	282	286	298 - 1,632
Military armored vehicle, tank, and tank components manufacturing	33692	NA	NA	NA	D	122	215	358	335	392	652
All other transportation equipment manufacturing	33699	NA	NA	NA	415	D	362	428	D	368	568
Furniture and related products manufacturing	33700	NA	NA	NA	300	382	383	389	458	364	430
Medical equipment and supplies manufacturing	33910	NA	NA	NA	10,141	10,703	11,797	10,987	11,336	12,024	12,981
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	NA	NA	NA	2,593	D	2,544	2,387	2,455	2,597	2,243
Merchant wholesalers, durable goods	42300	NA	NA	NA	505	1,461	449	414	1,507	551	460
Merchant wholesalers, nondurable goods	42400	NA	NA	NA	429	651	272	D	546	153	256
Wholesale electronic markets and agents and brokers (business to business)	42500	NA	NA	NA	54	182	D	139	D	23	40
Retail trade (except electronic shopping and electronic auctions)	44000	NA	NA	NA	52	101	96	58	87	149	73
Electronic shopping and electronic auctions	45411	NA	NA	NA	940	1,239	993	1,051	1,543	0 - 28,354	9,337
Transportation	48000	NA	NA	NA	123	D	D	388	205	100	784
Couriers, messengers, and express delivery services	49200	NA	NA	NA	D	D	D	344	D	394	264
Warehousing and storage	49300	NA	NA	NA	15	15	15	3	3	0	98
Newspaper, periodical, book, and directory publishers (except Internet)	51110	NA	NA	NA	345	229	316	89	99	80	91
Software publishers (except Internet) ^g	51120	NA	NA	NA	22,635	23,803	26,661	31,392	29,887	26,685	24,775
Motion picture and sound recording (except Internet)	51200	NA	NA	NA	61	73	86	71	10	16	25
Broadcasting (except Internet)	51500	NA	NA	NA	94	36	53	70	101	0 - 28,354	213 - 1,547
Wired telecommunications carriers	51710	NA	NA	NA	867	1,482	951	945	1,229	1,067	908 - 2,242
Wireless telecommunications carriers (except satellite)	51720	NA	NA	NA	391	739	1,768	2,481	1,176	1,477	1,901
Satellite telecommunications	51740	NA	NA	NA	D	195	106	107	681	699	590

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Other telecommunications (not listed elsewhere)	51790	NA	NA	NA	495	383	322	255	459	448	408
Data processing, hosting, and related services ^g	51800	NA	NA	NA	4,922	3,997	4,009	4,754	5,839	6,295	6,060
Cloud computing applications and Internet-based software services	51801	NA	NA	NA	NA	NA	3,727	5,718	5,783	9,981	16,515
Other information services, including Internet publishing, broadcasting, and Web search portals ^g	51910	NA	NA	NA	D	11,397	13,485	15,306	21,534	23,962	28,514 - 29,848
Finance: banking and credit intermediation	52200	NA	NA	NA	1,365	1,601	1,834	2,451	2,708	4,474	4,812
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	NA	NA	NA	1,148	893	1,153	937	1,352	1,516	1,601
Insurance carriers and related activities	52400	NA	NA	NA	D	1,141	1,573	887	1,364	1,216	1,125
Real estate	53100	NA	NA	NA	13	26	100	193	280	438	386
Rental and leasing services	53200	NA	NA	NA	27	D	69	59	D	97	204
Lessors of nonfinancial intangible assets, including patent licensing	53300	NA	NA	NA	319	369	74	78	79	40	154
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	NA	NA	NA	578	417	514	826	1,283	892	802
Architectural, engineering, and related services	54130	NA	NA	NA	2,028	4,206	3,398	3,392	4,143	3,259	2,844
Specialized design services	54140	NA	NA	NA	271	207	101	97	83	77	195
Computer systems design and related services ^g	54150	NA	NA	NA	11,129	12,390	11,472	13,216	13,647	14,159	12,221
Management, scientific, and technical consulting services	54160	NA	NA	NA	1,745	2,280	2,030	1,958	1,761	2,137	1,907
Research and development services in social sciences and humanities	54172	NA	NA	NA	D	601	792	745	756	0 - 28,354	0 - 1,631
Research and development services in biotechnology ^e	54173	NA	NA	NA	6,030	7,146	4,145	3,083	5,178	3,911	3,786
Research and development services in physical, engineering, and life sciences (except biotechnology)	54174	NA	NA	NA	7,196	9,427	9,139	9,068	10,907	10,621	12,958
Advertising and related services	54180	NA	NA	NA	80	377	450	435	424	344	353
Professional, scientific, and technical services (not listed elsewhere)	54190	NA	NA	NA	1,316	2,463	1,786	1,020	1,228	874	1,049
Management of companies and enterprises	55100	NA	NA	NA	20	40	68	25	D	28	91
Administrative and support services	56100	NA	NA	NA	338	436	556	401	202	418	1,548
Waste management and remediation services	56200	NA	NA	NA	19	D	39	31	24	25	24
Offices of physicians	62110	NA	NA	NA	24	73	74	88	79	106	195
Medical and diagnostic laboratories	62150	NA	NA	NA	764	1,027	959	965	1,204	0 - 28,354	1,395
Other ambulatory health care services (ambulance, dental, home health care)	62199	NA	NA	NA	11	41	51	35	42	24	79
Hospitals and nursing care facilities	62200	NA	NA	NA	2	2	2	7	7	9	17 - 1,351

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Social assistance services	62400	NA	NA	NA	7	36	38	16	2	2	0 - 359		
Arts, entertainment, and recreation	71000	NA	NA	NA	105	108	31	91	D	44	59		
Accommodation and food services	72000	NA	NA	NA	74	131	i	123	i	57	87	61	60
Other services (not listed elsewhere)	81000	NA	NA	NA	366	553	366	576	682	0 - 28,354	645		
Undistributed	-	NA	NA	NA	28,583	i	1,689	i	336	i	63	0	0

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 Data are tabulated independent of the industry classification of the company. Companies were asked to report their sales and R&D activity in one or more business activity codes.

^b Business codes and descriptions are based on 2012 NAICS industry definitions.

^c Questions used to collect these data in survey year 2008 are not directly comparable to those used in later survey years.

^d Data were collected as worldwide R&D paid for by others and performed by the company for survey years 2009 and 2010.

^e Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 32543, Biotechnology-based pharmaceutical and biological products (except diagnostic substances).

^f Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2014 and beyond: 33333, Digital cameras manufacturing.

^g Estimates for this business code may not be comparable to those from prior years due to the introduction of a related business code for survey year 2013 and beyond: 51801, Cloud computing applications and Internet-based software services.

Note(s)

Detail may not add to total because of rounding. 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 R&D. 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. Most statistics for years prior to 2017 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 U.S. Census Bureau, Business Research and Development Survey.