

TABLE 77

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2008–16

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2008 ^c	2009 ^d	2010 ^d	2011	2012	2013	2014	2015	2016
All business activities	21100–81000	NA	NA	NA	290,240	302,759	323,107	340,539	355,671	374,685
Oil and gas extraction	21100	NA	NA	NA	D	D	D	1,108	D	867
Mining	21200	NA	NA	NA	83	88	80	54	68	58
Support activities for mining, including oil and gas	21300	NA	NA	NA	D	1,860	1,871	2,349	2,076	1,544
Utilities	22100	NA	NA	NA	298	434	343	343	485	349
Construction	23000	NA	NA	NA	752	756	244 i	204 i	521	255 i
Food manufacturing	31100	NA	NA	NA	3,769	3,565	5,156	4,934 i	4,388 i	4,893
Beverages manufacturing	31210	NA	NA	NA	D	D	628	D	664	D
Tobacco manufacturing	31220	NA	NA	NA	D	140	163	D	153	153
Textiles, apparel, and leather products manufacturing	31990	NA	NA	NA	623	688	687	662 i	794	1,244 i
Wood products manufacturing	32100	NA	NA	NA	202	278	234	322 i	227	241
Paper manufacturing	32200	NA	NA	NA	755	982	1,166	1,028	D	1,168
Printing and related support activities	32300	NA	NA	NA	244	305 i	389	363	287	304
Petroleum refineries	32401	NA	NA	NA	D	596	438	D	443	441
Asphalt paving, roofing, and saturated materials manufacturing	32402	NA	NA	NA	38	41	117 i	66	52 i	75
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	NA	NA	NA	285	218	312 i	279 i	268	316
Basic chemicals manufacturing	32510	NA	NA	NA	3,099	3,228	2,925	3,144	3,071	2,839
Resins, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	NA	NA	NA	815	1,093	999	1,054	1,213	932
Pesticides, fertilizers, and other agricultural chemicals manufacturing	32530	NA	NA	NA	D	1,951	2,114 i	2,057 i	D	1,883 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	45,271
In vitro diagnostic substances manufacturing ^e	32542	NA	NA	NA	1,110	1,044 i	831	729	801	1,013
Biotechnology-based pharmaceutical and biological products (except diagnostic substances) manufacturing ^e	32543	NA	NA	NA	NA	NA	7,118	10,337	14,071	16,421
Soaps, cleaning compounds, and toilet preparations manufacturing	32591	NA	NA	NA	2,344	2,261	2,286	2,365	2,451	2,551
Paints, adhesives, and other chemicals manufacturing	32592	NA	NA	NA	1,552	1,630	1,489	1,562 i	D	D
Plastics and rubber products manufacturing	32600	NA	NA	NA	2,669	3,277	3,010	3,072 i	2,910	3,402
Clay and glass products manufacturing	32710	NA	NA	NA	801 i	987 i	973 i	1,003 i	948	991
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	NA	NA	NA	303	367	458 i	564 i	393 i	382
Primary metal manufacturing	33100	NA	NA	NA	552	750	644	703	596 i	601

TABLE 77

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2008–16

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2008 ^c	2009 ^d	2010 ^d	2011	2012	2013	2014	2015	2016
Fabricated metal products manufacturing	33200	NA	NA	NA	D	2,236	2,535 i	2,280	2,541	2,356
Agricultural machinery and equipment manufacturing	33311	NA	NA	NA	989	1,175	1,193	1,230	1,172	1,194
Construction machinery manufacturing	33312	NA	NA	NA	655	675	1,340	1,309	1,210	1,211
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
Semiconductor machinery manufacturing	33321	NA	NA	NA	2,207	1,308 i	3,146	2,979	3,218	3,374
Industrial machinery manufacturing (except semiconductor machinery)	33322	NA	NA	NA	945	850	878	1,158	1,143	901
Photographic and photocopying equipment manufacturing	33331	NA	NA	NA	656	23 i	458	79	133	83
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	NA	NA	NA	D	1,182	1,367	1,446	1,380	1,686
Digital cameras manufacturing	33333	NA	NA	NA	NA	NA	NA	25	491 i	421 i
Engine, turbine, and power transmission equipment manufacturing	33360	NA	NA	NA	3,257	3,603	2,373	1,847	2,304	2,367
Metalworking and other general purpose machinery manufacturing	33390	NA	NA	NA	1,832	1,607	1,780	2,089	2,292	2,123
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	18,324
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	NA	NA	NA	7,006	5,101	5,534	7,734	9,529	8,184
Radio, television, and wireless communication equipment manufacturing	33422	NA	NA	NA	4,182	5,851	7,664	6,325 i	3,387 i	D
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	1,799
Audio and video equipment manufacturing	33430	NA	NA	NA	798	865	876	1,018	1,071 i	972
Semiconductor and other electronic components manufacturing	33440	NA	NA	NA	24,580	28,983	30,792	31,986	30,805	31,413
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	NA	NA	NA	2,787	2,868 i	3,178 i	3,670	3,409	3,485 i
Search, detection, navigation, guidance, aeronautical, and nautical systems and instruments manufacturing	33452	NA	NA	NA	5,666	6,403	6,550	6,234	6,503	8,276
Measuring and control instruments manufacturing (not listed elsewhere)	33459	NA	NA	NA	3,191	3,465	3,901	4,045	4,201	4,223
Electrical equipment, appliances, and components manufacturing	33500	NA	NA	NA	3,007	3,391	4,208	4,461	4,378	4,816
Motor vehicles manufacturing	33610	NA	NA	NA	9,320	11,314	11,696	12,134	12,502	14,810

TABLE 77

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2008–16

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2008 ^c	2009 ^d	2010 ^d	2011	2012	2013	2014	2015	2016
Motor vehicle body and trailer manufacturing	33620	NA	NA	NA	69	91 i	98 i	96	156 i	114
Motor vehicle parts manufacturing	33630	NA	NA	NA	3,010	D	4,554	6,022	6,158	6,613
Aircraft manufacturing	33641	NA	NA	NA	5,853	15,380 i	16,607 i	15,632 i	14,757 i	11,989 i
Aircraft engine and engine parts manufacturing	33642	NA	NA	NA	1,636	1,296	1,758	2,294 i	1,580	1,738
Other aircraft parts and auxiliary equipment manufacturing	33643	NA	NA	NA	1,896	2,655	3,446	4,443	4,919	3,817
Guided missiles, space vehicles, and related parts manufacturing	33644	NA	NA	NA	3,526	2,850	2,703	2,826 i	3,011	3,063 i
Railroad rolling stock manufacturing	33651	NA	NA	NA	136	177	183	295	240	D
Ship and boat building	33660	NA	NA	NA	D	D	1,106	1,568 i	D	D
Motorcycle, bicycle, and parts manufacturing	33691	NA	NA	NA	212 i	176 i	214 i	251	282	286
Military armored vehicles, tanks, and tank components manufacturing	33692	NA	NA	NA	D	122	215	358	335	392
All other transportation equipment manufacturing	33699	NA	NA	NA	415	D	362	428	D	368
Furniture and related products manufacturing	33700	NA	NA	NA	300	382	383	389	458	405
Medical equipment and supplies manufacturing	33910	NA	NA	NA	10,141	10,703	11,797	10,987	11,336	11,727
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	NA	NA	NA	2,593	D	2,544	2,387	2,455 i	2,600 i
Merchant wholesalers, durable goods	42300	NA	NA	NA	505	1,461 i	449 i	414 i	1,507 i	559 i
Merchant wholesalers, nondurable goods	42400	NA	NA	NA	429	651 i	272 i	D	546 i	153 i
Wholesale electronic markets and agents and brokers (business to business)	42500	NA	NA	NA	54	182 i	D	139	D	23
Retail trade (except electronic shopping and electronic auctions)	44000	NA	NA	NA	52	101 i	96 i	58 i	87	153
Electronic shopping and electronic auctions	45411	NA	NA	NA	940 i	1,239	993	1,051	1,543 i	1,587 i
Transportation	48000	NA	NA	NA	123	D	D	388	205 i	100
Couriers, messengers, and express delivery services	49200	NA	NA	NA	D	D	D	344	D	394
Warehousing and storage	49300	NA	NA	NA	15	15	15	3	3	0
Newspaper, periodical, book, and directory publishers (except Internet)	51110	NA	NA	NA	345 i	229 i	316 i	89 i	99 i	80 i
Software publishers (except Internet) ^g	51120	NA	NA	NA	22,635	23,803	26,661	31,392	29,887 i	26,811
Motion picture and sound recording (except Internet)	51200	NA	NA	NA	61	73 i	86	71 i	10	16
Broadcasting (except Internet)	51500	NA	NA	NA	94	36	53	70 i	101 i	D
Wired telecommunications carriers	51710	NA	NA	NA	867	1,482 i	951 i	945 i	1,229 i	1,067 i
Wireless telecommunications carriers (except satellite)	51720	NA	NA	NA	391 i	739 i	1,768 i	2,481	1,176 i	1,477 i
Satellite telecommunications	51740	NA	NA	NA	D	195	106	107	681 i	699 i

TABLE 77

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2008–16

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2008 ^c	2009 ^d	2010 ^d	2011	2012	2013	2014	2015	2016
Other telecommunications (not listed elsewhere)	51790	NA	NA	NA	495	383	322	255	459	448
Data processing, hosting, and related services ^g	51800	NA	NA	NA	4,922	3,997	4,009	4,754	5,839	6,130
Cloud computing applications and Internet-based software services	51801	NA	NA	NA	NA	NA	3,727	5,718	5,783	9,798
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	D
Finance: banking and credit intermediation	52200	NA	NA	NA	1,365	1,601	1,834	2,451	2,708	4,474
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
Insurance carriers and related activities	52400	NA	NA	NA	D	1,141	1,573	887	1,364	1,216
Real estate	53100	NA	NA	NA	13	26	100	193	280	438
Rental and leasing services	53200	NA	NA	NA	27	D	69	59	D	22
Lessors of nonfinancial intangible assets, including patent licensing	53300	NA	NA	NA	319	369	74	78	79	40
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	NA	NA	NA	578	417	514	826	1,283	891
Architectural, engineering, and related services	54130	NA	NA	NA	2,028	4,206	3,398	3,392	4,143	3,424
Specialized design services	54140	NA	NA	NA	271	207	101	97	83	78
Computer systems design and related services ^g	54150	NA	NA	NA	11,129	12,390	11,472	13,216	13,647	14,431
Management, scientific, and technical consulting services	54160	NA	NA	NA	1,745	2,280	2,030	1,958	1,761	2,137
Research and development services in social sciences and humanities	54172	NA	NA	NA	D	601	792	745	756	D
Research and development services in biotechnology ^e	54173	NA	NA	NA	6,030	7,146	4,145	3,083	5,178	3,939
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	10,667
Advertising and related services	54180	NA	NA	NA	80	377	450	435	424	344
Professional, scientific, and technical services (not listed elsewhere)	54190	NA	NA	NA	1,316	2,463	1,786	1,020	1,228	885
Management of companies and enterprises	55100	NA	NA	NA	20	40	68	25	D	28
Administrative and support services	56100	NA	NA	NA	338	436	556	401	202	419
Waste management and remediation services	56200	NA	NA	NA	19	D	39	31	24	25
Offices of physicians	62110	NA	NA	NA	24	73	74	88	79	106
Medical and diagnostic laboratories	62150	NA	NA	NA	764	1,027	959	965	1,204	1,280

TABLE 77

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2008–16

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2008 ^c	2009 ^d	2010 ^d	2011	2012	2013	2014	2015	2016
Other ambulatory health care services (ambulance, dental, home health care)	62199	NA	NA	NA	11	41 i	51 i	35 i	42 i	23 i
Hospitals and nursing care facilities	62200	NA	NA	NA	2	2 i	2	7 i	7	9
Social assistance services	62400	NA	NA	NA	7	36	38	16	2	2
Arts, entertainment, and recreation	71000	NA	NA	NA	105	108	31	91 i	D	44
Accommodation and food services	72000	NA	NA	NA	74	131 i	123 i	57	87	61
Other services (not listed elsewhere)	81000	NA	NA	NA	366	553	366	576	682	D
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) manufacturing.

^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 2016 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared.

Source(s)

National Science Foundation, National Center for Science and Engineering Statistics, and U.S. Census Bureau, Business R&D and Innovation Survey.