

TABLE 65

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
All business activities	21100–81000	290,240	302,759	323,107	340,539	355,671	378,590	396,979	443,633	491,434	537,619
Oil and gas extraction	21100	D	D	D	1,108	D	867	0 - 11,355 i	0 - 16,964	712	681
Mining	21200	83	88	80	54	68	58	121	92	121	104
Support activities for mining, including oil and gas	21300	D	1,860	1,871	2,349	2,076	1,544	1,599 i	836 i	1,364	723
Utilities	22100	298	434	343	343	485	349	323 i	272	274	275
Construction	23000	752	756	244 i	204 i	521	258 i	507	686	868	1,070
Food manufacturing	31100	3,769	3,565	5,156	4,934 i	4,388 i	4,966	4,809	4,678	4,756	5,112
Beverage manufacturing	31210	D	D	628	D	664	0 - 28,354 i	734	702	654	647
Tobacco manufacturing	31220	D	140	163	D	153	153	175	196	189	226
Textile, apparel, and leather products manufacturing	31990	623	688	687	662 i	794	1,244 i	904	934	831	768
Wood products manufacturing	32100	202	278	234	322 i	227	238	236	261	232	233
Paper manufacturing	32200	755	982	1,166	1,028	D	1,165	1,411	1,302	1,472	1,244
Printing and related support activities	32300	244	305 i	389	363	287	304	265	321	439	349
Petroleum refineries	32401	D	596	438	D	443	441	396	491	0 - 17,119	499 - 735
Asphalt paving, roofing, and saturated materials manufacturing	32402	38	41	117 i	66	52 i	75	124	107	110	199
Other petroleum and coal products manufacturing, including motor oil, hydraulic fluid, and charcoal	32403	285	218	312 i	279 i	268	202	223	133	106 - 2,076	120
Basic chemicals manufacturing	32510	3,099	3,228	2,925	3,144	3,071	2,946	2,897	2,897	2,638	3,036
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	32520	815	1,093	999	1,054	1,213	930	825	1,262	1,293	1,339
Pesticide, fertilizer, and other agricultural chemicals manufacturing	32530	D	1,951	2,114 i	2,057 i	D	1,900 i	1,977	2,384 i	2,094	1,507
Pharmaceutical, medicinal, botanical, and biological products (except diagnostic substances) manufacturing ^c	32541	42,381	43,672	42,456	43,748	40,540	43,964	45,846	48,489	55,243	56,612
In vitro diagnostic substances manufacturing ^c	32542	1,110	1,044 i	831	729	801	987	1,308	1,151	1,380	1,552
Biotechnology-based pharmaceutical and biological products (except diagnostic substances)	32543	NA	NA	7,118	10,337	14,071	16,440	18,629	23,591	29,477	32,436
Soap, cleaning compound, and toilet preparations manufacturing	32591	2,344	2,261	2,286	2,365	2,451	2,550	2,492	2,534	0 - 17,119	2,404
Paint, adhesive, and other chemical manufacturing	32592	1,552	1,630	1,489	1,562 i	D	0 - 28,354	1,636	1,361	1,423	1,473
Plastics and rubber products manufacturing	32600	2,669	3,277	3,010	3,072 i	2,910	3,396	3,264	3,128	2,997	2,941
Clay and glass products manufacturing	32710	801 i	987 i	973 i	1,003 i	948	987	1,199	1,333	1,326 i	1,385 i

TABLE 65

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cement, concrete, lime, gypsum, and other nonmetallic mineral products manufacturing	32790	303	367	458 i	564 i	393 i	374	378	331	437	383
Primary metal manufacturing	33100	552	750	644	703	596 i	0 - 28,354	608	708	742	914
Fabricated metal products manufacturing	33200	D	2,236	2,535 i	2,280	2,541	2,321	2,650	2,764	3,278	3,901
Agricultural machinery and equipment manufacturing	33311	989	1,175	1,193	1,230	1,172	1,194	1,224	1,529	1,549	1,397 - 1,633
Construction machinery manufacturing	33312	655	675	1,340	1,309	1,210	1,209	1,203	1,316 i	1,276	1,257
Mining, oil, and gas field machinery and equipment manufacturing	33319	1,735	1,999	1,436 i	1,142	1,431	1,107	1,272	1,324	1,104	1,032
Semiconductor machinery manufacturing	33321	2,207	1,308 i	3,146	2,979	3,218	3,374	3,707	4,131	4,396	4,750
Industrial machinery manufacturing (except semiconductor machinery)	33322	945	850	878	1,158	1,143	900	1,049	971	1,386	1,044
Photographic and photocopying equipment manufacturing	33331	656	23 i	458	79	133	92	61	59 i	162	163
Commercial, service industry, temperature control, and air-flow control machinery manufacturing	33332	D	1,182	1,367	1,446	1,380	0 - 28,354	1,780	1,667	1,712	1,444
Digital cameras manufacturing	33333	NA	NA	NA	25	491 i	421 i	475	230	409	313 i
Engine, turbine, and power transmission equipment manufacturing	33360	3,257	3,603	2,373	1,847	2,304	2,365	2,543	2,273	2,550	2,467
Metalworking and other general purpose machinery manufacturing	33390	1,832	1,607	1,780	2,089	2,292	2,139	2,039	2,468	2,394	2,851
Computers and peripheral equipment manufacturing and magnetic and optical media ^d	33412	10,311	10,893	11,162	9,651	10,997	18,321	20,751	21,765	19,060 i	22,850
Telephone apparatus manufacturing, including routers, modems, and gateways	33421	7,006	5,101	5,534	7,734	9,529	8,182	7,789	8,550	8,495	7,562
Radio, television, and wireless communication equipment manufacturing	33422	4,182	5,851	7,664	6,325 i	3,387 i	4,108 i	3,942 i	0 - 16,964 i	2,589 i	2,291
Other communication equipment manufacturing (except radio, television, and wireless communication equipment)	33429	871	1,937	1,729	1,687	1,695 i	1,798	1,536	0 - 16,964	1,686	1,643
Audio and video equipment manufacturing	33430	798	865	876	1,018	1,071 i	972	1,058	1,084	1,270	1,285
Semiconductor and other electronic components manufacturing	33440	24,580	28,983	30,792	31,986	30,805	31,428	30,858	31,240	35,725	44,105
Electromedical, electrotherapeutic, and irradiation apparatus manufacturing	33451	2,787	2,868 i	3,178 i	3,670	3,409	3,417 i	3,094	4,079	3,973	3,885
Search, detection, navigation, guidance, aeronautical, and nautical system and instruments manufacturing	33452	5,666	6,403	6,550	6,234	6,503	8,275	6,538	7,819	7,870	8,836 i
Measuring and control instruments manufacturing (not listed elsewhere)	33459	3,191	3,465	3,901	4,045	4,201	4,222	3,885	3,888	3,911	4,375

TABLE 65

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electrical equipment, appliances, and components manufacturing	33500	3,007	3,391	4,208	4,461	4,378	4,805	4,512	4,362	5,230	5,273
Motor vehicles manufacturing	33610	9,320	11,314	11,696	12,134	12,502	15,095	16,308	17,447	15,241	15,572
Motor vehicle body and trailer manufacturing	33620	69	91 i	98 i	96	156 i	113	44	93	155	82
Motor vehicle parts manufacturing	33630	3,010	D	4,554	6,022	6,158	6,401	6,946	7,800	8,146 i	7,384
Aircraft manufacturing	33641	5,853	15,380 i	16,607 i	15,632 i	14,757 i	28,354 i	9,704 i	14,488 i	10,720 i	15,641
Aircraft engine and engine parts manufacturing	33642	1,636	1,296	1,758	2,294 i	1,580	1,738	1,850	2,226	2,104	2,038
Other aircraft parts and auxiliary equipment manufacturing	33643	1,896	2,655	3,446	4,443	4,919	3,817	4,453	1,887	1,434	1,742
Guided missiles, space vehicles, and related parts manufacturing	33644	3,526	2,850	2,703	2,826 i	3,011	3,063 i	3,269	3,405	3,496	3,327
Railroad rolling stock manufacturing	33651	136	177	183	295	240	187	11,355	148	17,119 i	239
Ship and boat building	33660	D	D	1,106	1,568 i	D	28,354 i	1,289	16,964	17,119	964
Motorcycle, bicycle, and parts manufacturing	33691	212 i	176 i	214 i	251	282	286	11,355	372	368	417
Military armored vehicle, tank, and tank components manufacturing	33692	D	122	215	358	335	392	653 i	664 i	541	468
All other transportation equipment manufacturing	33699	415	D	362	428	D	368	564	465	465	552
Furniture and related products manufacturing	33700	300	382	383	389	458	364	438	428	458	539
Medical equipment and supplies manufacturing	33910	10,141	10,703	11,797	10,987	11,336	12,024	13,299	13,211	14,801	14,680
Miscellaneous manufacturing not listed elsewhere (games, office supplies, slot machines, etc.)	33990	2,593	D	2,544	2,387	2,455 i	2,597 i	2,575	2,861	2,499	3,033
Merchant wholesalers, durable goods	42300	505	1,461 i	449 i	414 i	1,507 i	551 i	364	730 i	750	860
Merchant wholesalers, nondurable goods	42400	429	651 i	272 i	D	546 i	153 i	207	273 i	17,119	390
Wholesale electronic markets and agents and brokers (business to business)	42500	54	182 i	D	139	D	23	41 i	94 i	37 i	36 i
Retail trade (except electronic shopping and electronic auctions)	44000	52	101 i	96 i	58 i	87	149	69	190	280	216
Electronic shopping and electronic auctions	45411	940 i	1,239	993	1,051	1,543 i	28,354 i	11,355	16,964 i	17,119 i	0 - 15,222 i
Transportation	48000	123	D	D	388	205 i	100	691	2,045 i	9,398 i	4,078 i
Couriers, messengers, and express delivery services	49200	D	D	D	344	D	394	421	446	290	923
Warehousing and storage	49300	15	15	15	3	3	0	90	76	128 i	33
Newspaper, periodical, book, and directory publishers (except Internet)	51110	345 i	229 i	316 i	89 i	99 i	80 i	83	151	84	87
Software publishers (except Internet) ^e	51120	22,635	23,803	26,661	31,392	29,887 i	26,685	24,362	25,742	24,798	23,520

TABLE 65

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Motion picture and sound recording (except Internet)	51200	61	73	86	71	10	16	27	148	72	81
Broadcasting (except Internet)	51500	94	36	53	70	101	28,354	11,355	186	0 - 2,469	0 - 15,222
Wired telecommunications carriers	51710	867	1,482	951	945	1,229	1,067	924	469	424	505
Wireless telecommunications carriers (except satellite)	51720	391	739	1,768	2,481	1,176	1,477	1,920	2,147	2,306	2,022
Satellite telecommunications	51740	D	195	106	107	681	699	593	451	475	385
Other telecommunications (not listed elsewhere)	51790	495	383	322	255	459	448	413	691	0 - 17,119	427
Data processing, hosting, and related services ^e	51800	4,922	3,997	4,009	4,754	5,839	6,295	6,217	6,809	8,885	11,083
Cloud computing applications and Internet-based software services	51801	NA	NA	3,727	5,718	5,783	9,981	16,812	20,600	28,631	39,367
Other information services, including Internet publishing, broadcasting, and Web search portals ^e	51910	D	11,397	13,485	15,306	21,534	23,962	28,445	37,435	46,171	53,214
Finance: banking and credit intermediation	52200	1,365	1,601	1,834	2,451	2,708	4,474	4,819	4,309	4,924	7,932
Securities, commodity contracts, and other financial investments and related activities, including funds and trusts	52310	1,148	893	1,153	937	1,352	1,516	1,587	1,248	1,445	1,815
Insurance carriers and related activities	52400	D	1,141	1,573	887	1,364	1,216	1,127	1,673	2,190	2,543
Real estate	53100	13	26	100	193	280	438	251	377	0 - 17,119	368
Rental and leasing services	53200	27	D	69	59	D	97	536	639	945	2,766
Lessors of nonfinancial intangible assets, including patent licensing	53300	319	369	74	78	79	40	58	23	59	0 - 76
Legal, accounting, tax preparation, bookkeeping, and payroll services	54111	578	417	514	826	1,283	892	875	1,148	1,901	2,478
Architectural, engineering, and related services	54130	2,028	4,206	3,398	3,392	4,143	3,259	2,664	4,293	4,421	4,358
Specialized design services	54140	271	207	101	97	83	77	198	0 - 16,964	163	212
Computer systems design and related services ^e	54150	11,129	12,390	11,472	13,216	13,647	14,159	12,607	16,346	19,604	16,759
Management, scientific, and technical consulting services	54160	1,745	2,280	2,030	1,958	1,761	2,137	1,903	2,796	2,561	2,676
Research and development services in the social sciences and humanities	54172	D	601	792	745	756	0 - 28,354	1,124	674	764	691
Research and development services in biotechnology ^{c,f}	54173	6,030	7,146	4,145	3,083	5,178	3,911	3,610	5,398	5,564	5,541
Research and development services in the physical, engineering, and life sciences (except biotechnology)	54174	7,196	9,427	9,139	9,068	10,907	10,621	11,842	14,904	15,130	19,456
Research and development services in nanotechnology	54175	NA	NA	NA	NA	NA	NA	NA	NA	NA	180
Advertising and related services	54180	80	377	450	435	424	344	381	1,032	1,107	1,283

TABLE 65

Domestic R&D paid for by the company and others and performed by the company, by business activity: 2011–20

(Millions of U.S. dollars)

Business activity ^a	Business code ^b	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Professional, scientific, and technical services (not listed elsewhere)	54190	1,316	2,463 i	1,786	1,020	1,228	874	1,113	1,246	1,649	1,877
Management of companies and enterprises	55100	20	40	68	25 i	D	28	70	0 - 16,964	0 - 17,119	3 - 56
Administrative and support services	56100	338	436	556 i	401 i	202 i	418	1,405	2,302	3,285	3,521
Waste management and remediation services	56200	19 i	D	39 i	31	24 i	25	20	20	20	0 - 15,222
Offices of physicians	62110	24	73 i	74 i	88 i	79 i	106 i	190	155	508	235
Medical and diagnostic laboratories	62150	764	1,027	959	965	1,204	0 - 28,354 i	1,210	2,049	2,467	2,087
Other ambulatory health care services (ambulance, dental, home health care)	62199	11	41 i	51 i	35 i	42 i	24 i	65	46	148	93
Hospitals and nursing care facilities	62200	2	2 i	2	7 i	7	9	0 - 11,355	0 - 10,879	0 - 11,355	13 - 15,042
Social assistance services	62400	7	36	38	16	2	2	0 - 11,355	0 - 16,964	0 - 17,119	0 - 15,028
Arts, entertainment, and recreation	71000	105	108	31	91 i	D	44	48	44	415	0 - 15,028
Accommodation and food services	72000	74	131 i	123 i	57	87	61	49	120	80	121
Other services (not listed elsewhere)	81000	366	553	366	576	682	0 - 28,354	0 - 11,355	0 - 16,964	654	573
Undistributed	-	28,583 i	1,689 i	336 i	63	0	0	0	0	0	0

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.

^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 2017 North American Industry Classification System (NAICS) industry definitions.

^c 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).

^d 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.

^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: 51801, Cloud computing applications and Internet-based software services.

^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 2020 and beyond: 54175, Research and development services in nanotechnology.

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 \$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. Most statistics for years prior to 2020 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.