

TABLE 66

Worldwide R&D paid for by the company and others and performed by the company, by industry and company size: 2009–19

(Millions of U.S. dollars)

| Industry and company size | NAICS code | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|------------------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|------------------|--------------------|
| 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 | 597,420 |
| Manufacturing industries | 31–33 | 236,858 | 243,611 | 253,821 | 261,697 | 276,110 | 285,661 | 287,895 | 303,044 | 314,167 | 339,076 | 350,024 |
| Food | 311 | 4,916 | D | 5,589 | 5,163 | 6,335 | 6,136 | 6,058 | 5,824 | 5,424 | 5,459 | 5,015 |
| 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 |
| Textile, apparel, and leather products | 313–16 | 519 | 522 | 656 | 605 | 759 | 734 | 818 | 1,247 | 1,131 | 1,223 | 1,061 |
| Wood products | 321 | 283 | 254 | 211 | 282 | 222 | 341 | 198 | 166 - 751 | 174 | 206 | 193 |
| Paper | 322 | NA | 1,665 | 769 | 858 | 1,022 | 880 | 867 | 943 | 1,594 | 1,013 | 1,165 |
| Printing and related support activities | 323 | 217 | 269 | 212 | 291 | 258 | 238 | 198 | 223 | 236 | 246 | 429 |
| Petroleum and coal products | 324 | NA | D | 1,281 | D | 327 | 298 | 252 | 312 | 377 | 1,460 - 1,463 | 1,477 - 1,481 |
| Chemicals | 325 | 64,442 | 72,610 | 72,068 | 70,218 | 74,551 | 79,428 | 80,961 | 84,612 | 90,236 | 101,132 | 115,631 |
| 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 |
| 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 |
| 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 |
| Pharmaceuticals and medicines | 3254 | 53,456 | 60,537 | 58,866 | 58,920 | 62,480 | 66,731 | D | 73,193 | 79,004 | 88,776 | 103,487 |
| Soap, cleaning compound, and toilet preparation | 3256 | NA | 3,285 | 3,386 | 3,212 | 3,358 | 3,501 | D | 3,589 | 3,699 | 3,567 | 3,517 |
| 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 | 1,532 - 1,560 |
| 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 | 3,359 |
| Nonmetallic mineral products | 327 | 1,153 | 1,596 | 1,428 | 1,588 | 1,578 | 1,599 | 1,487 | 1,474 | 1,485 | 1,567 | 1,701 |
| Primary metals | 331 | 993 | 802 | 763 | 818 | 700 | 770 | 711 | 662 | 862 | 990 | 740 |
| Fabricated metal products | 332 | 2,174 | 1,818 | 1,993 | 1,949 | 2,303 | 2,329 | 2,467 | 2,273 | 2,405 | 2,533 | 3,163 |
| Machinery | 333 | 11,156 | 12,403 | 18,312 | 17,462 | 15,420 | 15,089 | 16,827 | 15,958 | 16,626 | 19,279 | 19,435 |
| Agricultural implement | 33311 | NA | D | 1,570 | 2,142 | 2,243 | D | 2,152 | 2,189 | 2,132 | 2,730 | 2,778 |
| Semiconductor machinery | 333242 | NA | 2,469 | 2,727 | 1,357 | 3,645 | 3,434 | 3,812 | 4,138 | 4,530 | 5,077 | 5,374 |
| 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 | 1,931 |
| Other machinery | other 333 | NA | 6,566 | D | D | 7,736 | D | 7,943 | 7,147 | 7,387 | 8,030 - 8,057 | 9,353 |
| 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 | 112,180 |
| Communications equipment | 3342 | NA | 17,069 | 15,197 | 18,877 | 20,392 | 22,048 | 23,049 | 16,124 | 15,568 | 16,467 | 15,907 - 15,912 |

TABLE 66

Worldwide R&D paid for by the company and others and performed by the company, by industry and company size: 2009–19

(Millions of U.S. dollars)

| Industry and company size | NAICS code | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|-------------------|--------|--------|---------|---------|---------|---------|---------|-----------------|---------|------------------|-----------------|
| 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 | 48,189 i |
| 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 | 21,512 |
| 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 i | 4,621 i |
| Search, detection, navigation, guidance, aeronautical, and nautical system and instrument | 334511 | NA | 8,769 | 8,641 | 8,312 | 8,753 | 8,486 | 8,033 | 8,372 | 8,347 | 0 - 13,142 | 10,541 |
| Other measuring and controlling device | other 3345 | NA | 4,588 | 4,615 | 5,329 | 6,456 | 5,458 | 5,387 | 6,187 | 5,916 | 6,520 | 6,350 |
| 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 | 26,567 - 26,571 |
| 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 | 7,006 |
| Transportation equipment | 336 | 56,183 | 51,362 | 49,030 | 50,415 | 51,547 | 56,597 | 57,698 | 60,161 | 59,432 | 59,850 | 53,187 |
| 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 | 31,110 |
| 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 i |
| 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 i |
| Guided missile, space vehicle, and related parts | 336414–15, 336419 | NA | D | D | 1,425 | D | D | 1,649 i | 1,428 i | 1,523 | 1,323 | 1,467 |
| Military armored vehicle, tank, and tank component | 336992 | NA | D | 52 | D | 9 i | D | 16 | 3 - 38 | 9 | 11 | 35 |
| Other transportation | other 336 | NA | D | D | D | 2,245 | D | 2,834 | 2,653 - 2,690 i | 3,164 | 2,936 - 2,961 | 3,099 |
| Furniture and related products | 337 | 433 | 407 | 347 | 383 | 401 | 422 | 477 | 381 | 470 | 418 - 444 | 444 |
| Miscellaneous | 339 | NA | 9,528 | D | D | 18,900 | 14,951 | 15,869 | 18,045 | 19,257 | 20,515 | 22,077 - 22,084 |
| 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 | 19,083 |
| Other miscellaneous manufacturing | 3399 | NA | 2,066 | D | D | 2,962 | 2,860 | 2,703 i | 2,646 - 2,657 i | 2,788 | 3,072 | 2,995 - 3,002 |
| 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 | 247,396 |
| 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 | 3,307 |
| Utilities | 22 | NA | 442 | 396 | 368 | 317 | 314 | 483 | 353 | 336 | 283 | 284 |

TABLE 66

Worldwide R&D paid for by the company and others and performed by the company, by industry and company size: 2009–19

(Millions of U.S. dollars)

| Industry and company size | NAICS code | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|------------|--------|--------|--------|--------|--------|--------|--------|-----------------|------------|-----------------|----------------|
| Wholesale trade | 42 | NA | 1,145 | 1,697 | 2,165 | 459 | D | 1,723 | 489 | 0 - 12,105 | 883 | 1,304 |
| Electronic shopping and electronic auctions | 454111–12 | NA | D | D | D | 1,845 | D | D | 0 - 14,624 | 0 - 12,105 | 11,715 - 15,515 | 3,200 - 20,013 |
| Transportation and warehousing | 48–49 | NA | 124 | 159 | 186 | D | 692 | 416 | 495 | 1,221 | 2,562 | 9,952 |
| Information | 51 | 43,197 | 45,099 | 52,341 | 56,815 | 68,375 | 78,013 | 77,965 | 84,400 | 94,412 | 111,653 | 129,277 |
| Publishing | 511 | 33,171 | 33,883 | 36,310 | 36,947 | 43,821 | 46,806 | 42,190 | 42,156 | 42,368 | 39,890 | 39,968 |
| Newspaper, periodical, book, and directory publishers | 5111 | NA | 826 | 401 | 221 | 348 | 92 | 107 | 84 | 72 | 150 | 61 |
| Software publishers | 5112 | NA | 33,058 | 35,910 | 36,726 | 43,473 | 46,714 | 42,083 | 42,073 | 42,296 | 39,739 | 39,907 |
| Telecommunications | 517 | 1,609 | 2,043 | 2,267 | 2,787 | 3,112 | 3,830 | 3,648 | 3,617 - 3,659 | 3,828 | 3,827 - 3,833 | 3,856 |
| 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 | 36,449 |
| Other information | other 51 | 5,410 | 6,278 | 8,313 | 11,506 | 13,654 | 17,022 | 21,526 | 24,530 | 29,323 | 39,713 | 49,004 |
| Finance and insurance | 52 | NA | 2,568 | 3,943 | 4,159 | 4,999 | 4,748 | 6,359 | 8,468 | 8,582 | 8,347 | 10,092 |
| Real estate and rental and leasing | 53 | NA | 367 | D | 400 | 202 | 268 | 313 | 477 | 892 | 1,072 | 1,476 |
| Lessors of nonfinancial intangible assets (except copyrighted works) | 533 | NA | NA | 365 | 379 | D | 58 | D | 27 | 77 | 6 | 48 |
| Other real estate and rental and leasing | other 53 | NA | NA | D | 21 | D | 210 | D | 450 | 814 | 1,066 | 1,427 |
| Professional, scientific, and technical services | 54 | 47,709 | 37,108 | 39,731 | 40,843 | 37,345 | 37,995 | 46,255 | 39,585 - 54,209 | 46,587 | 58,333 | 68,023 |
| Architectural, engineering, and related services | 5413 | 3,384 | 4,156 | D | 2,541 | 3,173 | 3,374 | 4,158 | 56 - 9,557 | 2,575 | 4,005 | 4,244 |
| Computer systems design and related services | 5415 | 15,310 | 12,458 | 13,181 | 13,404 | 10,535 | 12,579 | 17,227 | 15,483 - 20,617 | 17,190 | 20,378 | 26,416 |
| 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 | 30,675 |
| Research and development in biotechnology | 541711 | 8,492 | 6,266 | 7,985 | 8,364 | 5,889 | 4,898 | 7,114 | 6,062 | 6,076 | 8,428 - 8,442 | 9,250 |
| Research and development in the physical, engineering, and life sciences (except biotechnology) | 541712 | 10,129 | 9,591 | 10,697 | 11,261 | 11,794 | 12,291 | 12,807 | 13,409 | 15,680 | 19,507 | 20,651 |
| Research and development in the social sciences and humanities | 541720 | 686 | 551 | 613 | 600 | 795 | 682 | 709 | 723 | 879 | 672 - 683 | 774 |
| Other professional, scientific, and technical services | other 54 | 9,708 | 4,086 | D | 4,674 | 5,158 | 4,172 | 4,240 | 3,852 | 4,188 | 5,330 | 6,688 |
| Health care services | 621–23 | NA | D | D | 708 | 535 | 501 | 771 | 1,002 | 1,132 | 1,497 | 2,289 |

TABLE 66

Worldwide R&D paid for by the company and others and performed by the company, by industry and company size: 2009–19

(Millions of U.S. dollars)

| Industry and company size | NAICS code | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--|---|---------|---------|---------|---------|---------|---------|---------|------------------|---------|------------------|-------------------|
| 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 | 1,382 - 18,191 |
| All companies (number of domestic employees) | – | 336,571 | 338,451 | 359,490 | 374,916 | 396,352 | 416,343 | 429,174 | 457,591 | 484,740 | 543,369 | 597,420 |
| Micro companies ^a | | | | | | | | | | | | |
| 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 |
| Small companies | | | | | | | | | | | | |
| 10–19 | – | NA | NA | NA | NA | NA | NA | 5,750 | i 5,031 | i 3,532 | 4,511 | 5,639 |
| 20–49 | – | NA | NA | NA | NA | NA | NA | 10,654 | i 9,972 | 9,513 | 11,825 | 12,875 |
| Medium companies | | | | | | | | | | | | |
| 50–99 | – | 13,785 | 9,470 | 9,834 | 9,728 | 9,289 | 10,677 | 11,946 | 9,639 | 10,635 | 13,095 | 14,758 |
| 100–249 | – | 14,365 | 12,989 | 13,354 | 13,665 | 14,980 | 15,081 | 14,964 | 16,160 | 18,584 | 20,486 | 21,986 |
| Large companies | | | | | | | | | | | | |
| 250–499 | – | 12,315 | 11,439 | 14,573 | 12,693 | 13,379 | 13,675 | 14,837 | 14,751 | 16,522 | 21,971 | 21,592 |
| 500–999 | – | 12,124 | 11,794 | 11,388 | 12,955 | 13,663 | 15,422 | 17,442 | 16,601 | 20,173 | 20,309 | 26,922 |
| 1,000–4,999 | – | 54,600 | 60,782 | 63,801 | 62,729 | 69,212 | 71,679 | 71,259 | 79,017 | 79,494 | 83,959 | 92,224 |
| 5,000–9,999 | – | 27,461 | 34,453 | 32,578 | 41,006 | 43,087 | 51,305 | 48,399 | 49,479 | 54,572 | 61,047 | 62,775 |
| 10,000–24,999 | – | 61,681 | 50,710 | 61,593 | 60,544 | 60,844 | 63,818 | 70,864 | 81,547 | 87,965 | 108,249 | 111,876 |
| 25,000 or more | – | 118,424 | 125,067 | 132,719 | 144,097 | 152,547 | 155,180 | 159,959 | 173,666 | 183,750 | 197,916 | 226,773 |

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 Business Enterprise Research and Development Survey did not include companies with fewer than 5 domestic employees from 2008–16 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. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. This change has affected the comparability of these estimates with estimates published for years prior to 2018. For survey years 2009–13, industry classification was based on the 2007 NAICS. Beginning with survey year 2011, the composition of the Other nonmanufacturing industry changed. Most statistics for years prior to 2019 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.