



Research and development (R&D) worldwide

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

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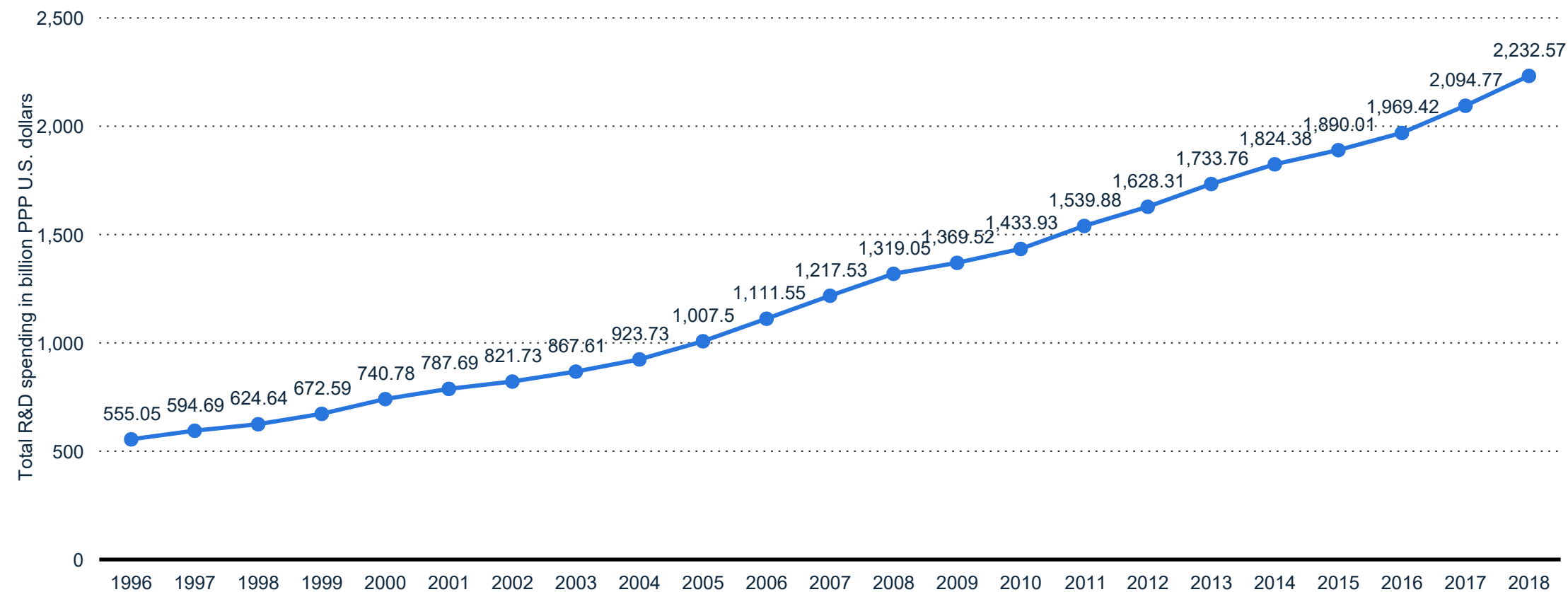
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RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Global R&D spending

Total global spending on research and development (R&D) from 1996 to 2018 (in billion PPP U.S. dollars)

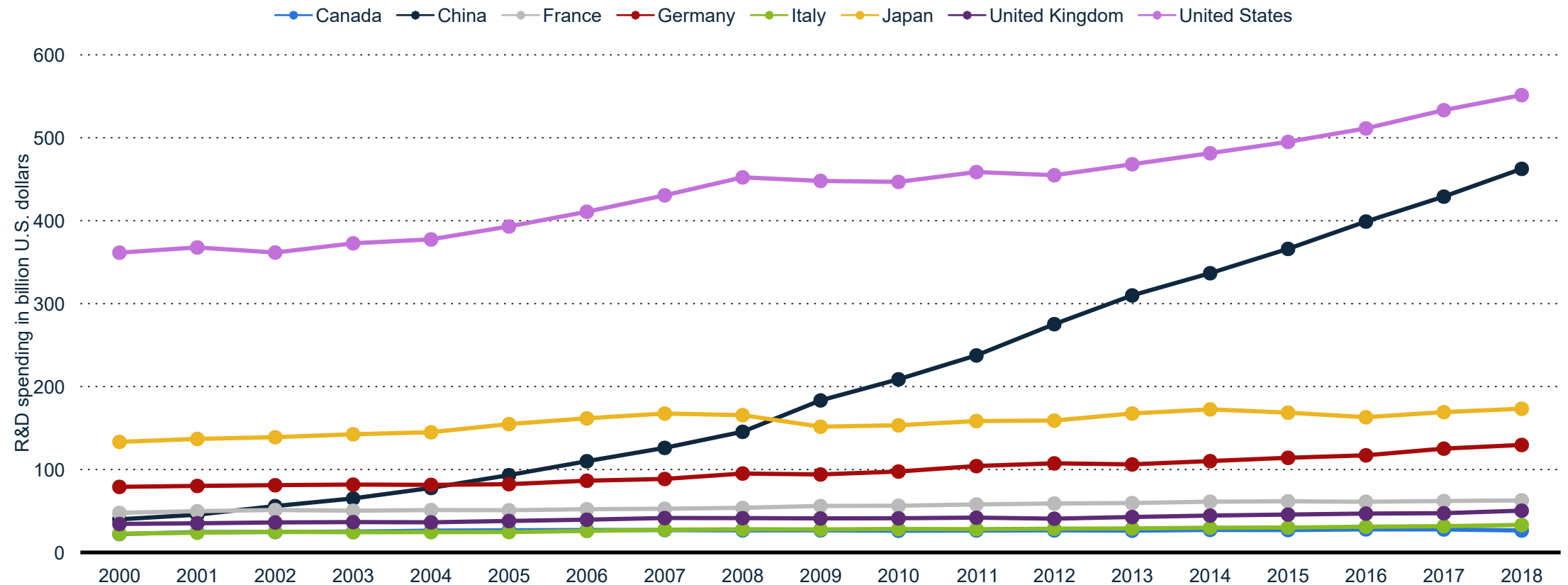
Total global R&D spending 1996-2018



Note(s): Worldwide; 1996 to 2018
Further information regarding this statistic can be found on [page 56](#).
Source(s): UNESCO Institute for Statistics; [ID 1105959](#)

Gross domestic spending on research and development (R&D) in G7 countries and China from 2000 to 2018, by country (in billion U.S. dollars)

Gross domestic R&D spending in G7 countries and China 2000-2018



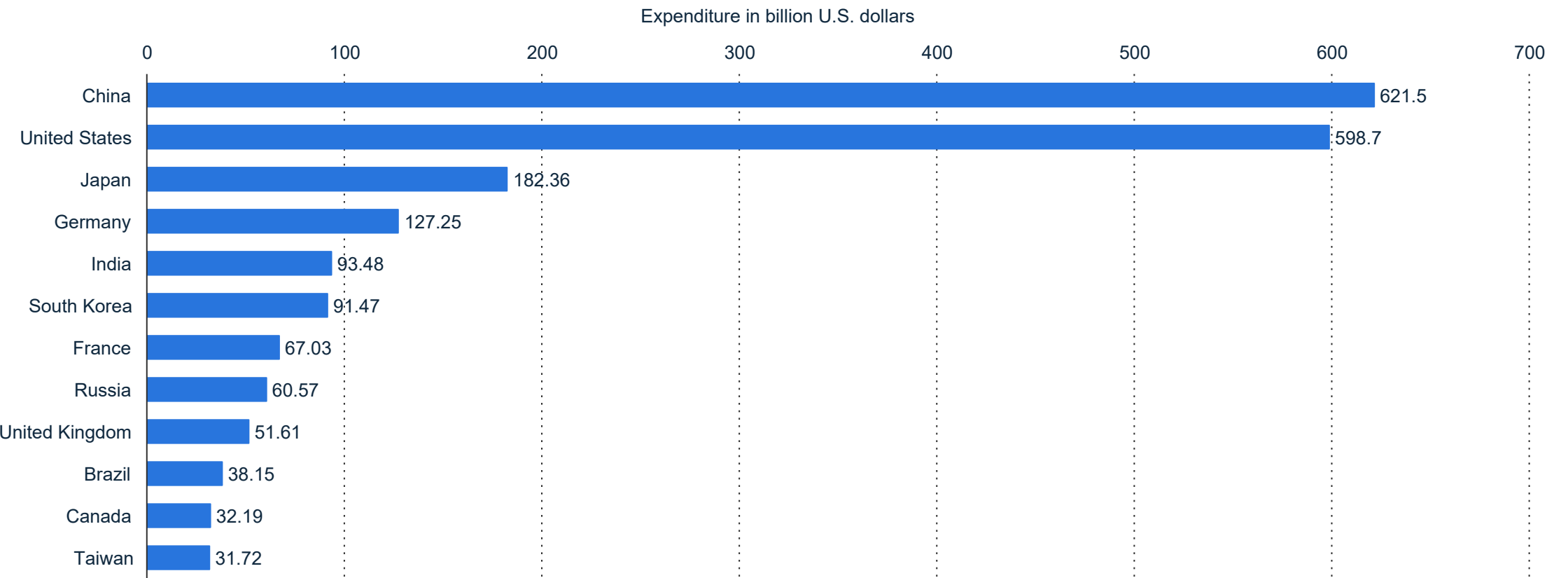
Note(s): Worldwide; 2000 to 2018

Further information regarding this statistic can be found on [page 57](#).

Source(s): OECD; [ID 1102478](#)

Leading countries by gross research and development (R&D) expenditure worldwide in 2021 (in billion U.S. dollars)

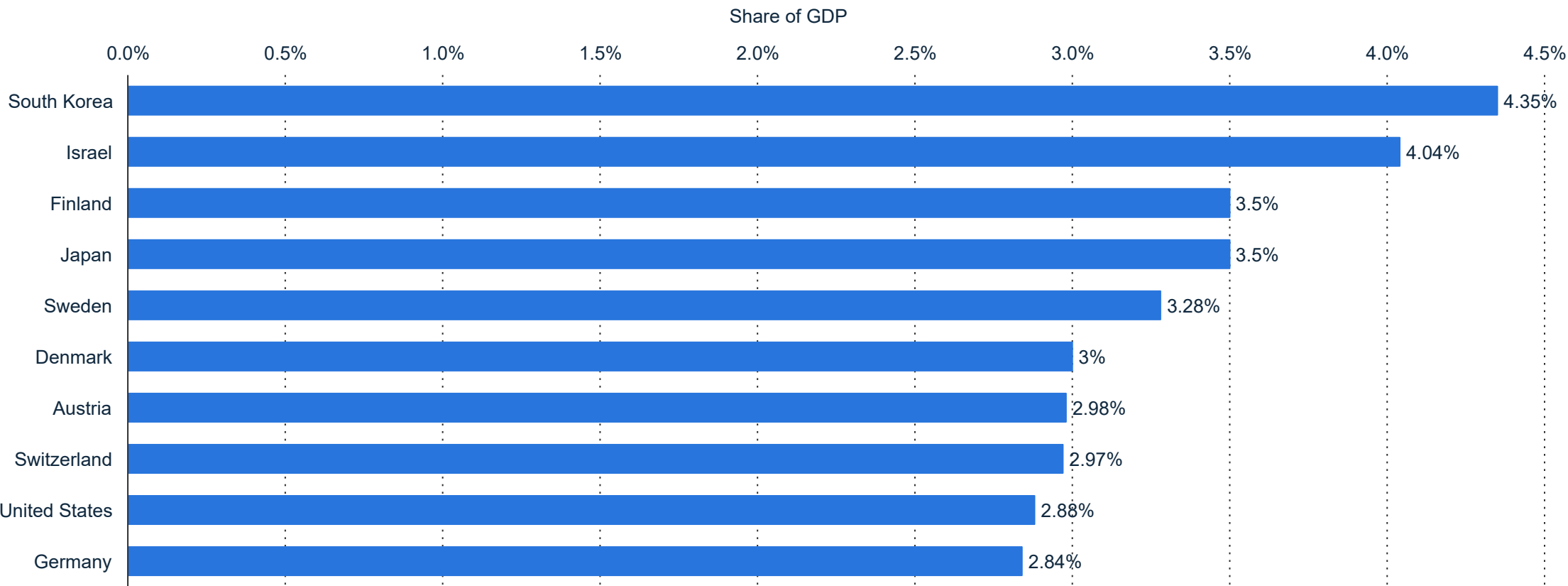
Leading countries by R&D spending worldwide 2021



Note(s): Worldwide; 2020; Derived from purchasing power parity calculations
Further information regarding this statistic can be found on [page 58](#).
Source(s): IRI; [ID 732247](#)

Leading countries by research and development (R&D) expenditure as share of gross domestic product (GDP) worldwide in 2021

Leading countries by R&D spending as share of GDP globally 2021



Note(s): Worldwide; 2020; Derived from purchasing power parity calculations
Further information regarding this statistic can be found on [page 59](#).
Source(s): IRI; [ID 732269](#)

Distribution of research and development (R&D) spending worldwide from 2017 to 2020, by country/region

Share of total R&D spending worldwide by region/country 2017-2020

| | 2017 | 2018 | 2019* | 2020** |
|------------------------------|--------|--------|--------|--------|
| Asia (24 countries) | 42.70% | 43.50% | 43.90% | 44.30% |
| North America (12 countries) | 27.70% | 26.80% | 27.20% | 27% |
| United States | 25.60% | 24.70% | 25.20% | 23.20% |
| China | 21.20% | 21.80% | 22.50% | 23.20% |
| Europe (34 countries) | 21% | 21.30% | 20.80% | 20.50% |
| Japan | 8.80% | 8.30% | 8% | 7.80% |
| Germany | 5.50% | 5.50% | 5.40% | 5.30% |
| India | 3.70% | 3.90% | 4% | 4% |
| South Korea | 4.10% | 3.90% | 3.80% | 3.80% |
| Russia/CAS (5 countries) | 2.90% | 2.80% | 2.70% | 2.70% |
| Middle East (13 countries) | 2.50% | 2.50% | 2.40% | 2.40% |
| South America (10 countries) | 2.40% | 2.30% | 2.20% | 2.20% |
| Africa (18 countries) | 0.90% | 0.90% | 0.90% | 0.90% |

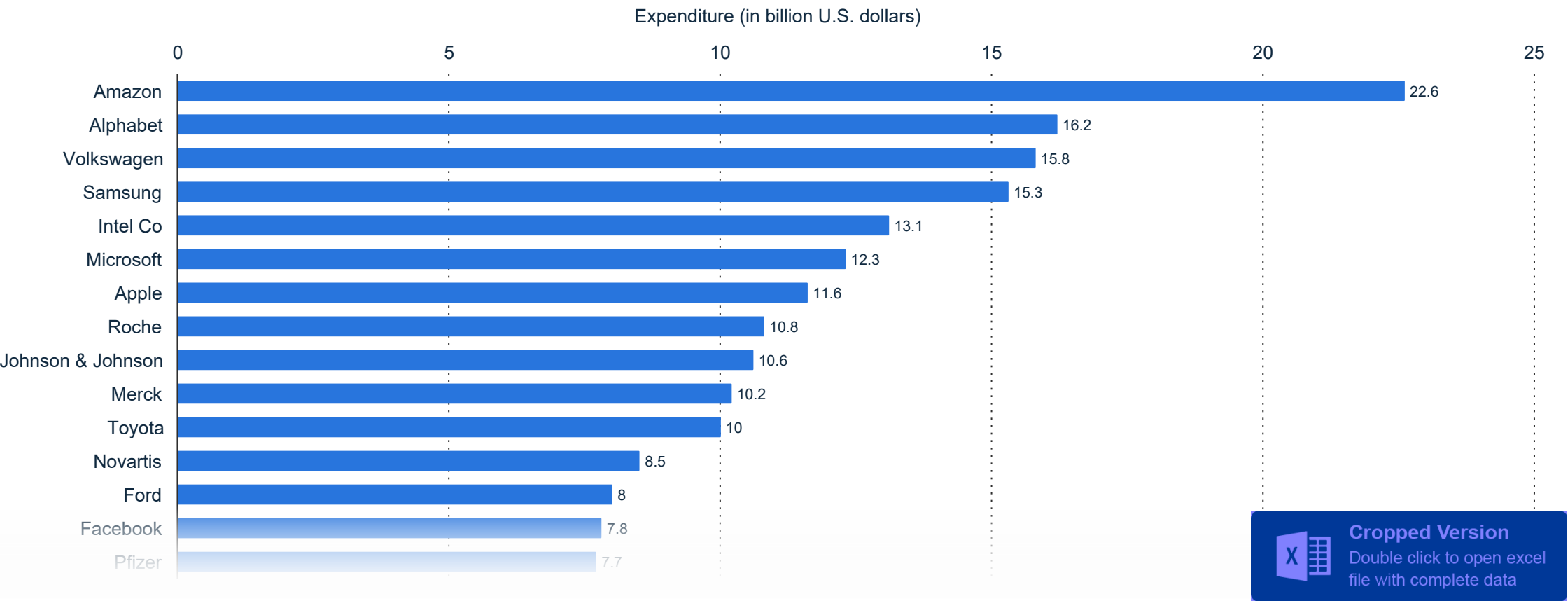
Note(s): Worldwide; 2017 to 2019

Further information regarding this statistic can be found on [page 60](#).

Source(s): IRI; [ID 732224](#)

Ranking of the 20 companies with the highest spending on research and development in 2018 (in billion U.S. dollars)

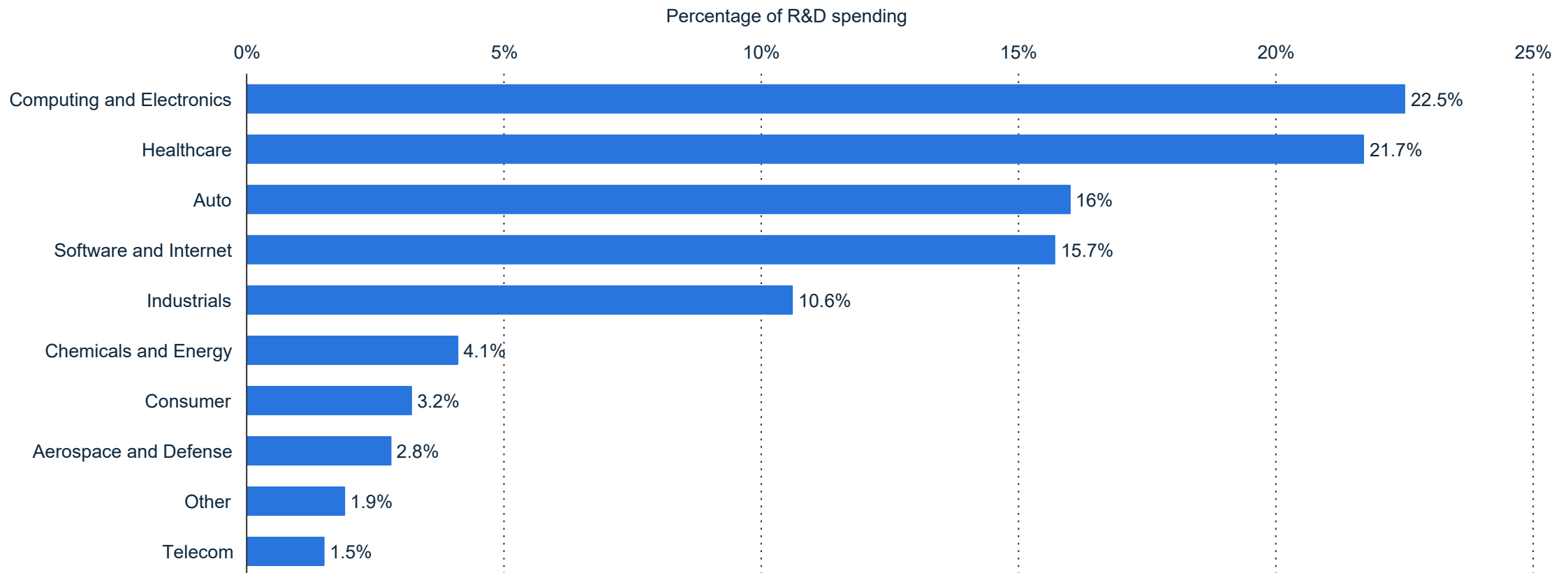
Companies with the highest spending on research and development 2018



Note(s): Worldwide
Further information regarding this statistic can be found on [page 61](#).
Source(s): Bloomberg; Capital IQ; Thomson Reuters; [ID 265645](#)

Percentage of global research and development spending in 2018, by industry

Percentage of global R&D spending, by industry 2018



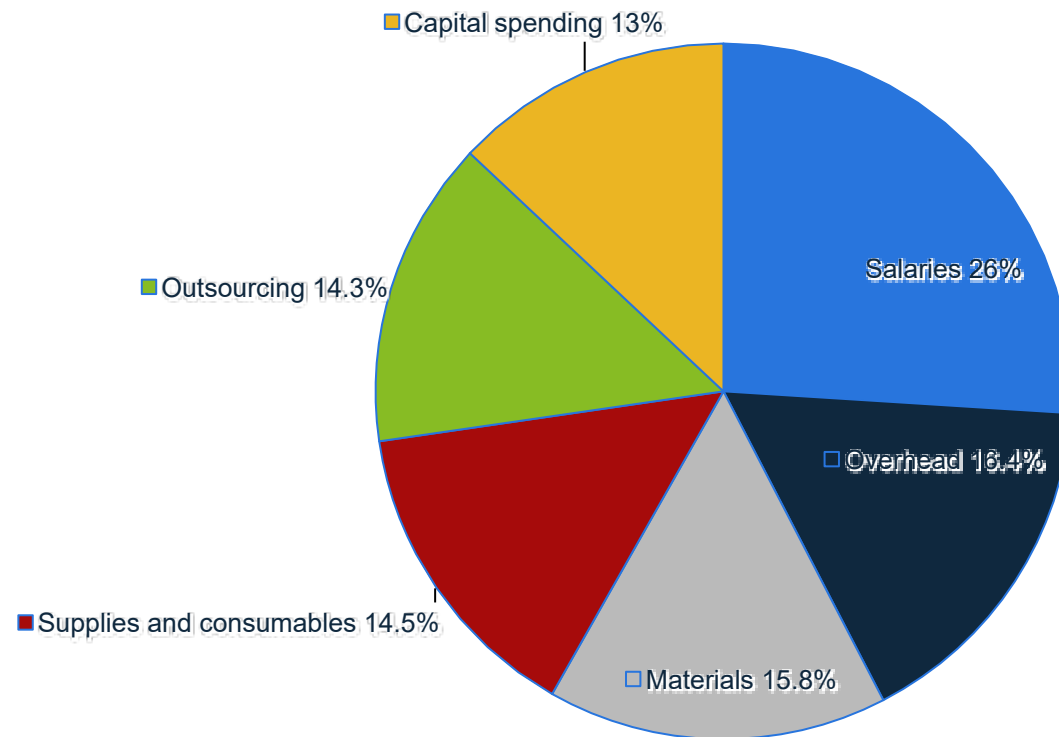
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 62](#).

Source(s): Bloomberg; Capital IQ; Thomson Reuters; [ID 270233](#)

Distribution of research and development (R&D) spending worldwide in 2020, by end use

Distribution of R&D expenditure globally 2020, by end use



Note(s): Worldwide; 2020

Further information regarding this statistic can be found on [page 63](#).

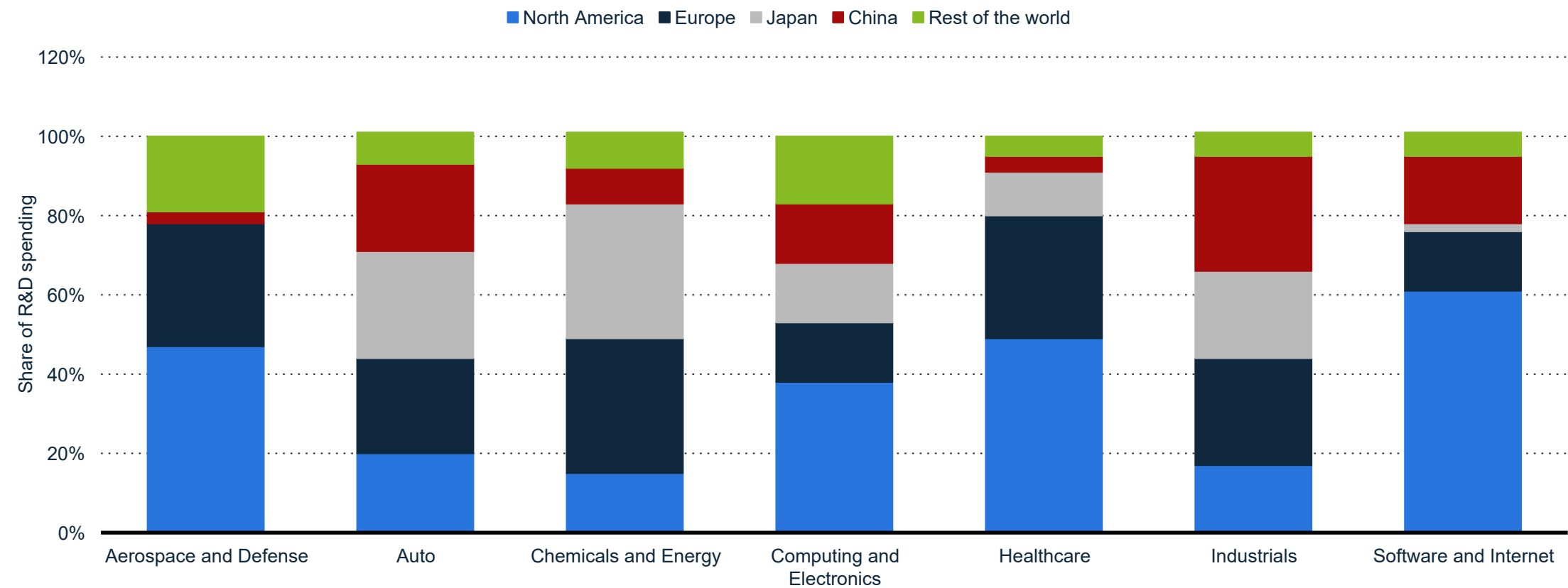
Source(s): IRI; [ID 732279](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Industry and geographic distribution

Share of global research and development (R&D) spending in 2018, by region and industry

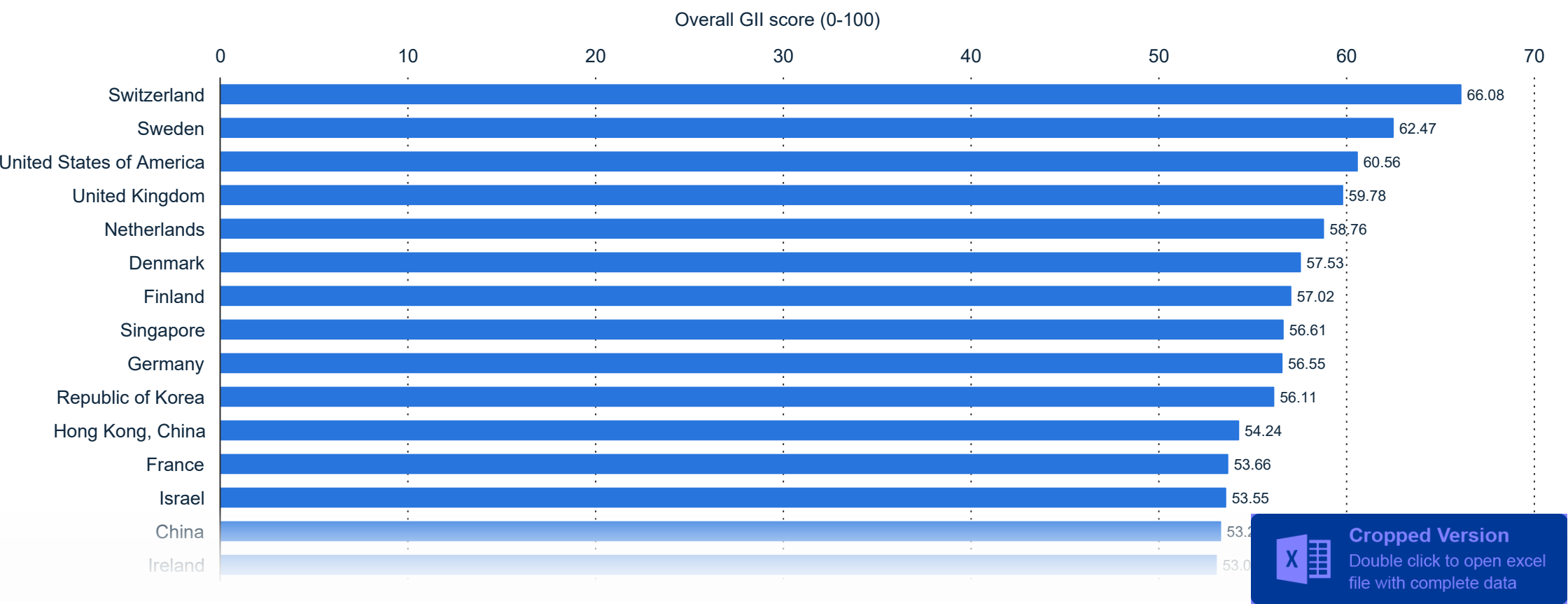
R&D spending shares by region and industry 2018



Note(s): Worldwide; 2018
Further information regarding this statistic can be found on [page 64](#).
Source(s): Strategy+Business; S&P Capital IQ; Thomson Reuters; Strategy&; [ID 1102738](#)

Most innovative countries in 2020, by global innovation index score

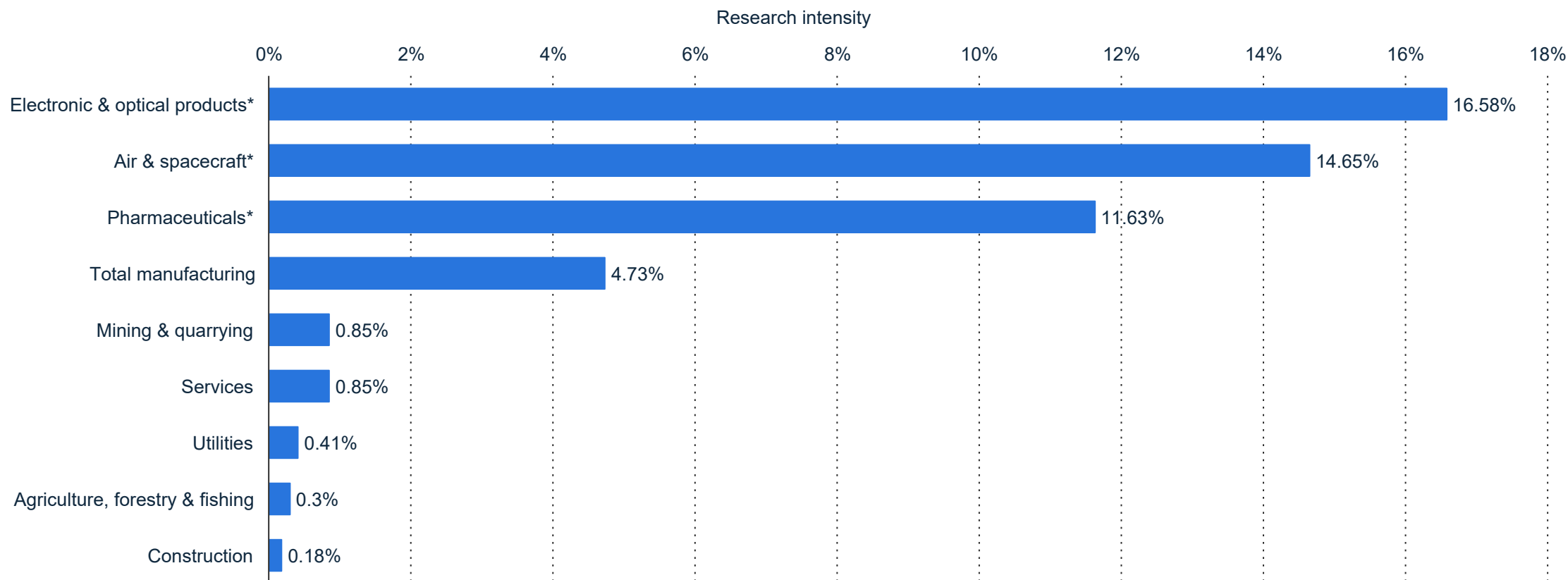
Most innovative countries by GII score 2020



Note(s): Worldwide; 2020
Further information regarding this statistic can be found on [page 65](#).
Source(s): WIPO; [ID 1102558](#)

Average research intensity of OECD countries in 2016, by industry

Research intensity by industry in OECD countries 2016



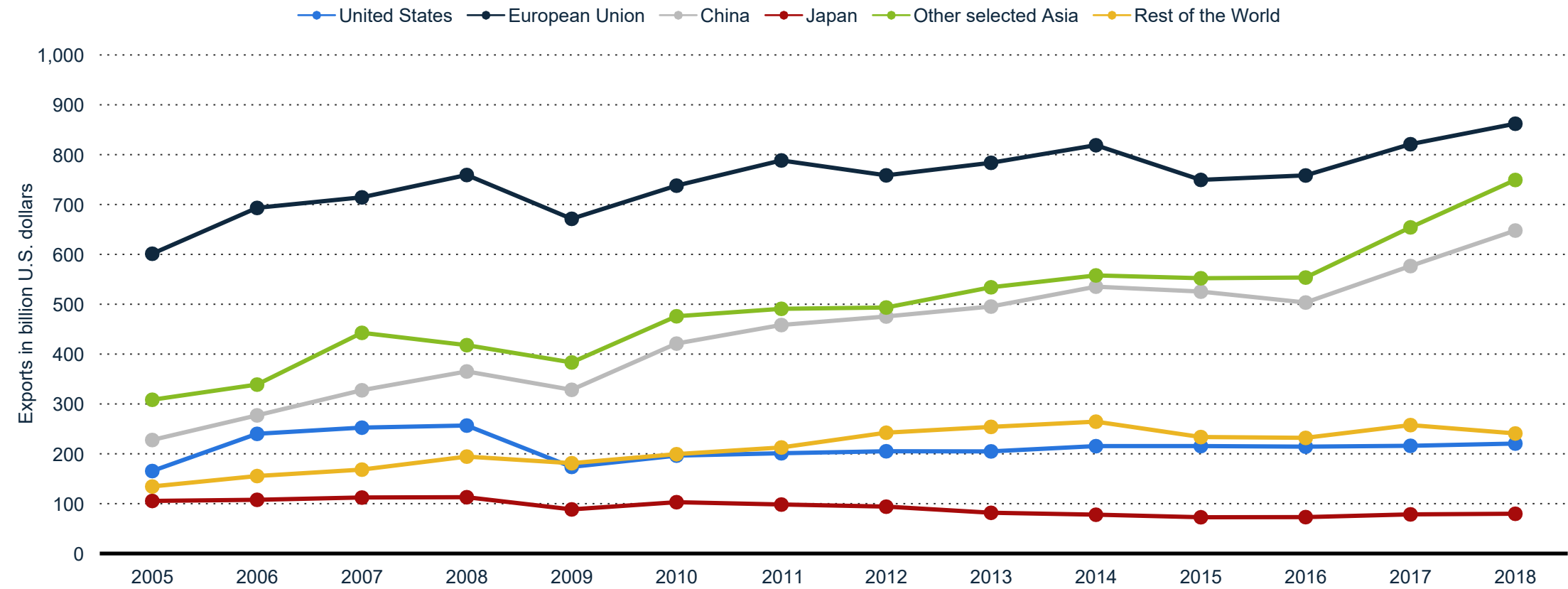
Note(s): Worldwide; 2016**

Further information regarding this statistic can be found on [page 66](#).

Source(s): OECD; [ID 1103594](#)

Exports of high research and development (R&D) intensive products from 2005 to 2018, by country (in billion U.S. dollars)

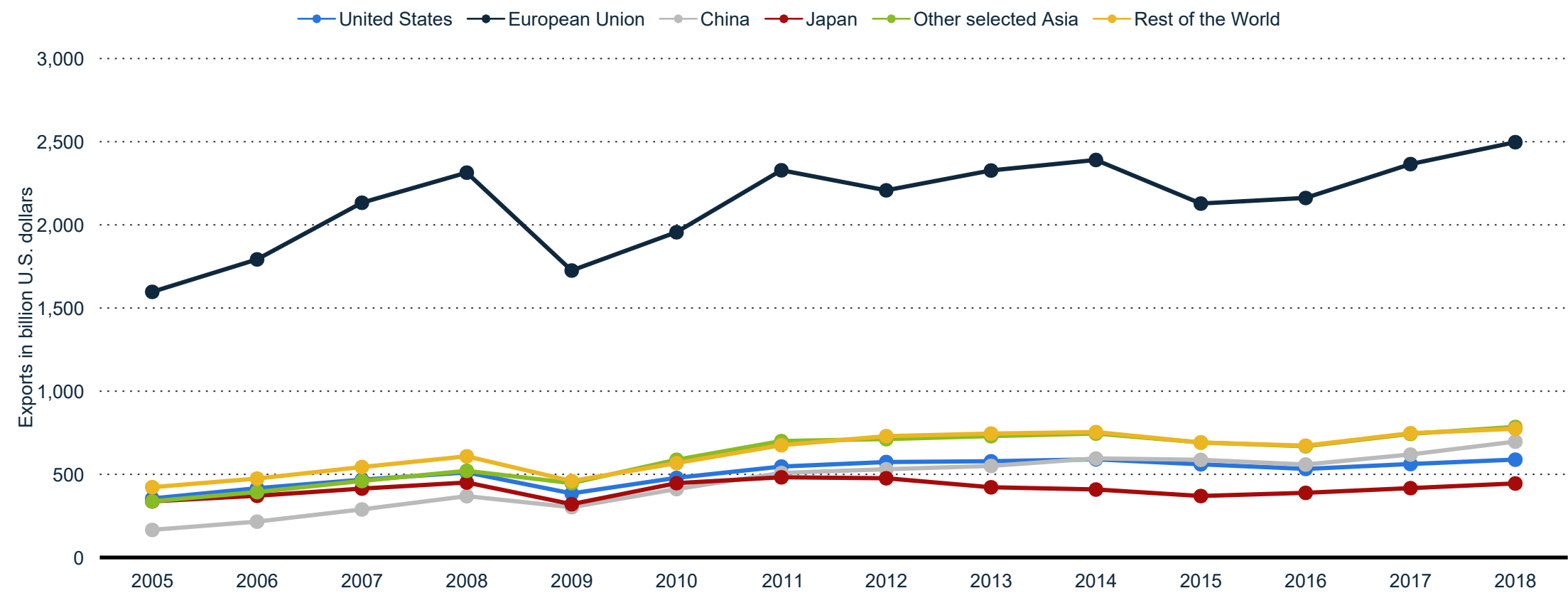
Exports of high R&D intensive products by country 2005-2018



Note(s): Worldwide; 2005 to 2018
Further information regarding this statistic can be found on [page 67](#).
Source(s): NCSES; Oxford Economics; [ID 1102728](#)

Exports of medium-high research and development (R&D) intensive products from 2005 to 2018, by country (in billion U.S. dollars)

Exports of medium-high R&D intensive products by country 2005-2018



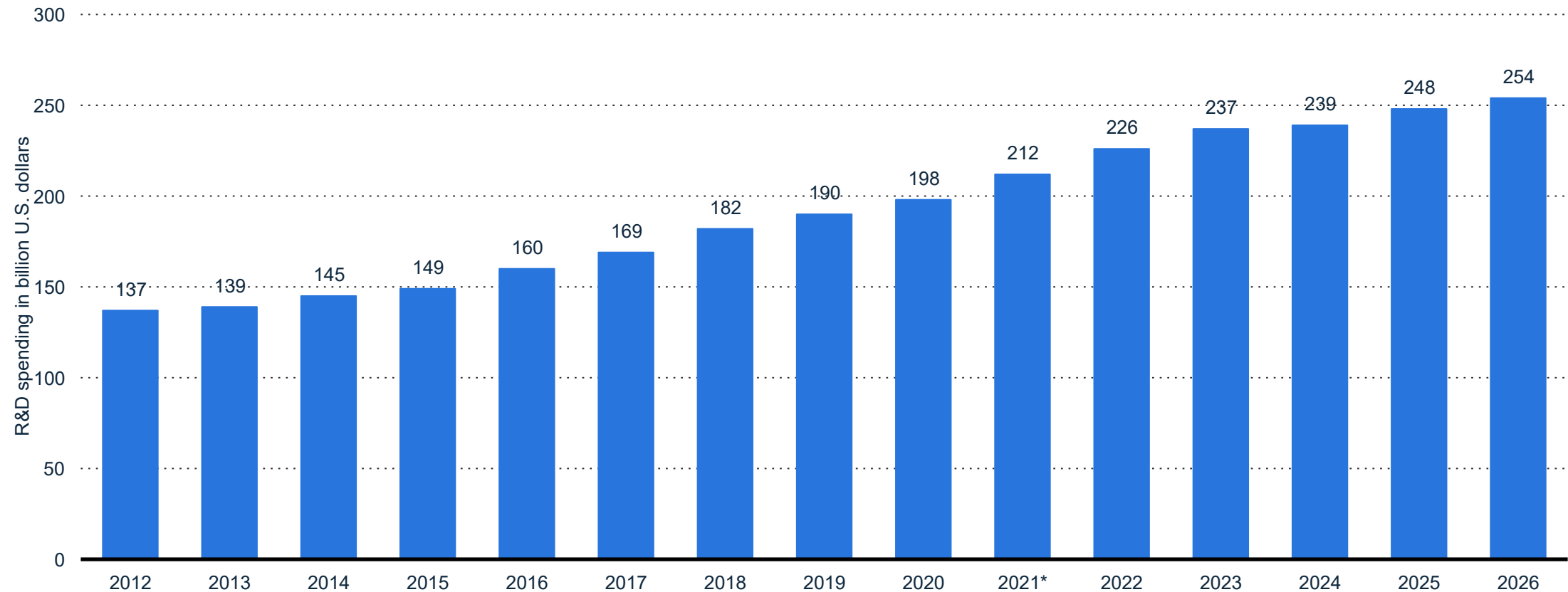
Note(s): Worldwide; 2005 to 2018
Further information regarding this statistic can be found on [page 68](#).
Source(s): NCSES; Oxford Economics; [ID 1102753](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Pharmaceuticals & healthcare

Total global spending on pharmaceutical research and development from 2012 to 2026 (in billion U.S. dollars)

Total global pharmaceutical R&D spending 2012-2026



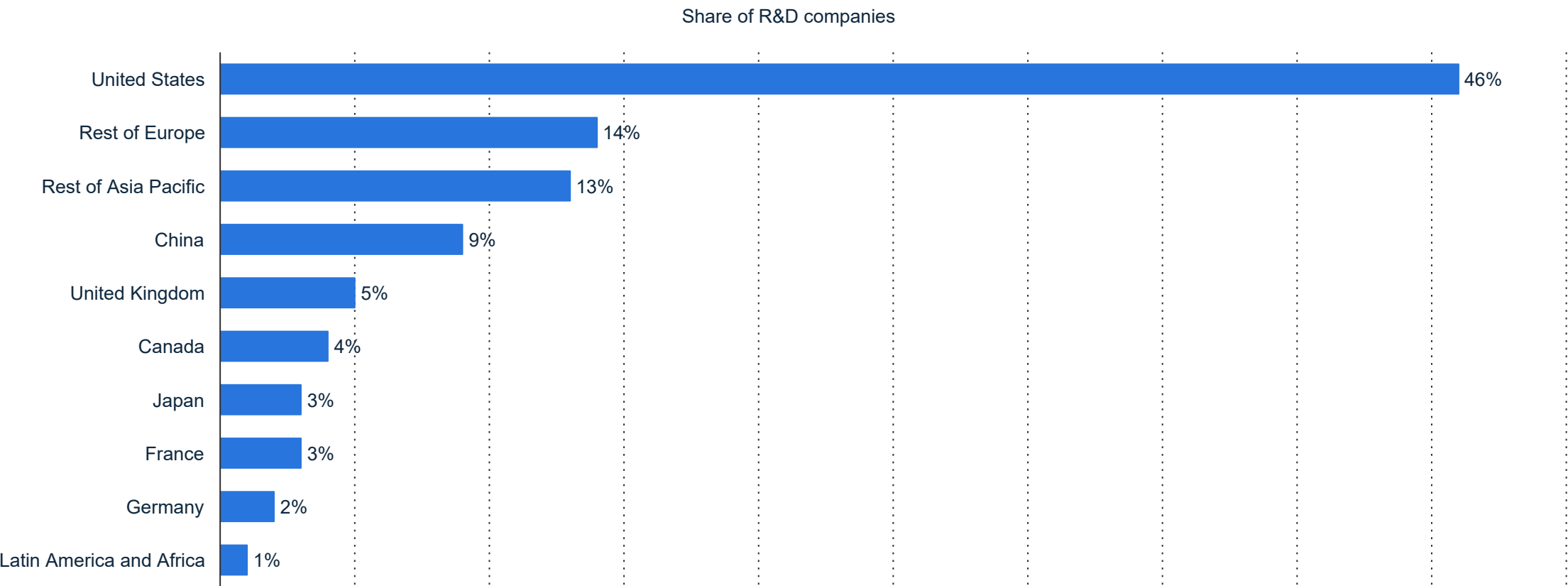
Note(s): Worldwide; as of May 2021

Further information regarding this statistic can be found on [page 69](#).

Source(s): Evaluate; [ID 309466](#)

Distribution of pharmaceutical R&D companies worldwide by country in 2021*

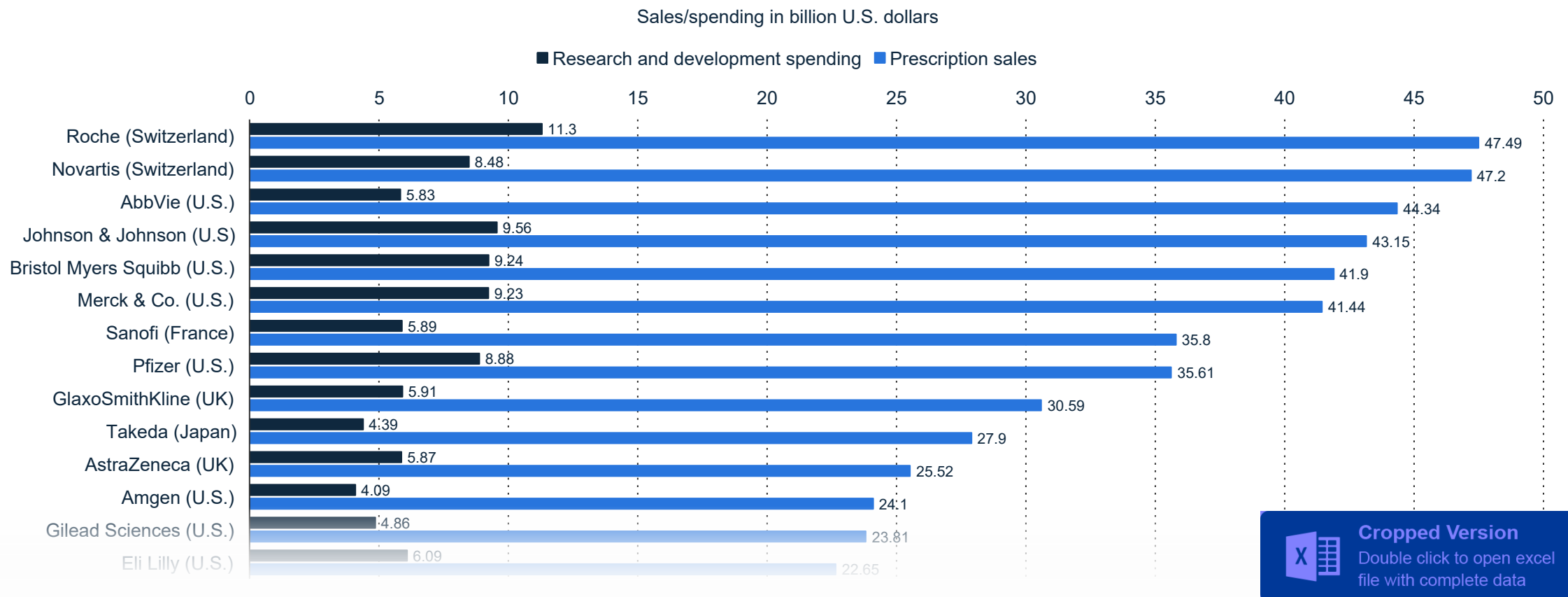
Distribution of pharmaceutical R&D companies by region 2021



Note(s): Worldwide; as of January 2021
Further information regarding this statistic can be found on [page 70](#).
Source(s): Pharma Intelligence; [ID 788274](#)

Leading 50 global pharmaceutical companies by prescription sales and R&D spending in 2020 (in billion U.S. dollars)

Top 50 pharmaceutical companies - Rx sales and R&D spending 2020



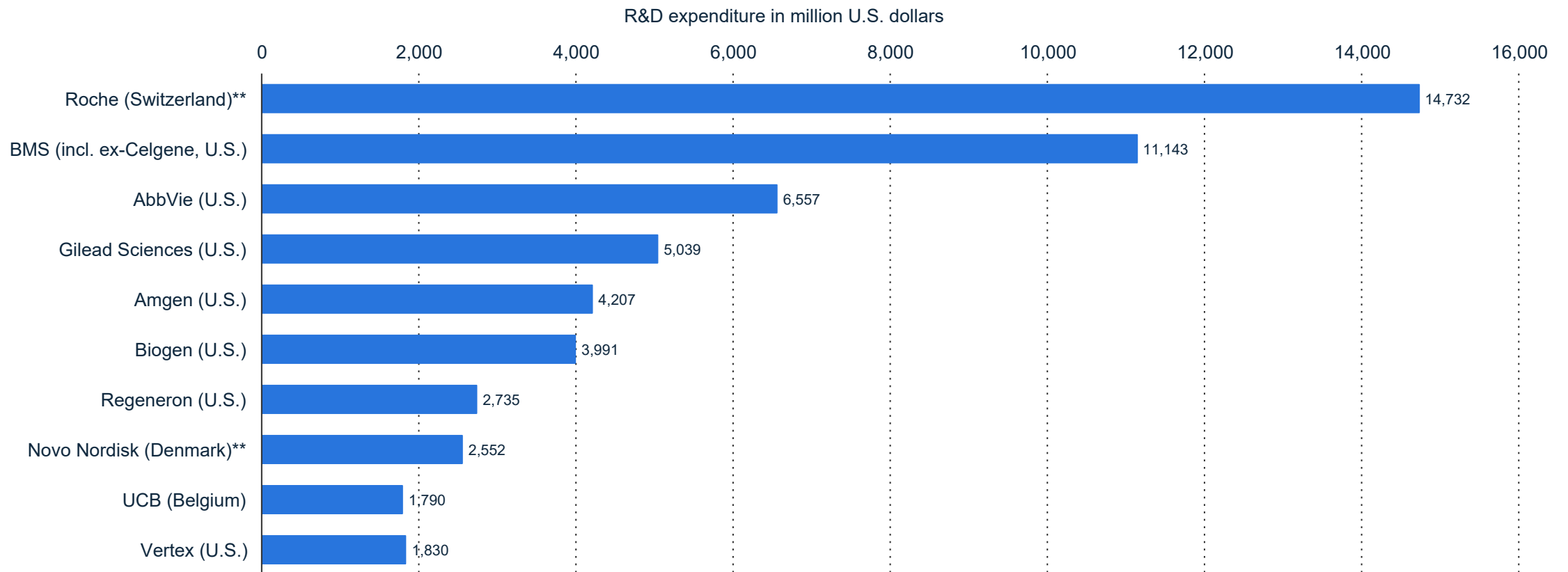
Note(s): Worldwide

Further information regarding this statistic can be found on [page 71](#).

Source(s): Pharmaceutical Executive; Evaluate (EvaluatePharma); Various sources (company data); [ID 273029](#)

Select leading global biotechnology companies' R&D expenditure in 2020* (in million U.S. dollars)

Top global biotech companies - R&D expenditure 2020



Note(s): Worldwide

Further information regarding this statistic can be found on [page 72](#).

Source(s): Various sources; Pharmaceutical Executive; Statista; [ID 262701](#)

Distribution of total global funding on research and development for selected diseases from 2014 to 2019

Distribution of total funding on R&D for selected diseases 2014-2019

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------------------------|--------|--------|--------|--------|-------|-------|
| HIV/AIDS | 32% | 33.30% | 34.40% | 35.20% | 36% | 38% |
| Tuberculosis | 17.40% | 18.60% | 17.70% | 17.30% | 17% | 17% |
| Malaria | 18.10% | 18.60% | 18% | 17.50% | 16% | 16% |
| Diarrhoeal diseases | 5.30% | 5.30% | 4.50% | 4.60% | 4.20% | 4.10% |
| Kinetoplastida | 4.40% | 3.70% | 4.10% | 4.10% | 3.70% | 3.80% |
| Worms and flukes | 2.40% | 2.50% | 2.30% | 2.50% | 2.20% | 2.20% |
| Dengue fever | 2.60% | 3.30% | 3.50% | 2.30% | 2% | 1.90% |
| Salmonella infections | 2% | 2.20% | 2.90% | 2.30% | 2.20% | 1.80% |
| Bacterial pneumonia/meningitis | 2.40% | 3% | 2.90% | 2.10% | 2.30% | 1.30% |
| Hepatitis C | - | 1.10% | 0.70% | 0.40% | 1.10% | 0.30% |
| Snakebite envenoming | 4.90% | - | - | - | 0.20% | 0.30% |
| Hepatitis B | - | - | - | - | 0.10% | 0.20% |
| Cryptococcal meningitis | - | - | 0.20% | 0.30% | 0.20% | 0.20% |
| Leprosy | 0.30% | 0.40% | 0.30% | 0.40% | | |
| Buruli ulcer | 0.10% | 0.10% | 0.10% | 0.10% | | |



Cropped Version

Double click to open excel file with complete data

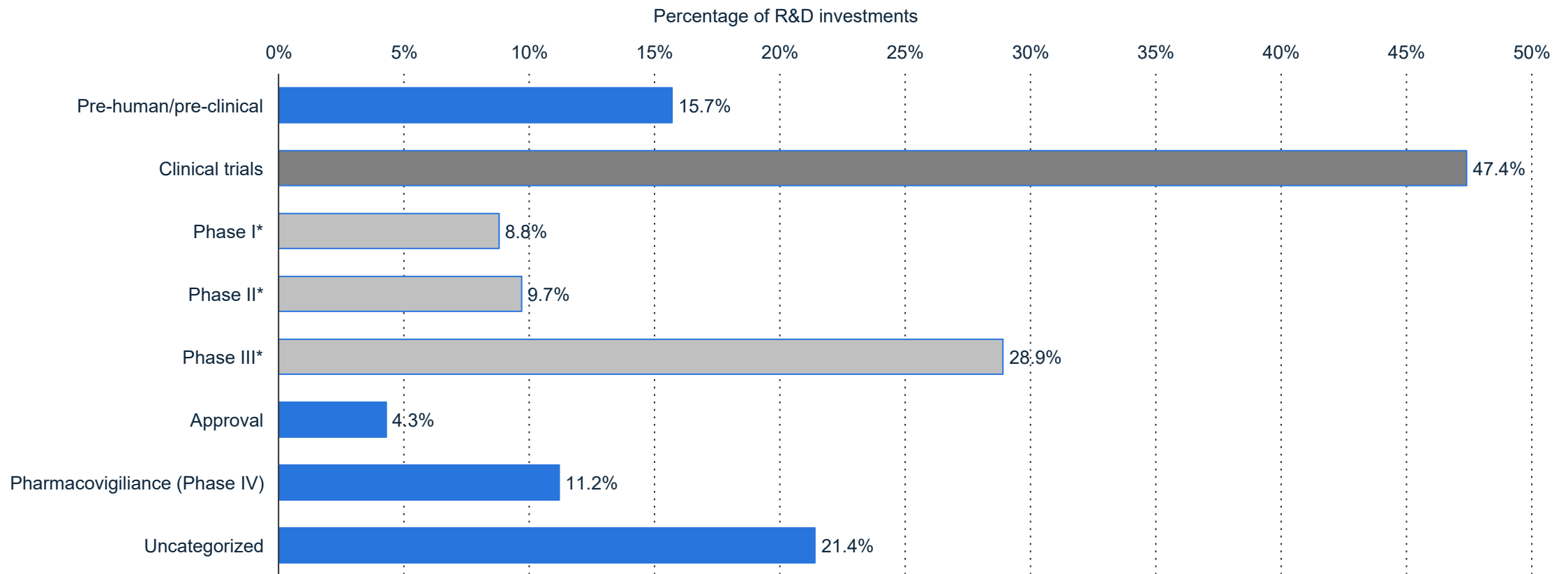
Note(s): Worldwide

Further information regarding this statistic can be found on [page 73](#).

Source(s): Policy Cures; [ID 266961](#)

Allocation of research and development investments in pharmaceutical industry in 2019, by function

Allocation of R&D investments in pharmaceutical industry by function 2019



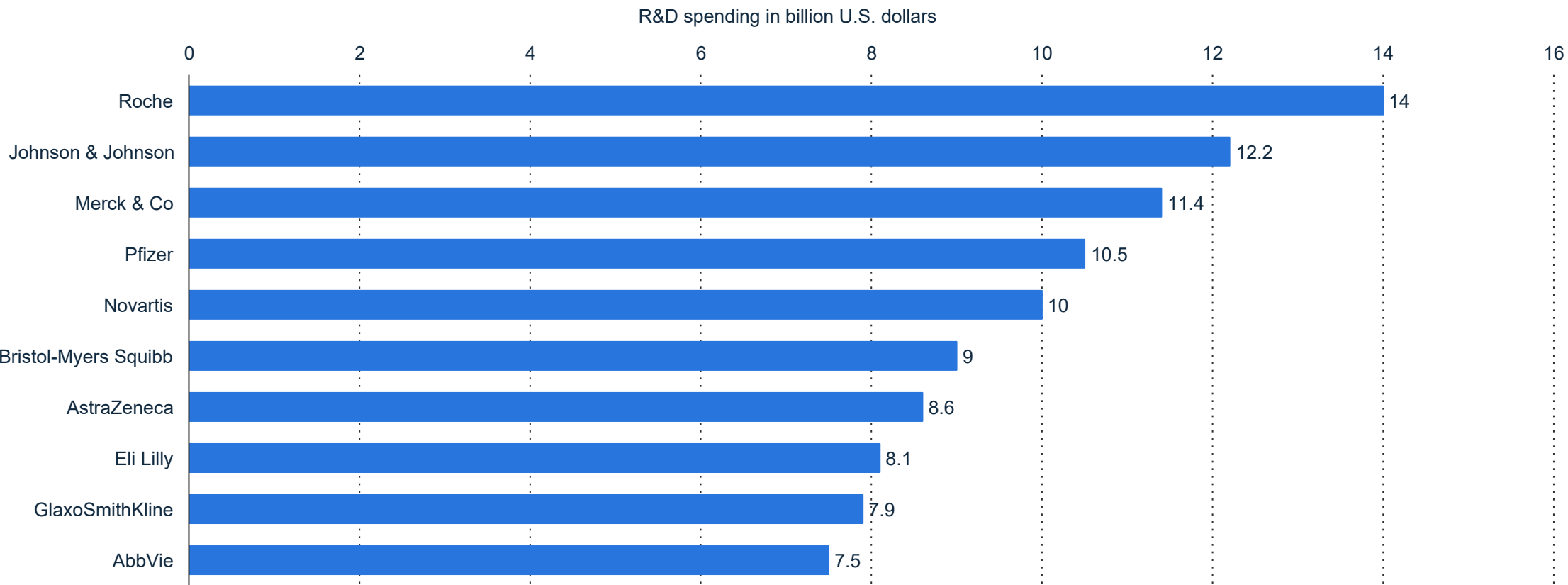
Note(s): Worldwide

Further information regarding this statistic can be found on [page 74](#).

Source(s): PhRMA; EFPIA; ID 315957

Global top 10 pharmaceutical companies based on projected R&D spending in 2026 (in billion U.S. dollars)

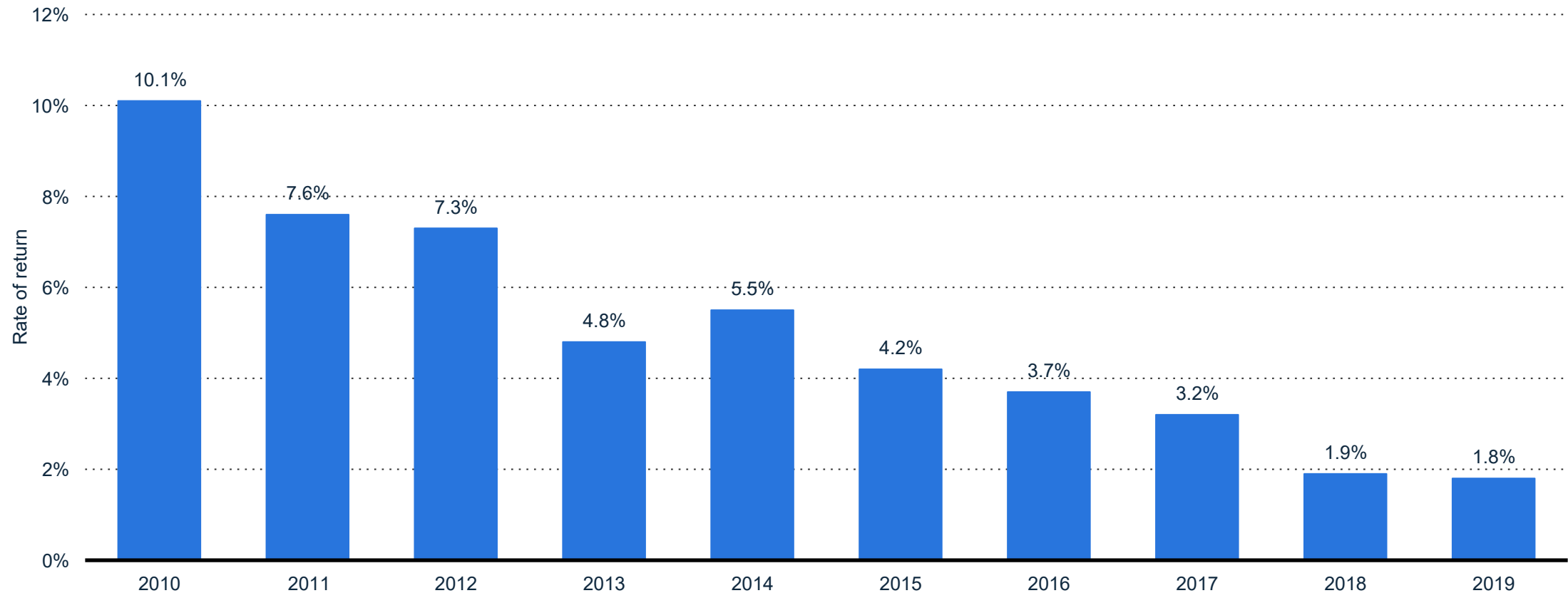
Global top pharmaceutical companies based on R&D spending 2026



Note(s): Worldwide; as of May 2021
Further information regarding this statistic can be found on [page 75](#).
Source(s): Evaluate; [ID 309469](#)

Projected rate of return on biopharmaceutical research and development investments from 2010 to 2019

Projected return on biopharma R&D investments U.S. 2010-2019



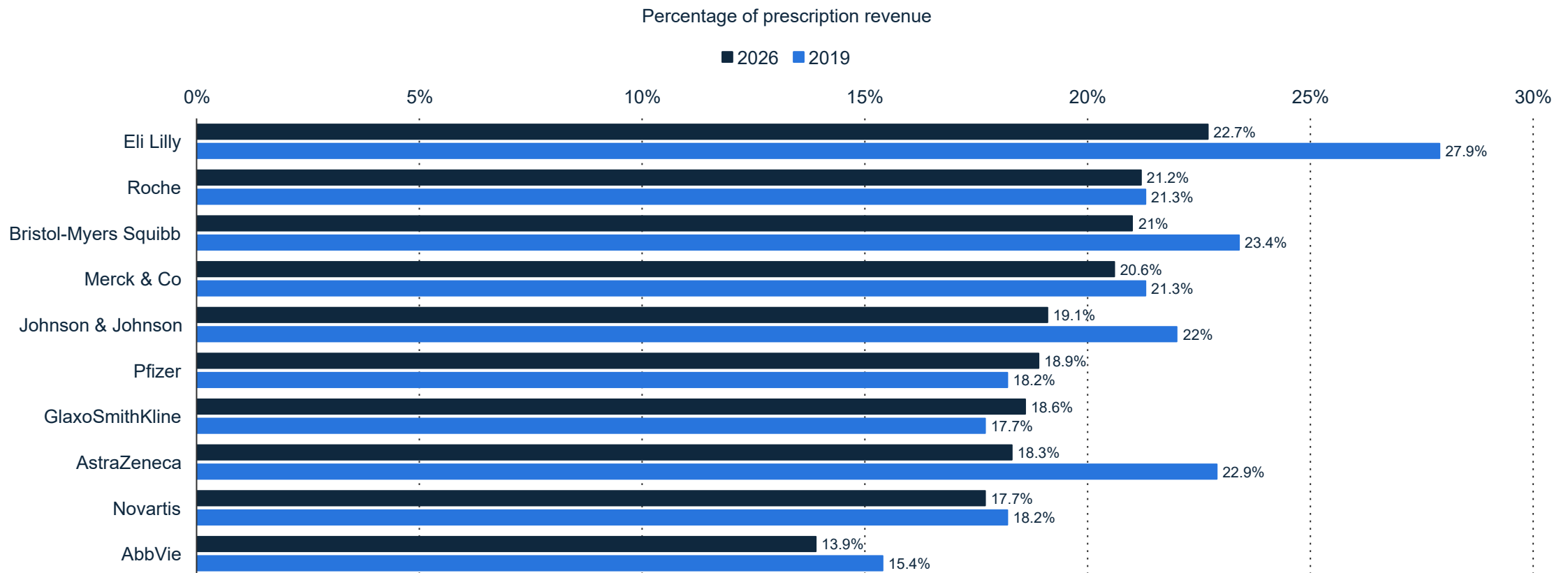
Note(s): Worldwide; 12 large cap biopharma companies

Further information regarding this statistic can be found on [page 76](#).

Source(s): PhRMA; Deloitte; [ID 886479](#)

Top 10 pharmaceutical companies based on R&D spending as revenue share in 2019 and 2026*

R&D spending share of top pharmaceutical companies 2019 and 2026



Note(s): Worldwide; as of June 2020

Further information regarding this statistic can be found on [page 77](#).

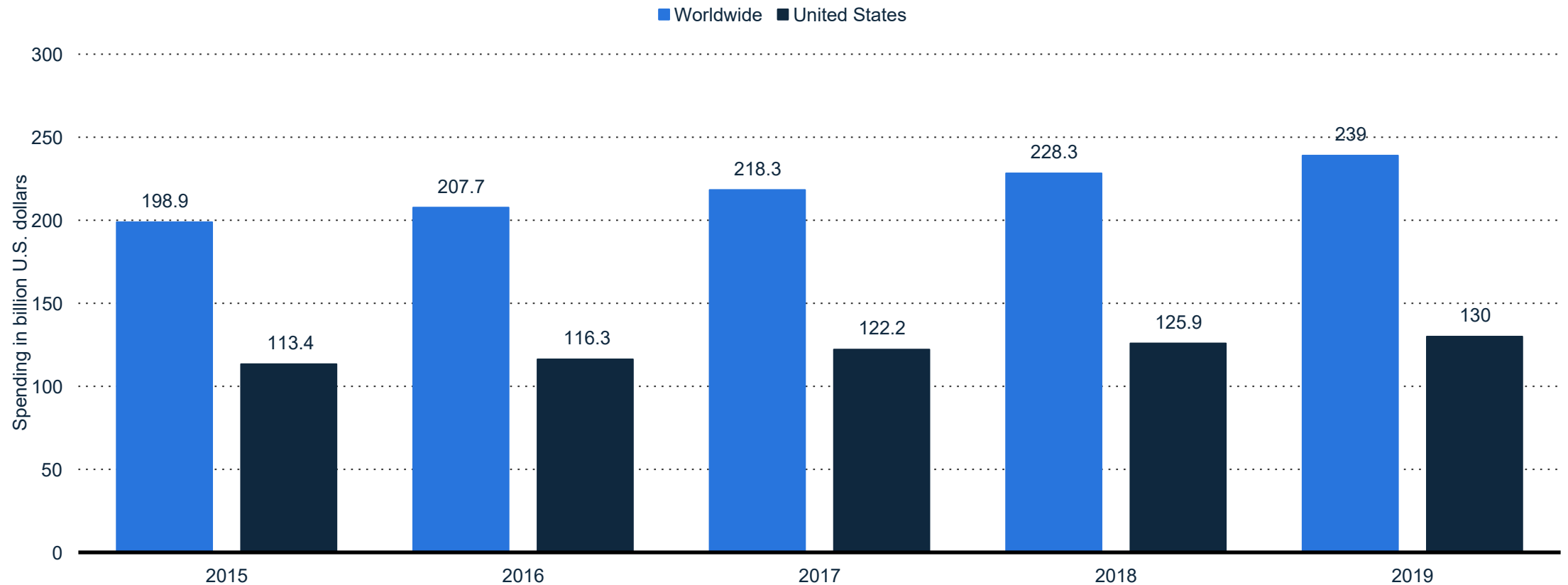
Source(s): Evaluate; [ID 309471](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Software, computing, communication & electronics

Information and communication technology (ICT) research and development (R&D) expenditure in the United States and worldwide, from 2015 to 2019 (in billion U.S. dollars)

ICT research and development expenditure in U.S. and worldwide 2015-2019



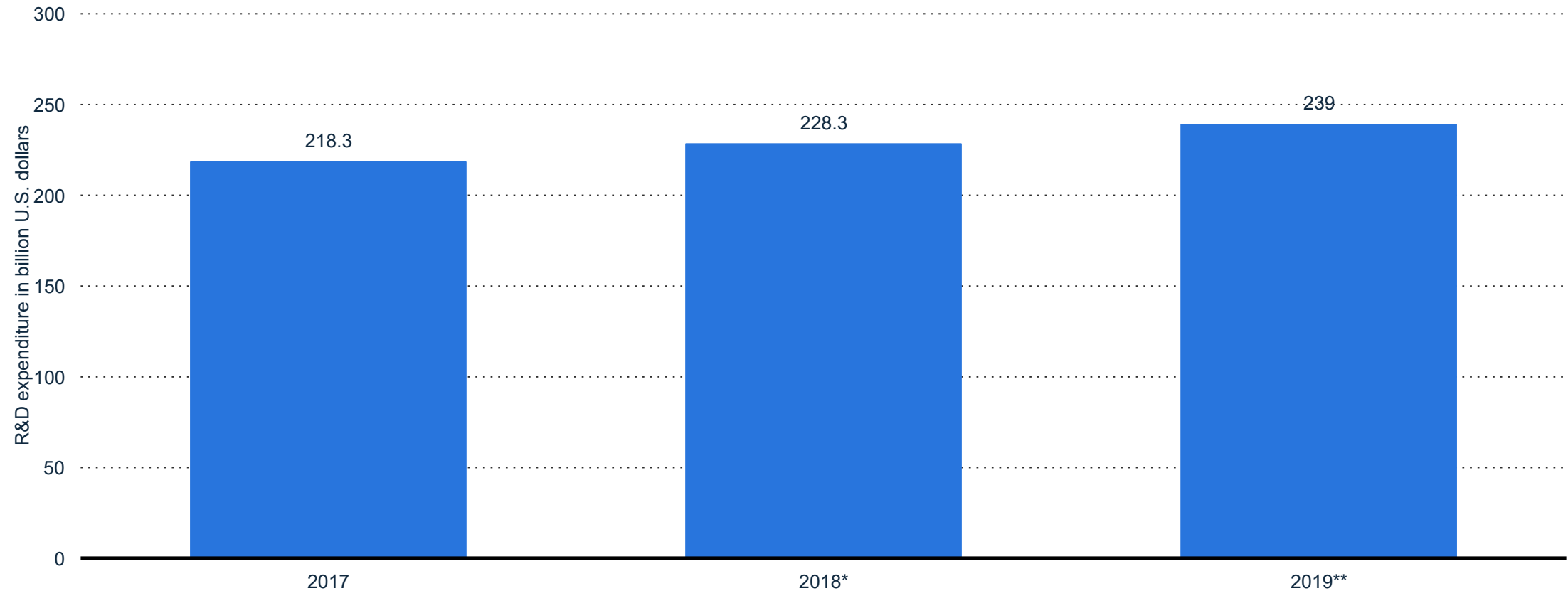
Note(s): Worldwide, United States; 2015 to 2019

Further information regarding this statistic can be found on [page 78](#).

Source(s): IRI; [ID 732308](#)

Total global research and development (R&D) spending on information and communications from 2017 to 2019 (in billion U.S. dollars)

Total R&D spending on information and communications worldwide 2017-2019



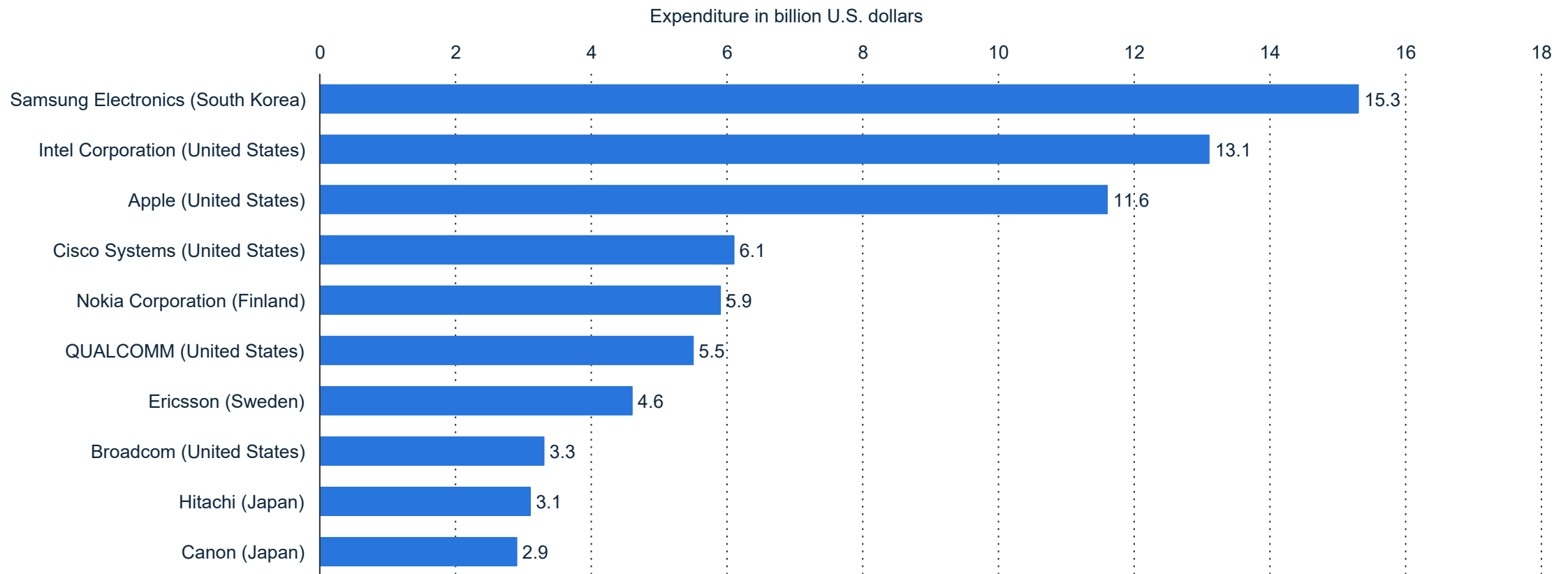
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 79](#).

Source(s): IRI; issuu ; [ID 1102905](#)

Ranking of the leading technology hardware & equipment companies with the highest spending on research and development (R&D) in 2018 (in billion U.S. dollars)

Technology hardware & equipment companies with the highest spending on R&D 2018



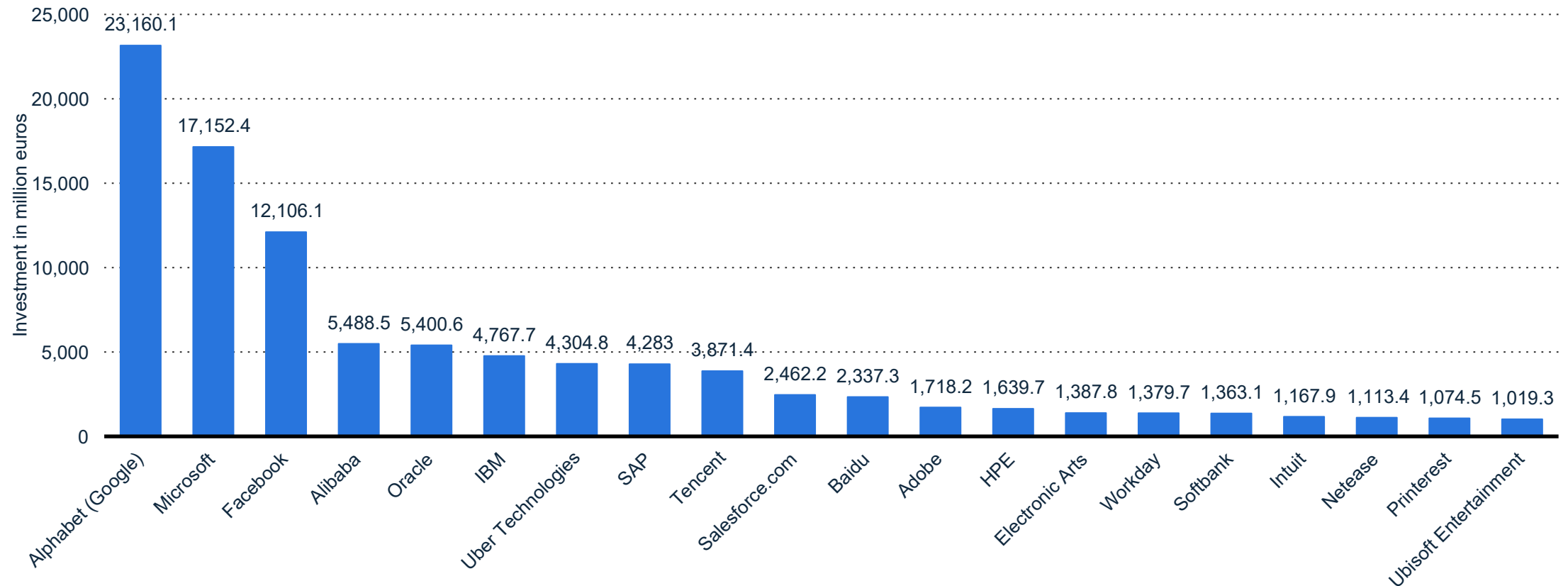
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 80](#).

Source(s): Bloomberg; Capital IQ; Thomson Reuters; [ID 1102851](#)

Leading R&D spenders in software and computer services sector worldwide in 2019/20, by company (in million euros)

Top software and computer services R&D investors worldwide 2020, by company



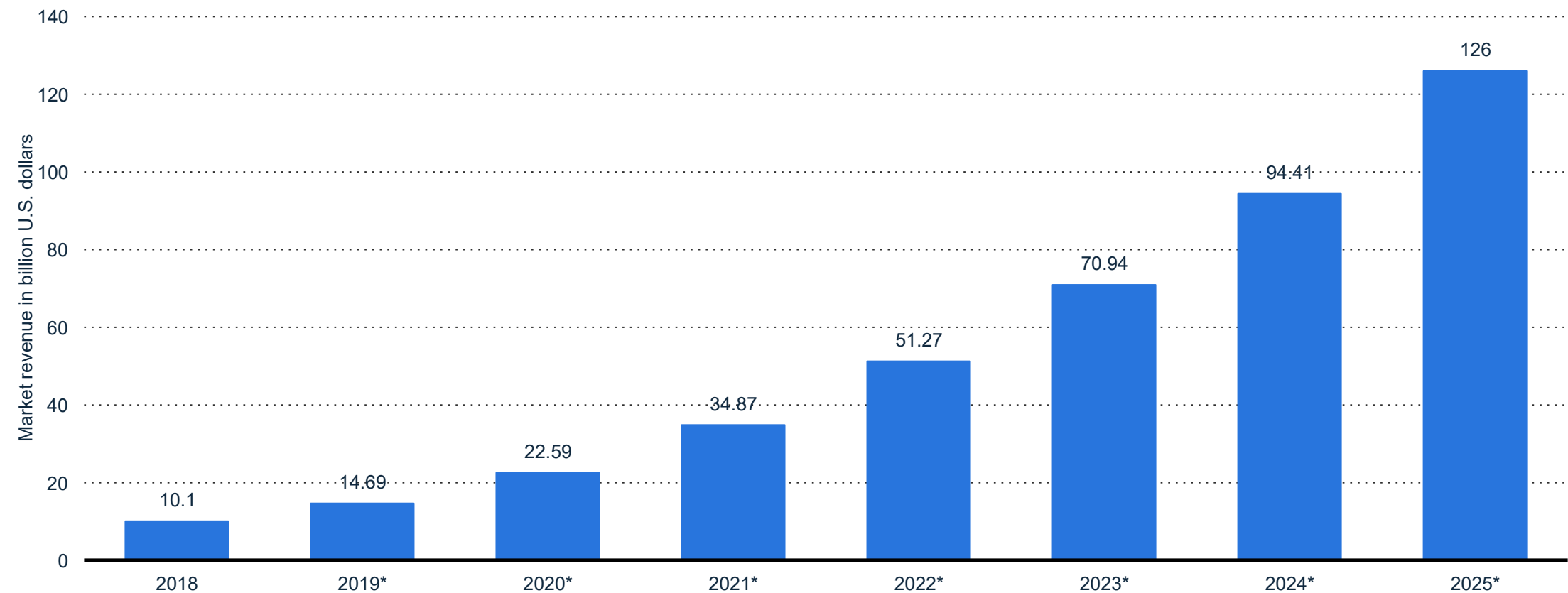
Note(s): Worldwide; 2019 to 2020

Further information regarding this statistic can be found on [page 81](#).

Source(s): IRI; Joint Research Centre; [ID 738664](#)

Revenues from the artificial intelligence (AI) software market worldwide from 2018 to 2025 (in billion U.S. dollars)

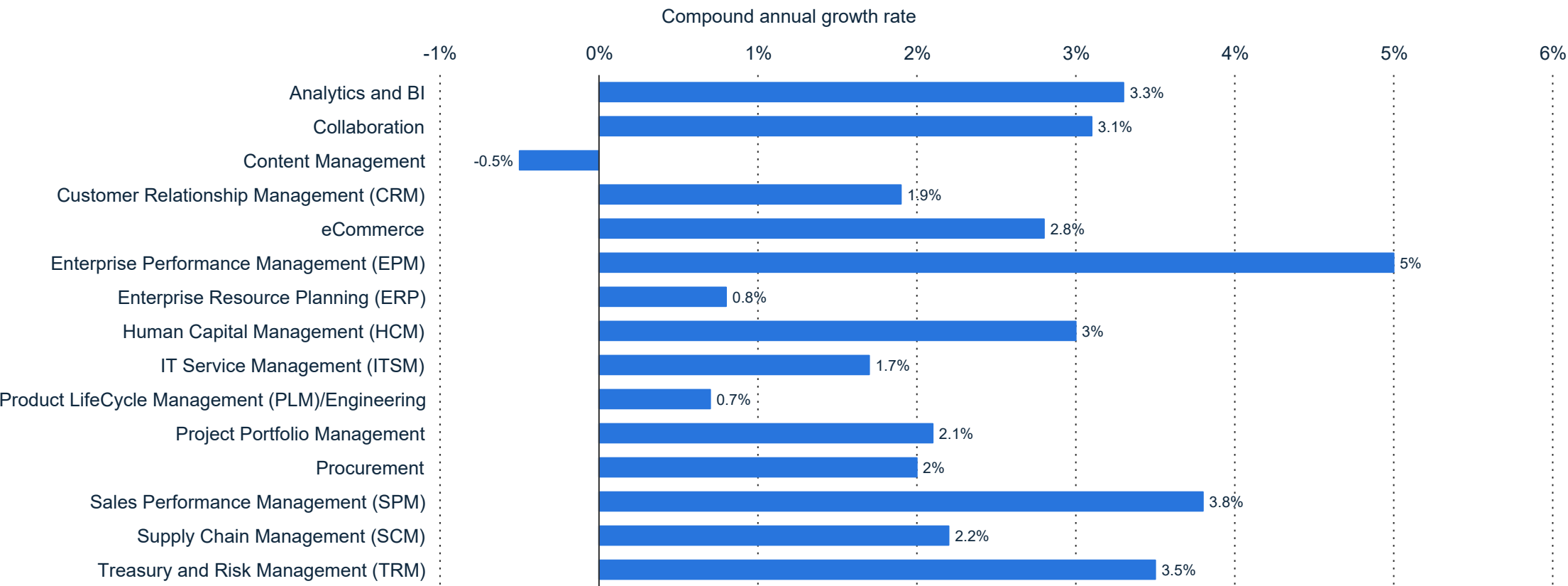
Artificial intelligence software market revenue worldwide 2018-2025



Note(s): Worldwide; 2018 to 2020
Further information regarding this statistic can be found on [page 82](#).
Source(s): Omdia; [ID 607716](#)

Forecast compound annual growth rate of the cloud applications market by segment from 2017 to 2022

Cloud applications market CAGR 2017-2022, by segment



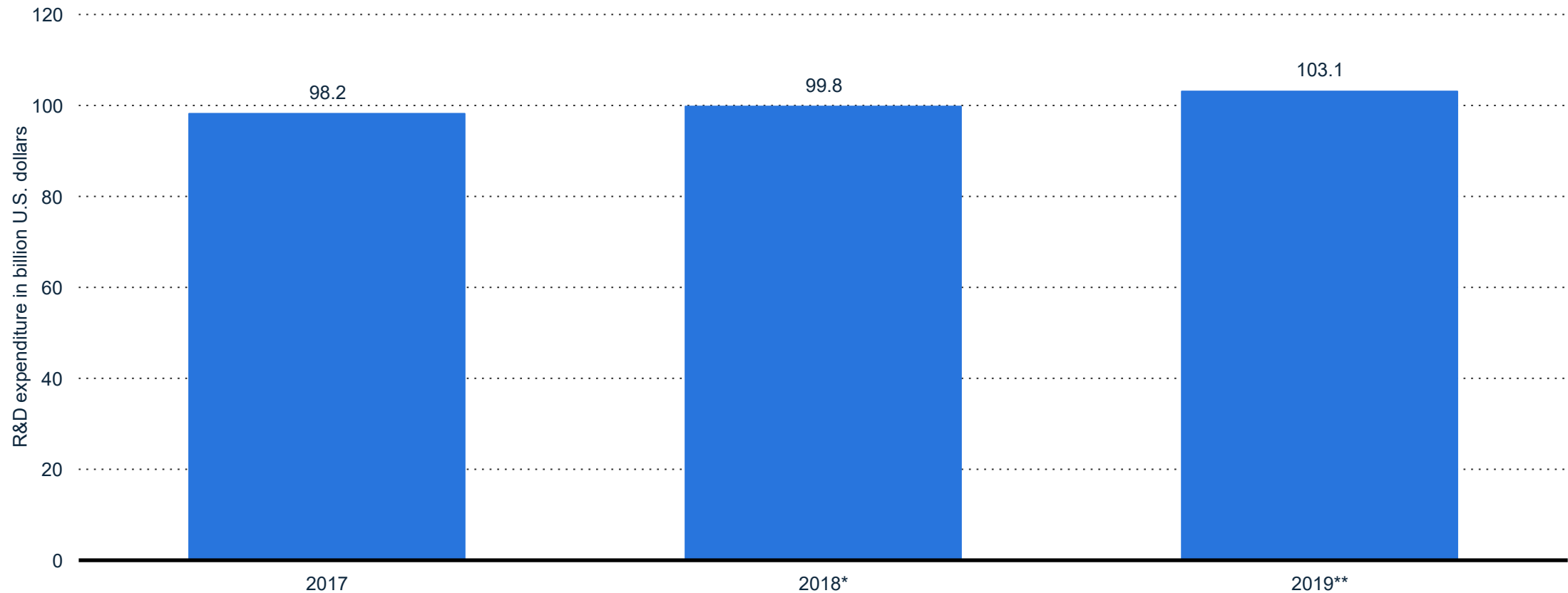
Note(s): Worldwide; 2018
Further information regarding this statistic can be found on [page 83](#).
Source(s): Apps Run The World; [ID 475768](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Automotive, Aerospace & Defense

Total global research and development (R&D) spending on automotive from 2017 to 2019

Total R&D spending on automotive worldwide 2017-2019



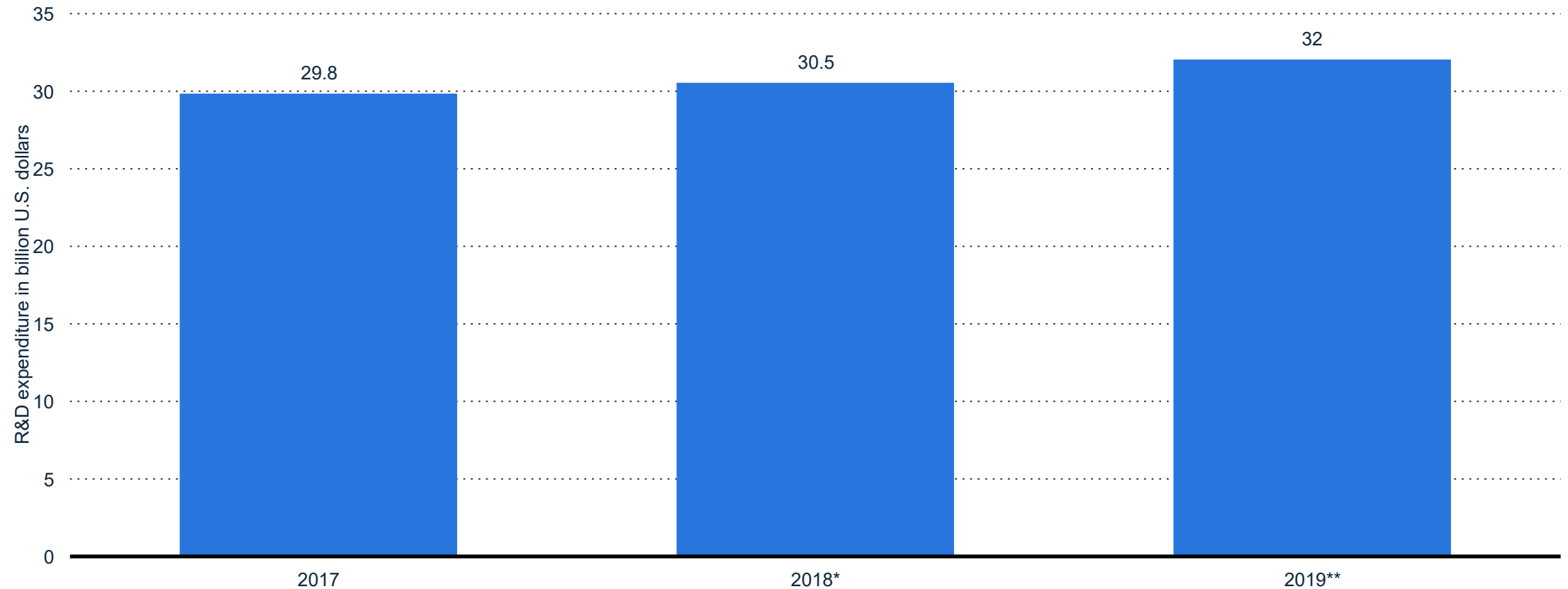
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 84](#).

Source(s): IRI; issuu ; [ID 1102932](#)

Total global research and development (R&D) spending on aerospace and defense from 2017 to 2019

Total R&D spending on aerospace and defense worldwide 2017-2019



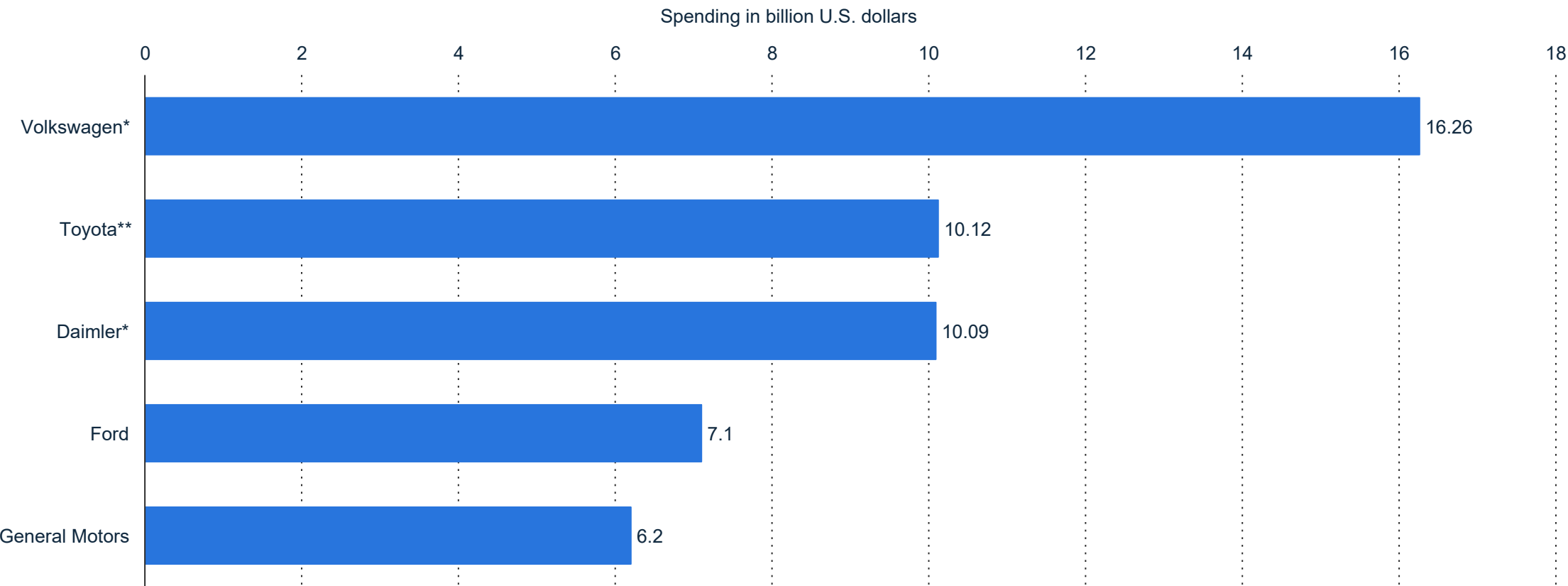
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 85](#).

Source(s): IRI; issuu ; [ID 1102929](#)

Leading automotive firms by research and development spending worldwide in FY 2020 (in billion U.S. dollars)

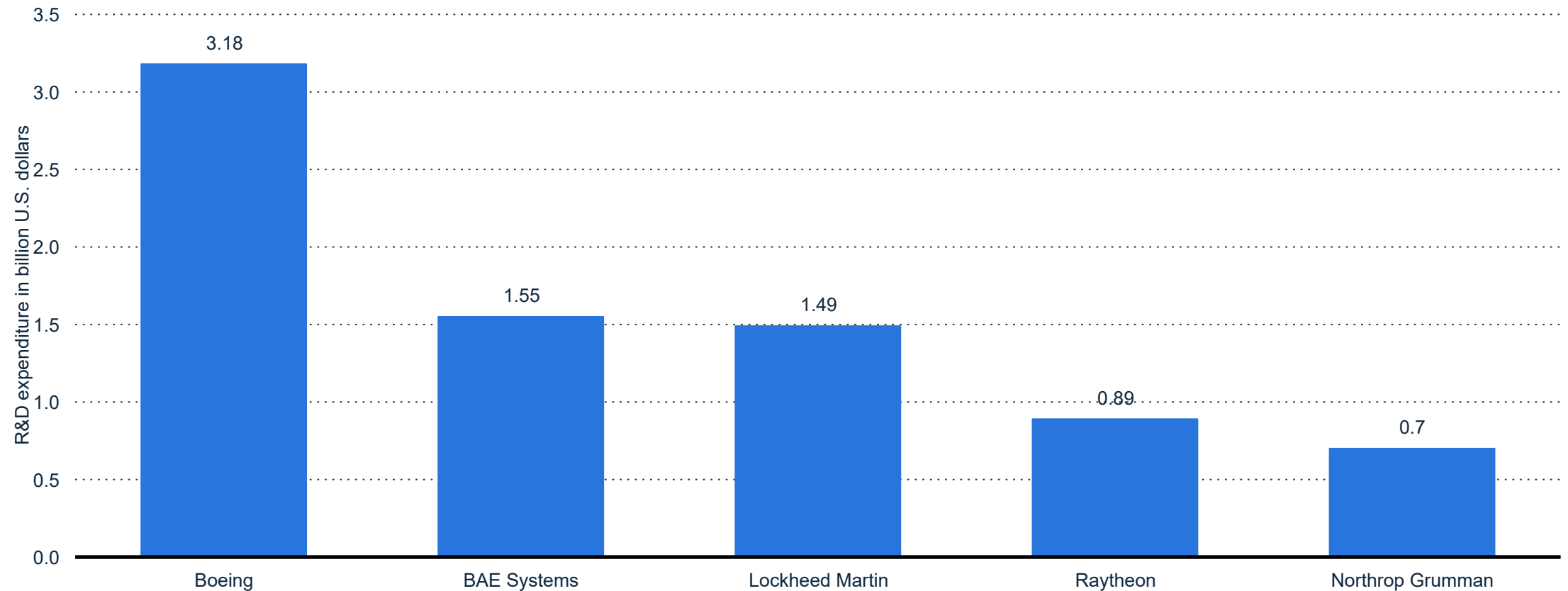
Global R&D spending: key companies in the automotive sector 2020



Note(s): Worldwide; FY 2020
Further information regarding this statistic can be found on [page 86](#).
Source(s): Statista; Various sources; [ID 566060](#)

Aerospace and defense companies with the highest spending on research and development (R&D) in 2019 (in billion U.S. dollars)

Aerospace and defense companies with the highest spending on R&D 2019



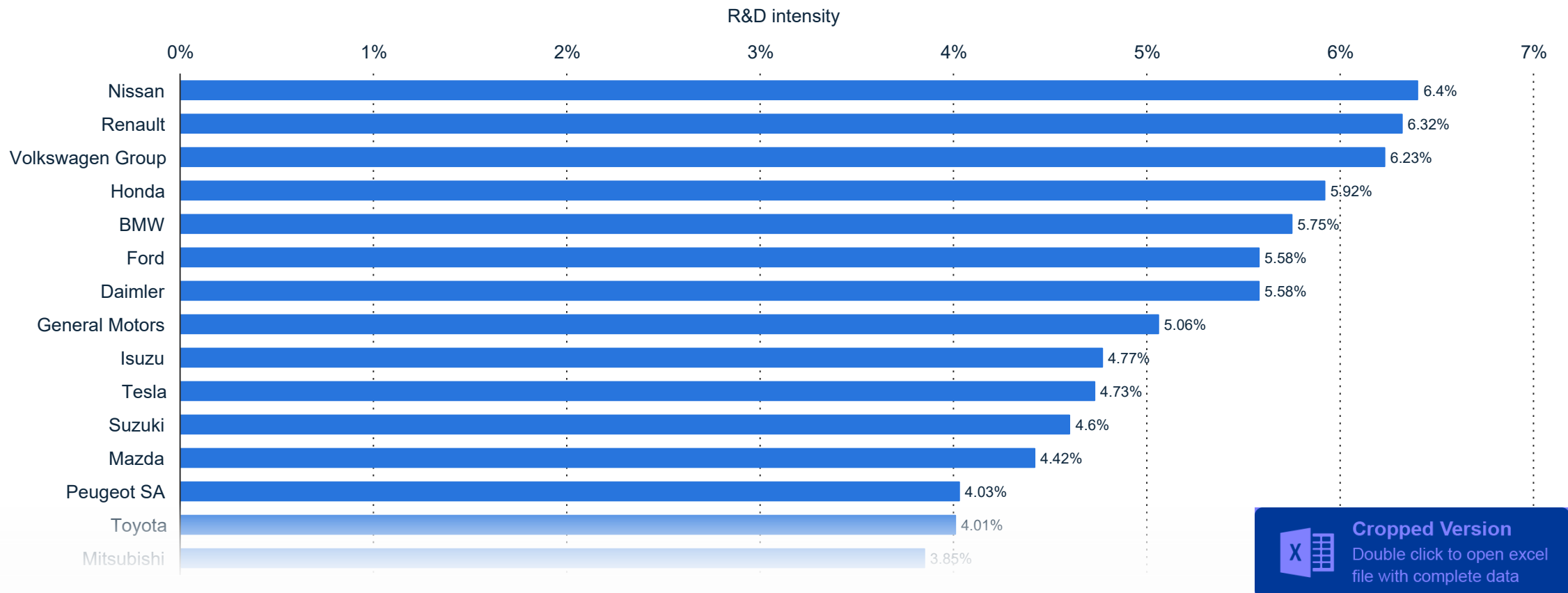
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 87](#).

Source(s): IRI; issuu ; [ID 1102967](#)

Selected automakers' R&D intensity worldwide in FY 2020

R&D intensity of selected automakers worldwide 2020



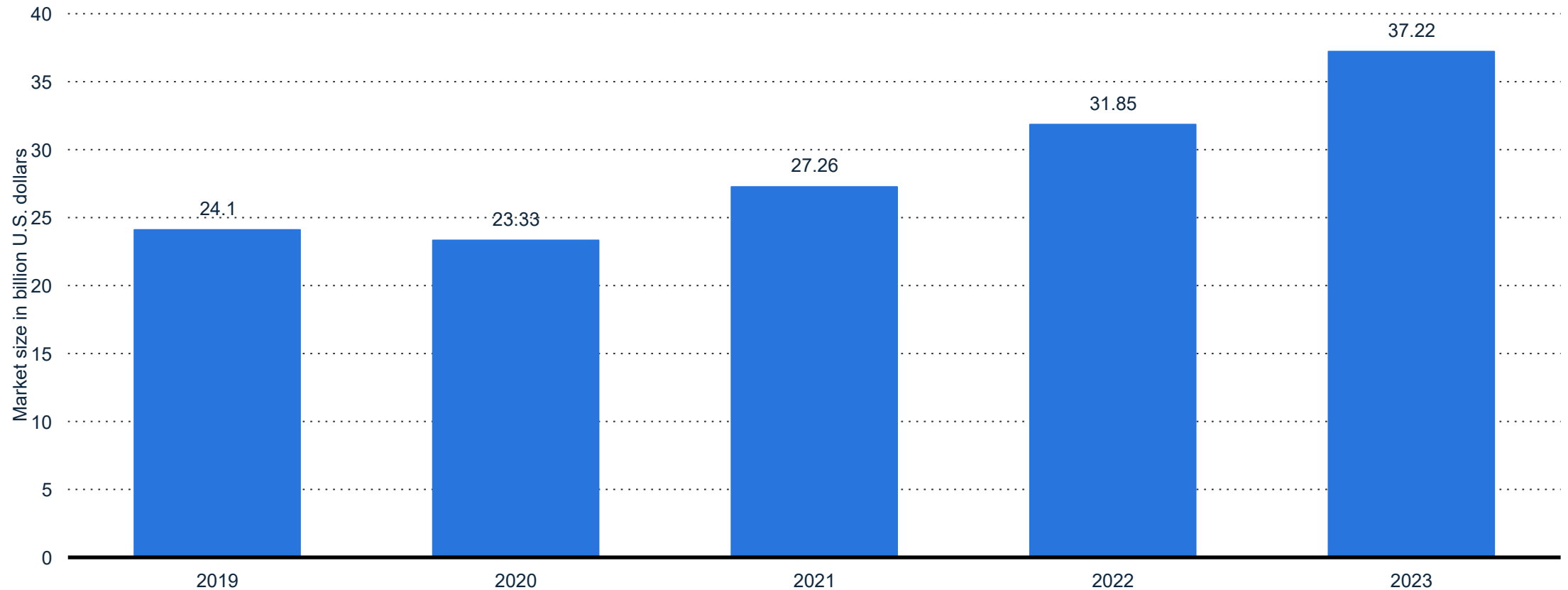
Note(s): Worldwide; FY 2020/21

Further information regarding this statistic can be found on [page 88](#).

Source(s): Statista; Various sources; [ID 574012](#)

Projected size of the global autonomous car market from 2019 to 2023 (in billion U.S. dollars)

Size of the global autonomous car market 2019-2023



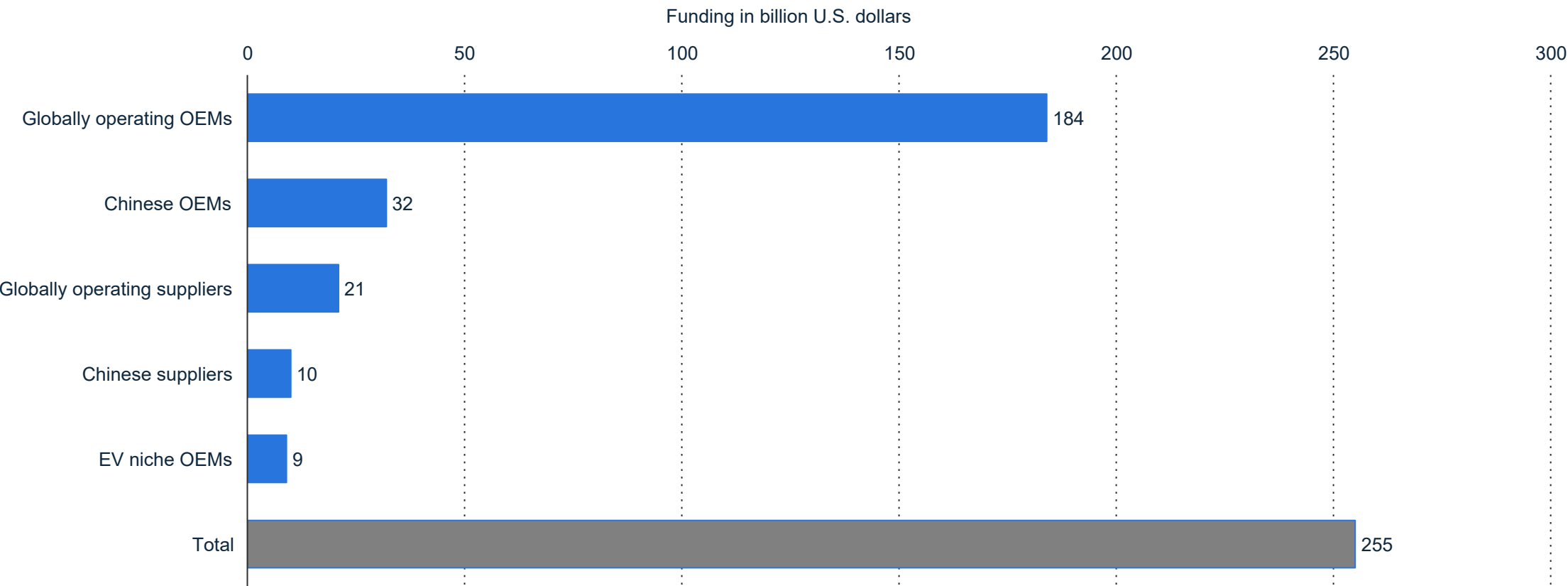
Note(s): Worldwide; 2020

Further information regarding this statistic can be found on [page 89](#).

Source(s): Statista; Research and Markets; GlobeNewswire; [ID 428692](#)

Projected research and development funding efforts towards electric vehicles in 2023, by investor type (in billion U.S. dollars)

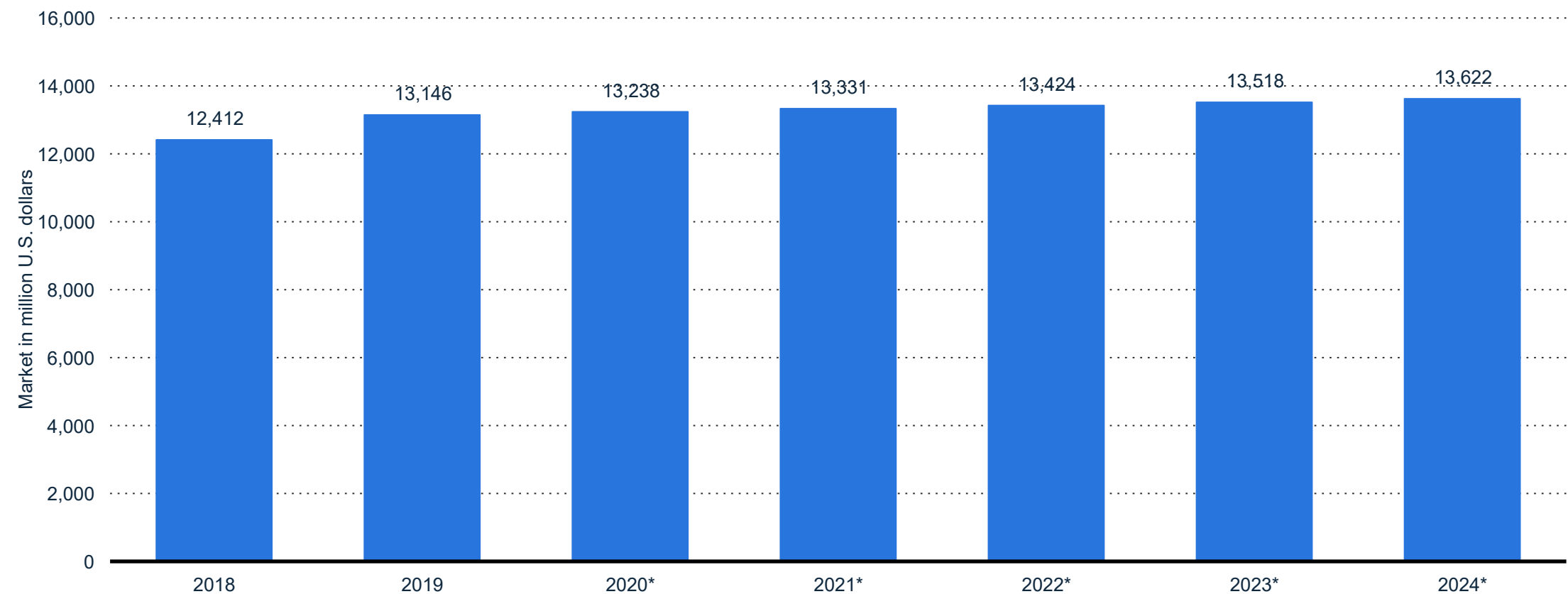
Electric vehicles: auto industry R&D funding by investor type 2023



Note(s): Worldwide
Further information regarding this statistic can be found on [page 90](#).
Source(s): AlixPartners; [ID 970977](#)

Size of the automotive software market worldwide from 2018 to 2024 (in million U.S. dollars)

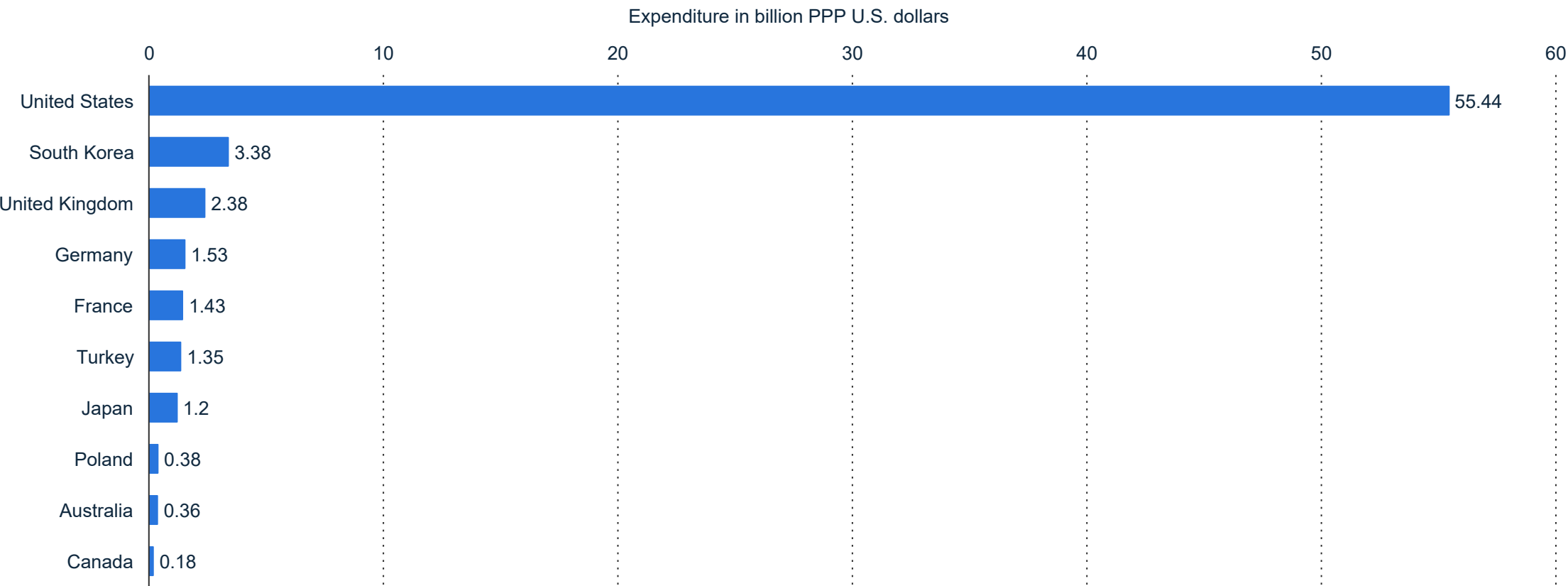
Automotive software market size 2018-2024



Note(s): Worldwide; 2019
Further information regarding this statistic can be found on [page 91](#).
Source(s): Apps Run The World; Statista; [ID 590055](#)

Leading government spending on defense research and development (R&D) among OECD members in 2017, by country (in billion PPP U.S. dollars)

OECD Countries with the highest government R&D spending on defense 2017



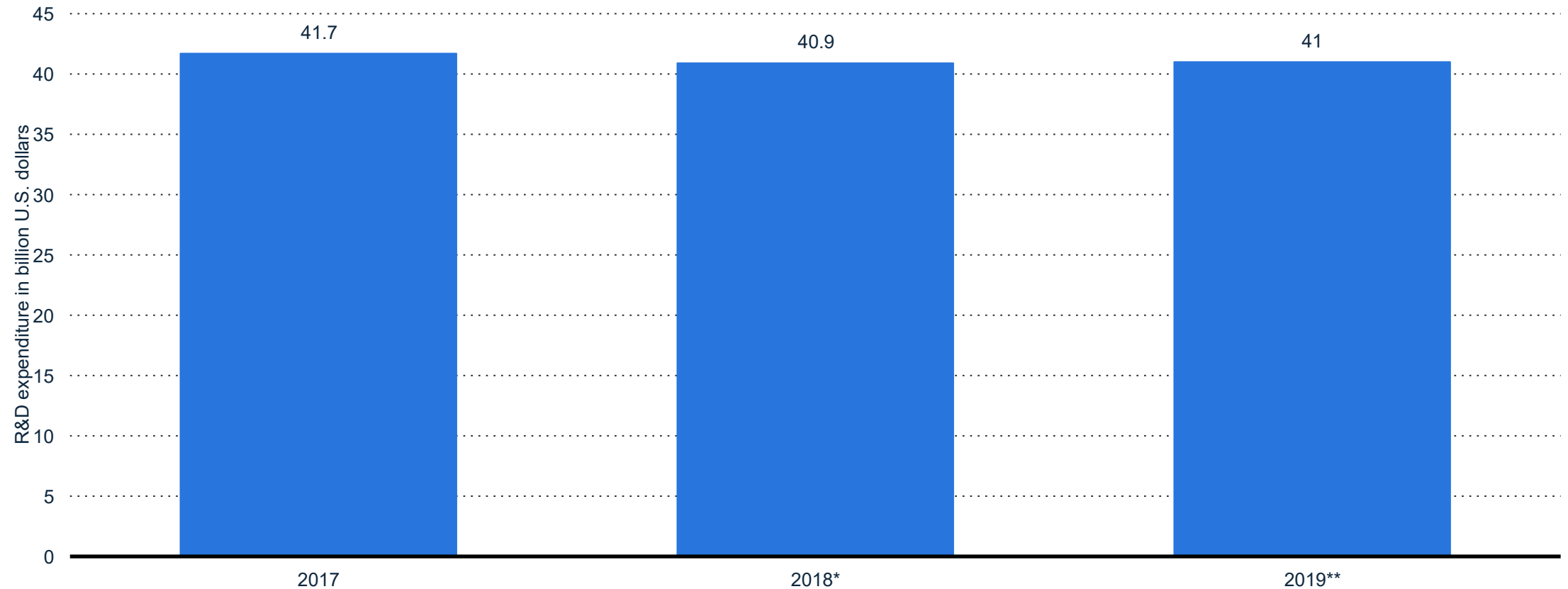
Note(s): Worldwide; 2017
Further information regarding this statistic can be found on [page 92](#).
Source(s): OECD; CRS; [ID 1102845](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Chemicals, Energy & Industrial Manufacturing

Total global research and development (R&D) spending on advanced materials and chemicals from 2017 to 2019

Total R&D spending on advanced materials and chemicals worldwide 2017-2019



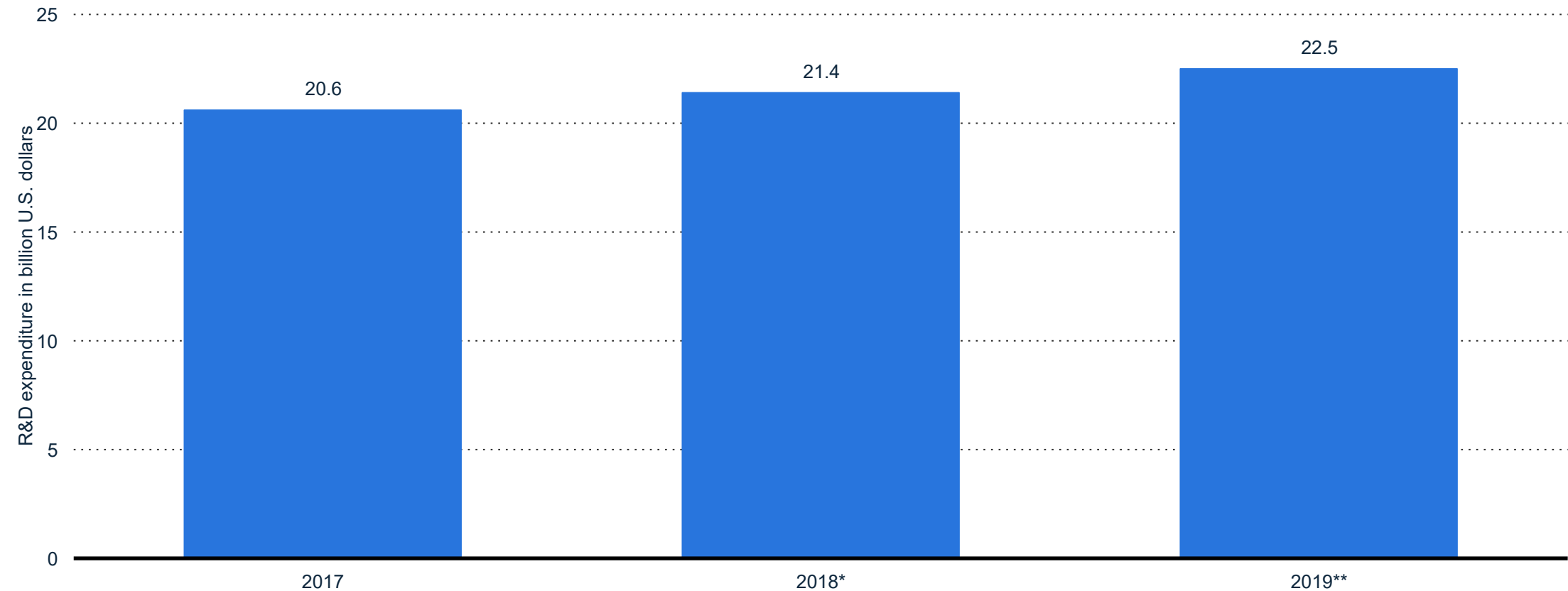
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 93](#).

Source(s): IRI; issuu ; [ID 1102942](#)

Total global research and development (R&D) spending on energy from 2017 to 2019 (in billion U.S. dollars)

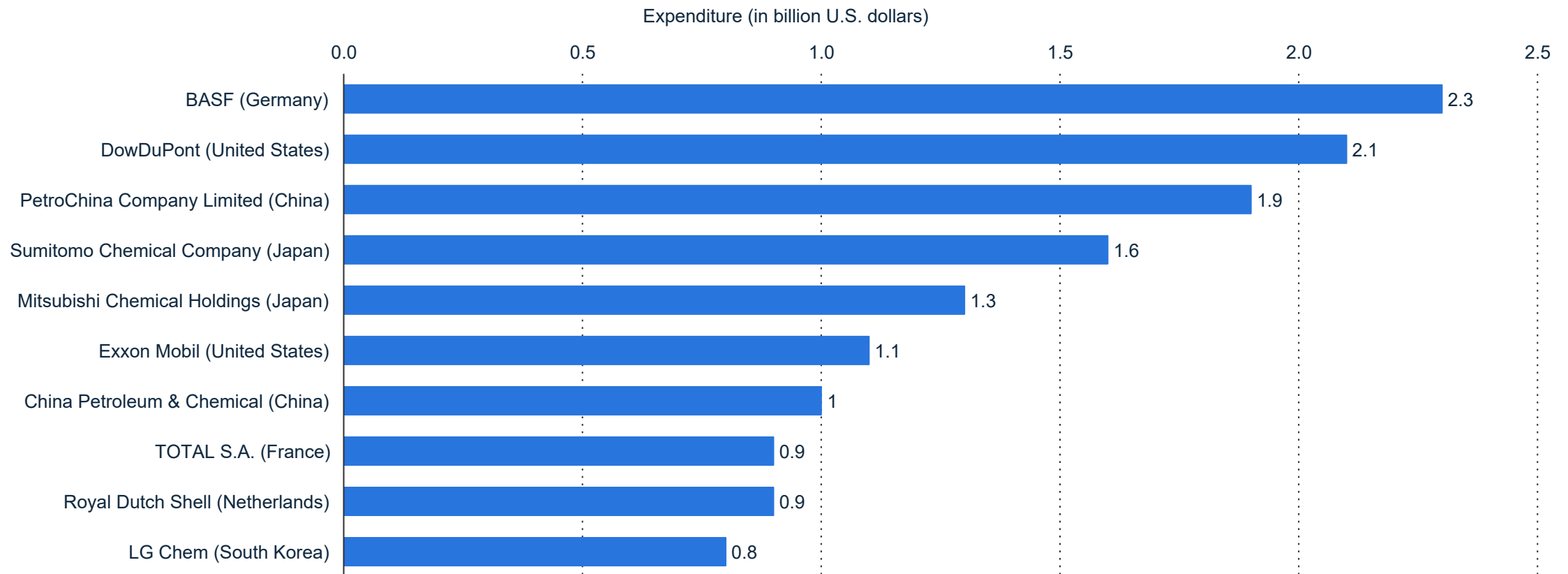
Total R&D spending on energy worldwide 2017-2019



Note(s): Worldwide; 2018
Further information regarding this statistic can be found on [page 94](#).
Source(s): IRI; issuu ; [ID 1102949](#)

Ranking of the leading energy and chemicals companies with the highest spending on research and development (R&D) in 2018 (in billion U.S. dollars)

Energy and chemicals companies with the highest spending on R&D 2018



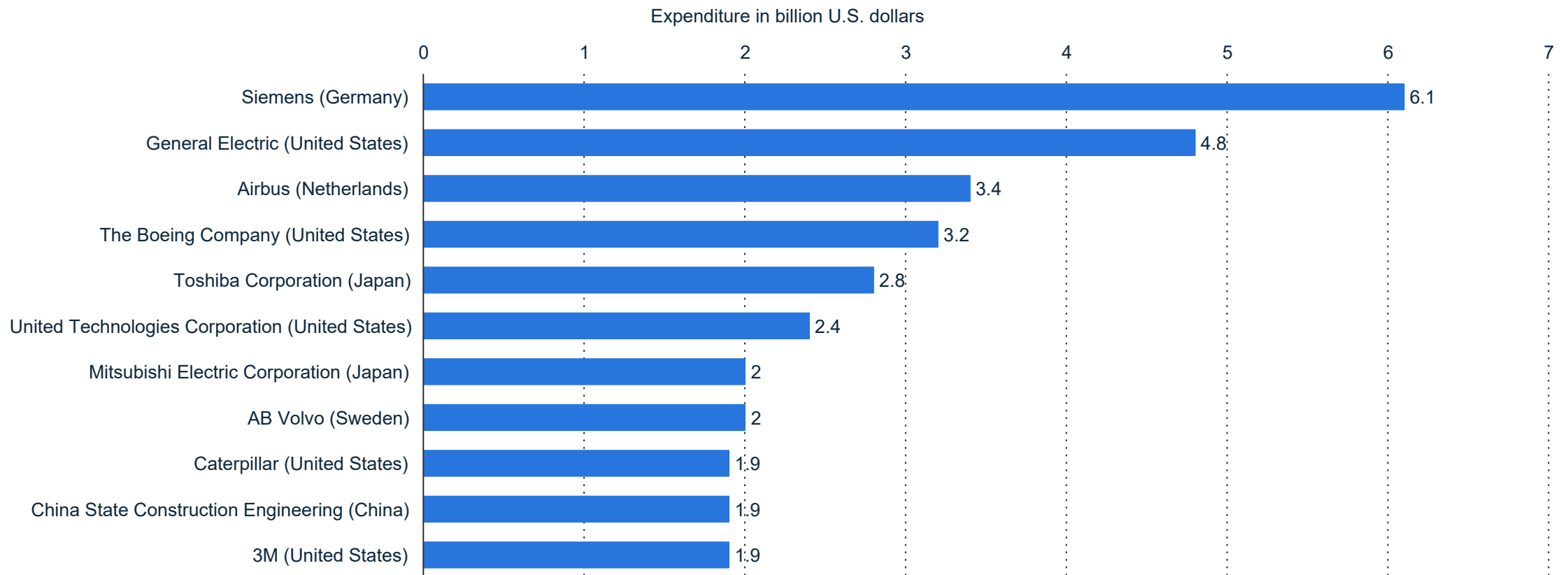
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 95](#).

Source(s): Bloomberg; Capital IQ; Thomson Reuters; [ID 1102877](#)

Ranking of the leading capital goods companies with the highest spending on research and development (R&D) in 2018 (in billion U.S. dollars)

Capital goods companies with the highest spending on R&D 2018



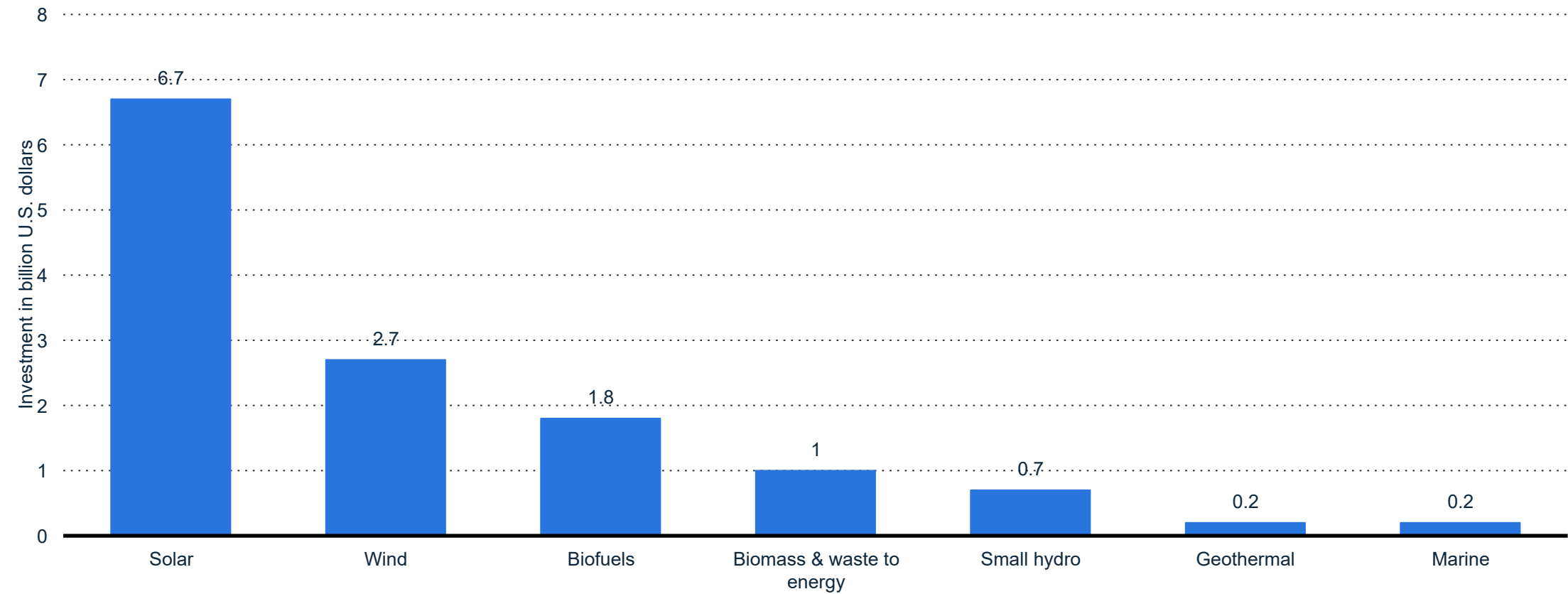
Note(s): Worldwide; 2018

Further information regarding this statistic can be found on [page 96](#).

Source(s): Bloomberg; Capital IQ; Thomson Reuters; [ID 1102865](#)

Research and development investment in renewable energy worldwide in 2019, by sector (in billion U.S. dollars)

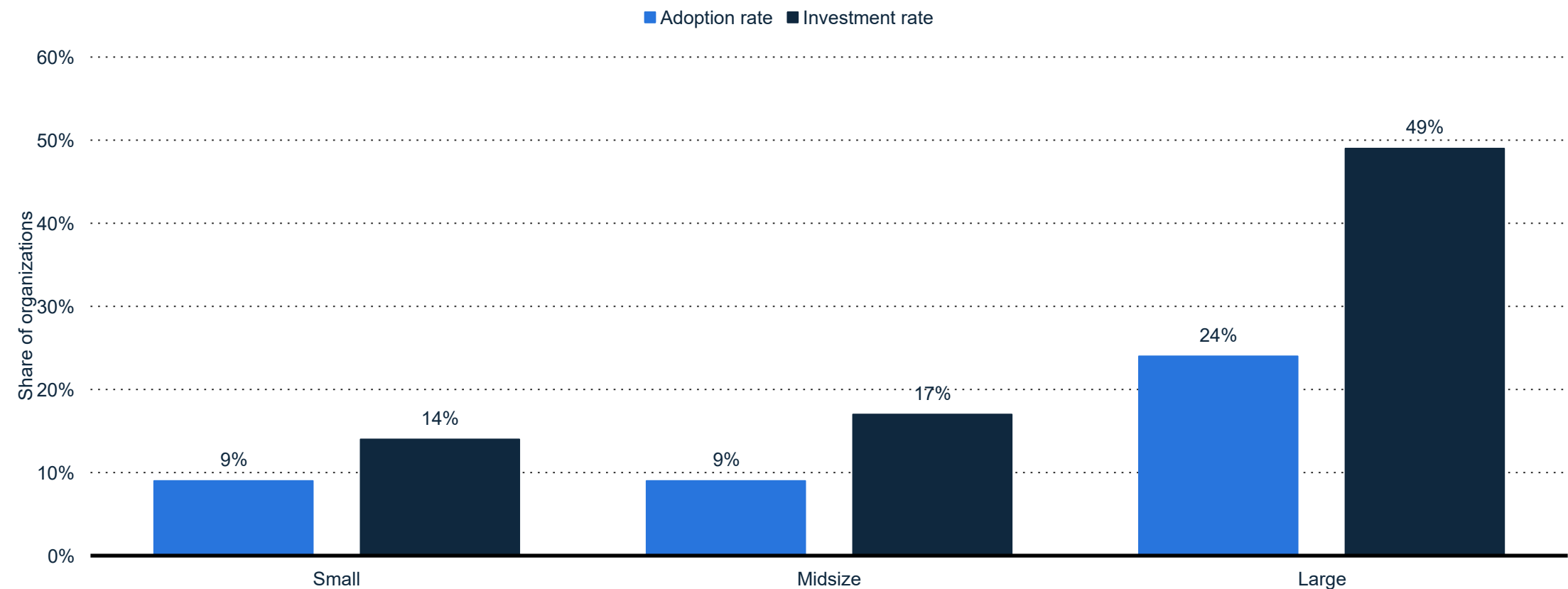
Global R&D investment in clean energy 2019, by sector



Note(s): Worldwide; 2019; includes corporate and government investments.
Further information regarding this statistic can be found on [page 97](#).
Source(s): BloombergNEF; FS-UNEP Collaborating Centre; UNEP; [ID 519522](#)

Robotic process automation (RPA) adoption and investment rates worldwide in 2019, by organization size

RPA adoption and investment rates worldwide 2019, by organization size



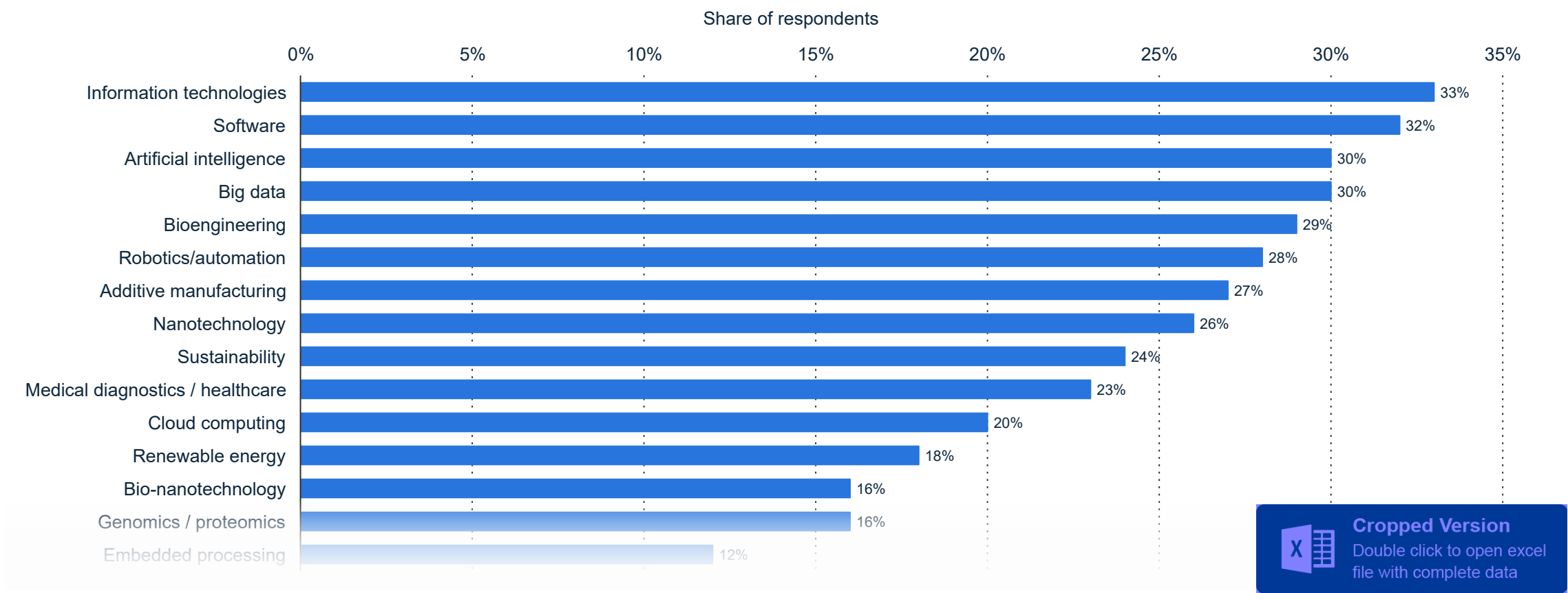
Note(s): Worldwide; 2019
Further information regarding this statistic can be found on [page 98](#).
Source(s): Computer Economics; [ID 1017027](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

Outlook

Ranking of technologies by expected importance worldwide in 2021, as of 2018

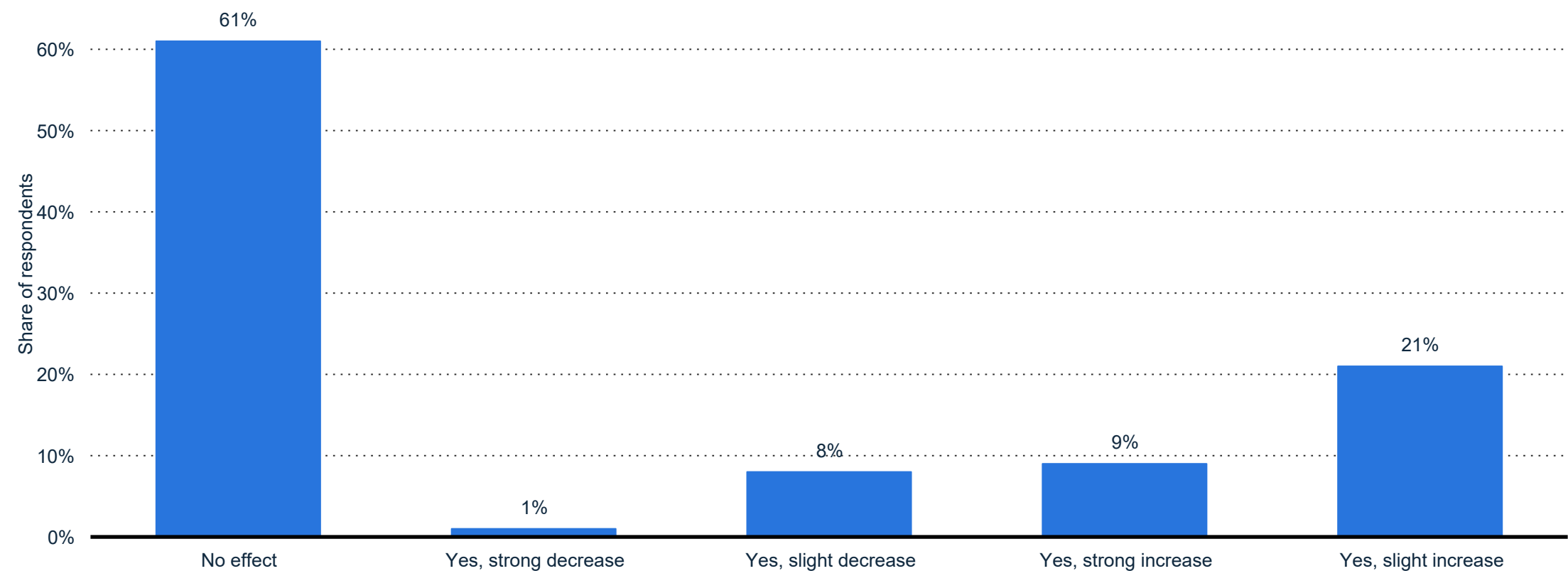
Technologies ranked by importance in 2021, as of 2018



Note(s): Worldwide; June to September, 2018; R&D Magazine readers and members of global R&D community
Further information regarding this statistic can be found on [page 99](#).
Source(s): IRI; [ID 732288](#)

Do stock market changes affect R&D?

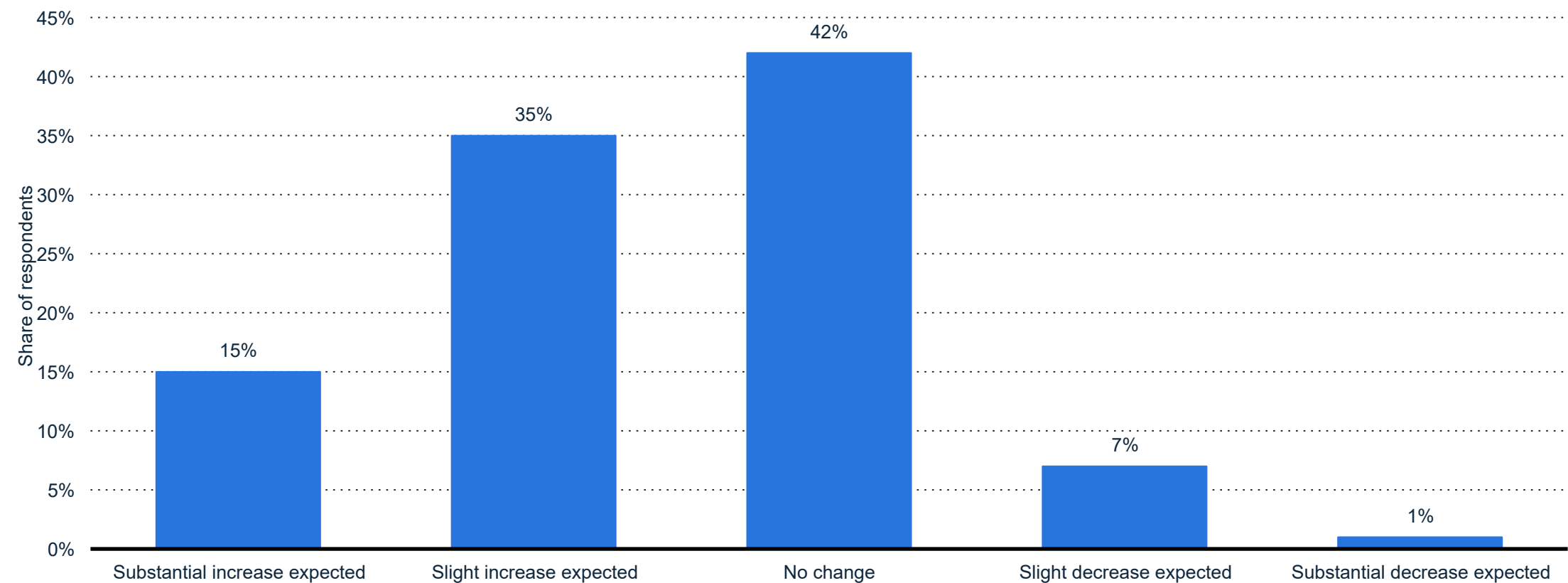
Impact of stock market changes on R&D spending worldwide 2018



Note(s): Worldwide; June to September 2018; R&D Magazine readers
Further information regarding this statistic can be found on [page 100](#).
Source(s): IRI; issue ; [ID 1103654](#)

Expected changes to research and development (R&D) staffing worldwide from 2019 to 2020

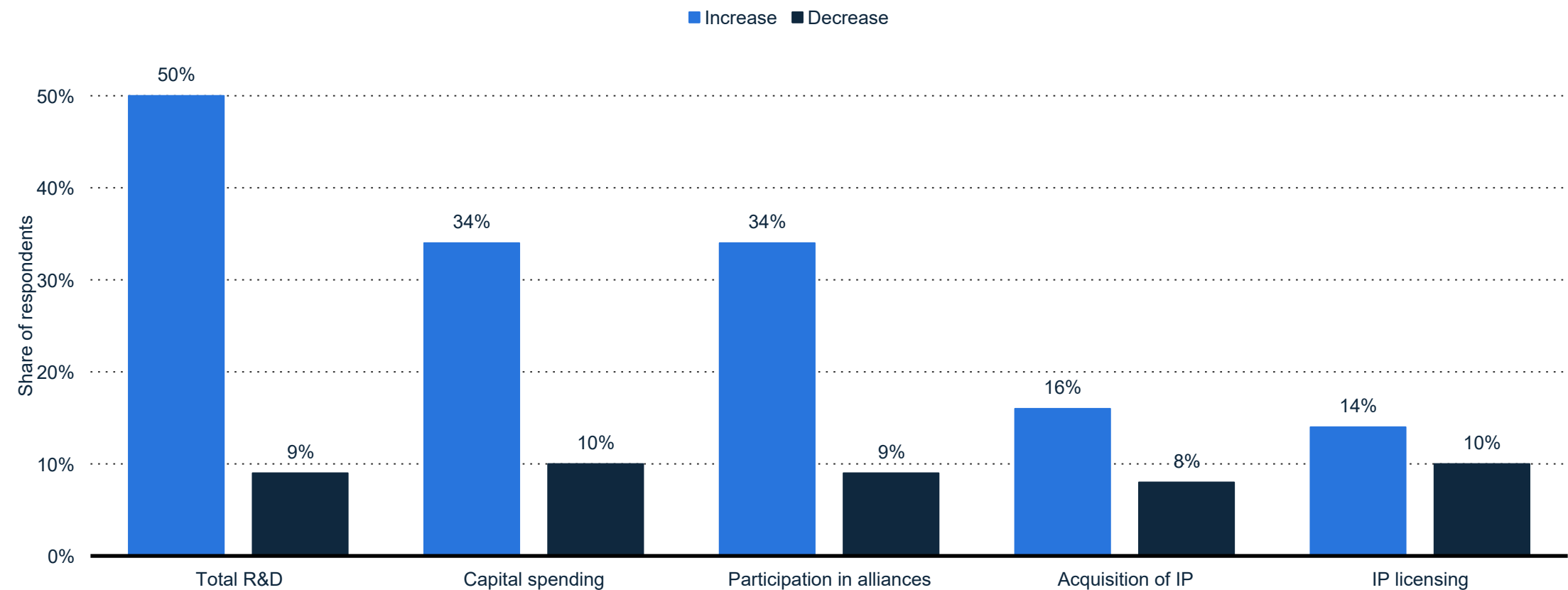
Expected changes to R&D staffing worldwide 2020



Note(s): Worldwide; September 2019; more than 2,100; R&D Magazine readers
Further information regarding this statistic can be found on [page 101](#).
Source(s): IRI; issuu ; [ID 1103673](#)

Expected changes to research and development (R&D) budgets worldwide from 2019 to 2020, by spending category

Expected changes to R&D budgets worldwide by spending category 2020



Note(s): Worldwide; September 2019; more than 2,100; R&D Magazine readers
Further information regarding this statistic can be found on [page 102](#).
Source(s): IRI; issue ; [ID 1103681](#)

RESEARCH AND DEVELOPMENT (R&D) WORLDWIDE

References

Total global spending on research and development (R&D) from 1996 to 2018 (in billion PPP U.S. dollars)

Total global R&D spending 1996-2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | UNESCO Institute for Statistics |
| Conducted by | UNESCO Institute for Statistics |
| Survey period | 1996 to 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | UNESCO Institute for Statistics |
| Publication date | March 2021 |
| Original source | unesco.org |
| Website URL | visit the website |
| Notes: | <i>PPP - Purchasing power parity. The source does not indicate a release date. The date of access was taken as the release date.</i> |

Description

Research and development (R&D) spending reached over 2.23 trillion U.S. dollars globally in 2018 (once local currencies are converted for purchasing power parity). This compares to around one trillion U.S. dollars in 2005, and around 555 billion U.S. dollars in 1996.

[Back to statistic](#)

Gross domestic spending on research and development (R&D) in G7 countries and China from 2000 to 2018, by country (in billion U.S. dollars)

Gross domestic R&D spending in G7 countries and China 2000-2018

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | OECD |
| Conducted by | OECD |
| Survey period | 2000 to 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | OECD |
| Publication date | October 2020 |
| Original source | oecd.org |
| Website URL | visit the website |
| Notes: | <i>The source does not indicate a release date. The date of access was taken as the release date.</i> |

Description

In 2018, gross domestic spending on research and development (R&D) in China came closest that of the United States, reaching 462.58 billion U.S. dollars, compared to 551.52 billion U.S. dollars in the United States. In that year, Japan came a distant third, spending 173.31 billion U.S. dollars on R&D.

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Leading countries by gross research and development (R&D) expenditure worldwide in 2021 (in billion U.S. dollars)

Leading countries by R&D spending worldwide 2021

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI |
| Conducted by | IRI |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | Derived from purchasing power parity calculations |
| Published by | IRI |
| Publication date | February 2021 |
| Original source | rdworldonline.com |
| Website URL | visit the website |
| Notes: | <i>Forecasted values.</i> |

Description

According to the forecast for 2021, China will be the leading country worldwide in terms of spending on research and development, with R&A expenditure exceeding 621 billion U.S. dollars. The United States is expected to invest about 598.7 billion U.S. dollars into research and development.

[Back to statistic](#)

Leading countries by research and development (R&D) expenditure as share of gross domestic product (GDP) worldwide in 2021

Leading countries by R&D spending as share of GDP globally 2021

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI |
| Conducted by | IRI |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | Derived from purchasing power parity calculations |
| Published by | IRI |
| Publication date | February 2021 |
| Original source | rdworldonline.com |
| Website URL | visit the website |
| Notes: | <i>Forecasted values. Values are limited to the top 40 countries by total R&D spending in U.S. dollars, adjusted for purchasing power parity (PPP).</i> |

Description

In 2021, South Korea is expected to invest the equivalent of 4.35 percent of the country's GDP into research and development. In Israel, the expenditure on R&A is predicted to amount to 4.04 of the GDP.

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Distribution of research and development (R&D) spending worldwide from 2017 to 2020, by country/region

Share of total R&D spending worldwide by region/country 2017-2020

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI |
| Conducted by | IRI |
| Survey period | 2017 to 2019 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | IRI |
| Publication date | March 2020 |
| Original source | rdworldonline.com |
| Website URL | visit the website |
| Notes: | <i>* Estimated values. ** Forecasted values. Values prior to 2018 taken from prior Global R&D Funding Forecast reports released by the source, available here .</i> |

Description

The statistic reveals the distribution of global research and development (R&D) investment or spending from 2017 to 2020. In 2020, it is forecast that the United States will account for around 23.2 of worldwide spending on research and development. Global growth in R&D spending has been largely driven by increases in Asian countries, particularly China.

[Back to statistic](#)

Ranking of the 20 companies with the highest spending on research and development in 2018 (in billion U.S. dollars)

Companies with the highest spending on research and development 2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Bloomberg; Capital IQ; Thomson Reuters |
| Conducted by | Bloomberg; Capital IQ; Thomson Reuters |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | PwC |
| Publication date | October 2018 |
| Original source | The 2018 Global Innovation 1000, page 32 |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

Amazon spent the most on research and development in 2018, with about 22.6 billion U.S. dollars. Alphabet, Volkswagen, Samsung, and Intel rounded out the top five of companies with the highest R&D spending.

Leading by innovation

Spending money on research and development, or R&D, is how a company innovates new technologies and conducts research to develop new products and services. R&D allows companies, such as Amazon, to stay ahead of their competition and work towards the future. Most of the R&D spending in the world is in computing and electronics , and the United States is the leading country for R&D expenditure in the world .

AI and R&D

Currently many companies are investing in Artificial Intelligence (AI) innovation, including the ethical implications of AI and how it can be used to better society as a whole. Major companies, such as Amazon and Alphabet , are throwing their collective weight into this issue and conducting research into its future applications. With the world's leading companies spending billions of dollars on R&D, the future of AI is sure to progress quickly.

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Percentage of global research and development spending in 2018, by industry

Percentage of global R&D spending, by industry 2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Bloomberg; Capital IQ; Thomson Reuters |
| Conducted by | Bloomberg; Capital IQ; Thomson Reuters |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | PwC |
| Publication date | October 2018 |
| Original source | The 2018 Global Innovation 1000, page 29 |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

This statistic shows the percentage of global research and development spending in 2018, by industry. In 2018, about 2.8 percent of global research and development spending was made by the aerospace and defense industry. Lockheed Martin's expenditure on research and development in 2017, for example, stood at 1.2 billion U.S. dollars.

Additional information on research and development in the healthcare industry

The pharmaceutical and medical care companies that service the global healthcare industry have a large influence on the degree of global research and development occurring. The pharmaceuticals and biotechnology industry had the highest percentage of spending on research and development of total revenue from 2012 to 2016 . In 2016, the industry spent 15 percent of total revenue on research and development. The nature of the sector requires companies to invest in research in order to remain competitive. Projections on the worldwide research and development spending in medical technology from 2011 to 2024 suggest that total spending in 2024 will reach 38.9 billion dollars, a significant increase on the 23.4 billion spent in 2011.

The high degree of financial risk as well as the high costs associated with conducting medical research means that a smaller number of large companies tend to dominate the market and thus dominate subsequent research. One such firm is Johnson & Johnson who increased spending on research and development from around 6.5 billion dollars in 2005 to over 10.5 billion in 2017 . Such increases in spending suggest further the competitive nature of the market and that even the larger dominant firms must remain ahead of the competition.

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Distribution of research and development (R&D) spending worldwide in 2020, by end use

Distribution of R&D expenditure globally 2020, by end use

Source and methodology information

| | |
|-------------------------|-----------------------------------|
| Source(s) | IRI |
| Conducted by | IRI |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | IRI |
| Publication date | February 2021 |
| Original source | rdworldonline.com |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

In 2020, salaries consumed about 26 percent of global research and development budget. Another 15.8 percent of the budget was dedicated to materials.

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Share of global research and development (R&D) spending in 2018, by region and industry

R&D spending shares by region and industry 2018

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | Strategy+Business; S&P Capital IQ; Thomson Reuters; Strategy& |
| Conducted by | Strategy+Business; S&P Capital IQ; Thomson Reuters; Strategy& |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Strategy+Business; S&P Capital IQ |
| Publication date | October 2018 |
| Original source | strategy-business.com |
| Website URL | visit the website |
| Notes: | <i>Percentages may not total 100 percent due to rounding.</i> |

Description

In 2018, North America spent the most on research and development (R&D) across four sectors: aerospace and defense with 47 percent of global R&D expenditure, computing and electronics with 38 percent, healthcare with 49 percent, and software and internet with 61 percent. However, Japan had the largest share of R&D expenditure for automotive (27 percent) and chemicals and energy (34 percent).

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Most innovative countries in 2020, by global innovation index score

Most innovative countries by GII score 2020

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | WIPO |
| Conducted by | WIPO |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | n.a. |
| Age group | n.a. |
| Special characteristics | n.a. |
| Published by | WIPO |
| Publication date | September 2020 |
| Original source | The Global Innovation Index (GII) 2020, page xxxii |
| Website URL | visit the website |
| Notes: | <i>The GI</i> provides detailed innovation metrics for a total of 131 economies. All economies covered represent 93.5% of the world's population and 97.4% of the world's GDP. The overall GI score is the average of the Input and Output Sub-Index scores. More information on the methodology available here . |

Description

According to the the Global Innovation Index (GII) in 2020, Switzerland was the most innovative country in the world, with an overall GI score of 66.08 out of 100. Sweden ranked second, with a score of 62.47, while the United States was third with 60.56.

[Back to statistic](#)

Average research intensity of OECD countries in 2016, by industry

Research intensity by industry in OECD countries 2016

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | OECD |
| Conducted by | OECD |
| Survey period | 2016** |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | OECD |
| Publication date | November 2019 |
| Original source | oecd.org |
| Website URL | visit the website |
| Notes: | <i>* Sub-categories of manufacturing, so are also included in the value for total manufacturing. **2016 or latest year available. Research intensity is calculated as business expenditure on research and development as a proportion of gross value added.</i> |

Description

On average, electronic and optical products were the most research-intensive in OECD countries in 2016, with research and development expenditure constituting 16.6% of the gross value added by businesses in this sector. Construction was the lowest research intensive industry, with a research intensity of 0.18 percent in this year.

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Exports of high research and development (R&D) intensive products from 2005 to 2018, by country (in billion U.S. dollars)

Exports of high R&D intensive products by country 2005-2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | NCSES; Oxford Economics |
| Conducted by | NCSES; Oxford Economics |
| Survey period | 2005 to 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | NCSES |
| Publication date | January 2020 |
| Original source | nces.nsf.gov |
| Website URL | visit the website |
| Notes: | <i>High R&D intensive products include aircraft; pharmaceuticals; and computer, electronic, and optical products classified by the Organisation for Economic Co-operation and Development. China includes Hong Kong, and excludes bilateral flows between mainland China and Hong Kong. Other selected Asia inc [...] For more information visit our Website</i> |

Description

Between 2005 and 2018, Chinese exports of R&D intensive products increased from 227.75 billion U.S. dollars to 647.8 billion U.S. dollars, making their export market the largest of any single country. However, taken together, the value of the European Union R&D intensive export market is higher, amounting to 862.1 billion U.S. dollars in 2018.

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Exports of medium-high research and development (R&D) intensive products from 2005 to 2018, by country (in billion U.S. dollars)

Exports of medium-high R&D intensive products by country 2005-2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | NCSES; Oxford Economics |
| Conducted by | NCSES; Oxford Economics |
| Survey period | 2005 to 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | NCSES |
| Publication date | January 2020 |
| Original source | nces.nsf.gov |
| Website URL | visit the website |
| Notes: | <i>Medium-high R&D intensive products include weapons and ammunition; motor vehicles; medical and dental instruments; machinery and equipment; chemicals and chemical products; electrical equipment; and railroad, military vehicles, and transport classified by the Organisation for Economic Co-operation a [...] For more information visit our Website</i> |

Description

The European Union has a far larger export market for medium-high research and development (R&D) intensive products than any other country, amounting to 2.5 trillion U.S. dollars in 2018. This compares to around 696.88 billion U.S. dollars for China, and 588.75 billion U.S. dollars for the United States in the same year.

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Total global spending on pharmaceutical research and development from 2012 to 2026 (in billion U.S. dollars)

Total global pharmaceutical R&D spending 2012-2026

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | Evaluate |
| Conducted by | Evaluate (EvaluatePharma) |
| Survey period | as of May 2021 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Evaluate |
| Publication date | July 2021 |
| Original source | EvaluatePharma - World Preview 2021, Outlook to 2026, page 23 |
| Website URL | visit the website |
| Notes: | <i>* All values are projected from 2021 on.</i> |

Description

In 2020, research and development spending in the pharmaceutical industry totaled nearly 200 billion U.S. dollars globally. For comparison, R&D expenditures totaled 137 billion dollars in 2012. Pharmaceutical R&D includes all steps from the initial research of disease processes, the compound testing over pre-clinical, and all clinical trial stages . At a certain point in the process – mostly during the pre-clinical phase – a governmental authority is involved to overview, regulate, and ultimately approve the drug . In the United States, the Food and Drug Administration is the principal agency associated with processes.

The pressure to innovate
In comparison to other industries, pharmaceutical companies are more driven by the imperative to manufacture innovative products , and thus to spend significant amounts on research and development. This is largely due to the time-limited patent protection of drugs and the following threat of sales erosion through generic and biosimilar competition . Two major effects of patent expirations for the pharma industry are a specific high R&D intensity and a growing focus on specialty drugs to diversify their product portfolio.

The latest trends
For the last several years, major developments in pharmaceutical research and development have begun to change the R&D landscape. A growing number of drug manufacturers are outsourcing large parts of R&D , mostly to clinical research organizations (also contract research organizations), with the main aim to reduce costs. Another important development is the use of big data in clinical research . Thus, a predictive modeling is possible which uses clinical and molecular data to develop safer and more efficient drugs. Particularly, real-time or real-world evidence (RWE) is becoming a greater interest . This makes cooperation with technology companies necessary and includes data gathered from various sources, even that of social media.

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Distribution of pharmaceutical R&D companies worldwide by country in 2021*

Distribution of pharmaceutical R&D companies by region 2021

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Pharma Intelligence |
| Conducted by | Pharma Intelligence (Pharmaprojects) |
| Survey period | as of January 2021 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Pharma Intelligence |
| Publication date | May 2021 |
| Original source | Pharma R&D Annual Review 2021, page 16 |
| Website URL | visit the website |
| Notes: | <i>* Based on headquarters of R&D companies.</i> |

Description

This statistic shows the distribution of pharmaceutical R&D companies worldwide by country or region, as of January 2021. As of that moment, almost half of all pharmaceutical R&D companies were headquartered in the United States.

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Leading 50 global pharmaceutical companies by prescription sales and R&D spending in 2020 (in billion U.S. dollars)

Top 50 pharmaceutical companies - Rx sales and R&D spending 2020

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Pharmaceutical Executive; Evaluate (EvaluatePharma); Various sources (company data) |
| Conducted by | Pharmaceutical Executive; Various sources (company data); Evaluate (EvaluatePharma) |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | n.a. |
| Age group | n.a. |
| Special characteristics | n.a. |
| Published by | Pharmaceutical Executive |
| Publication date | June 2021 |
| Original source | pharmexec.com |
| Website URL | visit the website |
| Notes: | No value means no data available. "0" in fact means larger than 0 and smaller than 0,01. * Formed through the merger of Mylan and Upjohn on Nov. 16, 2020. ** 2020 data for Allergan is Evaluate's broker-derived consensus estimates for Allergan's WW Rx Sales and R&D Spend from January to May 8, 2020, [...] For more information visit our Website |

Description

The top 50 pharmaceutical companies by prescription sales in 2020 – and their research and development (R&D) spending – included big name companies such as Pfizer, Novartis, and Merck &Co. During that year, Roche's Rx sales were approximately 48 billion dollars. Thus, the Swiss pharma giant was both the largest pharmaceutical company based on pure pharma revenue worldwide and the top pharmaceutical company based on R&D spending. Roche spent 11.3 billion U.S. dollars on R&D in that year.

Pharmaceutical R&D spending
Research and development in the pharmaceutical industry involves the identification and development of compounds used to make new drugs. The pharmaceutical industry has the largest percentage of spending attributable to R&D among all industries. Research and development spending in the pharmaceutical industry around the world is increasing over time. However, there have been variations in the growth of research and development spending with significant declines in 2015 and 2019.

New pharmaceutical products
The goal of R&D is to produce new drugs and compounds. Globally, the U.S. pharmaceutical industry created the largest number of new drugs and compounds between 2015 and 2019, followed by Europe. Among U.S. pharmaceutical companies, there are various levels of success for new drugs depending on the phase of development. The data shows that between phase I and II alone, already over half of all drugs are failing.

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Select leading global biotechnology companies' R&D expenditure in 2020* (in million U.S. dollars)

Top global biotech companies - R&D expenditure 2020

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | Various sources; Pharmaceutical Executive; Statista |
| Conducted by | Various sources (company data); Pharmaceutical Executive; Statista |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Statista |
| Publication date | June 2021 |
| Original source | <i>n.a.</i> |
| Website URL | visit the website |
| Notes: | <i>* The statistic includes pure-play or predominantly biotech companies. All values are rounded. The statistic was assembled from the annual/financial reports of the regarding companies. ** Based on exchange rate at December 31, 2020.</i> |

Description

This statistic depicts R&D expenditures of some of the global leading companies in biotechnology in 2020. In that year, Danish biopharmaceutical manufacturer Novo Nordisk spent around 2.37 billion U.S. dollars on research and development.

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Distribution of total global funding on research and development for selected diseases from 2014 to 2019

Distribution of total funding on R&D for selected diseases 2014-2019

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Policy Cures |
| Conducted by | Policy Cures |
| Survey period | 2014 to 2019 |
| Region(s) | Worldwide |
| Number of respondents | n.a. |
| Age group | n.a. |
| Special characteristics | n.a. |
| Published by | Policy Cures |
| Publication date | April 2021 |
| Original source | G-Finder - Neglected Disease Research and Development 2020, page 13 |
| Website URL | visit the website |
| Notes: | <i>This statistic was assembled from several editions of the G-Finder report. Please note that some of the diseases listed above are actually groups of diseases, such as the diarrhoeal illnesses and helminth infections. This reflects common practice and also the shared nature of research in some areas. [...] For more information visit our Website</i> |

Description

The statistic shows the distribution of total global funding on research and development for selected diseases from 2014 to 2019. In 2019, the share of funding on research and development on HIV and AIDS amounted to 38 percent.

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Allocation of research and development investments in pharmaceutical industry in 2019, by function

Allocation of R&D investments in pharmaceutical industry by function 2019

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | PhRMA; EFPIA |
| Conducted by | PhRMA |
| Survey period | 2019 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | EFPIA |
| Publication date | June 2021 |
| Original source | EFPIA Key Data 2021 - The Pharmaceutical Industry in Figures, page 8 |
| Website URL | visit the website |

Notes: *EFPIA: European Federation of Pharmaceutical Industries and Associations * Phase I to III are part of clinical trials. Note: PhRMA, Annual Membership Survey 2020 (percentages calculated from 2019 data; total values may be affected by rounding)*

Description

This statistic displays the pharmaceutical industry's research and development investment allocation by select functions in 2019. The pharmaceutical industry spent 15.7 percent of research and development investments during pre-human or pre-clinical stages.

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Global top 10 pharmaceutical companies based on projected R&D spending in 2026 (in billion U.S. dollars)

Global top pharmaceutical companies based on R&D spending 2026

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | Evaluate |
| Conducted by | Evaluate (EvaluatePharma) |
| Survey period | as of May 2021 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Evaluate |
| Publication date | July 2021 |
| Original source | EvaluatePharma - World Preview 2021, Outlook to 2026, page 24 |
| Website URL | visit the website |
| Notes: | <i>All values are projections.</i> |

Description

In 2026, Swiss-based Roche is projected to spend 14 billion U.S. dollars on pharmaceutical research and development. Other companies with high projected R&D expenditures are Merck, Pfizer, and Johnson & Johnson.

Expenditure per country

The United States is projected to spend between 605 and 635 billion U.S. dollars on medicine in 2025 . Current expenditures, as well as future estimates for the United States, are significantly higher than those of other high-spending countries, such as Japan and Germany. Japan, for example, is expected to spend between 75 and 95 billion U.S. dollars on pharmaceuticals that year.

Johnson & Johnson

Johnson & Johnson is a major pharmaceutical company, which had a total employee count of about 135 thousand people in 2020, headquartered in New Jersey, United States. The multinational company produces various pharmaceutical products , including Telara, Remicade, Zytiga, Imbruvica, and Darzalex. In 2020, Stelara was Johnson & Johnson's top drug, earning the company almost 7.7 billion U.S. dollars in revenue. However, Johnson & Johnson has also significant medical devices and consumer products divisions.

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Projected rate of return on biopharmaceutical research and development investments from 2010 to 2019

Projected return on biopharma R&D investments U.S. 2010-2019

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | PhRMA; Deloitte |
| Conducted by | Deloitte |
| Survey period | 2010 to 2019 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | 12 large cap biopharma companies |
| Published by | PhRMA |
| Publication date | December 2020 |
| Original source | Chart Pack - Biopharmaceuticals in Perspective (2020), page 57 |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

This statistic shows the projected internal rate of return on investments in research and development for large cap biopharmaceutical companies from 2010 to 2019. The percentage return on R&D investments decreased from 10.1 percent in 2010 to some 1.8 percent in 2019.

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Top 10 pharmaceutical companies based on R&D spending as revenue share in 2019 and 2026*

R&D spending share of top pharmaceutical companies 2019 and 2026

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Evaluate |
| Conducted by | Evaluate (EvaluatePharma) |
| Survey period | as of June 2020 |
| Region(s) | Worldwide |
| Number of respondents | n.a. |
| Age group | n.a. |
| Special characteristics | n.a. |
| Published by | Evaluate |
| Publication date | July 2020 |
| Original source | EvaluatePharma - World Preview 2020, Outlook to 2026, page 25 |
| Website URL | visit the website |
| Notes: | <i>* R&D spending as a share of total prescription revenue. The statistic includes the 10 companies with the highest amount of R&D spending dollars forecasted for 2026.</i> |

Description

In 2019, pharmaceutical companies AstraZeneca and Eli Lilly spent about 23 and 28 percent of their prescription drug revenue on research and development, respectively. The companies are predicted to spend some four to five percent less of their revenues on R&D in 2026.

Global R&D spending

In 2019, the pharmaceutical industry spent 186 billion U.S. dollars on research and development , which is an increase of over five billion compared to the previous year. By 2026, expenditures are expected to reach a total of over 230 billion U.S. dollars. Some 17,700 prescription drugs were in the 2020 R&D pipeline , a global number that has been growing with each consecutive year. The drug count has doubled since 2006 and is set to increase even further in the future.

AstraZeneca

AstraZeneca is a British-Swedish multinational pharmaceutical company, based in Cambridge, United Kingdom. The company's top product in 2019 was Symbicort, which is used for controlling and preventing symptoms of asthma. The product generated close to 2.5 billion U.S. dollars in revenue that year. Revenue earned through Symbicort has decreased each year since 2015.

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Information and communication technology (ICT) research and development (R&D) expenditure in the United States and worldwide, from 2015 to 2019 (in billion U.S. dollars)

ICT research and development expenditure in U.S. and worldwide 2015-2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI |
| Conducted by | IRI |
| Survey period | 2015 to 2019 |
| Region(s) | Worldwide, United States |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | IRI |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 19 |
| Website URL | visit the website |
| Notes: | <i>Values prior to 2017 taken from previous editions.</i> |

Description

The statistic shows the amount of money spent on information and communication technology research and development (R&D) in the United States and worldwide, from 2015 to 2019. In 2019, global spending on information and communication research and development is expected to reach 239 billion U.S. dollars, while U.S. spending alone will amount to almost 130 billion U.S. dollars.

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Total global research and development (R&D) spending on information and communications from 2017 to 2019 (in billion U.S. dollars)

Total R&D spending on information and communications worldwide 2017-2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 19 |
| Website URL | visit the website |
| Notes: | <i>* Estimated values. ** Forecasted values.</i> |

Description

Global R&D spending in the information and communications sector is anticipated to increase to 239 billion U.S. dollars in 2019. Of this total, just over half - some 130 billion U.S. dollars - is expected to come from the United States.

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Ranking of the leading technology hardware & equipment companies with the highest spending on research and development (R&D) in 2018 (in billion U.S. dollars)

Technology hardware & equipment companies with the highest spending on R&D 2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Bloomberg; Capital IQ; Thomson Reuters |
| Conducted by | Bloomberg; Capital IQ; Thomson Reuters |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | PwC |
| Publication date | October 2018 |
| Original source | The 2018 Global Innovation 1000 |
| Website URL | visit the website |
| Notes: | <i>Included are companies who produce technology hardware & equipment, as well as producers of semiconductors & semiconductor equipment.</i> |

Description

In 2018, the technology hardware manufacturer that spent the most on research and development (R&D) was South Korean giant Samsung, with an R&D expenditure of 15.3 billion U.S. dollars. Their main rival in the smartphone market, Apple, was ranked third with 11.6 billion U.S. dollars in R&D spending, behind microprocessor manufacturer Intel, who spent 13.1 billion U.S. dollars.

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Leading R&D spenders in software and computer services sector worldwide in 2019/20, by company (in million euros)

Top software and computer services R&D investors worldwide 2020, by company

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | IRI; Joint Research Centre |
| Conducted by | IRI; Joint Research Centre |
| Survey period | 2019 to 2020 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | IRI; Joint Research Centre |
| Publication date | January 2020 |
| Original source | The 2020 EU Industrial R&D Investment Scoreboard |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

The statistic shows the top 20 R&D spenders in the software and computer services sector worldwide in 2019/20. That year, Alphabet, the parent company of Google, spent around 23.2 billion euros on research and development.

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Revenues from the artificial intelligence (AI) software market worldwide from 2018 to 2025 (in billion U.S. dollars)

Artificial intelligence software market revenue worldwide 2018-2025

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Omdia |
| Conducted by | Omdia |
| Survey period | 2018 to 2020 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Omdia |
| Publication date | March 2020 |
| Original source | Artificial Intelligence Market Forecasts |
| Website URL | visit the website |
| Notes: | <i>*Forecast</i> |

Description

The global artificial intelligence (AI) software market is forecast to grow rapidly in the coming years, reaching around 126 billion U.S. dollars by 2025. The overall AI market includes a wide array of applications such as natural language processing, robotic process automation, and machine learning.

What is artificial intelligence?

Artificial intelligence refers to the capability of a machine that is able to replicate or simulate intelligent human behaviours such as analysing and making judgments and decisions. Originated in the computer sciences and a contested area in philosophy, artificial intelligence has evolved and developed rapidly in the past decades and AI use cases can now be found in all corners of our society: the digital voice assistants that reside in our smartphones or smart speakers, customer support chatbots, as well as industrial robots.

Investments in AI

Many of the biggest names in the tech industry have invested heavily into both AI acquisitions and AI related research and development. When it comes to AI patent applications by company , Microsoft, IBM, Google, and Samsung have each submitted thousands of such applications, and funding for AI related start-ups are raking in dozens of billions of dollars each year.

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Forecast compound annual growth rate of the cloud applications market by segment from 2017 to 2022

Cloud applications market CAGR 2017-2022, by segment

Source and methodology information

| | |
|-------------------------|-----------------------------------|
| Source(s) | Apps Run The World |
| Conducted by | Apps Run The World |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Apps Run The World |
| Publication date | January 2019 |
| Original source | appsruntheworld.com |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

This statistic shows the compound annual growth rate of the cloud applications market by segment from 2017 to 2022. The 2017-2022 CAGR for the analytics and business intelligence segment is expected to be 3.3 percent.

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Total global research and development (R&D) spending on automotive from 2017 to 2019

Total R&D spending on automotive worldwide 2017-2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 17 |
| Website URL | visit the website |
| Notes: | <i>* Estimated values. ** Forecasted values.</i> |

Description

Global R&D spending in the automotive sector is anticipated to increase to 103.1 billion U.S. dollars in 2019. The majority of this investment is from Europe and Japan , which in 2018 accounted for 24 and 27 percent of global investment in this sector.

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Total global research and development (R&D) spending on aerospace and defense from 2017 to 2019

Total R&D spending on aerospace and defense worldwide 2017-2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 16 |
| Website URL | visit the website |
| Notes: | <i>* Estimated values. ** Forecasted values.</i> |

Description

Global R&D spending in the aerospace and defense sector is anticipated to increase to 32 billion U.S. dollars in 2019. Of this total, just under half - some 15.9 billion U.S. dollars - is expected to come from the United States.

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Leading automotive firms by research and development spending worldwide in FY 2020 (in billion U.S. dollars)

Global R&D spending: key companies in the automotive sector 2020

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Statista; Various sources |
| Conducted by | Various sources (Annual reports) |
| Survey period | FY 2020 |
| Region(s) | Worldwide |
| Number of respondents | n.a. |
| Age group | n.a. |
| Special characteristics | n.a. |
| Published by | Statista |
| Publication date | September 2021 |
| Original source | Annual reports |
| Website URL | visit the website |
| Notes: | <i>* These figures have been converted from euros to U.S. dollars at the following rate, correct as of September 20, 2021: 1 EUR = 1.1709644 USD; ** this figure has been converted from Japanese yen to U.S. dollars at the following rate, correct as of September 20, 2021: 1 JPY = 0.0091 USD; the figure i [...] For more information visit our Website</i> |

Description

This graph portrays the leading automotive companies as of 2020, based on their research and development expenditures. In the 2020 fiscal year, U.S.-based carmaker Ford reported research and development costs of around seven billion U.S. dollars.

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Aerospace and defense companies with the highest spending on research and development (R&D) in 2019 (in billion U.S. dollars)

Aerospace and defense companies with the highest spending on R&D 2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 16 |
| Website URL | visit the website |
| Notes: | <i>Forecasted values.</i> |

Description

In 2019, it is forecast that Boeing will spend the most on research and development (R&D) of any aerospace and defense company, with an R&D expenditure of 3.18 billion U.S dollars. This is over twice as much as the 1.55 billion U.S. dollars that BAE Systems, the next-largest aerospace and defense R&D spender, is expected to spend in that year.

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Selected automakers' R&D intensity worldwide in FY 2020

R&D intensity of selected automakers worldwide 2020

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | Statista; Various sources |
| Conducted by | Various sources (Company data); Statista |
| Survey period | FY 2020/21 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Statista |
| Publication date | October 2021 |
| Original source | Company information |
| Website URL | visit the website |
| Notes: | <i>Only includes companies with publicly available figures. Fiscal year ended December 31, 2019: Ferrari, Volkswagen, BMW, Renault, Tesla, General Motors, Daimler, Hyundai, Fiat Chrysler Automobiles, PSA Fiscal year ended March 31, 2020: Isuzu, Suzuki, Toyota, Mitsubishi, Honda, Nissan, Mazda, Subaru</i> |

Description

Ford's R&D intensity came to under six percent in the 2020 fiscal year. That year, the automaker had research and development costs of some 7.1 billion U.S. dollars, compared to revenue streams of about 127.14 billion U.S. dollars.

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Projected size of the global autonomous car market from 2019 to 2023 (in billion U.S. dollars)

Size of the global autonomous car market 2019-2023

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Statista; Research and Markets; GlobeNewswire |
| Conducted by | Statista; Research and Markets |
| Survey period | 2020 |
| Region(s) | Worldwide |
| Number of respondents | n.a. |
| Age group | n.a. |
| Special characteristics | n.a. |
| Published by | Statista |
| Publication date | April 2021 |
| Original source | Global Autonomous Cars Market (2020 to 2030) - COVID-19 Growth and Change |
| Website URL | visit the website |
| Notes: | <i>For the Statista estimate an exponential development of the values between 2020 and 2023 was assumed to estimate the annual values. The values for 2020 and 2023 were provided by the source.</i> |

Description

The global autonomous car market is expected to shrink by some three percent in 2020 as a result of the economic slowdown caused by the Covid-19 pandemic. In 2021, however, the market is forecast to recover and start growing, reaching a size of over 37 billion U.S. dollars in 2023.

Technological challenges
Fully autonomous vehicle technology is extremely complex. In the United Kingdom, it is expected that 73 percent of all cars will have some level of autonomy (Levels 1-3) before fully autonomous vehicles are even starting to enter the market in 2025. One reason behind this is the lack of consistent 5G or high-speed internet to allow the self-driving cars to communicate with each other and to gather information about driving conditions and traffic jams or potential obstacles blocking the road. Another reason is that some vehicles require extremely detailed maps to navigate safely.

Concerns about autonomous cars
Overcoming technological hurdles is not enough for autonomous vehicles to take off. Securing public support is vital as well. People need to feel comfortable about riding in an autonomous vehicle in order to use them and buy them. Although over 40 percent of customers worldwide would be willing to use fully autonomous or semi-autonomous cars, they still have some concerns. More than half of the customers are worried about the safety of autonomous cars and over 30 percent are not sure whether the technologies necessary for autonomous vehicles to operate are advanced enough.

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Projected research and development funding efforts towards electric vehicles in 2023, by investor type (in billion U.S. dollars)

Electric vehicles: auto industry R&D funding by investor type 2023

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | AlixPartners |
| Conducted by | AlixPartners |
| Survey period | as of June 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | AlixPartners |
| Publication date | June 2018 |
| Original source | Betting Big in Electrification and Autonomous, page 29 |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

This graph illustrates the projected research and development (R&D) funding efforts towards electric vehicles in 2023, with a breakdown by investor type. It is predicted that Chinese suppliers will spend some 10 billion U.S. dollars on electric vehicle-related R&D activities.

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Size of the automotive software market worldwide from 2018 to 2024 (in million U.S. dollars)

Automotive software market size 2018-2024

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Apps Run The World; Statista |
| Conducted by | Apps Run The World; Statista |
| Survey period | 2019 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Statista |
| Publication date | November 2020 |
| Original source | appsruntheworld.com |
| Website URL | visit the website |
| Notes: | <i>* Forecast. For this statistic, the figures from 2020 to 2023 were rounded after being calculated using a constant annual growth rate of 0.7 percent CAGR, as provided by the source.</i> |

Description

In 2019, the automotive software market was valued at 13.1 billion U.S. dollars worldwide. The automotive software market is anticipated to reach 13.6 billion U.S. dollars by 2024.

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Leading government spending on defense research and development (R&D) among OECD members in 2017, by country (in billion PPP U.S. dollars)

OECD Countries with the highest government R&D spending on defense 2017

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | OECD; CRS |
| Conducted by | OECD; CRS |
| Survey period | 2017 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | CRS |
| Publication date | January 2020 |
| Original source | Government Expenditures on Defense Research and Development by the United States and Other OECD Countries: Fact Sheet, page 1 |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

In 2017, the United States government spent over 55 billion U.S. dollars on defense research and development - more than four times as much as all the other OECD countries combined. The next largest government expenditure on defense R&D in that year was South Korea, with 3.4 billion U.S. dollars (adjusted for purchasing power parity).

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Total global research and development (R&D) spending on advanced materials and chemicals from 2017 to 2019

Total R&D spending on advanced materials and chemicals worldwide 2017-2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 15 |
| Website URL | visit the website |
| Notes: | <i>* Estimated values. ** Forecasted values.</i> |

Description

Global R&D spending in the advanced materials and chemicals sector is anticipated to increase slightly to 41 billion U.S. dollars in 2019. However, this estimation is still below the 41.7 billion spent on R&D in this industry in 2017.

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Total global research and development (R&D) spending on energy from 2017 to 2019 (in billion U.S. dollars)

Total R&D spending on energy worldwide 2017-2019

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 18 |
| Website URL | visit the website |
| Notes: | <i>* Estimated values. ** Forecasted values.</i> |

Description

Global R&D spending in the energy sector is anticipated to increase slightly to 22.5 billion U.S. dollars in 2019. As of 2018, less than half of this investment was for R&D in renewable energy .

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Ranking of the leading energy and chemicals companies with the highest spending on research and development (R&D) in 2018 (in billion U.S. dollars)

Energy and chemicals companies with the highest spending on R&D 2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Bloomberg; Capital IQ; Thomson Reuters |
| Conducted by | Bloomberg; Capital IQ; Thomson Reuters |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | PwC |
| Publication date | October 2018 |
| Original source | The 2018 Global Innovation 1000 |
| Website URL | visit the website |
| Notes: | <i>Included are companies who produce technology hardware & equipment, as well as producers of semiconductors & semiconductor equipment.</i> |

Description

In 2018, the chemicals and energy producer that spent the most on research and development (R&D) was German company BASF, who spent 2.3 billion U.S. dollars. They were closely followed by U.S. company DowDuPont, who spend 2.1 billion U.S. dollars on R&D in that year.

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Ranking of the leading capital goods companies with the highest spending on research and development (R&D) in 2018 (in billion U.S. dollars)

Capital goods companies with the highest spending on R&D 2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | Bloomberg; Capital IQ; Thomson Reuters |
| Conducted by | Bloomberg; Capital IQ; Thomson Reuters |
| Survey period | 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | PwC |
| Publication date | October 2018 |
| Original source | The 2018 Global Innovation 1000 |
| Website URL | visit the website |
| Notes: | <i>Capital goods are goods that are produced by one company, and then sold to another company who uses them to provide consumer goods or services.</i> |

Description

German multinational Siemens spent the most on research and development (R&D) of any capital goods manufacturer in 2018, spending 6.1 billion U.S. dollars. U.S. multinational General Electric was second, spending 4.8 billion U.S. dollars on R&D in that year.

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Research and development investment in renewable energy worldwide in 2019, by sector (in billion U.S. dollars)

Global R&D investment in clean energy 2019, by sector

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | BloombergNEF; FS-UNEP Collaborating Centre; UNEP |
| Conducted by | BloombergNEF; UNEP; FS-UNEP Collaborating Centre |
| Survey period | 2019 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | includes corporate and government investments. |
| Published by | BloombergNEF; FS-UNEP Collaborating Centre; UNEP |
| Publication date | June 2020 |
| Original source | Global Trends in Renewable Energy Investment 2020, page 65 |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

This statistic displays the investments funding research and development in renewable energies around the world in 2019, broken down by sector. During this year, there was some 6.7 billion U.S. dollars invested into R&D for the solar energy sector.

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Robotic process automation (RPA) adoption and investment rates worldwide in 2019, by organization size

RPA adoption and investment rates worldwide 2019, by organization size

Source and methodology information

| | |
|-------------------------|-----------------------------------|
| Source(s) | Computer Economics |
| Conducted by | Computer Economics |
| Survey period | 2019 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | <i>n.a.</i> |
| Published by | Computer Economics |
| Publication date | April 2019 |
| Original source | computereconomics.com |
| Website URL | visit the website |
| Notes: | <i>n.a.</i> |

Description

The statistic shows the adoption and investment rates for robotic process automation (RPA) worldwide in 2019, by organization size. In 2019, 24 percent large organizations have adopted RPA, in comparison to nine percent small- and medium-size organizations.

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Ranking of technologies by expected importance worldwide in 2021, as of 2018

Technologies ranked by importance in 2021, as of 2018

Source and methodology information

| | |
|-------------------------|---|
| Source(s) | IRI |
| Conducted by | IRI |
| Survey period | June to September, 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | R&D Magazine readers and members of global R&D community |
| Published by | IRI |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 35 |
| Website URL | visit the website |
| Notes: | <i>Multiple answers were possible. Original question: "What will be the most important technologies by 2021?"</i> |

Description

The statistic reveals the technologies believed to be most important by the year 2021, according to a survey of the research and development community worldwide in 2018. That year, 27 percent of respondents believed that big data would be one of the most important technologies worldwide by 2021.

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Do stock market changes affect R&D?

Impact of stock market changes on R&D spending worldwide 2018

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | June to September 2018 |
| Region(s) | Worldwide |
| Number of respondents | <i>n.a.</i> |
| Age group | <i>n.a.</i> |
| Special characteristics | R&D Magazine readers |
| Published by | issuu |
| Publication date | February 2019 |
| Original source | 2019 Global R&D Funding Forecast - Winter 2019, page 6 |
| Website URL | visit the website |
| Notes: | <i>Number of respondents and survey method not stated by the source.</i> |

Description

According to a worldwide survey conducted in 2018, only 61 percent of respondents believed that stock market changes affect research and development (R&D) spending. This compares to nine percent of respondents who believed stock market changes cause strong increases in R&D spending.

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Expected changes to research and development (R&D) staffing worldwide from 2019 to 2020

Expected changes to R&D staffing worldwide 2020

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | September 2019 |
| Region(s) | Worldwide |
| Number of respondents | more than 2,100 |
| Age group | <i>n.a.</i> |
| Special characteristics | R&D Magazine readers |
| Published by | issuu |
| Publication date | February 2020 |
| Original source | R&D World February 2020, page 61 |
| Website URL | visit the website |
| Notes: | <i>Survey method not stated by the source.</i> |

Description

According to a worldwide survey conducted in 2019, 35 percent of respondents expected a slight increase in research and development (R&D) staffing levels in 2020. Conversely, only eight percent expected their R&D staffing levels to decrease (either slightly or substantially).

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Expected changes to research and development (R&D) budgets worldwide from 2019 to 2020, by spending category

Expected changes to R&D budgets worldwide by spending category 2020

Source and methodology information

| | |
|-------------------------|--|
| Source(s) | IRI; issuu |
| Conducted by | IRI |
| Survey period | September 2019 |
| Region(s) | Worldwide |
| Number of respondents | more than 2,100 |
| Age group | n.a. |
| Special characteristics | R&D Magazine readers |
| Published by | issuu |
| Publication date | February 2020 |
| Original source | R&D World February 2020, page 65 |
| Website URL | visit the website |
| Notes: | <i>Survey method not stated by the source.</i> |

Description

According to a worldwide survey conducted in 2019, 50 percent of respondents expected their total research and development (R&D) budget to increase in 2020. The main spending categories predicted to increase were capital expenditure and participation in alliances, with 34 percent of respondents expecting budgetary increases.

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