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Global Research and Development Expenditures: Fact Sheet

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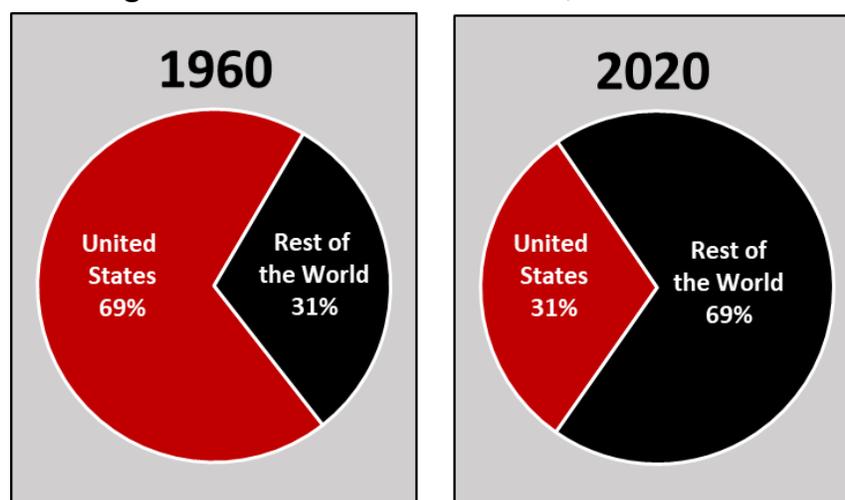
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Research and development (R&D) plays a central role in advanced economies in areas such as economic growth and job creation, industrial competitiveness, national security, energy, agriculture, transportation, public health and well-being, environmental protection, and expanding the frontiers of human knowledge understanding.¹ Accordingly, companies, governments, universities, nonprofit organizations, and others around the world have made substantial investments in R&D. Since 2000, total global R&D expenditures have more than tripled in current dollars, from \$675 billion to \$2.4 trillion in 2020.

The United States emerged as a global leader in science and technology in the second half of the 20th century. During this period, U.S. public and private investments in R&D grew rapidly and helped to propel the United States to a position of global economic leadership. By 1960, the United States accounted for approximately 69% of the world's R&D funding. By 2020, however, the U.S. share of global R&D expenditures² had fallen to about 31%.³ (See **Figure 1.**) The U.S. decline in share of global R&D is not the result of a reduction in U.S. R&D investments—in fact, U.S. public and private R&D grew robustly during this period—but rather is the result of even greater increases in the investments of the governments and industries of other countries, which have recognized the importance of R&D to their industrial innovation and competitiveness.

Figure 1. U.S. Share of Global R&D, 1960 and 2020



Sources: 1960: CRS analysis of U.S. Department of Commerce, Office of Technology Policy, *The Global Context for U.S. Technology Policy*, Summer 1997. 2020: CRS analysis of Organisation for Economic Cooperation and Development (OECD) data, Main Science and Technology Indicators, OECD.Stat.

Notes: Rest of the World includes the members of the OECD (less the United States), as well as Argentina, China, Romania, Russia, Singapore, South Africa, and Taiwan. R&D expenditures by some other countries are not included but are likely to be small in relative terms. In estimating total global R&D, CRS used the most recent year's reported R&D expenditures for three countries (Argentina, Singapore, and South Africa) that had not reported data for 2020.

¹ Alternatively, some nations have taken non-R&D intensive paths to economic growth, for example by serving as low labor-cost locations for the manufacturing and service needs of other nations, by licensing or acquiring the intellectual property needed for production activities, and by extracting and refining natural resources (e.g., oil, gas, minerals).

² For purposes of this report, global R&D expenditures include those of the OECD countries, as well as Argentina, China, Romania, Russia, Singapore, South Africa, and Taiwan. R&D expenditures by some other countries are not included but are likely to be small in relative terms.

³ 2020 is the latest year for which OECD R&D data is largely complete. It generally takes a year or two for national R&D data to be collected and reported, then harmonized and published by the OECD.

In 2020 (the most recent year for which comprehensive data are available), global R&D expenditures were \$2.352 trillion.⁴ The United States continued to fund more R&D than any other country. China, ranked second in 2020, funded more R&D than the next four highest countries combined. The 10 largest R&D-funding countries of 2020 accounted for \$1.999 trillion in R&D expenditures, 85.0% of the global total; the top 20 R&D-funding countries accounted for \$2.225 trillion, 94.6% of the global total. (See Table 1.)

Table 1. Countries with the Highest Expenditure on R&D, 2020
(in billions of current PPP dollars)

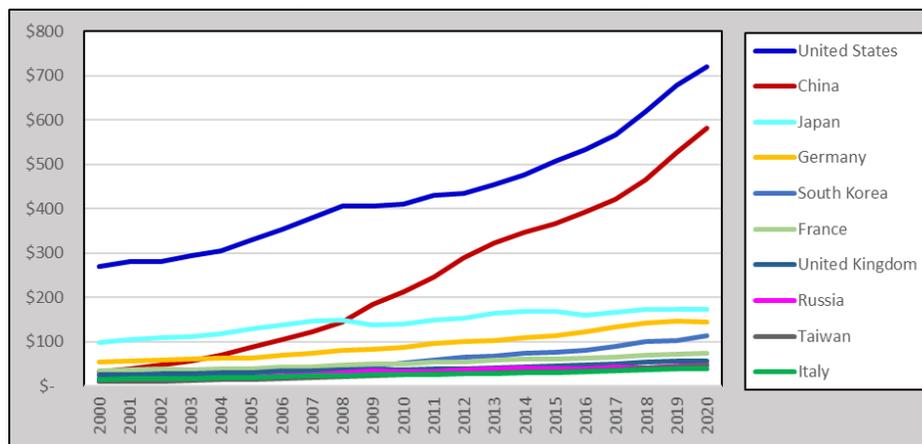
Rank	Country	Amount	Rank	Country	Amount
1	United States	720.9	11	Canada	30.1
2	China	582.8	12	Spain	25.1
3	Japan	174.1	13	Turkey	25.0
4	Germany	143.4	14	Australia	24.0
5	South Korea	112.9	15	Netherlands	23.7
6	France	74.6	16	Belgium	21.3
7	United Kingdom	56.0	17	Sweden	20.1
8	Russia	48.0	18	Israel	19.8
9	Taiwan	47.9	19	Switzerland	19.4
10	Italy	38.2	20	Poland	18.1

Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them. Australia, Switzerland, and United Kingdom based on 2019 data.

Figure 2 illustrates R&D expenditures between 2000 and 2020 for the 10 countries with the highest R&D expenditures.

Figure 2. R&D Expenditures of Selected Countries, 2000-2020
(in billions of current PPP dollars)



Source: CRS analysis of Organisation for Economic Cooperation and Development, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

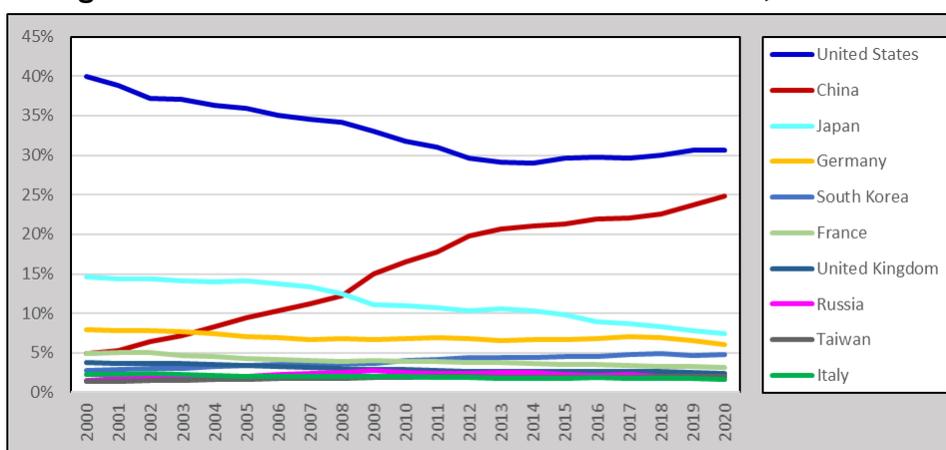
⁴ Includes OECD members, plus Argentina, China, Romania, Russia, Singapore, South Africa, and Taiwan. (Organisation for Economic Cooperation and Development, OECD.Stat database)

Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.

Trends in global R&D share between 2000 and 2020 for the 10 countries with the highest 2020 R&D expenditures are illustrated in **Figure 3**. Among them, six saw declines in share of global R&D—the United States, Japan, Germany, France, the United Kingdom, and Italy—while four saw their shares grow—China, South Korea, Russia, and Taiwan.

In 2000, China accounted for nearly 5% of global R&D, joining the United States, Japan, South Korea, and the countries of Western Europe as the largest funders of R&D. In 2009, China surpassed Japan to become the second largest funder of R&D. From 2000 to 2020, while China's share of global R&D rose from 4.9% to 24.8%, the U.S. share fell from 39.9% to 30.7% and Japan's share fell from 14.7% to 7.4%.

Figure 3. Share of Global R&D of Selected Countries, 2000-2020

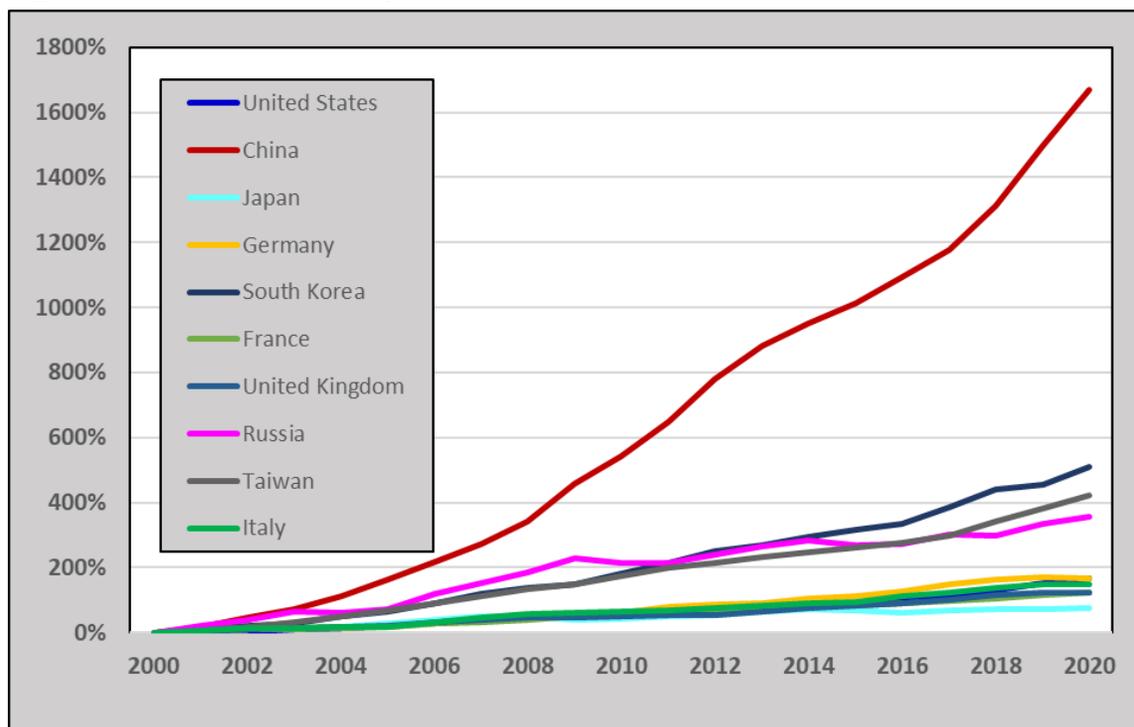


Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Notes: Global R&D includes the expenditures of the OECD countries, Argentina, China, Romania, Russia, Singapore, South Africa, and Taiwan. Share computed in PPP terms. PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.

Figure 4 illustrates the growth of R&D expenditures for each of the 10 countries with the highest 2020 R&D expenditures for 2000 to 2020 as a percentage of its 2000 R&D expenditures. During this period, China had the highest growth in R&D expenditures (1,669%), followed by South Korea (509%), Taiwan (423%), and Russia (357%).

Figure 4. Growth in R&D Expenditures Since 2000 for Selected Countries, 2000-2020



Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Author Information

John F. Sargent Jr.
Specialist in Science and Technology Policy

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