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U.S. Research and Development Funding and Performance: Fact Sheet

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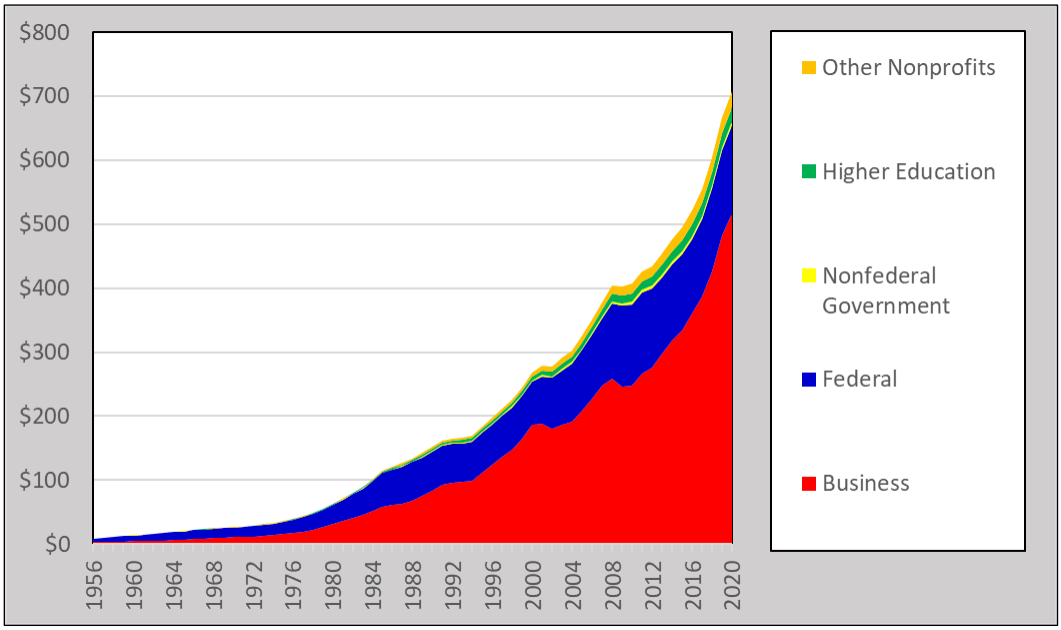
Research and development (R&D) in the United States is funded and performed by a number of sectors—including the federal government, state governments, businesses, academia, and nonprofit organizations—for a variety of purposes. This fact sheet begins by providing a profile of the U.S. R&D enterprise, including historical trends and current funding by sector and by whether the R&D is basic research, applied research, or development. The final section of this fact sheet includes data on R&D performance by sector.

Historical Trends in U.S. R&D Funding

The United States became a global leader in R&D in the 20th century, funding as much as 69% of annual global R&D in the period following World War II.[1] **Figure 1** shows the growth in total U.S. R&D expenditures from 1956 to 2020 in current dollars.[2] U.S. R&D in 2020 was 83 times higher than it was in 1956 in current dollars, and more than 11 times higher in constant dollars.[3] By sector, business-funded R&D grew the most during this period. However, faster growth in total R&D spending of other nations reduced the U.S. share of global R&D to approximately 30.7% in 2020.[4]

Figure 1. U.S. R&D Expenditures by Source of Funding, 1956-2020

Current dollars, in billions



Source: CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Table 6, February 22, 2022, https://ncses.nsf.gov/pubs/nsf22320.

[1] Office of Technology Policy, U.S. Department of Commerce, *The Global Context for U.S. Technology Policy*, 1997.

[2] Data for all years in this report are for fiscal years unless otherwise specified.

[3] CRS analysis of data from National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Table 6, February 22, 2022, https://ncses.nsf.gov/pubs/nsf22320. 2020 is the latest year for which total U.S. R&D data are available.

[4] Organisation for Economic Co-operation and Development, OECD.Stat, *Main Science and Technology Indicators*, database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB. 2020 is the latest year for which mostly complete data is available. For more information about global R&D, see CRS Report R44283, *Global Research and Development Expenditures: Fact Sheet*, by John F. Sargent Jr.

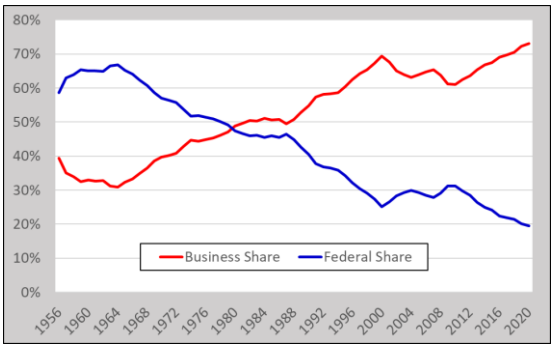
Notes: The data for 2020 are estimates and are likely to be revised later.

Two sectors—business and the federal government—have together accounted for more than 90% of U.S. R&D funding since 1955, though their combined share has fallen from a high of 98% in 1956 to 93% in 2016. Federal R&D expenditures as a share of total U.S. R&D expenditures peaked in 1964 at 66.8%, the same year that business R&D expenditures reached a nadir of 30.8%. Between 1964 and 2000, the federal government's share fell and business's share rose. In 2000, business accounted for 69.4% of U.S. R&D expenditures and the federal government 25.1%. This shift in the composition of R&D funding resulted not from a reduction in federal government R&D expenditures, but rather from faster growth in business R&D expenditures. From 2000 to 2010, business R&D's share declined from 69.4% to 61.0%, and has risen each year since, reaching an all-time high of 73.1% in 2020; from 2010 to 2020, the federal share declined from 31.1% to 19.5%.[5] (See **Figure 2**.)

Trends in Federally Funded R&D

In current dollars, federal funding for R&D grew from $3.5 billion in 1955 to $137.8 billion in 2020, a compound annual growth rate (CAGR) of 5.3%. In constant dollars, federal R&D grew by a 2.1% CAGR during this period. However, between 2011 and 2014, federal R&D funding, as measured in current dollars, fell for three consecutive years for the first time since such data has been collected; the total decline in federal funding for these years was $8.6 billion (6.8%). In constant dollars, federal R&D declined from 2009 to 2016 by 15.6%; a similar drop occurred from 1987 to 1994, when federal R&D fell by 16.0%.[6] In FY2017, FY2018, FY2019, and FY2020, federal R&D grew by 1.0%, 4.1%, 1.4%, and 1.8% respectively, in constant dollars. **Figure 3** shows federal R&D funding by budget function in constant dollars from 1956 to 2020.

Figure 2. Federal and Business Shares of U.S. R&D Expenditures, 1956-2020



Source: CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Table 6, February 22, 2022.

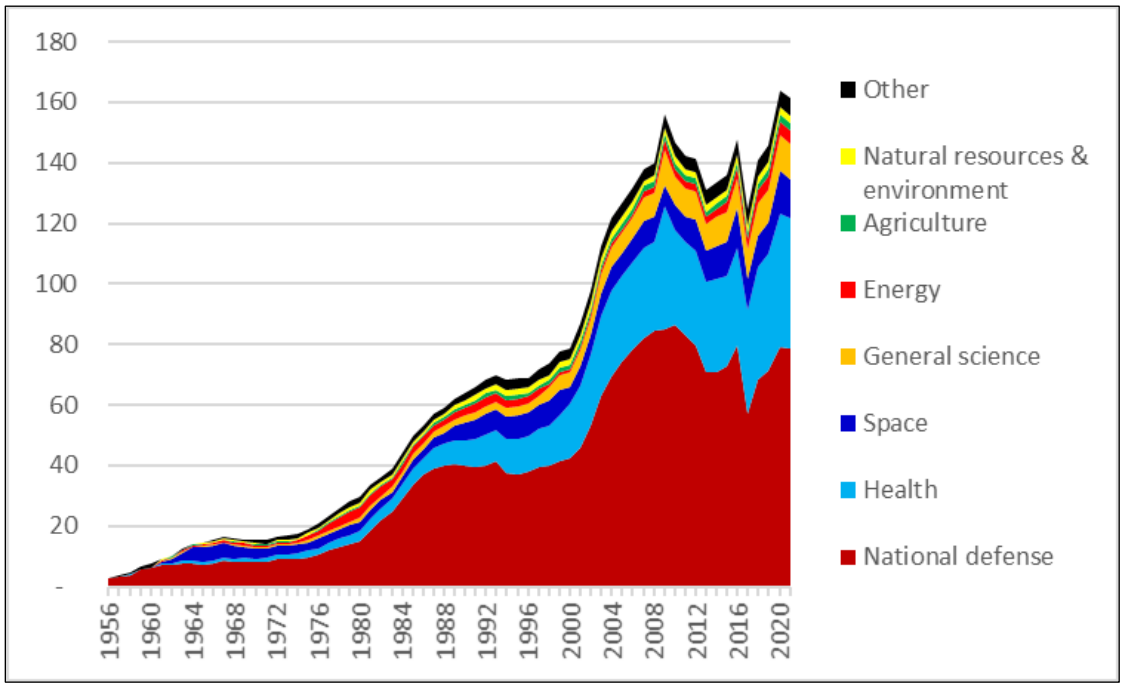
Notes: The data for 2020 are estimates and are likely to be revised later.

[5] CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Table 6, February 22, 2022.

[6] Ibid.

Figure 3. Federal R&D Funding by Budget Function, 1956-2021

Current dollars, in billions



Source: CRS analysis of data from National Science Foundation, *Federal R&D Funding, by Budget Function: Fiscal Years 2020–22,* (NSF 22-316), Table 23, January 18, 2022, https://ncses.nsf.gov/pubs/nsf22316.

Notes: Data from FYs 1956–1994 are from agencies' submissions to OMB, Circular A-11, exhibit 44A, "Research and development activities," and from supplemental data obtained from agencies' budget offices. Data from FYs 1995–2021 are from agencies' submissions to OMB per MAX Schedule C, budget justification documents, and supplemental data obtained from agencies' budget offices. Beginning in 2017, OMB ceased including non-experimental development in its national R&D calculations (including Department of Defense budget activity 6.7 and some funding for the National Aeronautics and Space Administration). Data for 2021 (included in the chart but not shown on the axis) are preliminary and may be revised.

Trends in U.S. Business-Funded R&D

Business funding of R&D, measured in current dollars, has grown nearly every year since 1955. In current dollars, business-funded R&D grew from $3.3 billion in 1956 to $517.4 billion in 2020, a compound annual growth rate of 8.2%. In constant dollars, business-funded R&D grew by a 4.9% CAGR during this period. In recent years, business-funded R&D has grown at a slower pace. Between 2000 and 2020, business R&D grew by 5.2% CAGR in current dollars, and by 3.3% CAGR in constant dollars.[7]

[7] Ibid.

Current Composition of U.S. R&D Funding

R&D funding can be categorized by the character of the work that it supports: basic research, applied research, and development. (See text box for definitions.) Total estimated U.S. R&D expenditures in 2020 (the most recent year for which data are available) were $708.0 billion. Of this amount, $107.9 billion (15.2%) was for basic research, $139.5 billion (19.7%) was for applied research, and $460.5 billion (65.1%) was for development.[8]

Table 1 shows total U.S. R&D expenditures in 2020 by funding sector and character of work. Notably, federal R&D funding accounts for the largest share of basic research (40.7%) while business accounts for the largest shares of applied research (55.0%) and development (85.5%). **Figure 4** shows this information graphically.

Character of R&D: Definitions

Basic research. Experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.

Applied research. Original investigation undertaken to acquire new knowledge; directed primarily, however, toward a specific, practical aim or objective.

Development. Systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.

Source: *National Science Board, Science and Engineering Indicators 2018.*

Table 1. U.S. R&D Funding by Sector and Character, 2020

Current dollars, in billions

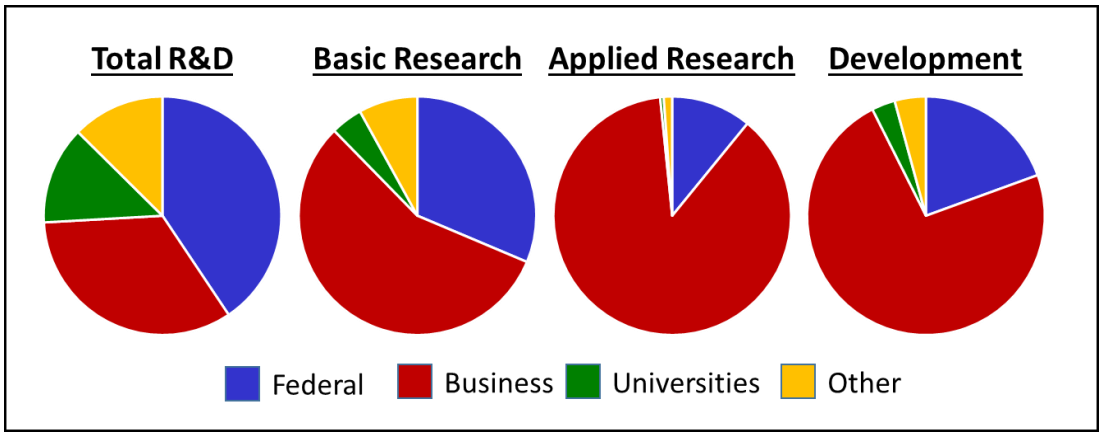
Sector	Basic Research		Applied Research		Development		Total	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
Federal Government	43.8	40.6%	43.7	31.3%	50.3	10.9%	137.8	19.5%
Nonfederal Government	2.7	2.5%	1.7	1.2%	0.6	0.1%	5.0	0.7%
Business	36.2	33.5%	78.6	56.3%	402.7	87.4%	[illegible]	73.1%
Higher Education	14.3	13.3%	6.0	4.3%	2.2	0.5%	[illegible]	3.2%
Other Nonprofit Organizations	10.9	10.1%	9.5	6.8%	4.7	1.0%	25.1	3.5%
Total	**107.9**	**100.0%**	**139.5**	**100.0%**	**460.5**	**100.0%**	**708.0**	**100.0%**

Source: CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Tables 7-9, February 22, 2022. Elements may not add to totals due to rounding.

Note: Rows and columns may not add to totals due to rounding. 2020 data are preliminary and may be revised.

[8] CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Tables 7-9, February 22, 2022. Elements may not add to totals due to rounding.

Figure 4. U.S. R&D Funding by Character and Sector, 2020



Source: CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Tables 7-9, February 22, 2022.

Notes 2020 data are preliminary and may be revised.

Current Composition of U.S. R&D Performance

R&D is often performed by sectors other than the one funding the R&D. For example, the federal government performs some of the research it funds, but also funds research performed by business, universities and colleges, and other organizations. **Table 2** provides data on performance of U.S. R&D by sector and character of the work (basic research, applied research, and development).

Table 2. U.S. R&D Performance by Sector and Character, 2020

Current dollars, in billions

Sector	Basic Research		Applied Research		Development		Total	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
Federal Government	12.6	11.7%	21.6	15.5%	31.5	6.8%	65.7	9.3%
Nonfederal Government	0.1	0.1%	0.5	0.4%	0.0	0.0%	0.7	0.1%
Business	34.7	32.2%	81.0	58.1%	416.3	90.4%	532.0	75.1%
Higher	50.9	47.2%	22.6	16.2%	7.6	1.7%	81.1	11.5%
Other Nonprofit Organizations	9.6	8.9%	13.8	9.9%	5.2	1.1%	28.5	4.0%
Total	107.9	100.0%	139.5	100.0%	460.5	100.0%	708.0	100.0%

Source: CRS analysis of National Science Foundation, *National Patterns of R&D Resources: 2019–20 Data Update*, NSF 22-320, Tables 3-5, February 22, 2022.

Note: Rows and columns may not add to totals due to rounding. 2020 data are preliminary and may be revised.

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