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Government Expenditures on Defense Research and Development by the United States and Other OECD Countries: Fact Sheet

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Background

Research and development (R&D) has played a central role in the national security of the United States and its allies. R&D creates the foundation for new and improved technologies that underpin a wide range of applications. These applications include advanced weapons and systems that provide intelligence, medical treatments, and troop support.

For more than 70 years, U.S. defense-related R&D has delivered breakthroughs in computing, communications, networks, satellites, fighter and bomber aircraft, aircraft carriers, submarines, tanks, tactical and strategic missiles, nuclear weapons, drones, advanced materials, autonomy, and other weapons and technologies. Military and policy analysts broadly agree that investments in R&D can provide substantial technological advantages against potential adversaries.

This fact sheet provides data on government defense R&D funding of the United States and other countries of the Organisation for Economic Co-operation and Development (OECD).[1]

Government Defense R&D Funding of OECD Members

In 2017, the United States spent $55.4 billion on defense R&D, more than four times as much on defense R&D than the rest of the OECD countries combined. **Table 1** shows government-funded defense R&D for OECD countries in 2017. The United States spent 16 times the amount spent by the next-highest funder, South Korea; 23 times the amount spent by the United Kingdom; 36 times the amount spent by Germany; 39 times the amount spent by France; 41 times the amount spent by Turkey; and 46 times the amount spent by Japan.

OECD defense R&D is highly concentrated among a handful of countries. Since at least 2009, the United States has accounted for 79% or more of total OECD government defense R&D funding. In 2017, the U.S. share was 81.2% (see **Figure 1**); the top seven countries account for 97.7%.

Table 1. Top Ten OECD Countries by Government Defense R&D Funding, 2017

(in millions of purchasing power parity dollars)

Country	R&D
United States	$55,441.0
South Korea	3,377.3
United Kingdom	2,379.4
Germany	1,530.2
France	1,431.1
Turkey	1,350.9
Japan	1,199.1
Poland	379.2
Australia	358.7
Canada	183.1[a]
Other OECD Countries	675.5
Total, OECD	**$68,305.5**

Source: Organisation for Economic Co-operation and Development (OECD), Research and Development Statistics (RDS) Database, https://stats.oecd.org/Index.aspx?DataSetCode=GBARD_NABS2007.

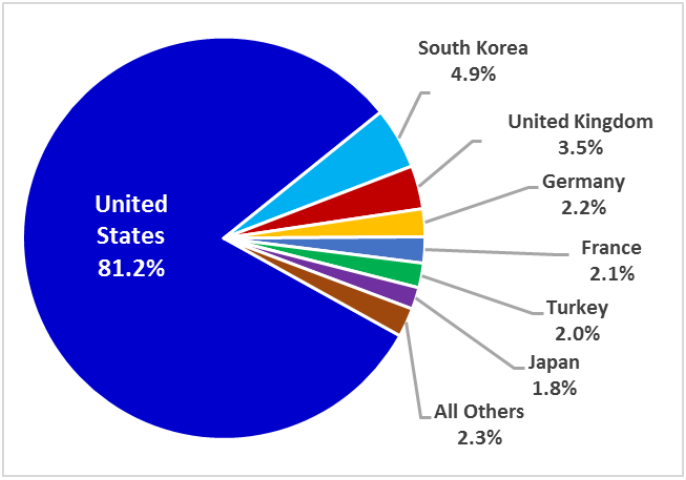
[1] The OECD is an organization of 36 countries formed after World War II to promote economic cooperation and reconstruction. Among its activities, the OECD collects, analyzes, and publishes data on each of its member countries.

Notes: Purchasing power parity is a method of adjusting foreign currencies to a single common currency (in this case U.S. dollars) to allow for direct comparison between countries. It is intended to reflect the spending power of each local currency, rather than international exchange rates. OECD government defense R&D data for 2017 are not available for Canada and Latvia; data for 2016 for these countries have been used instead.

a. The most recent government defense R&D data available for Canada is for 2016.

Figure 1. Share of Total OECD Government Defense R&D Funding, by Country, 2017

(in purchasing power parity terms)



Source: OECD, RDS Database.

Notes: Purchasing power parity is a method of adjusting foreign currencies to a single common currency (in this case U.S. dollars) to allow for direct comparison between countries. It is intended to reflect the spending power of each local currency, rather than international exchange rates. OECD government defense R&D data for 2017 are not available for Canada and Latvia; data for 2016 for these countries have been used instead.

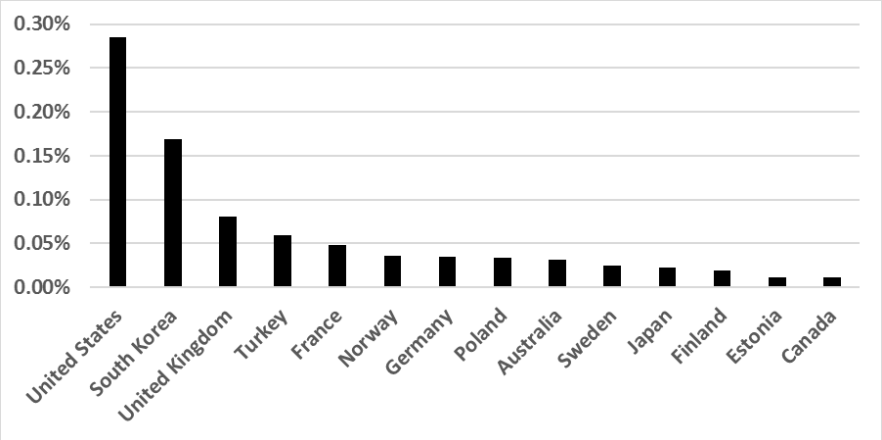
Government Defense R&D Funding as a Share of GDP

In general, countries with larger economies are able to make larger investments in R&D and defense.[2] In 2017, the United States had the largest GDP among OECD countries at $19.5 trillion, followed by Japan ($5.3 trillion), Germany ($4.3 trillion), the United Kingdom ($3.0 trillion), and France ($3.0 trillion).

One approach used to facilitate comparison of government defense R&D spending among countries with different size economies is to divide each government's defense R&D spending by that country's gross domestic product (GDP). **Figure 2** illustrates this metric, government defense R&D funding as a percentage of GDP, for the OECD countries ranked highest by this metric in 2017. The United States spent 0.285% of its GDP on defense R&D in 2017. The United States led in this metric, spending more than 68% more than the share spent by South Korea (0.169%), the OECD country ranked second in this metric. Compared to the other largest OECD economies, the United States spent a much greater share of GDP on defense R&D: more than 12 times the share spent by Japan, more than 8 times the share spent by Germany (0.035%), more than 3 times the share spent by the United Kingdom (0.080%), and more than 5 times the share spent by France (0.048%).

[2] For additional information on overall national spending on research and development, see CRS Report R44283, *Global Research and Development Expenditures: Fact Sheet*, by John F. Sargent Jr.

Figure 2. OECD Countries with the Highest Levels of Government Defense R&D Funding as a Share of GDP, 2017



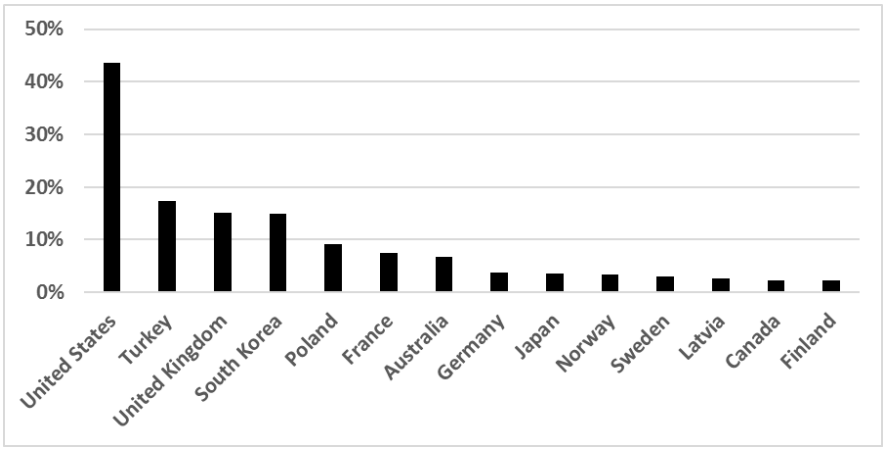
Source: CRS analysis of OECD RDS Database data.

Notes: Does not include countries with less than 0.01% government defense R&D as a share of GDP. Data for Canada are for 2016.

Share of Government R&D Funding Spent on Defense R&D

Government defense R&D spending as a share of total government R&D spending is a metric that provides an indication of the relative importance of defense R&D within each nation's R&D portfolio. **Figure 3** illustrates this metric for each OECD country. In FY2017, the United States devoted 43.5% of government R&D expenditures to defense. Turkey ranked second in this metric among OECD countries at 17.3%. Among the largest OECD economies, the United Kingdom ranked third (15.2%); South Korea, fourth (15.0%); France, sixth (7.5%); Germany, eighth (3.8%); and Japan ninth (3.5%).

Figure 3. OECD Countries with the Highest Levels of Government Defense R&D Funding as a Percentage of Total Government R&D Funding, 2017



Source: CRS analysis of OECD RDS Database data.

Notes: Does not include countries that spent less than 2.0% of total government R&D on defense R&D. Data for Canada and Latvia are for 2016; government defense R&D not available for Israel.

Statistical Notes

The data, table, and figures in this fact sheet are based on CRS analysis of 2017 OECD data on government budget allocations for R&D (GBARD), government budget allocations for defense-related R&D, and gross domestic product (GDP), on a purchasing power parity basis.[3]

Some caveats:

- The 2017 OECD data are the most recent nearly complete set of government defense R&D funding figures for OECD countries. OECD funding information for government defense R&D does not include 2017 data for Canada and Latvia; for purposes of this analysis, 2016 data were used instead. OECD funding information for total government R&D does not include 2017 data for Canada; for purposes of this analysis 2016 data were used instead.
- In July 2016, the U.S. Office of Management and Budget adopted a refinement to the categories of R&D used by the federal government in data collection, replacing "development" with "experimental development." This new definition more narrowly defines the set of activities to be included in R&D reporting. A key purpose of this change was to better harmonize U.S. government R&D reporting with that of other nations. This change in definition applies to all agencies, but the predominant impact is that the Department of Defense's (DOD's) Operational Systems Development (Budget Activity 7) is no longer included as development. DOD Operational Systems Development was about $26.0 billion in FY2017. This amount would have been reported as R&D under the previous definition; its exclusion reduced overall U.S. defense R&D funding by about one-third.

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[3] Organisation for Economic Co-operation and Development (OECD), Research and Development Statistics (RDS) Database, https://stats.oecd.org/Index.aspx?DataSetCode=GBARD_NABS2007.