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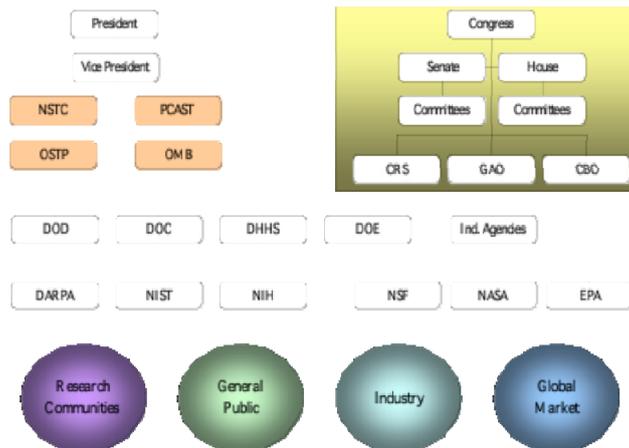
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U.S. Innovation Strategy: Continuity & Disruption in National Policy

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U.S. System for S&T Policy



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Core principles of U.S. S&T Policy

1. Basic science is a public good. Investments in science lead to new technologies and, occasionally, to new industries.
2. Federal agencies pursue the development of new technology for specific “missions” in activities with extensive public good characteristics.
3. The federal government refrains from “picking winners” through R&D investments.
4. The federal government creates the appropriate regulatory environment to enable efficient markets and to occasionally steer private sector investment in desired directions (e.g., toward environmentally benign technologies).

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I. Past 4 Years

Nicholas S. Vonortas with Brennan Hoban & Connor Rabb. “United States”, UNESCO Science Report 2021
(released June 11, 2021) <https://unesdoc.unesco.org/ark:/48223/pf0000377433>

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R&D expenditure trends

The US:

- performs the largest share of global R&D
- generates the largest share of R&D-intensive industry output globally
- awards the largest number of S&E doctoral degrees
- accounts for significant shares of S&E research articles and citations worldwide including the highest share of highly cited scientific works by a wide margin

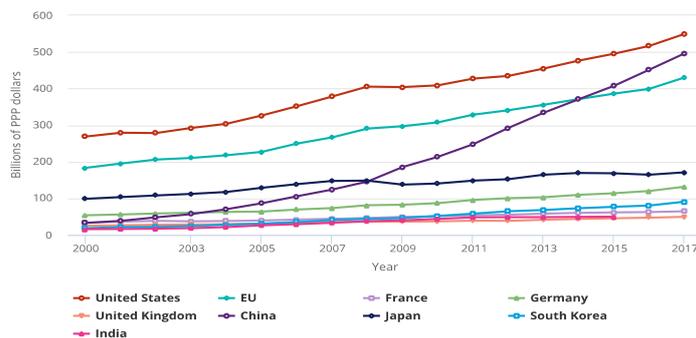
R&D performed in the country totaled \$547.9b in 2017, up from \$493.7b in 2015 and 406.6b in 2010.

From 2003 to 2018, U.S. value-added output in R&D-intensive industries almost doubled from \$570b to \$1.04tr.

Still, its share of global output declined from 38% to 32%, largely due to China's rapidly increasing share.

R&D expenditure trends

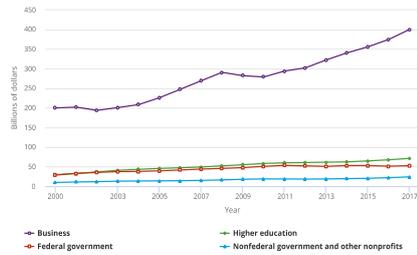
Gross domestic expenditures on R&D, by selected region, country, or economy: 2000–17



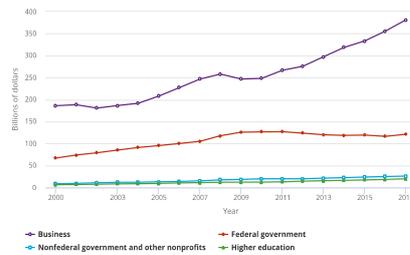
EU = European Union; PPP = purchasing power parity.

Domestic R&D performance & source of funds

U.S. R&D expenditures, by performing sector: 2000-17



U.S. R&D expenditures, by source of funds: 2000-17



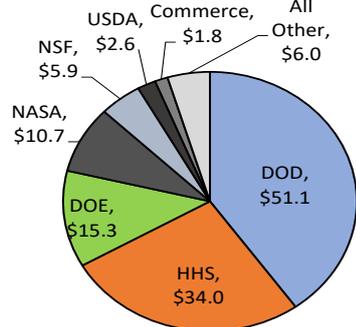
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Federal government R&D

Figure 4: R&D in FY 2017

budget authority in billions of dollars



Estimates based on agency and OMB data. R&D includes conduct of R&D and facilities. © 2018 AAAS

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Strategic Technology Platforms

- Artificial Intelligence (AI)
- Quantum Information Science (QIS)
- Fifth Generation Mobile Network Technology (5G)
- Cybersecurity

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Broad Strategic Initiatives

- Advanced Manufacturing
- Energy / Environment
- Health
- Space

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II. Next 4 Years

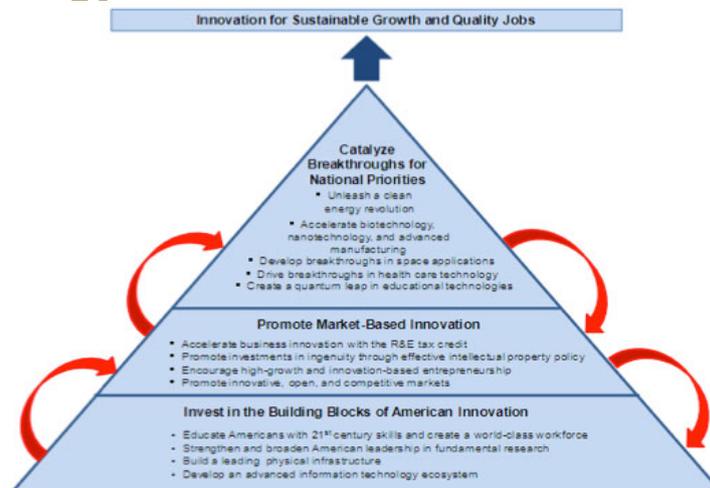
The United States Innovation and Competition Act 2021

Tom Lee and Juan Londono. "The United States Innovation and Competition Act (USICA): A Primer",
AAF Insight, June 9, 2021

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Strategy for American Innovation 2011



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Super Legislation: U.S. Innovation and Competition Act 2021

On June 8, 2021, the U.S. Senate passed the *United States Innovation and Competition Act (USICA)*, a \$200 billion proposal for FY 2022-2026 aimed at countering China's influence domestically and abroad.

Bipartisan support – a “must-pass” legislation

This legislation was first introduced in 2020 by Senators Chuck Schumer (D-NY) and Todd Young (R-IN) as the *Endless Frontier Act (EFA)*.

EFA was dramatically expanded in the past weeks to include several additional provisions. EFA is now just one part (a division) within the expanded package renamed as the USICA.

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Super Legislation: U.S. Innovation and Competition Act 2021

The negotiation process in the Senate has resulted in the inclusion of amendments and provisions that deviate from the bill's (EFA) original goal.

The main reason for this is that various Senators have been preparing several pieces of legislation trying to *safeguard against what is perceived by many as a general assault of China on U.S. interests in the struggle for international preeminence*. These bills have now been combined into this “super bill”.

The bill proposes an expanded role for the federal government in “strategic sectors” with increased funding, supervision, and regulation of various industries.

It also further expands the use of trade provisions in order to restrict the flow of Chinese goods and services and to bolster President Biden's Buy American agenda.

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Super Legislation: U.S. Innovation and Competition Act 2021

USICA proposes a dramatic expansion in the federal government's role in facilitating technological advancement, economic growth, and promotion of US interests domestically and internationally.

It will pour hundreds of billions of dollars into R&D in key areas such as artificial intelligence, advanced energy sources, and biotechnology.

Bipartisan support reflects the opinion of many on both sides of the (Congressional) aisle that these expenditures are necessary to propel American growth in the 21st century and compete with China.

One of the few bills expected to pass this year, the bill has been amended repeatedly to squeeze in many different provisions, reflecting regional concerns of signatories.

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Super Legislation: U.S. Innovation and Competition Act 2021

Division A – Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act &
ORAN 5G Emergency Appropriations

Division B – Endless Frontier Act (EFA)

Division C – Strategic Competition Act of 2021

Division D – Securing America's Future Act

Division E – Meeting the China Challenge Act of 2021

Division F – Other Matters

Title I – Competitiveness and Security for Education and Medical Research

Title II – Committee of the Judiciary

Title III – Other Matters

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Division A – CHIPS Act & ORAN 5G Emergency Appropriations

Introduced by Sen. Cornyn (R-Tex) and Warner (D- Va.) in 2020. The CHIPS Act passed as part of the annual National Defense Authorization Act in 2020 but required follow-on appropriations funding. The investments were aimed at enabling US companies to maintain their technological edge in semiconductor materials, process technology, architectures, designs, and applications.

The Act as introduced:

- Authorizes \$10 billion to incentivize domestic semiconductor manufacturing.
- Authorizes significant federal investments in semiconductor R&D and chip drive technology at DOD, NSF and DOE.
- Creates a refundable Investment Tax Credit for semiconductor facilities.
- Establishes a National Semiconductor Technology Center to conduct research and prototyping of advanced chips.
- Creates a center on advanced semiconductor packaging.

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Division B – Endless Frontier Act

Focuses on a long list of advanced technology areas including:

- Artificial Intelligence (AI)
- Quantum science
- New high-performance computing and semiconductors
- Robotics (and automation and advanced manufacturing)
- Biotechnology
- Cybersecurity
- Advanced materials
- Advanced energy technology
- Advanced communication technology

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Division B – Endless Frontier Act

- Provides \$81 billion over five years to the National Science Foundation (NSF). Of this, \$26 billion for a new **Technology Directorate** for research through later stage technology development. It will also manage a competition for and fund University Technology Centers for later stage development through prototyping of these technologies – these can be single universities or consortia with universities and industry. The remainder of the funds are for existing NSF directorates.
- Provides \$17 billion for basic research at the Office of Science (including its energy labs).
- Provides for regional scale-up, by funding, through the Commerce Department, “at least” ten regional innovation hubs run by consortia of industry, state and local government and education institutions.

Division B – Endless Frontier Act

- Directs the Commerce Department to monitor U.S. critical supply chain resiliency issues and has a broad and general authority to set up financing and support mechanisms for U.S. production funded at “such sums as are necessary.”
- Adds provisions for the Commerce Department to greatly expand support for the Manufacturing Extension Partnership that works with small manufacturers.
- Increase funding for the Manufacturing USA institute network as well as to create additional institutes.

A slimmer version of the bill has been introduced as an NSF reauthorization bill in the House Science, Technology and Space Committee and that proposes creating a more modestly sized directorate that would address “societal challenges” rather than focus exclusively on technology.

Divisions C++

Basically about strategic competition with China.

E.g., the Strategic Competition Act of 2021:

- Identifies (i) key objectives for a U.S. policy of strategic competition with China and (ii) the core tenets of U.S. diplomatic, economic, military, technology, and information policy needed to achieve those objectives.
- *States that China is the greatest geopolitical and geo-economic challenge for United States foreign policy*, and outlines steps related to organization, budget, coordination among domestic stakeholders, workforce development, allied cooperation, and other elements necessary to marshal sustained political will to protect U.S. interests and values in effective strategic competition with China.

Major Takeaway

A rare "AHA!!" moment for the United States. Similar in many respects – but also importantly different – to the "AHA" moment of the 1980s with Japan and the Soviet Union. The Giant has woken up! Tries to stand up to the challenge!

China identified as the biggest strategic challenge since the fall of the Soviet Union. Contrary to the previous Administration, the current leadership is trying to reassert the position of the U.S. internationally – as obvious from the frantic int'l realignment and negotiation of the Biden Administration such as the [G7 summit](#) and the [NATO summit](#) earlier this summer. Even the dramatic exit from Afghanistan has been presented by the President as an effort to break a diversion to focus on the major challenge.

The U.S. Innovation and Competition Act of 2021 is the comprehensive response of the U.S. Congress from the point of view of STI, industry, competitiveness.

USICA is viewed as a major break with prior practice!

THANK YOU!!

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