



# The State of U.S. Science & Engineering

Vipin Arora  
NCSES Deputy Director

*BESAC Panel*  
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National Center for Science and Engineering Statistics  
Social, Behavioral and Economic Sciences  
National Science Foundation

# Key takeaways

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- The United States is a global leader across different aspects of science and engineering, and we have a central role as an international collaborator.
- Our position and role are changing as other countries grow their science and technology investments and capabilities at a faster rate.
- New measures of the STEM workforce illustrate the importance of skilled technical workers.
- There is an uneven distribution of science and engineering activities and STEM career opportunities across our country.
- Foreign-born workers are a large segment of the S&E workforce.

# Overview

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1. NCSES and *Indicators*
2. The STEM Workforce
3. The Geography of Innovation
4. U.S. STEM Education
5. Research & Development (R&D)
6. Science & Engineering (S&E) Publications and Collaboration



# NCSES and *Indicators*

NCSES is NSF's statistical agency -- we provide critical information on the scientific progress that drives American well-being

## Research and Development and Innovation Statistics



## S&E Education and S&E Workforce Statistics





# Science and Engineering Indicators is the world's premier source for information on science and engineering

Indicators consist of:

- Congressionally mandated, biennial report to the President and Congress
- Thematic reports: Education, workforce, R&D, academic R&D, S&E publications, industry output, innovation, and public attitudes
- State data tool
- *Indicators* is policy neutral

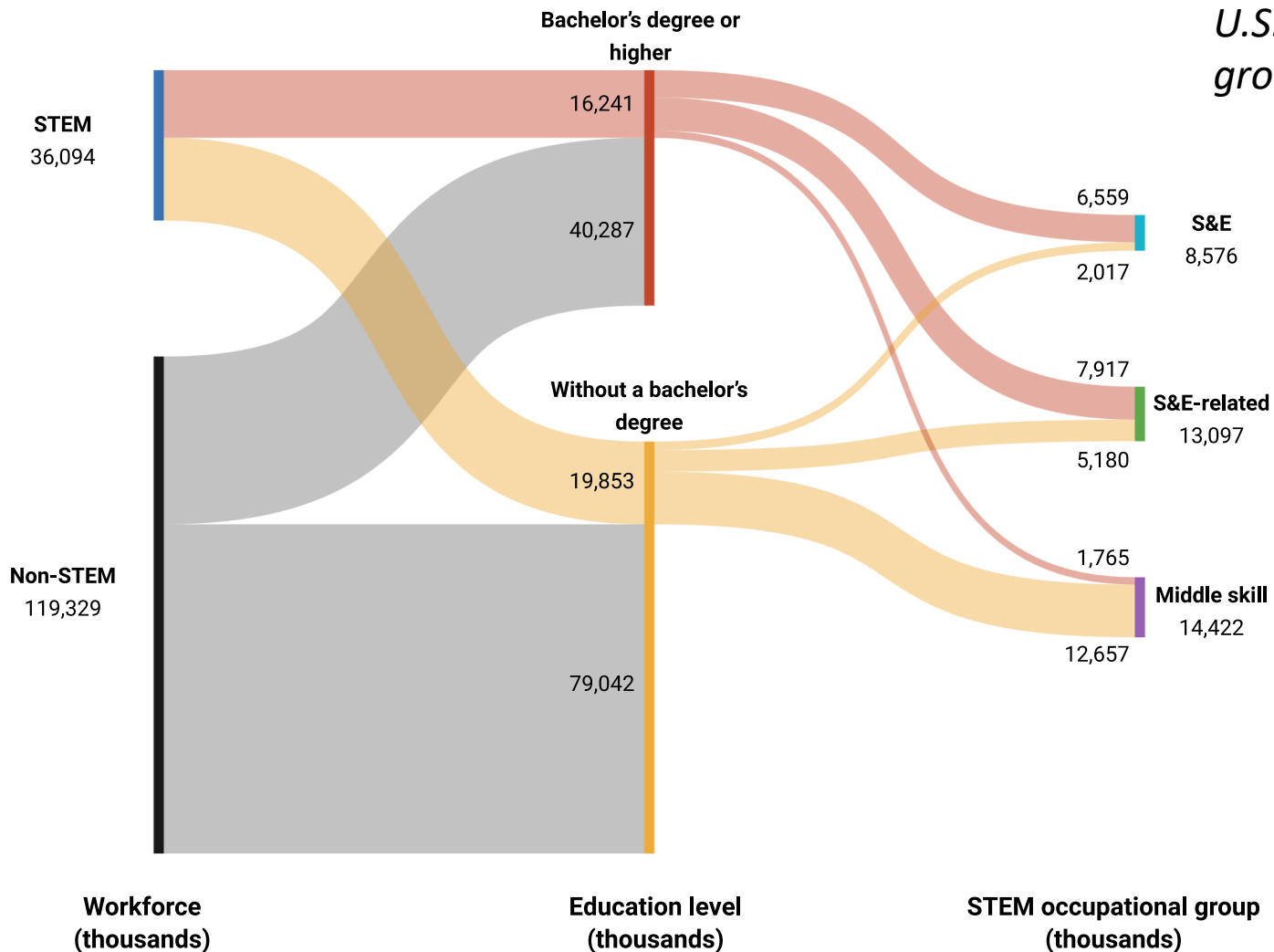
The screenshot displays the homepage of the Science and Engineering Indicators website. At the top left is the cover of the '2020 The State of U.S. Science & Engineering' report, featuring a metallic knot on a circuit board. To its right is a summary of the report, dated January 2020, with a 'CONTINUE READING >' link. Further right is a 'Reports' section listing three reports: 'The State of U.S. Science and Engineering 2020' (January 2020), 'Publications Output: U.S. Trends and International Comparisons' (October 2021), and 'Academic Research and Development' (September 2021). Below these are two more reports: 'The STEM Labor Force of Today: Scientists, Engineers, and Skilled Technical Workers' (August 2021) and a 'BROWSE ALL REPORTS >' link. The main content area is divided into four columns: 'About S&E Indicators' (describing the scope of the indicators), 'State Indicators' (offering a state comparison tool), 'Explore Indicators' (with links for 'DATA SOURCES', 'BROWSE TOPICS', and 'HOW DO I...?'), and 'Learn More' (providing information about the NSF and NCSES).

<https://nces.nsf.gov/indicators>

# The STEM Workforce

# 23% of the U.S. workforce are in STEM jobs

*U.S. workforce, by STEM occupational group and education level: 2019*



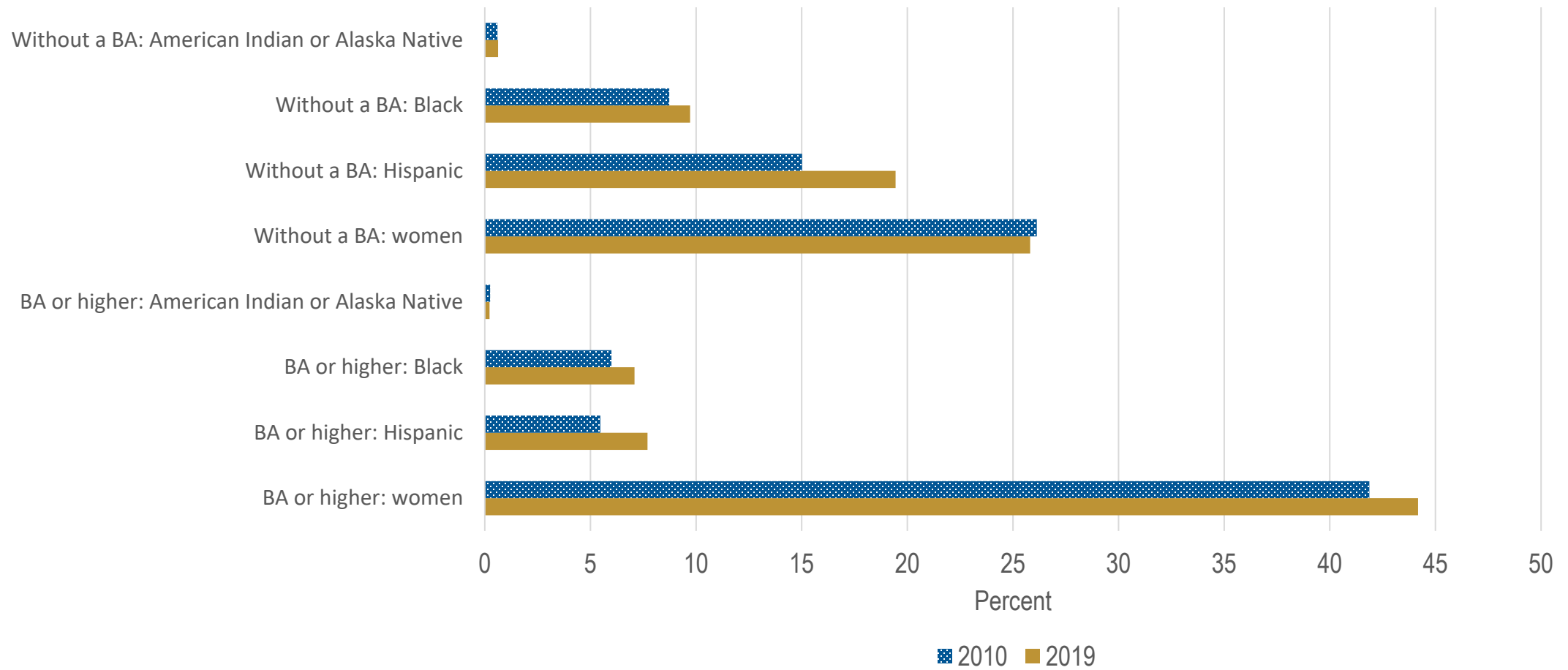
STEM workers with a BA or higher mostly work in S&E or S&E-related occupations.

STEM workers without a BA mostly work in middle-skill occupations.



# The share of Hispanics in the STEM workforce grew between 2010 and 2019

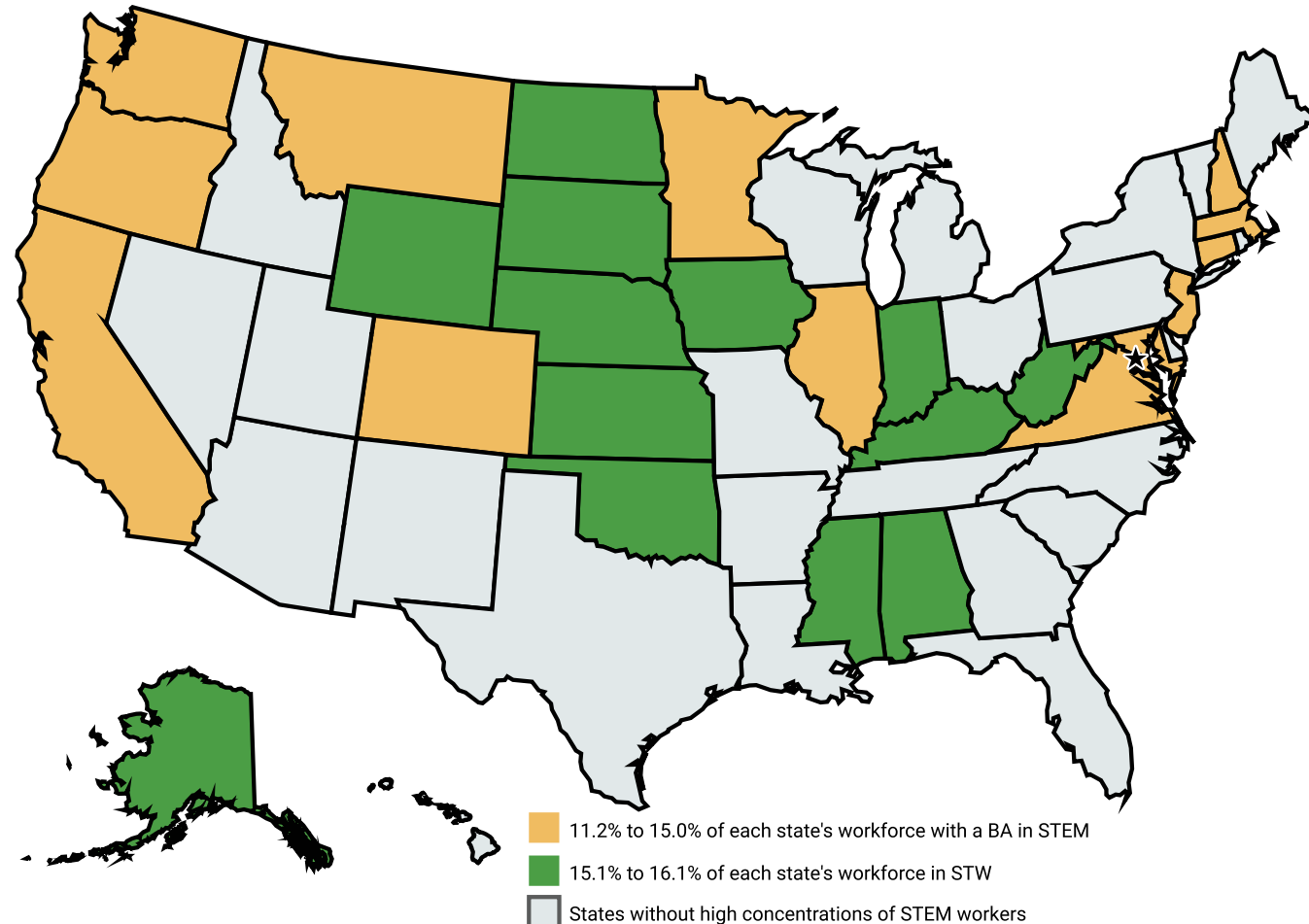
Demographic composition of the STEM workforce, by selected groups: 2010 and 2019



# The Geography of Innovation

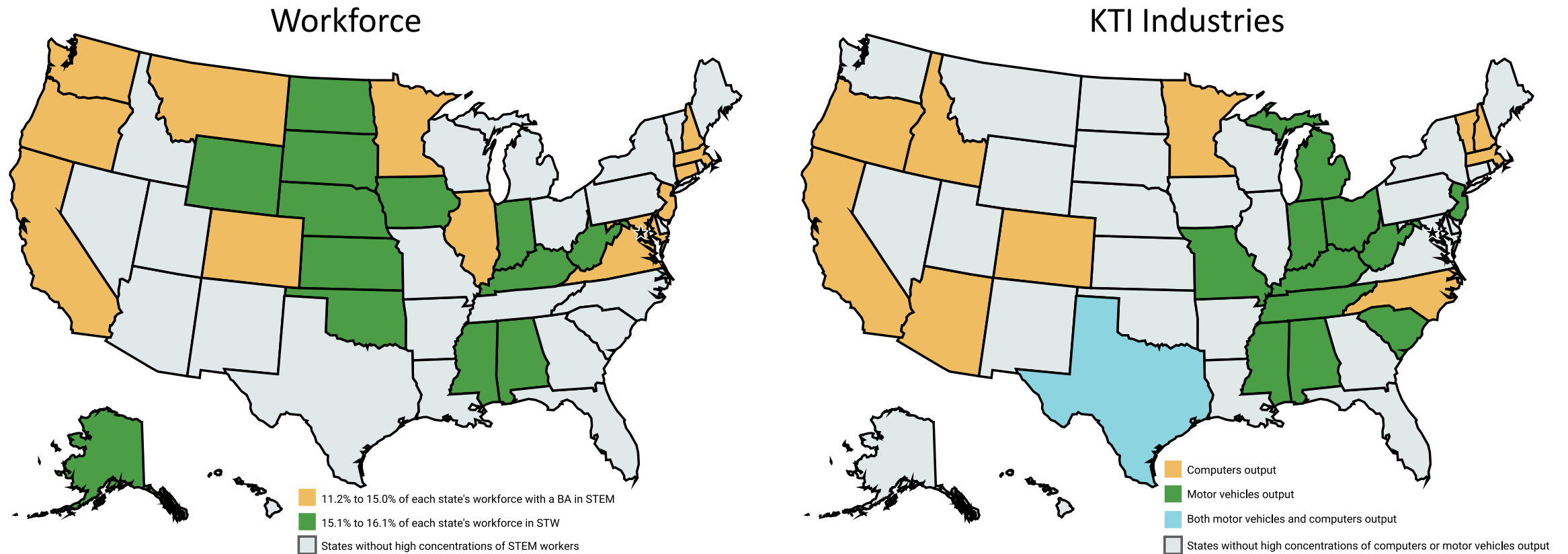
# States with high concentrations of skilled technical workers tend to cluster in the Central, Midwest, and Southern areas of the U.S. and in Alaska

*High concentration of STW and STEM workers with a bachelor's degree or above, by state: 2019*





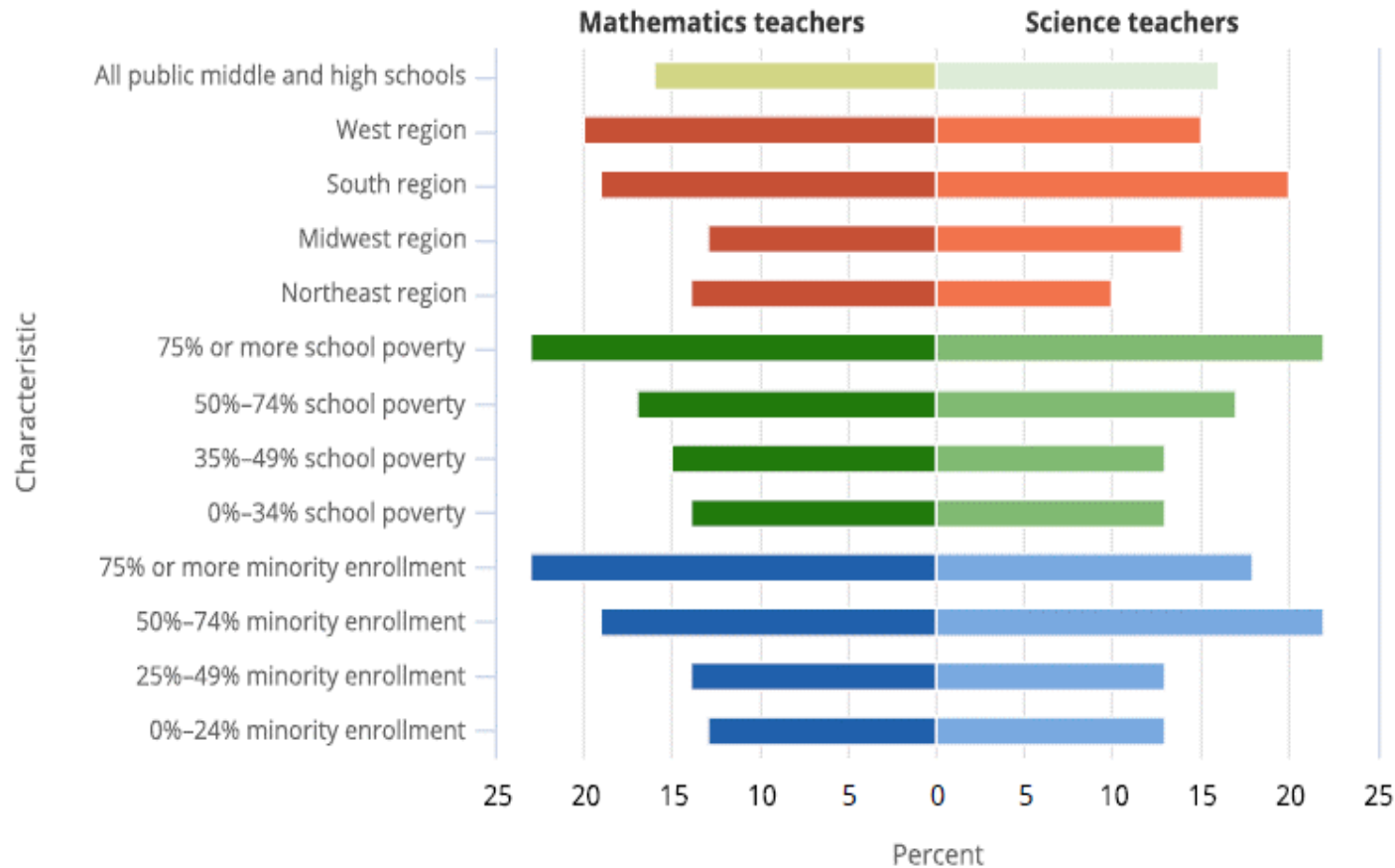
# Similarities and differences in the distribution of the STEM workforce and selected Knowledge and Technology Intensive (KTI) Industries



# U.S. STEM Education



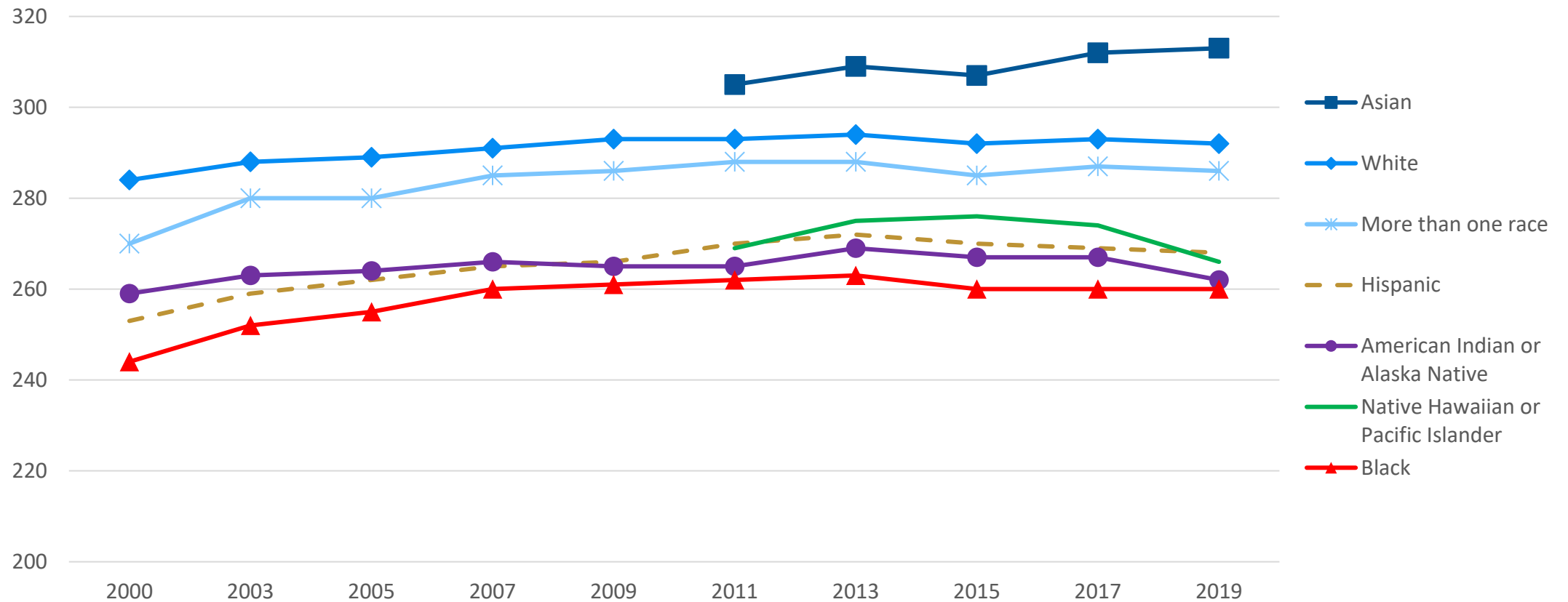
# Inexperienced STEM teachers are more prevalent at high-minority, high-poverty schools



*Public middle and high school mathematics and science teachers with 3 years or less of teaching experience, by selected school characteristics: 2017–18*

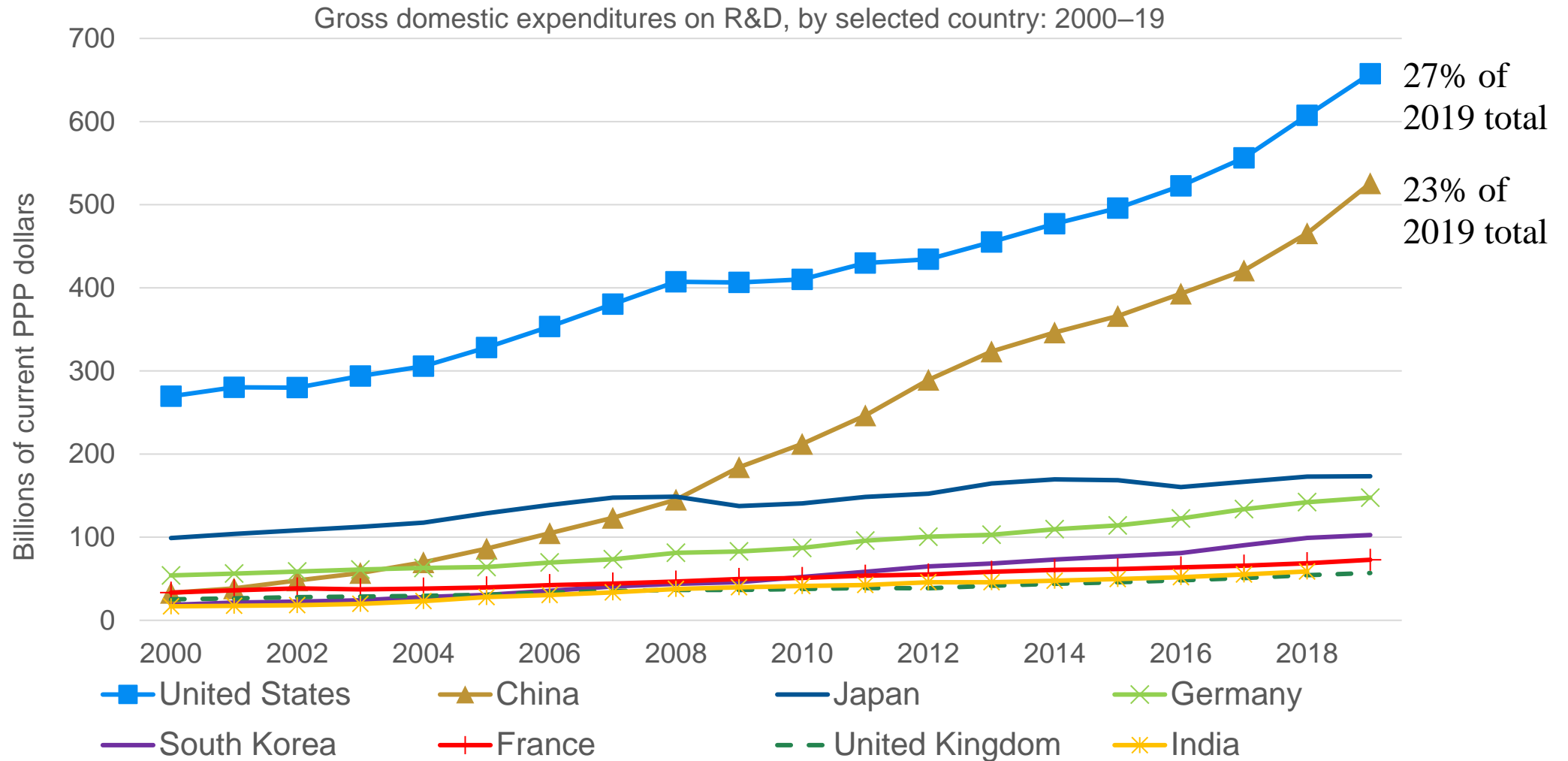
# Minority groups consistently trail behind White and Asian peers in mathematics scores

Average scores of U.S. students in grade 8 on the NAEP mathematics assessment, by race or ethnicity: 2000–19

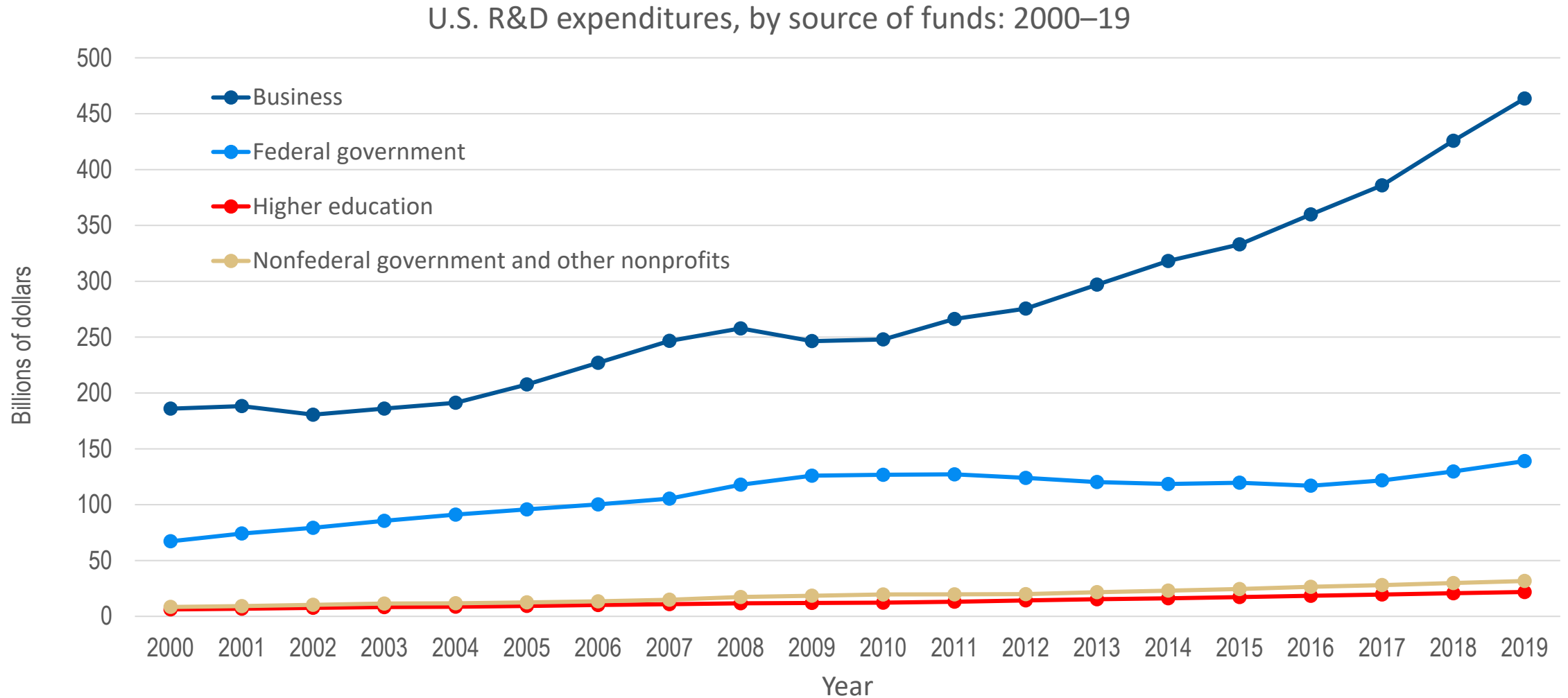


# Research and Development (R&D)

# Global R&D spending has risen threefold in 2 decades, with the United States spending more on R&D than any other country

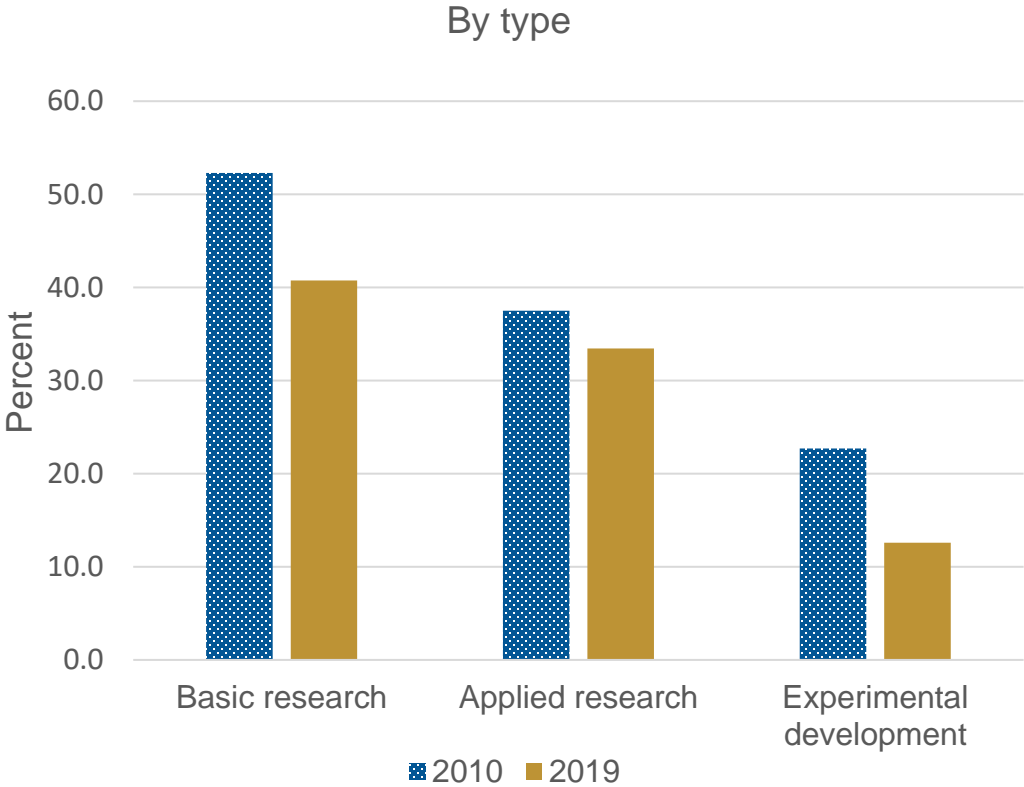
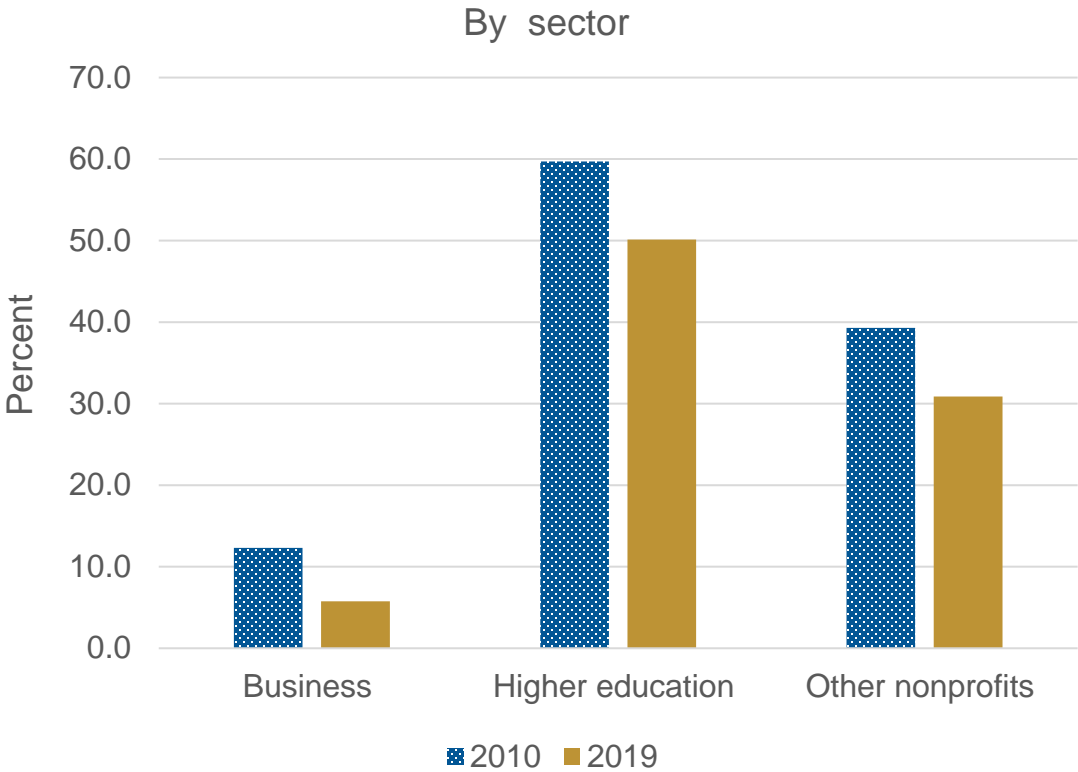


# Businesses and the federal government spend the most on R&D



# Even as federal funding increased between 2010 and 2019, the share of federal funding declined

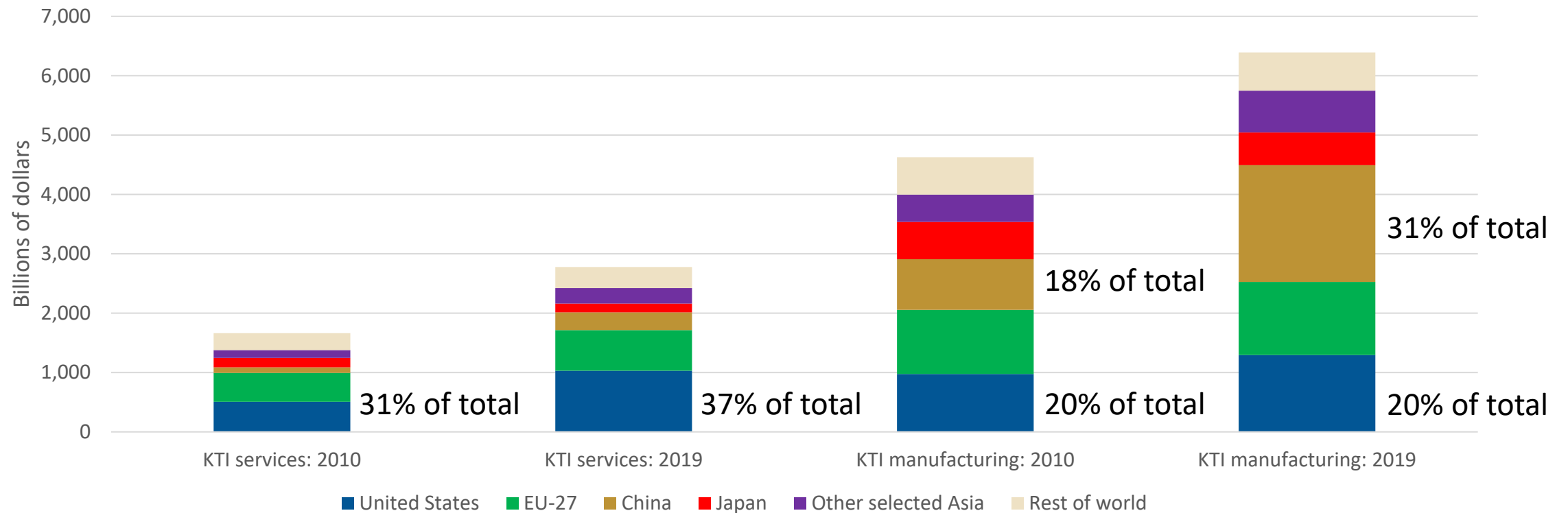
Federal government funding share of R&D





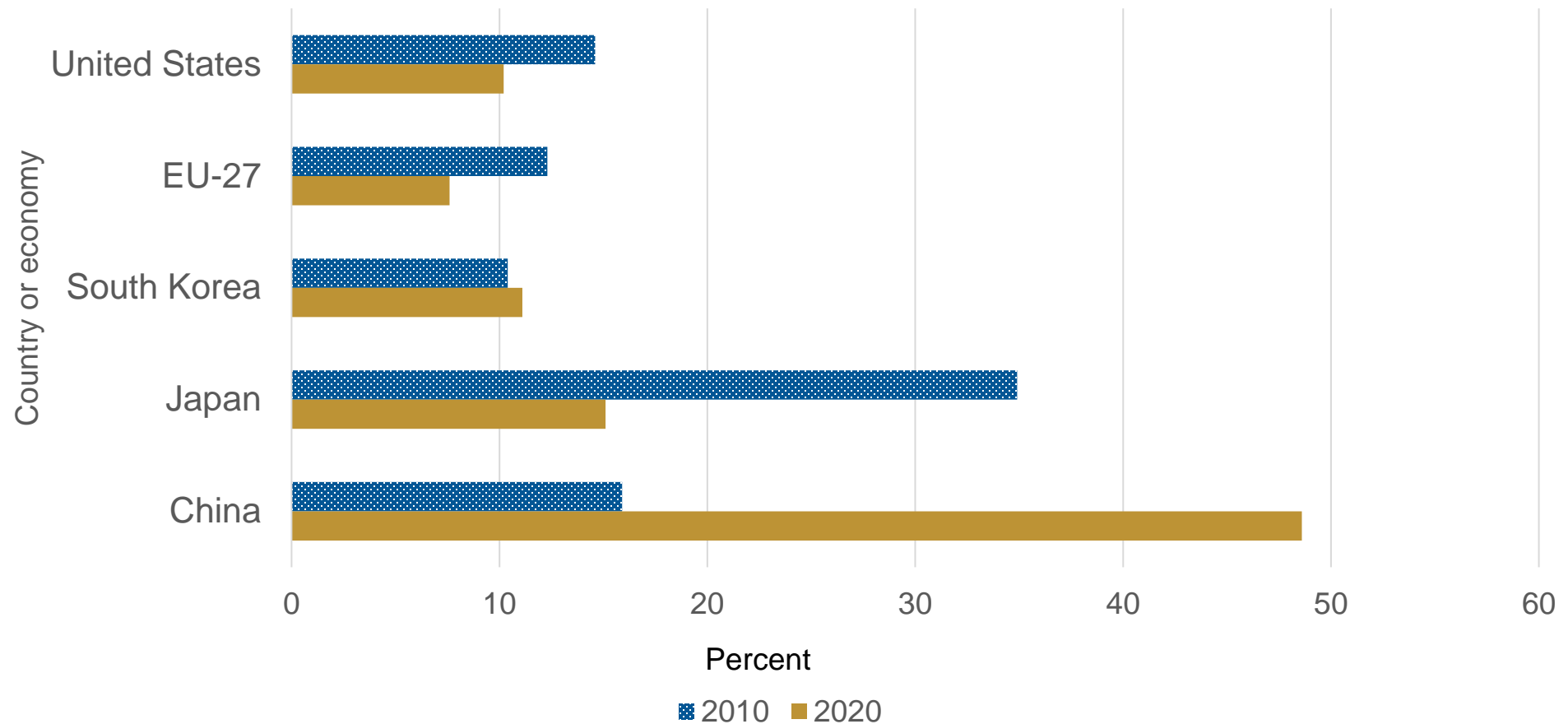
# R&D-intensive output: The United States leads in services; China leads in manufacturing

Output of R&D-intensive (knowledge- and technology-intensive or KTI) industries for selected regions, countries, or economies, by sector: 2010 and 2019



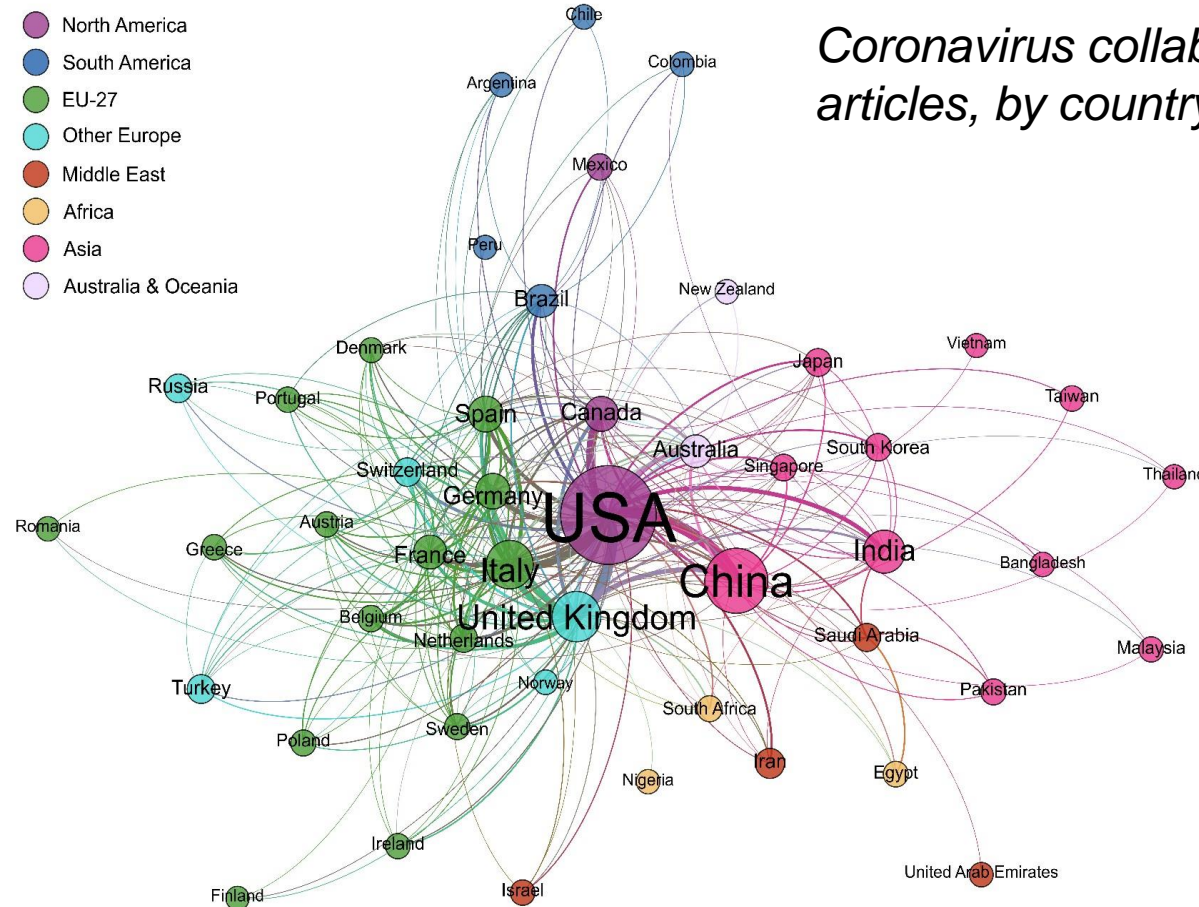
# Increasing patenting activity globally has led to shifts in the shares of patenting by country over the last decade

Shares of worldwide patents granted to inventors, by selected region, country, or economy: 2010 and 2020



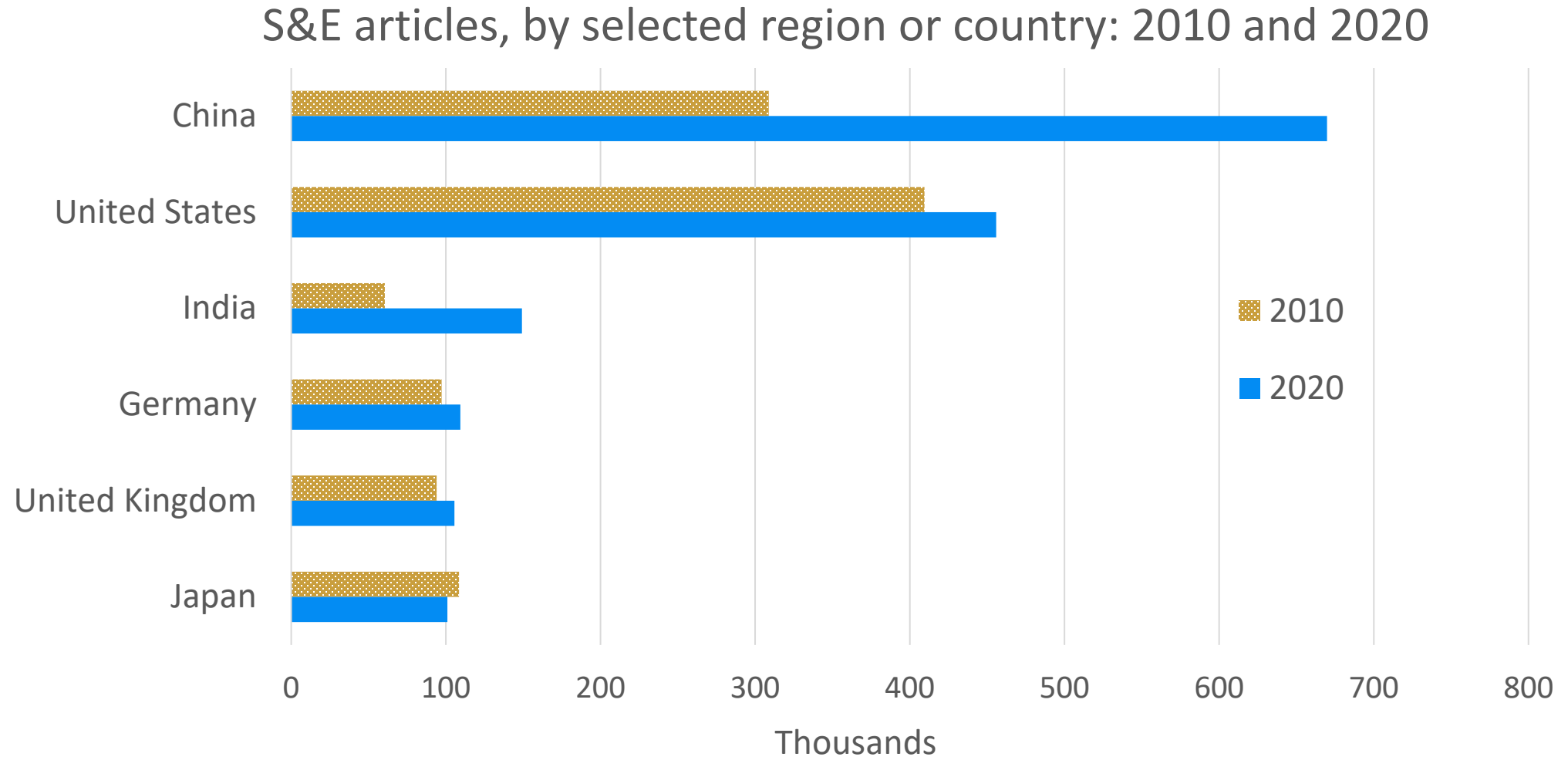
# Science and Engineering (S&E) Publications and Collaboration

# The United States played a central role in international collaboration during the COVID-19 pandemic



*Coronavirus collaboration network of articles, by country: 2020*

# The United States is the second highest producer of S&E articles in 2020



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