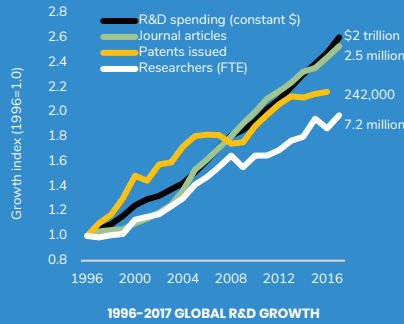


# WHO DOES RESEARCH?

## UNDERSTANDING GLOBAL RESEARCH & DEVELOPMENT

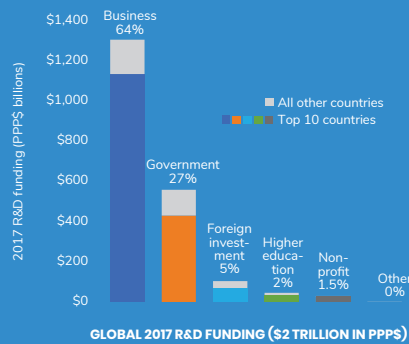
### GROWTH

In the two decades from 1996-2017, global research and development (R&D) increased by around 250 percent. Similar increases occurred in the number of researchers, patents, and journal articles published.



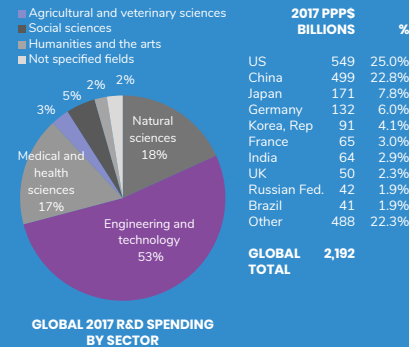
### FUNDING

Businesses fund 64% of all R&D globally. Government funding is second highest at 27 percent. Most R&D happens in just a handful of countries (see below). Higher education performs much more R&D than it funds.



### SPENDING

Most R&D spending is in engineering and technology. However, countries prioritize their R&D spending differently, and spend widely varying amounts on R&D. The top 10 countries account for 78% of the global total R&D.



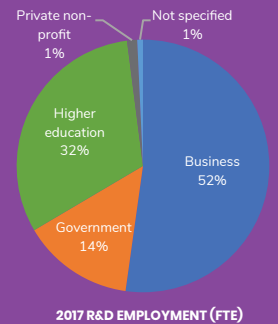
### TYPES

R&D is divided into basic research, applied research, and experimental development. Most is experimental development, of which business performs 90 percent. Higher education performs 44% of basic research.



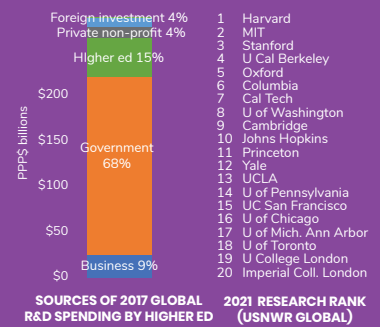
### PEOPLE

Approximately 7.2 million people (FTE) are employed as researchers (not including many more who work in supporting R&D roles). Most researchers work for businesses. Women are 30% of the R&D workforce.



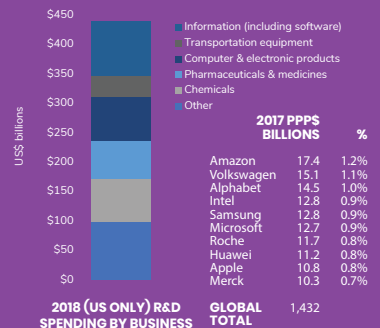
### HIGHER ED

Higher education institutions performed \$286 billion of R&D work in 2017. This work is impactful, accounting for almost all research published in journals. Businesses also increasingly outsource their basic research to higher ed.



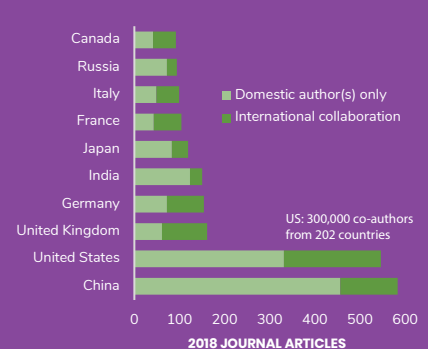
### COMPANIES

Information, auto and pharmaceutical companies are big spenders on R&D. The top 10 companies account for 9% of investment by this sector. Business R&D spending is higher as a percent total R&D in top-10 countries (see left).



### LINKS

A global ecosystem of stakeholders creates and sustains research, from universities to businesses, governments, publishers, and beyond. The interconnectedness and impact of this work is broad and significant.



## OSI Infographic 3 sources & notes

Most of the data in this infographic was extracted from the UNESCO UIS dataset at <http://data.uis.unesco.org>. Additional data sources are as noted.

<p><b>Growth</b></p> <ul style="list-style-type: none"> <li>• R&amp;D and researchers: UNESCO UIS data tables. Count only includes personnel classified as researchers, not all include all R&amp;D personnel (such as technicians).</li> <li>• Publication data: US NSB Science &amp; Engineering Indicators, <a href="https://nces.nsf.gov/pubs/nsb20206/publication-output-by-region-country-or-economy">https://nces.nsf.gov/pubs/nsb20206/publication-output-by-region-country-or-economy</a></li> <li>• Patent data: OECD data tables, <a href="https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB#">https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB#</a>. Patent reporting for 2017 is incomplete (2016 is last available year).</li> </ul>	<p><b>People</b></p> <ul style="list-style-type: none"> <li>• R&amp;D and researchers: UNESCO UIS data tables. Count only includes personnel classified as researchers, not all include all R&amp;D personnel (such as technicians).</li> </ul>
<p><b>Funding</b></p> <ul style="list-style-type: none"> <li>• UNESCO UIS data tables</li> </ul>	<p><b>Higher ed</b></p> <ul style="list-style-type: none"> <li>• Figures from UNESCO UIS data tables</li> <li>• Rankings from US News &amp; World Report research university rankings. List and ranking methodology at <a href="https://www.usnews.com/education/best-global-universities/rankings">https://www.usnews.com/education/best-global-universities/rankings</a></li> <li>• Additional data from <a href="https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0202120">https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0202120</a></li> </ul>
<p><b>Spending</b></p> <ul style="list-style-type: none"> <li>• Main data from UNESCO UIS data tables</li> <li>• Data for US from: NSB S&amp;E indicators: <a href="https://nces.nsf.gov/pubs/nsb20203/recent-trends-in-federal-support-for-u-s-r-d#figureCtr920">https://nces.nsf.gov/pubs/nsb20203/recent-trends-in-federal-support-for-u-s-r-d#figureCtr920</a></li> <li>• Data for Germany from: <a href="https://www.datenportal.bmbf.de/portal/en/K1.html">https://www.datenportal.bmbf.de/portal/en/K1.html</a></li> <li>• Available worksheets show how US and Germany data was transposed and converted to PPP</li> </ul>	<p><b>Companies</b></p> <ul style="list-style-type: none"> <li>• Individual company R&amp;D: <a href="https://www.visualcapitalist.com/global-leaders-r-d-spending/">https://www.visualcapitalist.com/global-leaders-r-d-spending/</a></li> <li>• Aggregate global figures: <a href="https://nces.nsf.gov/pubs/nsf20316/">https://nces.nsf.gov/pubs/nsf20316/</a></li> </ul>
<p><b>Types</b></p> <ul style="list-style-type: none"> <li>• UNESCO UIS database</li> </ul>	<p><b>Links</b></p> <ul style="list-style-type: none"> <li>• Source: <a href="https://nces.nsf.gov/pubs/nsb20201/global-science-and-technology-capabilities">https://nces.nsf.gov/pubs/nsb20201/global-science-and-technology-capabilities</a>. See <a href="https://www.natureindex.com/news-blog/international-collaborations-growing-exponentially">https://www.natureindex.com/news-blog/international-collaborations-growing-exponentially</a> for additional (callout) data</li> </ul>