

DECEMBER 2022

THE ROLE OF AMERICAN TECHNOLOGY SECTOR IN SAFEGUARDING U.S. ECONOMIC AND NATIONAL SECURITY

By JAMIL N. JAFFER

THIS NSI BACKGROUND

- | | | | | | | | |
|---|--|---|--|---|---|---|---|
| 1 | IDENTIFIES the benefits of a strong and vibrant U.S. technology sector. | 2 | DETAILS the value of a robust technology ecosystem to the American economy. | 3 | EXPLORES how a strong technology sector supports American national security. | 4 | OUTLINES how American technology leadership advances U.S. interests. |
|---|--|---|--|---|---|---|---|

FUELING AMERICA'S ECONOMIC FUTURE

- **Driving Job Growth:** The technology industry, comprised of companies of varying sizes that research, develop, manufacture, or distribute technology systems, contributes nearly \$1.99 trillion annually to the U.S. GDP, and directly supports approximately 12.4 million American jobs.¹ Hiring for the tech sector is projected to grow faster than in any other field over the next decade.² And the digital economy³ itself represents a “substantial and increasing share of the U.S. economy” with its share of the overall economy (in terms of total economy value added) rising from 7.8% to 10.2% between 2005 and 2020, growing at an average of 6.1% per year, four times the rate of the overall economy.⁴
- **Investing in Research and Development:** U.S. tech companies outpace other industry leaders in research and development (R&D), with seven of the top ten R&D spenders in the United States being tech companies, including the top five.⁵ While government R&D spending is crucial, particularly for basic science, private sector R&D represents 70% of all R&D expenditures in the U.S.⁶
- **Providing Cross-cutting Economic Benefits:** Innovation in the technology sector can also drive economic activity elsewhere given its use in other industries.⁷ A 2019 study from Deloitte reported that 85% of small business owners claimed that the daily use of technology has aided their businesses’ success, both in financial results and employment growth.⁸ While the historical data is somewhat mixed, as the demand for high-skilled labor increases and adoption of digital tools continues to expand in the post-pandemic environment, investment in technology could significantly help boost productivity and foster economic growth.⁹



PROMOTING NATIONAL SECURITY INTERESTS

- **Supporting the U.S. National Security Community:** The U.S. national security community increasingly relies on technology research, development, and innovation from private sector companies of all sizes. The Department of Defense (DoD) funds numerous innovation-focused organizations and offices that partner with technology companies to solve critical national security challenges using leading-edge commercial technology, including: the Defense Innovation Unit (DIU), the Defense Advanced Research Projects Agency (DARPA), the Air Force Research Laboratory (AFRL) and its AFWERX program, the Rapid Capabilities and Strategic Capabilities Offices, the Navy's Rapid Innovation Fund, and the Marine Innovation Unit, to name a few.
 - To meet adversarial challenges in areas such as quantum computing, semiconductors, telecommunications, and advanced artificial intelligence (AI) and machine learning – specifically those challenges attached to growing Chinese capabilities in these areas – as well as the increase in nation-state cyberattacks, both the U.S. government and outside commissions have flagged the critical need for government and industry partnership in combatting these threats.¹⁰
 - DoD is also leveraging capabilities of the private sector to scale its computing capabilities through the Joint Warfighter Cloud Capability (JWCC), to allow DoD to expand and enhance efforts across several domains, including land, air, sea, space, and cyberspace.¹¹
- **The IC, Emerging Technologies, and Intelligence Collection:** Technology companies of all sizes have contributed extensively to the development and expansion of U.S. intelligence collection capabilities, significantly enhancing how information is gathered, processed, and exploited.
 - For example, AI can be used to identify targets and validate intelligence information collected; quantum decryption and quantum key distribution developed by the private sector will alter how the government collects and secures national security information; emerging analytic technologies can operate across multiple domains to assist the IC and DoD; and new academic partnerships are increasingly being utilized in developing new intelligence capabilities and techniques.
- **Bolstering American Cybersecurity and Data Privacy:** U.S. technology companies, including more established players and newer entrants alike, are also a critical resource in the fight against cyberattacks, including ransomware attacks conducted by hostile nation-states and their proxies.
 - For example, in August 2021, tech giants Apple, Google, and Microsoft teamed up with the Biden Administration to improve public-private cybersecurity cooperation, pledging more than \$30 billion to reinforce U.S. cybersecurity defenses.¹² Efforts include promoting the adoption of multi-factor authentication, enhanced security training, supply chain security improvements, development of advanced cybersecurity solutions, and funds to support federal, state, and local governments with technical services and training partnerships.¹³ Other private sector entities and non-profits have sought to address and prevent future ransomware attacks, including the Institute for Security and Technology, which brought together more than 60 members from technology and cybersecurity companies, government agencies, and other industries to build a comprehensive anti-ransomware framework.¹⁴
 - Newer technology ecosystem participants, including startups, are playing a key role in strengthening our cyber defenses. For example, in response to President Biden's May 2021 Executive Order, the Cybersecurity Infrastructure Security Agency (CISA) deployed an endpoint platform from CrowdStrike, a startup that had gone public just two years earlier, to secure critical endpoints and workloads.¹⁵ Additionally, in October 2021, an IoT startup, Dragos, raised an additional \$200 million in part to support critical infrastructure cybersecurity in cooperation with the Department of Energy.¹⁶
 - Moreover, Amazon, Google, Microsoft, Mandiant, Meta, and several other technology companies joined the Department of Homeland Security's new Joint Cyber Defense Collaborative (JCDC), a combined effort between the private sector and government to defend against and reduce the impact of cyber intrusions and to help develop new cyber defense plans and solutions.¹⁷ Other leading efforts include the NSA Cybersecurity Collaboration Center, which brings together government and private sector cybersecurity companies to detect and counter malicious cyber activity.¹⁸

- 
- **Propelling the Space Industry Forward:** Private U.S. tech companies provide a vital competitive advantage to the U.S. over nation-state competitors like Russia and China when it comes to space capabilities, and companies such as SpaceX, Blue Origin, and Scaled Composites are now providing a significant portion of U.S. national security and scientific space launch, transport, and on-orbit capabilities at substantially reduced cost.¹⁹ In late 2021, the National Aeronautics and Space Administration (NASA) partnered with several private companies to develop commercial space stations that intend to replace the International Space Station (ISS).²⁰ Just one year earlier, SpaceX brought human spaceflight launch back to U.S. soil for NASA, who was previously reliant on Russia to fly NASA astronauts to the ISS for a decade following the retirement of the Space Shuttle in 2011.²¹ And numerous startups, small and large, are providing an increasingly diverse array of on-orbit services to corporate and individual customers, including expanded global communications capabilities, increasingly rich sensing data, and access to scientific experiments not previously achievable.
 - **Championing American Foreign Policy Interests Abroad:** In addition to working with the U.S. government, U.S.-based technology companies have also worked to promote American foreign policy and national security interests in partnership with allies and partners overseas.
 - For example, following the Russian invasion of Ukraine and attacks on Ukraine's communications infrastructure, SpaceX's Starlink services helped to restore communications in critical areas throughout the country.²² The satellite communication system has not only helped the Ukrainian military communicate with forces on the ground, but has also provided access to Ukrainian civilians to communicate with friends and family, while staying aware of Russian advances and providing information on safe spaces.
 - In addition to donating more than \$246 million combined to humanitarian efforts in Ukraine, U.S. tech companies have also worked tirelessly to counter misinformation and disinformation surrounding the conflict.²³ For example, Google and YouTube have blocked Russian state media and demonetized certain content, Meta has restricted Russian state media and has flagged posts for false information, and messaging sites such as Signal and Twitter have become essential tools for Ukrainian outreach and communication.²⁴

■ THE DEMOCRATIZATION OF INFORMATION AND ECONOMIC OPPORTUNITY

- **Increasing Accessibility and Use of Data:** The advancement of modern computing capabilities alongside the development of online information discovery and sharing capabilities has made information dramatically more accessible by a broader and more diverse group of individuals across the globe. And the breadth and depth of access to high-speed data networks, social media platforms, and powerful search, computing, and communications capabilities has provided such individuals with the ability to use and deploy this information for a variety of purposes. This has enabled civilians to undertake new and novel economic opportunities that in turn, allow them to drive social change, personal and economic growth, and political action.
 - Between the sharing of information on search platforms like Google or real-time news updates via social media platforms like Facebook, Instagram, and Twitter, applications like Uber or Airbnb that allow individuals to provide or receive services, and the deployment of mobile computing devices and capabilities by companies like Apple and Google, this democratization of information and economic opportunity has largely—although not exclusively—been driven by American technology companies.
 - American platforms have played an important role in conveying real-time information around the world, especially as we have seen during the Russian invasion of Ukraine, but also in the historic Arab Spring movement in 2011, the nascent Orange Revolution in Eastern Europe, and the Hong Kong democracy protests.
 - To be sure, the use of these platforms has not been an unalloyed good, particularly given the spread of misinformation and disinformation through these vehicles.
 - Moreover, we have seen significant criticisms in the United States, in particular, regarding the implementation of content-moderation and other related policies.

- Nonetheless, the increasing willingness and efforts on the part of technology platforms to confront the spread of false information (including, in particular, nation-state developed disinformation and misinformation campaigns), anti-democratic conspiracy theories, and attacks on human rights, while also providing a platform for legitimate political dissent and debate has provided opportunities once unimaginable to a broad range of individuals across the globe.
- ▣ In the aftermath of the 2016 elections, a number of platforms undertook new efforts to address the use of their systems to spread foreign nation-state disinformation; and in December 2021, Twitter and Facebook collectively removed thousands of accounts connected to Chinese disinformation campaigns, many of which sought to undermine human rights abuse allegations and included anti-American rhetoric.²⁵

» KEY ITEMS TO WATCH

LEGISLATIVE ACTION BY CONGRESS

- Whether Congress will move forward with legislation like the American Innovation and Choice Online Act to implement a revised antitrust framework for a specific handful of large companies; whether national security concerns expressed by the private sector and national security experts will be effectively addressed by policymakers; whether new legislation will require similar oversight of Chinese tech giants such as Huawei, ZTE, or other adversary-backed companies; and whether Congress will take action to modify existing laws related to online content and the protections currently afforded to platform companies.

USG EFFORTS TO COUNTER ADVERSARIAL ACTIVITY

- Whether the Executive Branch will issue new regulatory policies to target specific technology companies or address particular areas of concern, like cybersecurity, that leverage existing authority in new ways; and whether existing laws or policies will be subject to broader interpretation or greater enforcement efforts, potentially limiting incentives for innovation.

RESPONSE TO ECONOMIC PRESSURES ON U.S. CONSUMERS

- Whether such pressures will make Americans less interested in U.S. engagement in international affairs; whether higher prices globally will result in an increasing shift towards and positive reception of cheaper goods produced in China or other lower cost-of-production nations; and whether economic pressure on Americans will make citizens more concerned about the alleged anti-competitive behavior of large tech market players.

ENDNOTES

- 1 “Cyberstates 2021: The Definitive Guide to the U.S. Tech Industry and Tech Workforce,” THE COMPUTING TECH. INDUS. ASS’N. (2021), https://www.cyberstates.org/pdf/CompTIA_Cyberstates_2021.pdf; see also *Technology: Background*, GLOBALEDGE, <https://globaledge.msu.edu/industries/technology/background> (last visited Oct. 6, 2022).
- 2 *Employment Projections*, U.S. BUREAU OF LAB. STAT., <https://data.bls.gov/projections/occupationProj> (last visited Oct. 6, 2022).
- 3 See David M. Byrne, “The Digital Economy and Productivity,” FIN. AND ECON. DISCUSSION SERIES 2022-038, at 8, <https://doi.org/10.17016/FEDS.2022.038> (“In the United States, the Bureau of Economic Analysis (BEA) has constructed a satellite account to supplement the core national income and product accounts (NIPAs) that provides a serviceable measure of the digital economy. It encompasses infrastructure (production of IT capital), e-commerce, and priced digital services (services related to computing and communications). In practice, approximately 200 products and services judged to be primarily digital are identified from the list of thousands of types of output in the input-output accounts produced by BEA.”) (last updated June 17, 2022).
- 4 See David M. Byrne, “The Digital Economy and Productivity,” FIN. AND ECON. DISCUSSION SERIES 2022-038, at 8, <https://doi.org/10.17016/FEDS.2022.038> (“In the United States, the Bureau of Economic Analysis (BEA) has constructed a satellite account to supplement the core national income and product accounts (NIPAs) that provides a serviceable measure of the digital economy. It encompasses infrastructure (production of IT capital), e-commerce, and priced digital services (services related to computing and communications). In practice, approximately 200 products and services judged to be primarily digital are identified from the list of thousands of types of output in the input-output accounts produced by BEA.”) (last updated June 17, 2022).
- 5 Prableen Bajpai, “Which Companies Spend the Most in Research and Development (R&D)?,” NASDAQ (June 21, 2021, 2:30 PM), <https://www.nasdaq.com/articles/which-companies-spend-the-most-in-research-and-development-rd-2021-06-21>.
- 6 John F. Sargent, *U.S. Research and Development Funding and Performance: Fact Sheet*, CONG. RSCH. SERV., <https://sgp.fas.org/crs/misc/R44307.pdf> (last updated Sept. 13, 2022).
- 7 “U.S. Economic Contribution of the Consumer Technology Sector,” PWS (Apr. 2019), https://cdn.cta.tech/cta/media/media/resources/research/pdfs/2019_pwc_cta_economic-contribution-of-the-consumer-technology-sector.pdf?_ga=2.244942277.1183134287.1633633752.1116424526.1633633752.
- 8 “The performance of Small and Medium Sized Businesses in a digital world,” DELOITTE (2019), <https://www2.deloitte.com/content/dam/Deloitte/es/Documents/Consultoria/The-performance-of-SMBs-in-digital-world.pdf>.
- 9 Compare Heather Long, “The U.S. could be on the verge of a productivity boom, a game-changer for the economy,” WASH. POST (Aug. 18, 2021, 6:00 AM), <https://www.washingtonpost.com/business/2021/08/18/us-productivity-boom/>, with Steve Lohr, “Why Isn’t New Technology Making Us More Productive?,” N.Y. TIMES (May 24, 2022), <https://www.nytimes.com/2022/05/24/business/technology-productivity-economy.html>; see also Zia Qureshi, “Technology and the Future of Growth: Challenges of Change,” BROOKINGS (Feb. 25, 2020), <https://www.brookings.edu/blog/up-front/2020/02/25/technology-and-the-future-of-growth-challenges-of-change/> (“Productivity is the main long-term propeller of economic growth. Technology-enabled innovation is the major spur to productivity growth. Yet, paradoxically, productivity growth has slowed as digital technologies have boomed. Among advanced economies over the past 15 years or so, it has averaged less than half of the pace of the previous 15 years.”); Byrne, *supra* n. 3 at 10-12 (suggesting that traditional productivity data may routinely undercount the economic benefits of technological innovation).
- 10 The Cyberspace Solarium Commission Report at pp. 1, 8-13, 16-19 & 96. See: <https://www.solarium.gov/report> (last visited Oct. 18, 2022); Alexander Culafi, “CISA director promotes collaboration and trust at RSAC 2022,” TECH TARGET (Jun. 8, 2022), <https://www.techtarget.com/searchsecurity/news/252521282/CISA-director-promotes-collaboration-and-trust-at-RSAC-2022>.
- 11 Jon Harper, “Pentagon Cancels JEDI Program, Launches New Cloud Computing Effort,” NAT’L DEF. (July 6, 2021), <https://www.nationaldefensemagazine.org/articles/2021/7/6/pentagon-cancels-jedi-program-launches-new-cloud-computing-effort>; DOD Cloud Strategy, DOD CLOUD STRATEGY (Dec. 2018), <https://media.defense.gov/2019/Feb/04/2002085866/-1/-1/1/DOD-CLOUD-STRATEGY.PDF>.
- 12 Andrea Shalal, “U.S. to Work with Big Tech, Finance Sector on New Cybersecurity Guidelines,” REUTERS (Aug. 26, 2021, 8:04 PM), <https://www.reuters.com/world/us/cyber-threats-top-agenda-white-house-meeting-with-big-tech-finance-executives-2021-08-25/>.
- 13 “Biden Administration and Private Sector Leaders Announce Ambitious Initiatives to Bolster the Nation’s Cybersecurity,” BRIEFING ROOM (Aug. 25, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/25/fact-sheet-biden-administration-and-private-sector-leaders-announce-ambitious-initiatives-to-bolster-the-nations-cybersecurity/>.
- 14 “Ransomware Task Force,” INSTITUTE FOR SECURITY AND TECHNOLOGY (last visited Oct. 6, 2022).
- 15 George Kurtz, “CrowdStrike Is Working to Strengthen the U.S. Government’s Cybersecurity Posture,” CROWDSTRIKE BLOG (Dec. 1, 2021), <https://www.crowdstrike.com/blog/how-crowdstrike-is-strengthening-the-us-governments-cybersecurity-posture/>.
- 16 Leslie Kesselring, “Dragos Welcomes NSA and CISA as Trusted Advisors for Neighborhood Keeper, Increasing OT Cybersecurity for Industrial Infrastructure,” BUS. WIRE: DRAGOS (Feb. 14, 2022, 10:06 AM), <https://www.businesswire.com/news/home/20220214005554/en/Dragos-Welcomes-NSA-and-CISA-as-Trusted-Advisors-for-Neighborhood-Keeper-Increasing-OT-Cybersecurity-for-Industrial-Infrastructure>.
- 17 *CISA Launches New Joint Cyber Defense Collaborative*, CISA, <https://www.cisa.gov/news/2021/08/05/cisa-launches-new-joint-cyber-defense-collaborative> (Aug. 6, 2021); Charlie Mitchell, “CISA adds partners to JCDC as ‘specialists’ in specific operational collaborations,” INSIDE CYBERSECURITY (Apr. 12, 2022), <https://insidcybersecurity.com/daily-news/cisa-adds-partners-jcdc-‘specialists’-specific-operational-collaborations>].
- 18 Joseph Marks, “NSA Is Surging Its Collaboration With the Private Sector,” WASH. POST (Oct. 21, 2021, 7:31 AM), <https://www.washingtonpost.com/politics/2021/10/21/nsa-is-surg-ing-its-collaboration-with-private-sector/>.
- 19 Benjy Sarlin, Jacob Ward, and Ezra Kaplan, “Private Space Industry Is Helping to Change the Game,” NBC NEWS (Oct. 8, 2021, 2:12 PM), <https://www.nbcnews.com/meet-the-press/news/private-space-industry-helping-change-game-n1280898>.
- 20 Christian Davenport, “NASA Looks to Private Sector for Successor to the International Space Station,” WILSON CTR. (Jan. 21, 2022), <https://www.wilsoncenter.org/article/nasa-looks-private-sector-successor-international-space-station>.
- 21 Yvette Smith, “SpaceX Demo 2 Mission Launches into History,” NASA (Jan. 11, 2021), <https://www.nasa.gov/image-feature/spacex-demo-2-mission-launches-into-history>].
- 22 Christopher Miller, Mark Scott, and Bryan Bender, “UkraineX: How Elon Musk’s space satellites changed the war on the ground,” POLITICO (June 8, 2022), <https://www.politico.eu/article/elon-musk-ukraine-starlink/>.
- 23 “How Tech is Supporting Ukraine,” U.S. CHAMBER OF COMMERCE TECHNOLOGY ENGAGEMENT CENTER (last visited Oct. 13, 2022), <https://americaninnovators.com/news/how-tech-is-supporting-ukraine/>.
- 24 *Id.*
- 25 Paul Mozur, “Twitter and Facebook Hit Back at Chinese Propaganda Campaigns,” N.Y. TIMES (Dec. 2, 2021), <https://www.nytimes.com/2021/12/02/business/facebook-twitter-china-propaganda.html>.