

Trump vs. Biden: Comparing the Candidates' Positions on Technology and Innovation

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Tech policy broadly defined becomes more important each presidential election, and this one is no different. As it has in every cycle since 2008, ITIF provides a side-by-side comparison of the nominees' positions on key issues related to the progress of technological innovation.

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FORWARD

Technological innovation has long been and will continue to be critically important to both income growth and national competitiveness. So it is important that we examine the 2020 presidential candidates' policy agendas through that lens.

In every presidential election since 2008, the Information Technology and Innovation Foundation (ITIF) has released a report examining the two major candidates' positions on a host of technology and innovation policy issues.

In past elections, both parties' nominees generally articulated positions on nearly all of the policy areas ITIF identified as key priorities for promoting innovation. This is generally not the case in 2020. While Biden has stated his positions on most of the issues tracked by ITIF, Trump has been much vaguer, offering few detailed positions. Nevertheless, we believe it is important to clearly document what the two candidates have said (or not said) about these critical innovation issues (as well as what the Trump administration has done to date), as their positions serve as the best-available guide to the next administration's policy priorities—and the lack of a stated position may indicate which issues would be low priorities.

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This report is based on information gathered directly from the campaigns' websites and policy documents, and from media accounts of statements the candidates have made. The report begins with an overview of each candidate's general philosophy on technology, innovation, and trade policy, and then compares the candidates' policy positions across 10 specific issue areas:

- Innovation and Research and Development (R&D)
- Internet and Digital Economy
- Broadband and Telecommunications
- Education and Skills
- Taxes
- Regulation
- Trade
- Advanced Manufacturing
- Life Sciences and Biotechnology
- Clean Energy Innovation

ITIF is a nonpartisan research and educational institution that focuses on innovation, productivity, and digital economy issues. It does not endorse any candidates for office. Rather, our goal in providing a factual, impartial comparison of the candidates' technology and innovation policies is to amplify the national dialogue around the need to bolster innovation-based economic growth.

GENERAL PHILOSOPHY TOWARD TECHNOLOGY AND INNOVATION POLICY

In many ways, the candidates have very different approaches to technology and innovation policy. Trump has focused more on reducing government barriers in the economy, including taxes and regulations that, among other things, limit innovation. The administration has taken this approach with a number of emerging technologies, including autonomous transportation systems and artificial intelligence (AI), pushing for an innovation principle-based approach. And while the Trump budgets have increased funding for research in some particular technology areas, especially AI, overall they have sought to cut government support for research.

While much of the focus of Biden's economic plan is on more traditional issues such as expanding health care and investing in physical infrastructure, the campaign has highlighted its support for significantly increased public investment in R&D and advanced production.

As described below, the two candidates are closer together on trade policy, where both reject or at least question the prevailing Washington consensus on expanding trade—and both are focused on being tough on China, with Trump preferring a largely unilateral approach and Biden supporting a multilateral approach.

The candidates have very different approaches to technology and innovation policy.

Biden's approach to technology and innovation policy appears to be formulated to engage the government as an active partner alongside industry in setting a national technology and innovation agenda, as well as a tougher regulator of many technology industries. Moreover, a particular focus of the Biden agenda is to support innovation policy that accomplishes social policy goals, such as revitalizing economically distressed communities and regions, and supporting economic opportunities among disadvantaged groups, including racial minorities.

When it comes to climate innovation, the Trump administration would do little; in fact, its budget proposals have cut funding for clean energy R&D. In contrast, while much of the Biden proposals related to climate focus on regulation and adoption of existing technologies (e.g., building insulation), Biden also supports massive increases in clean energy R&D funding.

They differ on immigration, with Biden embracing the more traditional Democratic position, which has supported increases in both high- and low-skill immigration. President Trump has pushed back against greater immigration, especially illegal, low-skill, and H1-B immigration. The Biden campaign has proposed significant increases in public investment in education and skills. The Trump administration has pushed for a reduction in funding generally, but increases in support for apprenticeship programs; and the president signed an executive order, as ITIF had recommended, requiring the federal government to hire on the basis of capabilities, not degrees.

Both support increased investment in rural broadband infrastructure, although it appears Biden supports much larger federal investments in this space.

When it comes to tax and regulation, the campaigns differ significantly. The Biden campaign supports higher taxes on business, particularly large corporations; stronger regulations, including on privacy and broadband providers; and more-aggressive antitrust enforcement, particularly on large Internet companies. The Trump administration embraces a more traditional Republican

approach of lighter regulations and lower business taxes, and antitrust that is grounded in the consumer welfare principle. However, one exception is when it comes to Internet platforms wherein the administration has argued for limiting Section 230 protections and potentially bringing antitrust enforcement against major platforms. Biden agrees on this.

Table 1: The candidates' general philosophies toward technology and innovation policy

Trump	Biden
<ul style="list-style-type: none"> ▪ Has focused on reducing government barriers in the economy, including taxes and regulations that limit innovation. ▪ Trump budgets have proposed increased funding for research in some technology areas, especially emerging technologies such as AI, but also have sought to cut overall support for research. ▪ Rejects Washington consensus on trade policy and focuses on being tough on China with a largely unilateral approach. ▪ Budget proposals have cut funding for clean energy R&D. ▪ Has pushed back against greater immigration, including H1-B and L1 workers. ▪ For education and training, has pushed for less funding generally, but more support for apprenticeship programs. Also signed an executive order requiring the federal government to hire on the basis of capabilities, not degrees. ▪ Supports increased investment in rural broadband infrastructure. ▪ Embraces lighter regulations, lower business taxes, and a traditional consumer-welfare approach to antitrust—except for Internet platforms. ▪ Supports limiting Section 230 protections and potential antitrust enforcement against major Internet platforms. 	<ul style="list-style-type: none"> ▪ Policy approach formulated to engage government as both an active partner with industry in setting a technology agenda—particularly to achieve social goals—and as a tougher regulator of many technology industries. ▪ Has highlighted support for significantly increased public investment in R&D and advanced production. ▪ Questions Washington consensus on trade and is focused on being tough with China—but supports a more multilateral approach than does Trump. ▪ Supports massive increases in clean energy R&D funding. ▪ Embraces the traditional Democratic position on immigration, which has supported increases in both high- and low-skill immigration. ▪ Has proposed significant increases in public investment in education and skills. ▪ Appears to support greater federal investment in rural broadband infrastructure than Trump. ▪ Supports higher taxes on business, particularly large corporations; stronger regulations, including on privacy and broadband providers; and more aggressive antitrust enforcement, particularly on large Internet companies. ▪ Supports limiting Section 230 protections and potential antitrust enforcement against major Internet platforms.

INNOVATION AND R&D

Among nations, a fierce race for global innovation leadership has emerged. Countries increasingly recognize the importance of coordinated national innovation and R&D strategies in driving growth and spurring competitiveness, which explains why over 50 countries have now created national innovation strategies and launched national innovation foundations. But as ITIF found in a comparative analysis of 56 leading nations, U.S. policies are only the world's tenth-best (on a per capita basis) at proactively contributing to global innovation. That's in large part because the U.S. government is underinvesting in R&D relative both to historical norms and to peer nations (on a per capita basis), and also because the United States increasingly offers less-attractive incentives for R&D activity; in fact, the U.S. R&D tax incentives now rank just 24th out of 34 nations.¹

While, as a nation, the United States continues to invest the most annually in scientific research in absolute terms, the country has fallen from fifth among Organization for Economic Cooperation and Development (OECD) nations in R&D intensity (total national investment in R&D as a share of gross domestic product) in 2000 to eighth in 2019. In fact, to restore the federal R&D-to-GDP ratio to levels averaged in the 1980s, federal R&D funding would need to increase by about 80 percent, or \$100 billion per year.

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The Trump administration has been attentive to innovation and R&D policy, focusing its energies especially on five key “Industries of the Future”: AI, quantum computing/quantum information sciences, advanced communication networks including 5G, advanced manufacturing, and biotechnology. While the administration has supported sizable increases in R&D budgets for these technologies, each budget proposal initially submitted by the Trump administration has called for overall cuts in federal R&D investment, particularly with regard to budgets for the National Institutes of Health (NIH), the National Science Foundation (NSF), and science programs at the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA). More positively, the Trump administration has been focused on improving R&D efficiency, commencing a whole-of-government review on how to increase returns from federally funded R&D, which culminated in the Department of Commerce’s National Institute of Technology and Standards’ (NIST) “Return on Investment Initiative for Unleashing American Innovation.”²

Candidate Biden proposes significant new federal R&D investments, on the order of \$300 billion over four years, particularly for breakthrough technologies. He would also amend many existing small-business support initiatives to increase their focus on minority- and women-owned enterprises. Table 2 reviews the 2020 presidential candidates’ positions on innovation and R&D policy.

Table 2: The candidates' positions on innovation and R&D policy

Issue	Trump	Biden
Federal R&D Funding	<ul style="list-style-type: none"> ▪ Has proposed sizable overall reductions in federal research spending in each of his four proposed budgets (e.g., FY 2021 budget request represented a 9 percent decline in FY 2020 actual spending).³ ▪ Has focused on increased R&D investments for five “Industries of the Future” (e.g., FY 2022 budget request of \$2.2 billion for non-defense AI and quantum computing research represents 30 percent increase over FY 2020 levels).⁴ 	<ul style="list-style-type: none"> ▪ Calls for \$300 billion in new investment in R&D and breakthrough technologies, over four years.⁵
Defense/Defense R&D Investment	<ul style="list-style-type: none"> ▪ FY 2021 budget request increased Defense budget by 0.1 percent to \$705.4 billion.⁶ FY 2021 budget proposal cuts overall defense R&D budget by 5.5 percent vs. 2020 levels, including \$284 million (10.9 percent) decline in basic research programs, \$675 million (11.1 percent) decline for applied programs, and \$959 million (14 percent) decline for advanced technology development programs. However, Defense Advanced Research Projects Agency (DARPA) programs would be slated for a 3.1 percent (\$108 million) increase.⁷ 	<ul style="list-style-type: none"> ▪ “Doesn’t foresee major reductions in the U.S. defense budget.”⁸ Has called for “major increases in direct federal R&D spending,” including at DARPA, but a specific dollar figure not offered.⁹
Artificial Intelligence	<ul style="list-style-type: none"> ▪ In February 2019, signed an Executive Order on “Maintaining American Leadership in Artificial Intelligence,” which launched the American AI Initiative, the first official U.S. national AI strategy.¹⁰ 	<ul style="list-style-type: none"> ▪ AI identified as a “breakthrough technology” in line for significantly increased R&D funding.
Quantum Computing	<ul style="list-style-type: none"> ▪ Signed the National Quantum Initiative Act into law, released a National Strategic Overview for Quantum Information Science, established the Quantum Economic Development Consortium, and has launched Quantum Leap Challenge Institutes.¹¹ 	<ul style="list-style-type: none"> ▪ Quantum computing identified as a “breakthrough technology” in line for significantly increased R&D funding.

Issue	Trump	Biden
	<ul style="list-style-type: none"> Has called on federal agencies to prioritize the implementation of a national strategic computing ecosystem.¹² 	
Semiconductors	<ul style="list-style-type: none"> Supports the CHIPS Act and American Foundries Act, which were merged and included in 2020 NDAA.¹³ 	<ul style="list-style-type: none"> Has called for increased U.S. semiconductor manufacturing and supply chain resiliency.¹⁴
Tech Transfer and Commercialization	<ul style="list-style-type: none"> Administration undertook a comprehensive review of how to maximize U.S. innovation from government-funded research, culminating in an April 2019 NIST Green Paper that provided 15 discrete policy recommendations.¹⁵ Has called on federal agencies to “develop the skills and prioritize the resources” to “improve transfer of federally funded technologies from lab to market.”¹⁶ 	<ul style="list-style-type: none"> Calls for a “scaled-up” Small Business Innovation Research (SBIR) program.¹⁷
Supporting Start-Ups and Small Businesses	<ul style="list-style-type: none"> In 2018, signed the bipartisan Small Business 7(a) Lending Oversight Reform Act, which streamlined the SBA 7(a) lending program, improved program oversight and transparency, and increased program flexibility.¹⁸ 	<ul style="list-style-type: none"> Would implement a new and expanded State Small Business Credit Initiative (SSBCI) that would create a \$10 billion venture capital investment program for minority-owned companies and increase to \$3 billion funds for women-owned companies.¹⁹
Support Regional Innovation Initiatives	<ul style="list-style-type: none"> Strengthen coordination on existing and new partnerships that improve place-based and national-level collaboration for innovation economies, such as those in Opportunity Zones, underrepresented populations, historically black colleges and universities (HBCUs), and minority-serving institutions (MSIs).²⁰ 	<ul style="list-style-type: none"> Would create a national network of free incubators and innovation hubs co-located with Small Business Development Centers (SBDCs), libraries, HBCUs, community colleges, MSIs, etc.²¹
Taxpayer Benefits of Federal R&D Funding	<ul style="list-style-type: none"> NIST Green Paper found that the scope of the government-use license was not well-defined and promised further clarification.²² 	<ul style="list-style-type: none"> Calls for “strengthening existing federal rights” to ensure U.S. government “captures a share of royalties from high-profit products.”²³

Issue	Trump	Biden
	<ul style="list-style-type: none"> Has not proposed royalty paybacks from high-profit biopharmaceutical products. 	

INTERNET AND DIGITAL ECONOMY

The digital economy is a key driver of U.S. competitiveness and economic growth, and a key enabler of better quality of life for Americans. As such, the federal government should pursue policies that foster the adoption and use of digital technologies among both consumers and businesses. National leadership is especially important because many countries are moving quickly to compete with the United States in emerging technologies such as AI and the Internet of Things.

The next administration will need to work with the private sector to accelerate the development and widespread deployment of productivity-enhancing technologies to help transform sectors such as health, education, manufacturing, transportation, and government, as well as grapple with complex policy questions on a wide variety of issues including data protection, cybersecurity, and digital trade. The next administration should also continue the U.S. tradition of using a light touch to regulate the Internet and online platforms, and aggressively enforce illegal online activity, such as cyberattacks and digital IP theft.

Table 3: The candidates’ positions on Internet and digital economy policy

Issue	Trump	Biden
Cybersecurity	<ul style="list-style-type: none"> Has signed executive orders on cybersecurity that have aimed to improve cybersecurity for federal networks, critical infrastructure, and the nation, as well as strengthen the federal cybersecurity workforce.²⁴ Has given U.S. Cyber Command more freedom to engage in offensive hacking operations.²⁵ The Trump administration’s National Cyber Strategy has called for using the power of the purse to drive sector-wide improvements in cybersecurity, and developing and implementing standards in emerging areas such as quantum-resistant public key cryptography.²⁶ 	<ul style="list-style-type: none"> Has called for “cybersecurity improvements to make smart grids more resilient to attacks.”²⁷ The 2020 Democratic Platform calls for a Biden administration to “maintain American capabilities that can deter cyber threats” and “work with other countries—and the private sector—to protect individuals’ data and defect critical infrastructure.”²⁸
Encryption	<ul style="list-style-type: none"> Has not taken a position on encryption while in office. As a candidate in 2016, criticized 	<ul style="list-style-type: none"> N/A

Issue	Trump	Biden
	<p>Apple for opposing a government order to assist with decrypting the mobile phone of one of the San Bernardino shooters.²⁹</p> <ul style="list-style-type: none"> Within Trump's administration, Attorney General Barr has been an outspoken critic of "warrantless encryption."³⁰ 	
Internet Governance	<ul style="list-style-type: none"> The Trump administration has launched the "Clean Network" initiative, which includes efforts to restrict sensitive personal information and confidential business information from being stored in China, restrict U.S. companies from making their mobile apps available in Chinese app stores, and remove Chinese apps from U.S. mobile app stores.³¹ 	<ul style="list-style-type: none"> The 2020 Democratic Platform states, "We will recommit the United States to the principles of an open internet ... and vigorously oppose efforts to digitally silo off countries and populations from the rest of the world."³²
Open Data	<ul style="list-style-type: none"> The Trump administration has published an ambitious open data strategy. The Trump administration implemented new rules to foster health data exchange in 2020.³³ 	<ul style="list-style-type: none"> Has previously championed open data initiatives, particularly to support cancer research.³⁴
Copyright	<ul style="list-style-type: none"> Signed the Music Modernization Act, which significantly updated copyright law for digital music.³⁵ 	<ul style="list-style-type: none"> The 2020 Democratic Platform states, "We will use all tools at our disposal to take action against countries that steal American intellectual property."³⁶
Online Platforms	<ul style="list-style-type: none"> Alleges that social media platforms have an anti-conservative bias, and has threatened to "strongly regulate, or close them down."³⁷ Has signed an executive order directing the National Telecommunications and Information Administration (NTIA) to file a petition for rulemaking with the Federal Communications Commission (FCC) to propose regulations clarifying Section 230 of the Communications Decency Act.³⁸ 	<ul style="list-style-type: none"> Has said that online platforms should do more to prevent the spread of misinformation and hate speech.⁴⁰ In an interview, has called for rescinding Section 230 liability protections, saying "Section 230 should be revoked, immediately should be revoked."⁴¹ Biden's campaign circulated a petition calling on Facebook to remove false, viral information, prevent political candidates and PACs from spreading

Issue	Trump	Biden
	<ul style="list-style-type: none"> Has signed executive orders banning TikTok and WeChat, two Chinese-owned apps.³⁹ (The Treasury Department is currently reviewing TikTok’s proposal to mitigate the concerns raised by the executive order.) 	<p>misinformation through paid ads, and preventing all users, including prominent elected officials, from spreading false information about participating in elections.⁴²</p>
Data Privacy	<ul style="list-style-type: none"> Supports national consumer privacy legislation with “the appropriate balance between privacy and prosperity.”⁴³ Supported legislation that allow consumers to protect their private information by placing a security freeze on their credit files.⁴⁴ 	<ul style="list-style-type: none"> Has said, “We should be worried about the lack of privacy [on tech platforms],” and “we should be setting standards not unlike the Europeans are doing relative to privacy.”⁴⁵ The 2020 Democratic Platform calls for passing federal data privacy legislation, in particular expanding privacy protections for students.⁴⁶ The 2020 Democratic Platform calls for updating the Electronic Communications Privacy Act (ECPA) to give digital content the same privacy protections as physical content.⁴⁷
Artificial Intelligence	<ul style="list-style-type: none"> Launched the American AI Initiative to invest in AI R&D, make more resources available for AI, remove barriers to AI innovation, train an AI workforce, and promote an international environment that supports trustworthy AI.⁴⁸ His FY 2021 budget calls for doubling R&D spending for non-defense AI.⁴⁹ The White House entered the United States into the Global Partnership for AI, a G7 initiative to address AI policy governance. 	<ul style="list-style-type: none"> Has proposed a new \$300 billion investment in R&D for breakthrough technologies, including AI.⁵⁰ Has stated, “The technologies of the future, like AI, are bound by laws and ethics, and promote greater shared prosperity and democracy.”⁵¹

BROADBAND AND TELECOMMUNICATIONS

We live in an information-rich world in which citizens increasingly depend on advanced digital networks to connect our smartphones and computers with vital databases and information processing systems in the cloud. ITIF has long highlighted how the opportunities for information technology to deliver improvements in both the economy and quality of life are multiplied by fast, reliable, and pervasive digital networks.⁵² Innovation is particularly fast in the mobile world, but next-generation wireline networks form the essential foundation of all digital networking. Broadband and telecommunication policy debates focus on a variety of issues, including the means of managing spectrum rights, the nature of net neutrality regulations, and the transformation of telecommunications subsidies to support broadband.

Table 4: The candidates’ positions on broadband and telecommunications policy

Issue	Trump	Biden
<p>Universal Broadband Infrastructure</p>	<ul style="list-style-type: none"> ▪ Promises to build “the World’s Greatest Infrastructure System.”⁵³ Presumably this would include improvements of some kind to the nation’s broadband infrastructure. ▪ In 2019, the Trump FCC revamped the existing rural broadband subsidy program into the “Rural Digital Opportunity Fund.”⁵⁴ The first phase, which will begin in October, aims to provide broadband to over six million unserved homes and businesses.⁵⁵ ▪ In 2018, the administration proposed an infrastructure package that aimed to spur a total of \$1.5 trillion of investment, and incent state, local, and private investment through a combination of tax incentives and \$200 billion in federal spending, including state-directed grants that could be spent on broadband or other infrastructure projects.⁵⁶ The proposal did not advance in Congress. 	<ul style="list-style-type: none"> ▪ Promises “universal broadband access” to “expand broadband access to every American.”⁵⁷ ▪ The campaign has committed to invest \$20 billion in rural broadband as part of a larger infrastructure package.⁵⁸ ▪ Plans to triple U.S. Department of Agriculture rural broadband grants and partner with municipal utilities to increase rural broadband coverage.⁵⁹
<p>Wireless Spectrum and 5G</p>	<ul style="list-style-type: none"> ▪ After some rumors the administration would advance a national, wholesale wireless network, the White House clarified that the private sector would lead on 5G deployment.⁶⁰ In apparent diversion from this current White House and FCC policy, the Trump campaign asserts it will “Establish 	<ul style="list-style-type: none"> ▪ Has mentioned 5G as a component of a proposed \$300 billion investment in R&D to expand “our innovative edge” in emerging technologies.⁶⁴ ▪ Has mentioned 5G as a tool to expand broadband to every American.⁶⁵

Issue	Trump	Biden
	<p>a National High-Speed Wireless Internet Network.”⁶¹</p> <ul style="list-style-type: none"> ▪ During President Trump’s first term, the FCC pursued its “5G Fast Plan,” comprising several actions in three general categories: “(1) pushing more spectrum into the marketplace; (2) updating infrastructure policy; and (3) modernizing outdated regulations.”⁶² ▪ Through a 2018 presidential memorandum, the administration tasked an inter-agency task force with developing a long-term “National Spectrum Strategy,” to be released by late July 2019.⁶³ As of this writing, the report has yet to be released. 	<ul style="list-style-type: none"> ▪ Has not yet commented on spectrum policy.
Title II and Net Neutrality	<ul style="list-style-type: none"> ▪ Trump’s FCC, under Chairman Ajit Pai, rolled back Obama-era net neutrality rules, and removed its authority over mass-market residential broadband service.⁶⁶ ▪ Threatened to veto the Save the Internet Act, which would have restored common carriage-style net neutrality rules under Title II of the Communications Act.⁶⁷ 	<ul style="list-style-type: none"> ▪ Was reportedly “outraged” by the Trump administration’s reversal of Obama-era net neutrality rules.⁶⁸ ▪ The Biden-Sanders Unity Task Force report recommends Democrats restore the FCC’s authority over broadband providers, presumably through Title II of the Communications Act.⁶⁹ ▪ The Unity Task Force report calls for enforcement against “blocking, throttling, paid prioritization, or other measures that create artificial scarcity and raise consumer prices.”⁷⁰
Affordability and Broadband Subsidies	<ul style="list-style-type: none"> ▪ The FCC under the Trump administration has taken steps designed to limit waste and fraud in the Lifeline program.⁷¹ 	<ul style="list-style-type: none"> ▪ The Biden-Sanders Unity Task Force proposes to support access for low-income Americans by providing “subsidies ... through the Lifeline program.”⁷²
Broadband Competition and Public-Private Partnerships	<ul style="list-style-type: none"> ▪ The FCC under the Trump administration has taken steps to reduce barriers to private-sector-led facilities-based competition, and appears generally skeptical of municipal broadband. 	<ul style="list-style-type: none"> ▪ The Biden-Sanders Task Force calls for “action to prevent states from blocking municipalities and rural co-ops from building publicly-owned broadband networks,” and would increase federal support for municipal broadband.⁷³

EDUCATION AND SKILLS

If America is to succeed in the innovation-powered global economy, more workers will need better education and skills, especially in areas such as science and engineering will be vital. Toward that end, increasing STEM (science, technology, engineering, and mathematics) skills for Americans is critical. At the same time, a long-standing strength of the U.S. national innovation system has been its ability to attract STEM talent from around the world, as ITIF found in “Debunking the Top Ten Arguments Against High-Skilled Immigration.”⁷⁴ The global talent imperative requires that the United States implement policies that will both produce a domestic workforce equipped with globally demanded skills, and be open to skilled STEM-based foreign workers who wish to pursue their talents in the environment of economic opportunity the United States affords. This section focuses on the candidates’ high-skill immigration, K–12 STEM education proposals, tertiary education ideas covering community colleges, innovative educational programs, and support of underserved populations.

Table 5: The candidates’ positions on education and skills policy

Issue	Trump	Biden
Immigration of High-Skill Foreign Workers	<ul style="list-style-type: none"> ▪ Has worked to limit high-skill immigration, particularly for H1-B visas. ▪ Increased the denial rate for H1-B petitions from 6 percent in FY 2015 to 32 percent in the first quarter of FY 2019 because the United States Citizenship and Immigration Services and its adjudicators raised the standard of proof for approving an H-1B petition after the Buy American Hire American executive order.⁷⁵ ▪ Has temporarily barred new immigrants on several employment-based visas, including the H1-B and L-1 visas, from entering the United States during the COVID-19 pandemic through the end of 2020.⁷⁶ 	<ul style="list-style-type: none"> ▪ Would work with Congress to reform temporary visas to establish a wage-based allocation process and enforcement mechanisms to ensure they are aligned with the labor market and not used to undermine wages. ▪ Would expand the number of high-skilled visas and eliminate the limits on employment-based visas by country to alleviate long backlogs.⁷⁷
Support for STEM Education	<ul style="list-style-type: none"> ▪ Prioritized STEM in discretionary education grants, investing \$540 million in FY2019.⁷⁸ ▪ Released a five-year strategic plan to partner with industry and community organizations for STEM education. ▪ Each budget request has proposed cuts to STEM education funding, and prioritizes career and technical 	<ul style="list-style-type: none"> ▪ Would increase access to middle and high school courses in computer science. ▪ Would invest \$5 billion in graduate programs in teaching and health care, and develop internship and career pipelines at major research agencies, centered on minority-serving institutions.⁸⁰

Issue	Trump	Biden
	<p>education at the expense of bolstering STEM in primary and secondary schools.⁷⁹</p>	
Supporting Innovation in Education	<ul style="list-style-type: none"> ▪ Proposed a \$900 million increase in education spending to teach skills and trades and buy equipment for such curricula, one of the largest in recent history. ▪ Proposed an increase in funding for a competitive grant program for new and innovative education programs.⁸¹ ▪ Issued an executive order calling on all federal agencies to increase the use of skill assessments to determine applicants' qualifications, rather than only college degrees.⁸² 	<ul style="list-style-type: none"> ▪ Would invest in school vocational training and partnerships between high schools, community colleges, and employers to create programs that allow students to earn an industry credential upon high school graduation. ▪ Would increase access to middle and high school courses in computer science. ▪ Would invest \$20 billion in building high-tech labs, facilities, and digital infrastructure at HBCUs and minority serving institutions.
Supporting Minority and Low-Income Students	<ul style="list-style-type: none"> ▪ Implemented the year-round distribution of Pell grants, instead of limiting them to spring and fall semesters. ▪ Included \$1 billion in funding to Further Options of Children to Unlock Success Grants for public school choice, and \$250 million to the Education Innovation and Research Program to promote private school choice in his FY2018 Budget Request. ▪ Proposed a \$5 billion federal tax credit on donations to fund scholarships to private and vocational schools, apprenticeships programs, and other educational opportunities. ▪ Implemented Every Student Succeeds Act (ESSA) to delegate authority over education back to the states, encouraging the end of federal education mandates.⁸³ ▪ Signed a bill that would provide more than \$250 million a year to HBCUs and other minority-serving institutions.⁸⁴ 	<ul style="list-style-type: none"> ▪ Would triple funding for Title I, the federal program that funds schools with a high percentage of low-income students, and require districts to use funds to offer educators higher salaries, pay for pre-school, and provide access to rigorous coursework before using the funds for discretionary purposes. ▪ Would create a new program challenging local communities to ensure high schools meet changing demands of the workforce, first prioritizing building schools in low-income and minority communities. ▪ Would make public colleges and universities tuition free for all families with incomes below \$125,000. ▪ Would double the maximum value of Pell grants. ▪ Would more than halve payments on undergraduate federal student loans by reforming the income-based repayment program.

Issue	Trump	Biden
		<ul style="list-style-type: none"> Would invest over \$70 billion into HBCUs and minority-serving institutions to make them more affordable, well-equipped, and innovative.⁸⁵
Community Colleges	<ul style="list-style-type: none"> Supports ensuring community colleges focus more on educating for technical vocations.⁸⁶ 	<ul style="list-style-type: none"> Would provide two years of community college or other high-quality training programs without debt, with the federal government covering 75 percent of the cost and states contributing the remaining obligation. Would create a new grant program to support community colleges increasing their students' retention and credential completion, and scaling successful programs to help more students. Would give states financial incentives to foster collaboration between community colleges and community-based organizations to provide support services for students. Would establish a federal grant program to help community colleges create emergency grant programs for students with unexpected financial challenges that jeopardize their ability to stay enrolled. Would make a \$50 billion investment in workforce training, including community-college business partnerships and apprenticeships. Would invest \$8 billion to help community colleges improve the health and safety of their facilities.⁸⁷
Education Scholarships	<ul style="list-style-type: none"> Would give a tax credit for donations to organizations that grant scholarships. States would determine eligibility.⁸⁸ 	<ul style="list-style-type: none"> No provision.

TAXES

Governments can encourage more innovation by creating a climate that protects and rewards private-sector investment. One of the main components of a strong business climate is the tax code. A low corporate tax rate encourages more investment. Specific policies such as the R&D tax credit and expensing can spur more innovation. ITIF has argued that the U.S. corporate tax code should explicitly promote the international competitiveness of American businesses and encourage innovation by providing incentives for the drivers of productivity and innovation: investment in R&D; new capital equipment, including information and communications technology; and workforce education and training.

The Tax Cuts and Jobs Act of 2017 (TCJA) was one of the Trump administration’s major accomplishments. However, the TCJA did not increase the rate of the R&D tax credit, which remains one of the least generous in the world.⁸⁹ In fact, it made the situation worse. Starting in 2022, companies will have to write off their research expenditures over five years rather than deduct them immediately.

Most of the provisions involving individual income taxes expire at the end of 2025. A Trump administration would presumably want to extend them, while a Biden administration would want to reduce at least some of the cuts. Biden has proposed several changes that would increase taxes on corporations and high-income individuals. These proposals would raise revenues by \$3.8 trillion over the next decade, not accounting for macroeconomic effects.

Table 6: The candidates’ positions on tax policy

Issue	Trump	Biden
Corporate Tax Rate	<ul style="list-style-type: none"> Supported lowering corporate rate from 35 percent to 21 percent. 	<ul style="list-style-type: none"> Would increase corporate tax rate to 28 percent.⁹⁰ The tax would be increased by 10 percent for profits on foreign goods and services that are imported back to the United States. Would impose a 15 percent tax on book income to ensure all companies pay at least some tax.⁹¹
Offshoring Penalties	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> Would deny deductions and expensing write-offs for moving any production overseas that could “plausibly” be done in the United States.⁹²
Made in America Tax Credit	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> Provides a 10 percent tax credit for refurbishing old plants, expanding facilities, moving jobs to the United States, or increasing manufacturing wages.⁹³
Manufacturing Tax Credit	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> \$6 billion three-year provision for firms that invest in communities

Issue	Trump	Biden
		that experience mass layoffs or the closure of a major government institution. ⁹⁴
R&D Tax Credit.	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> No provision.
Accelerated Depreciation for Research	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> No provision.
Base Erosion and Profit-Shifting Activity	<ul style="list-style-type: none"> Has implemented many of the OECD recommendations, making it harder for companies to shift profits to low-tax countries and implement national tax laws in unintended ways. 	<ul style="list-style-type: none"> “Will confront global tax secrecy and avoidance, taking on individuals and businesses that stash their profits in tax havens to avoid paying their fair share while tightening anti-inversion rules.”⁹⁵
Digital Services Taxes (DSTs)	<ul style="list-style-type: none"> The U.S. Trade Representative has threatened to impose tariffs on any country that implements a DST targeted at U.S. firms. 	<ul style="list-style-type: none"> No provision.
Taxation of Foreign Corporate Income (GILTI)	<ul style="list-style-type: none"> Supported ending worldwide taxation, but inserted a new provision ensuring companies pay a minimum tax of 10.5 percent. 	<ul style="list-style-type: none"> Would double the current minimum tax rate from 10.5 to 21 percent. The tax would be applied country by country.⁹⁶
Independent Contractors	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> “Will enact legislation that makes worker misclassification a substantive violation of law under all federal labor, employment, and tax laws with additional penalties beyond those imposed for other violations.”⁹⁷
Pharmaceutical Advertising	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> Would deny a deduction for advertising expenditures.⁹⁸
Tax Expenditures	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> Reduces tax expenditures for fossil-fuel production and commercial real estate.
Innovation Box	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> No provision.
Capital Gains Tax Rate	<ul style="list-style-type: none"> Would lower to either 15.0 percent or 18.8 percent.⁹⁹ 	<ul style="list-style-type: none"> Taxes long-term capital gains and qualified dividends at ordinary rates on income for those households earning \$1 million or more.¹⁰⁰ Treatment of short-term gains remains the same.

Issue	Trump	Biden
Individual Rate	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> Increases tax rate on household incomes above \$400,000 from 37 percent to 39.6 percent. Limits the value of itemized deductions for taxpayers in tax brackets above 28 percent.¹⁰¹
Carried Interest	<ul style="list-style-type: none"> No provision. 	<ul style="list-style-type: none"> Has previously indicated he would eliminate it.¹⁰²
20 Percent Deduction for Passthrough Firms	<ul style="list-style-type: none"> Would extend.¹⁰³ 	<ul style="list-style-type: none"> Would repeal.¹⁰⁴
Social Security	<ul style="list-style-type: none"> Signed an Executive Order temporarily deferring Social Security taxes.¹⁰⁵ 	<ul style="list-style-type: none"> Would raise payroll tax from 0 percent to 12.4 percent for wages above \$400,000.¹⁰⁶

REGULATION

Designed properly, regulations can spur innovation and productivity by reducing regulatory uncertainty, rewarding beneficial actions, and requiring standards that require innovation to meet. Even when they can't, regulations should be designed in ways that limit cost and burdens on innovation. The United States needs smarter regulations, especially for its traded-sector firms. In this regard, ITIF has offered several recommendations, including forming an Office of Innovation Policy Review within the Office of Management and Budget (akin to an Office of Information and Regulatory Affairs (OIRA) for innovation). Moreover, OIRA should introduce an "international competitiveness screen" into its review of federal regulations.

Table 7: The candidates' positions on regulatory policy

Issue	Trump	Biden
Repeal of Existing Regulations	<ul style="list-style-type: none"> Signed 15 Congressional Review Act bills, and claims to have removed or withdrawn 860 regulatory actions from active status.¹⁰⁷ 	<ul style="list-style-type: none"> No provision.
OMB Regulatory Budget	<ul style="list-style-type: none"> Signed an Executive Order requiring agencies to eliminate two regulations for every new rule they create.¹⁰⁸ 	<ul style="list-style-type: none"> No provision.
Infrastructure Projects	<ul style="list-style-type: none"> Signed Executive Order accelerating approval of infrastructure projects. 	<ul style="list-style-type: none"> No provision.

Issue	Trump	Biden
Buy American Requirements	<ul style="list-style-type: none"> Instituted Buy American requirements for federal spending.¹⁰⁹ 	<ul style="list-style-type: none"> “When we spend taxpayer money, we should buy American products and support American jobs.”¹¹⁰
Antitrust	<ul style="list-style-type: none"> Both the Federal Trade Commission and the Department of Justice are investigating the role of large Internet platforms. 	<ul style="list-style-type: none"> Would aggressively use antitrust laws to fight large mergers in the hospital, insurance, pharmaceutical, and other industries.¹¹¹ Incorporates broader criteria into antitrust decisions, including the impact on labor, underserved communities, and racial equality.¹¹² Would review all mergers and acquisitions since Trump took office.¹¹³

TRADE

Trade policy has played a much larger role in U.S. economic and foreign policy over the last four years. Trade policy is important to innovation policy given much of the U.S. economy is based on innovation, wherein firms have relatively high fixed costs and lower marginal costs. Trade policy plays an essential supporting role by providing needed economies of scale through open and fair access to global markets, which spurs U.S. productivity and innovation. As ITIF has concluded in a number of reports, the United States must play a leadership role in defending an open and rules-based trading system, while demanding rigorous enforcement of trade commitments, and in the case of countries such as China, engaging in reciprocity and other actions to limit their unfairly obtained advantage.

U.S. trade policy is undergoing major and long overdue changes, but it's unclear what the end result will be, whether it's reforming the World Trade Organization (WTO), effectively addressing China's unfair trade challenge, or enacting new and better rules and agreements for modern trade with the United States' likeminded trade partners. The next administration will need to ensure, in each of these three key areas, that the end result supports a new set of norms and rules for fair, open, and rules-based global trade in goods and services for U.S. firms and their workers. A Biden administration would also add climate change commitments as a new component of U.S. trade policy, which has fundamentally and permanently changed from pre-2016—but it's a matter of how each candidate creates greater certainty and stability in the next administration.

Table 8: The candidates' positions on trade policy

Issue	Trump	Biden
General Approach	<ul style="list-style-type: none"> Has focused on getting tough with China, eschewing multilateral agreements in favor of bilateral agreements, and ensuring more domestic content. 	<ul style="list-style-type: none"> Commits to work with allies on new trade agreements, which would include stronger rules of origin and climate change commitments.¹¹⁴ Prioritizes major domestic investments before pursuing new trade agreements.
Trans-Pacific Partnership	<ul style="list-style-type: none"> Pulled the United States out of the TPP and is unlikely to rejoin. 	<ul style="list-style-type: none"> Is open to rejoining if the United States could renegotiate parts of the agreement.¹¹⁵
WTO	<ul style="list-style-type: none"> Is critical of WTO's failure to address Chinese innovation mercantilism, special and differential treatment for developing countries, members' failure to provide notifications of trade measures, and perceived judicial overreach of its dispute settlement body.¹¹⁶ His administration is involved in multiple efforts to reform the body. 	<ul style="list-style-type: none"> No mention, but has generally favored working with partners at WTO.
Trade Enforcement	<ul style="list-style-type: none"> Actively uses a range of trade remedies (antidumping, countervailing duties, and safeguards). Has also removed tariff-free benefits for developing countries that enact unfair trade barriers (e.g., India). 	<ul style="list-style-type: none"> Commits to develop a comprehensive strategy to "aggressively" enforce domestic trade laws.¹¹⁷
China-Specific Trade Policy	<ul style="list-style-type: none"> Continues to try to enforce the Phase 1 deal with China. However, has not prioritized efforts to negotiate a Phase 2 deal to address other systemic issues in China, such as subsidies and digital trade.¹¹⁸ 	<ul style="list-style-type: none"> Is critical of the Phase 1 U.S.-China deal arguing that it doesn't deal with key issues such as industrial overcapacity, cybertheft, and the role of state-owned enterprises, many of which he says he will address.¹¹⁹
Export Control Policy	<ul style="list-style-type: none"> Has expanded the use of export controls to target a greater range of high-tech exports to China and specific Chinese firms, especially Huawei.¹²⁰ Has halted high-tech exports to Hong Kong over security concerns.¹²¹ The Department of Commerce is still considering how 	<ul style="list-style-type: none"> No mention.

Issue	Trump	Biden
	to apply export controls to new and emerging technologies. ¹²²	
Export-Import (EXIM) Bank	<ul style="list-style-type: none"> In 2019, supported the reauthorization of EXIM for seven years and created a unit within EXIM to neutralize the advantages of China’s opaque export financing regime.¹²³ 	<ul style="list-style-type: none"> Supported the EXIM Bank during the Obama administration. His only campaign mention is he would prohibit funding for coal-fired power plants.¹²⁴
Trade Adjustment Assistance (TAA)	<ul style="list-style-type: none"> Several Trump administration budget proposals have cut or eliminated funding for TAA.¹²⁵ The Department of Labor is considering reforms that would improve TAA in some ways.¹²⁶ 	<ul style="list-style-type: none"> No specific mention of TAA, but Biden supports greater funding for broader workforce skills development programs.¹²⁷
Digital Free Trade	<ul style="list-style-type: none"> Enacted improved digital trade provisions in the United States-Mexico-Canada Agreement (USMCA). Rejected a deal with India, in part due to the lack of strong digital provisions. Enacted a digital trade agreement with Japan and is pursuing similar agreements with Australia and Brazil. 	<ul style="list-style-type: none"> No mention.
Buy American	<ul style="list-style-type: none"> The Trump administration has enacted stronger “Buy American” provisions, especially for iron and steel products.¹²⁸ Trump also signed an executive order to require certain essential drugs and medical supplies purchased by the federal government be manufactured domestically.¹²⁹ 	<ul style="list-style-type: none"> Strongly supports Buy American provisions (including via a \$400 billion procurement investment proposal) and will require federally funded infrastructure projects to source materials in the United States.¹³⁰ Commits to tighten domestic content rules, limit waivers to Buy American requirements, and extend Buy American provisions to other forms of government assistance, such as publicly funded R&D.¹³¹
Tariff Policy	<ul style="list-style-type: none"> Uses higher tariffs for economic (domestic steel and aluminum support) and trade objectives, including to create leverage in negotiations with China. 	<ul style="list-style-type: none"> Will review existing Section 232 tariffs and other tariff increases. Is open to using tariffs as part of new trade strategy.¹³²
Currency Manipulation	<ul style="list-style-type: none"> USMCA is the first agreement in U.S. trade policy history to directly address currency manipulation.¹³³ 	<ul style="list-style-type: none"> Opposes efforts to manipulate currency as a way of gaining an unfair trade advantage. Supports new transparency, consultation,

Issue	Trump	Biden
		and enforcement provisions in trade agreements. ¹³⁴
Clean/Green Trade	<ul style="list-style-type: none"> Trade policy does not address climate change issues. 	<ul style="list-style-type: none"> Commits to impose carbon adjustment fees or quotas on carbon-intensive goods from countries that are failing to meet their climate commitments. Will include Paris climate commitments as part of future trade agreements.¹³⁵

ADVANCED MANUFACTURING

A robust, advanced manufacturing sector remains critical to the health of the overall U.S. economy. In 2018, America’s approximately 250,000 manufacturers contributed \$2.3 trillion to the economy, accounted for \$1.4 trillion in exports (with 27 percent growth in manufacturing exports from 2010 to 2018), and employed 12.7 percent of the U.S. workforce.

Yet, despite its importance, U.S. manufacturing continues to struggle. Real manufacturing value added declined 13 percent from 2007 to 2019, from 13.2 percent of GDP to 11.5 percent. And, when controlling for the statistical overstatement of output growth in the computer industry, it fell by 20 percent, from 12.1 to just 9.7 percent. In terms of manufacturing value added as a share of U.S. GDP, it fell from 16 percent in 1997 to just 11 percent in the third quarter of 2019. Likewise, U.S. manufacturing sector productivity has stagnated, increasing just 0.5 percent annually over the five years from 2011 to 2016, well below the growth rate of 3.2 percent from 1987 to 2016. However, from January 2015 through January 2020, U.S. manufacturing employment did grow (0.9 percent annually), compared to many years of prior decline.

As ITIF has argued, the United States needs to develop a serious national manufacturing strategy, and implement much better tax, talent, technology, and trade (the “4 Ts”) policies to help U.S. manufacturing and other traded sectors thrive and remain globally competitive. Both candidates have recognized the central importance manufacturing plays in underpinning U.S. economic vitality, as table 9 illustrates.

Table 9: The candidates’ positions on advanced manufacturing policy

Issue	Trump	Biden
Promulgate an Advanced Manufacturing Strategy	<ul style="list-style-type: none"> In 2018, released “Strategy for American Leadership in Advanced Manufacturing.”¹³⁶ Wants to offer tax credits to entice U.S. firms to move factories out of China.¹³⁷ 	<ul style="list-style-type: none"> Calls for development of a comprehensive “manufacturing and innovation strategy.”¹³⁸

Issue	Trump	Biden
Manufacturing USA	<ul style="list-style-type: none"> DOE established a 15th Manufacturing USA Institute: “Clean Energy Manufacturing Innovation Institute: Cybersecurity in Energy-Efficient Manufacturing.”¹³⁹ FY 2021 budget calls for one new NIST (open competition) and one new Department of Defense Manufacturing USA Institute (focused on synthetic biology manufacturing, and funded with a \$15 billion federal investment). FY 2021 budget would drop Department of Defense support for the eight public-private manufacturing innovation institutes established under the Manufacturing USA program by \$105 million, a 63 percent decline.¹⁴⁰ 	<ul style="list-style-type: none"> Plans to keep Manufacturing USA at 15 institutes, but no stated plans to expand Manufacturing USA network. Proposes more than 50 communities to be chosen as technology hubs that would build on Manufacturing USA, combining new federal R&D investment with workforce development and business participation.¹⁴¹
Manufacturing Extension Partnership (MEP)	<ul style="list-style-type: none"> Trump administration budget requests have repeatedly called for zeroing out MEP funding.¹⁴² 	<ul style="list-style-type: none"> Calls for quadrupling MEP funding (which would bring it close to \$600 million annually).¹⁴³
Regional Manufacturing Support	<ul style="list-style-type: none"> No position. 	<ul style="list-style-type: none"> Expands “Manufacturing Innovation Partnerships” linking manufacturing institutes, universities and colleges, employers and unions, and state and local governments.¹⁴⁴
Provide Capital to Small and Medium-Sized Enterprises (SME) Manufacturers	<ul style="list-style-type: none"> No position. 	<ul style="list-style-type: none"> Establishes a credit facility to supply capital to SME manufacturers to facilitate plant modernization and energy efficiency.¹⁴⁵
Tax-Related Manufacturing Incentives	<ul style="list-style-type: none"> No position (see tax section for general tax proposals). 	<ul style="list-style-type: none"> Would pass a “Manufacturing Tax Credit” that promotes revitalizing, renovating, or modernizing existing or recently closed manufactured facilities.¹⁴⁶
Apprenticeships and Workforce Training	<ul style="list-style-type: none"> Department of Labor, through the National Apprenticeship Act, expedited the development of apprenticeships by authorizing third-party organizations to approve 	<ul style="list-style-type: none"> Would expand registered apprenticeship training programs such as the Industrial

Issue	Trump	Biden
	<p data-bbox="521 281 862 369">new “industry-recognized apprenticeship programs,” or IRAPs.¹⁴⁷</p> <ul data-bbox="496 390 902 541" style="list-style-type: none"> <li data-bbox="496 390 902 541">Established the National Council for the American Worker, tasked with developing a workforce strategy for the jobs of the future.¹⁴⁸ 	<p data-bbox="1000 281 1317 342">Manufacturing Technician Apprenticeship program.¹⁴⁹</p>
Opportunity Zones	<ul data-bbox="496 581 932 795" style="list-style-type: none"> <li data-bbox="496 581 932 795">Revitalize distressed communities through Opportunity Zones, with the White House Opportunity and Revitalization Council having taken more than 175 actions to encourage investment in such zones.¹⁵⁰ 	<ul data-bbox="976 581 1386 737" style="list-style-type: none"> <li data-bbox="976 581 1386 737">Supports Opportunity Zones approach, but calls for reforms, including mandatory impact reporting and adjustments to achieve greater racial equality.¹⁵¹

LIFE SCIENCES

While the United States was a global also-ran in life-sciences innovation well into the 1980s, a series of conscientious and bipartisan public policies introduced over the decades since have turned America into the world’s life-sciences innovation leader. These policies have included significant federal investment in life-sciences basic research, robust intellectual property (IP) protections, effective technology transfer policies, an effective regulatory environment, investment incentives, and, importantly, drug pricing policies that enable companies to invest in high-risk drug development.

Today, the United States leads the world in most indices of life-sciences R&D investment and innovation. The country has been the world’s largest global funder of biomedical R&D investment over the past two decades, considering all investments made by government, companies, foundations, and universities—a share some analyses suggest reached as high as 70 to 80 percent over that period. And from 2004 to 2018, U.S.-headquartered life-sciences companies produced almost twice as many new drugs as did firms in Europe, and 3 to 4 times as many as Japan.

But despite U.S. strengths in biopharmaceutical R&D and innovation, manufacturing has faltered. In fact, from 2009 to 2018, real U.S. value-added output in pharmaceutical and medicines manufacturing fell by nearly one-third, while the rest of U.S. manufacturing increased by 23 percent. Partly as a consequence, the U.S. trade balance in pharmaceuticals has grown from a deficit of \$16 billion in 2010 to a deficit of \$77 billion in 2019.

But global competition in the sector is intensifying rapidly, meaning that if the United States is serious about maximizing its biopharmaceutical competitiveness, Washington needs to put in place a robust national biopharmaceutical competitiveness strategy.

Before the COVID-19 crisis, the Trump administration had not particularly prioritized increasing federal funding for basic life-science research, although billions have subsequently been pumped in due to the exigency of the crisis. Candidate Biden has called for significantly increased biomedical R&D expenditures. While both candidates support innovation-enhancing policies in the sector, they would also seek to embrace drug price control policies such as international reference pricing, which would reduce drug company revenues that could be reinvested in research to produce future generations of biomedical innovation. Table 10 lists Biden’s and Trump’s positions on life-sciences policy.

Table 10: The candidates’ positions on life-sciences policy

Issue	Trump	Biden
Combatting COVID-19	<ul style="list-style-type: none"> ▪ Operation Warp Speed, which seeks to deliver 300 million doses of a safe, effective vaccine for COVID-19 by January 2021, has committed over \$10 billion in funds for the development of COVID-19 therapeutics and vaccines.¹⁵² ▪ Has refrained from developing a comprehensive national strategy to combat COVID-19, leaving more responsibility to U.S. states. ▪ FY 2022 budget request creates new R&D priority for “American Public Health Security and Innovation” which includes new funding for infectious-disease modeling, prediction, and forecasting, as well as diagnostic, vaccine, and therapeutic R&D.¹⁵³ 	<ul style="list-style-type: none"> ▪ Would see to it the Biomedical Advanced Research and Development Authority (BARDA) has necessary resources to ensure adequate production of COVID-19 therapeutics and vaccines.¹⁵⁴ ▪ Would introduce a comprehensive national strategy to address COVID-19, including ensuring adequate availability of testing kits nationwide and mandating mask-wearing.¹⁵⁵
National Institutes of Health Funding	<ul style="list-style-type: none"> ▪ Trump administration’s FY 2021 budget proposal (released in February 2020) called for 7 percent decrease in NIH funding (from \$41 billion to \$38.7 billion).¹⁵⁶ ▪ In March 2020, the administration requested an additional \$440 million for the National Institute of Allergy and Infectious Disease (and actual FY 2020 NIH funding became \$41.7 with additional congressional appropriations).¹⁵⁷ 	<ul style="list-style-type: none"> ▪ Proposal for \$300 billion in innovation funding calls for “major increases” in NIH funding, but specific amount not enumerated.¹⁵⁸
Drug Pricing	<ul style="list-style-type: none"> ▪ Wants to introduce “price controls on drugs that would cut the cost of 	<ul style="list-style-type: none"> ▪ Proposes, for Medicare programs, limiting price increases for all brand, biotech, and “abusively

Issue	Trump	Biden
	a patient's prescriptions by up to 70 percent." ¹⁵⁹	priced generic drugs" to inflation. ¹⁶⁰

CLEAN ENERGY INNOVATION

The positions of President Trump and Vice-President Biden contrast sharply on clean energy innovation policy. President Trump has supported policies that aid carbon-intensive technologies, such as coal plants and higher-mileage vehicles, while proposing that federal funding for clean energy R&D be reduced significantly in each of his budgets. Vice-President Biden has proposed that energy R&D funding be increased substantially as part of an overall expenditure of \$300 billion on R&D over four years. He has also called for the United States to achieve net-zero emissions as a nation by 2050, and to decarbonize the electricity grid by 2035.

The two candidates have deviated slightly from these general positions in a few areas. President Trump's administration, for instance, is pursuing the Energy Storage Grand Challenge, which could encourage more-rapid adoption of variable renewable energy technologies, such as wind and solar power. Vice-President Biden includes carbon capture, utilization, and storage (CCUS) among his technology priorities, rejecting calls to eliminate fossil fuel use altogether from some supporters of Bernie Sanders.

Table 11: The candidates' positions on clean energy innovation policy

Issue	Trump	Biden
General Approach to Energy and Climate Policy	<ul style="list-style-type: none"> Has promoted a strategy of "energy dominance," emphasizing domestic energy supplies, the provision of affordable energy, and energy system resilience and reliability.¹⁶¹ Has questioned whether climate change is occurring and whether it is caused by human activity.¹⁶² Has rejected the Paris Climate Accord and expressed opposition to some clean energy technologies such as wind turbines.¹⁶³ Has supported policies that aid carbon-intensive technologies, such as coal power plants and higher-mileage vehicles.¹⁶⁴ 	<ul style="list-style-type: none"> Has called for achieving net-zero U.S. emissions by 2050, supported by \$2 trillion of investment in clean energy and green infrastructure over his first term.¹⁶⁵ Has promoted innovation in a wide range of low-carbon energy technologies, and highlights the need for solutions for hard-to-abate sectors and negative emissions.¹⁶⁶
Federal Investment in Energy R&D	<ul style="list-style-type: none"> Has proposed cutting federal energy R&D funding significantly, including eliminating Advanced Research Projects Agency–Energy 	<ul style="list-style-type: none"> Has proposed \$300 billion over four years for public R&D spending, including for clean energy.¹⁶⁸

Issue	Trump	Biden
	<p>(ARPA-E) and weakening support for “later-stage” applied R&D.</p> <ul style="list-style-type: none"> Has proposed expanding R&D investment for select technologies, including grid modernization and coal power generation.¹⁶⁷ 	<ul style="list-style-type: none"> Has called for increasing funding for DOE laboratories and associated regional innovation ecosystems.¹⁶⁹ Has recommended creating ARPA-C (i.e., “climate”), an initiative targeting “game-changing technologies to help America achieve our 100% clean energy target.”¹⁷⁰
Federal Support for Clean Energy Commercialization and Deployment	<ul style="list-style-type: none"> Has opposed many policies, such as tax incentives, that would accelerate adoption of clean energy technologies.¹⁷¹ 	<ul style="list-style-type: none"> Has advocated “demand-pull” policies, including clean energy tax incentives, a price on carbon, and a technology-neutral energy efficiency and clean electricity standard.¹⁷² Has argued for using federal procurement to drive demand for clean energy technologies as part of additional \$400 billion spending government-wide, particularly for electric vehicles.¹⁷³
Innovation-Inducing Sector-Specific Policies	<ul style="list-style-type: none"> Has enacted policies that disincentivize clean energy innovation, including replacing the Clean Power Plan with a less stringent rule, rolling back the Corporate Average Fuel Economy (CAFE) standards, and eliminating the use of the social cost of carbon in regulatory decision-making.¹⁷⁴ Has sought to reduce state government power to pursue clean electricity standards, zero-emission vehicle mandates, and other sector-specific climate policies.¹⁷⁵ 	<ul style="list-style-type: none"> Has defined emission-reduction goals for some major sectors, including decarbonizing the electric grid by 2035 and reducing building emissions by 50 percent.¹⁷⁶ Has advocated accelerating progress in key technologies, such as CCUS, that are needed to decarbonize all sectors of the economy, including industry and agriculture.¹⁷⁷
Incorporating Environmental Justice into Clean Energy Innovation	<ul style="list-style-type: none"> Has not prioritized environmental justice in policymaking. 	<ul style="list-style-type: none"> Has committed to ensuring disadvantaged communities receive 40 percent of benefits from clean energy and green infrastructure investments.¹⁷⁸
Fostering Innovation in Domestic Clean Energy Supply Chains and Manufacturing	<ul style="list-style-type: none"> Has imposed tariffs on solar panels and other clean energy technology imports, which has induced some new domestic manufacturing.¹⁷⁹ 	<ul style="list-style-type: none"> Has proposed \$400 billion investment over 10 years to create industries of the future to achieve net-zero emissions.¹⁸²

Issue	Trump	Biden
	<ul style="list-style-type: none"> Has proposed eliminating DOE-funded Manufacturing USA Innovation Institutes.¹⁸⁰ Has developed the Energy Storage Grand Challenge, which seeks to build domestic supply chains for batteries and other storage devices and systems.¹⁸¹ 	<ul style="list-style-type: none"> Has supported public R&D to accelerate innovation in clean energy supply-chain resilience.¹⁸³ Has promoted using public-private partnerships to boost manufacturing capacity, such as the Manufacturing USA Innovation Institutes.¹⁸⁴ Has called for developing a national strategy for low-carbon manufacturing in every state.¹⁸⁵
U.S. Role in Global Clean Energy Innovation	<ul style="list-style-type: none"> Has set in motion U.S. withdrawal from the Paris Agreement.¹⁸⁶ Has sought to expand U.S. exports of nuclear power technologies and encouraged international cooperation on CCUS R&D.¹⁸⁷ 	<ul style="list-style-type: none"> Has encouraged nations participating in Mission Innovation to quadruple their clean energy R&D investments relative to the original baseline.¹⁸⁸ Has called for imposing carbon adjustment fees for imports from countries that do not meet their international climate obligations.¹⁸⁹

CONCLUSION

Technological innovation is a key factor in achieving virtually all of America’s most important goals: improving public health, strengthening national security, improving competitiveness, ensuring robust increases in living standards, and addressing climate change.

That will not happen if government does not develop and implement a coherent set of policies to advance innovation while eschewing policies that would limit innovation. Some of this should involve public-private partnerships. Other measures should involve corporate tax and regulatory reform, including boosting innovation incentives.

America is no longer the global innovation leader, at least on a per capita basis, and it risks losing out to China over the next decade or two. This could have serious implications for national security, and certainly serious implications for U.S. power globally.

Republicans have long focused on limiting or denying government’s contributions to bolstering U.S. innovation and competitiveness. But in the last four years, we have seen significant progress, particularly among Republican lawmakers in Congress recognizing that there is an important, proactive role for government in this area. We hope this trend will continue.

Democrats, meanwhile, have long been more willing to have government take an active role in supporting innovation and competitiveness, but that may be changing, too, with many

progressives often seeming more interested in shackling companies, particularly big companies, and in spending a major share of political capital on pursuing a redistribution agenda, rather than a growth agenda, and placing virtually all industrial policy resources in the “green” sector.

The reality is that America is no longer the global innovation leader, at least on a per capita basis, and it risks losing out to China over the next decade or two. This could have serious implications for national security, and certainly serious implications for U.S. power globally. Whether or not the two major parties understand this threat and want to prioritize it is unclear. If they do, it will require a new era of bipartisanship—at least on the sets of issues related to competitiveness and innovation—like we enjoyed during the Cold War. It will also require a bipartisan commitment to rejecting the anti-innovation policy advice of neoclassical economists as well as the anti-big business rhetoric of progressives. Finally, it will require recognizing that the U.S. innovation system of the last 40 years needs to be overhauled and replaced with a new one, just as the United States reinvigorated itself in the 1950s in response to the Soviet threat. This will require a wide array of policy reforms and significantly more public investment in direct expenditures and indirect tax incentives.

Even in this intense election season, policymakers must work harder to develop a bipartisan consensus around the need to advance a serious and comprehensive competitiveness, innovation, and productivity strategy for the United States.

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The Information Technology and Innovation Foundation (ITIF) is a nonprofit, nonpartisan research and educational institute focusing on the intersection of technological innovation and public policy. Recognized as the world's leading science and technology think tank, ITIF's mission is to formulate and promote policy solutions that accelerate innovation and boost productivity to spur growth, opportunity, and progress.

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