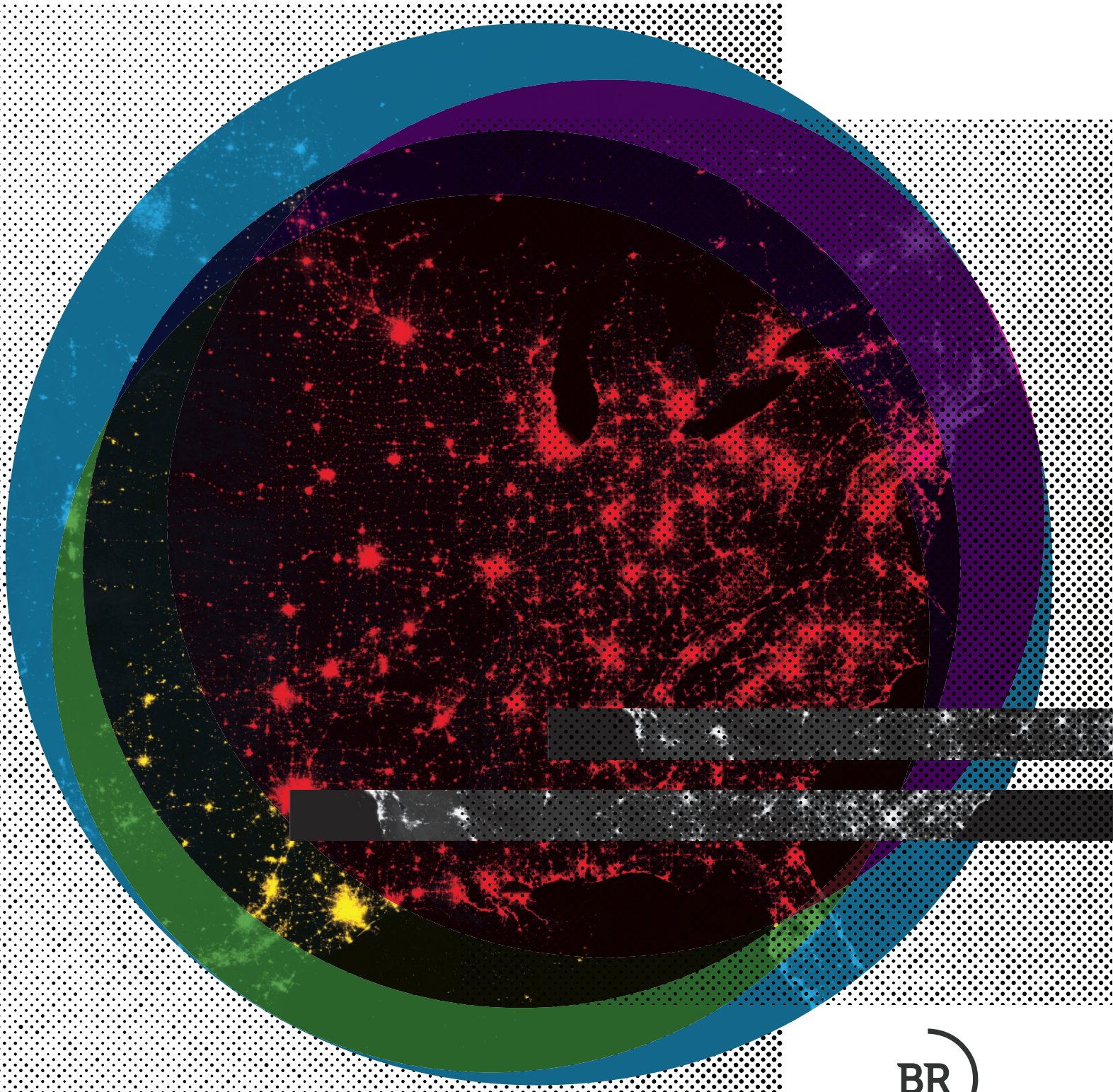
INNOVATION NATION

AN AMERICAN INNOVATION AGENDA FOR 2020



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Innovation Nation: An American Innovation Agenda For 2020

Table of Contents

Introduction 1

Principles for American Innovation 4

Invest in People 6

Improve Education and Workforce Training 7

Bolster Competitiveness through Immigration Reforms 10

Make Strategic, Long-Term Investments in Science and Technology 15

Fortify the U.S. Research and Development (R&D) Base 16

Remove Roadblocks to Innovation 21

Reform Regulatory Systems for Innovation 22

Harmonize Approaches to Data Privacy and Security 24

Position America to Compete and Thrive Worldwide 27

Pursue Inclusive Innovation 31

Conclusion 35

Introduction

Leadership in innovation is one of the most important factors for the economic and geopolitical future of the United States. Innovation makes the country more productive, dynamic and competitive. It is the process of taking an idea, a concept or knowledge and transforming it into something that creates new value.

Through innovation, the United States can achieve sustainable, long-term economic growth that increases prosperity and leads to a healthier, safer and higher standard of living for all Americans.

Turning scientific knowledge and engineering prowess into commercial products and services is what made the United States the world's foremost economic and technological powerhouse. In many ways, American success in innovation is a product of ambition and hard work to create, make progress, prosper and succeed — it is the modern American Dream.

During the Cold War, the United States had a national strategy for innovation — one that put a man on the moon, created the internet and the modern computing industry, and established the United States as the global leader in the development of cutting-edge technologies for several decades. Today, the country is still riding the wave created by that strategy, but government commitment to innovation has waned.

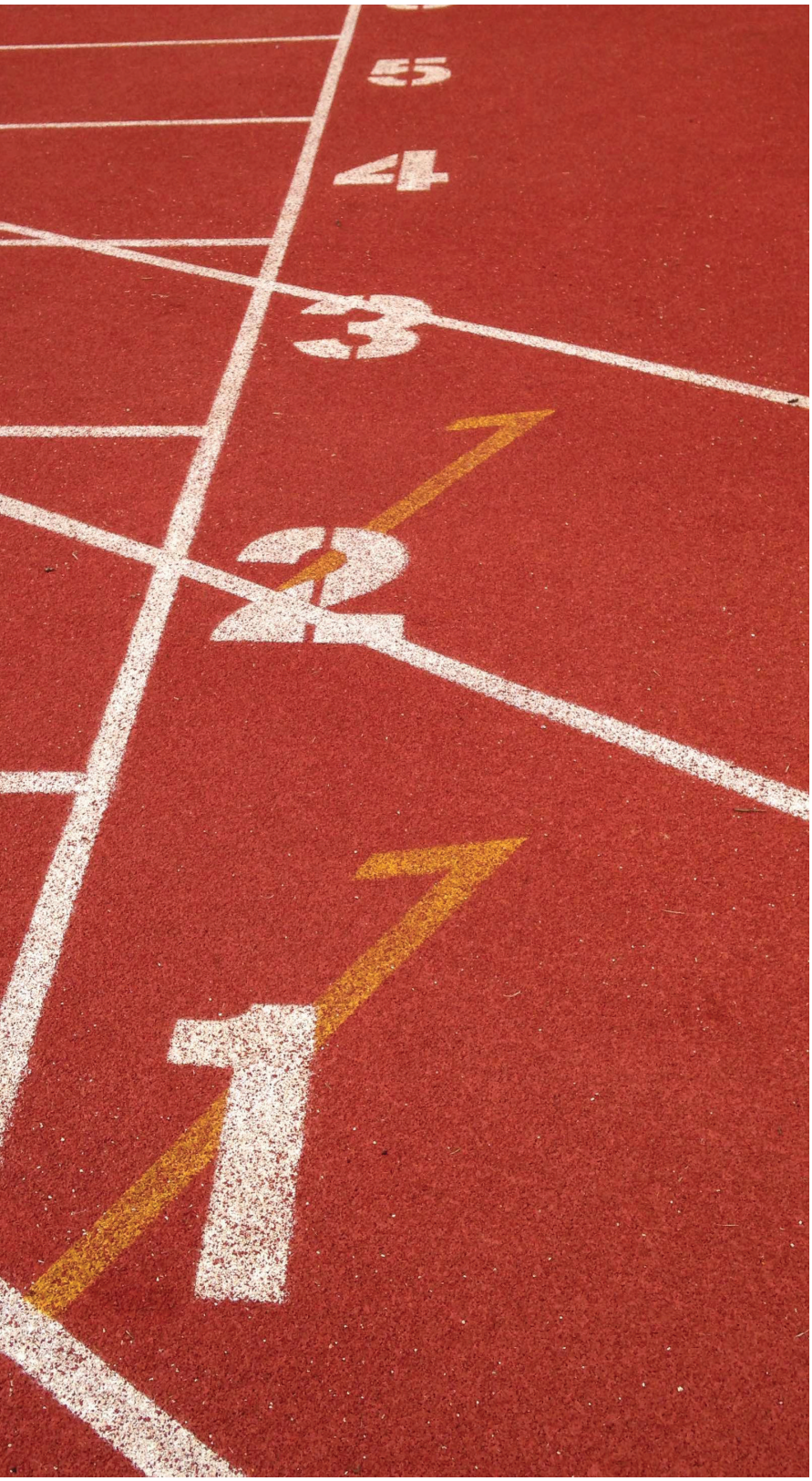
While America remains the global leader in innovation, there are legitimate concerns that it is losing ground. The foundation upon which U.S. leadership in innovation was built is being eroded by diminished investment in human capital, persistent regulatory barriers, and significant interventions by foreign governments and state-owned enterprises. Outdated regulations and underinvestment in science, technology, engineering and math (STEM) education; skilled worker training; basic research and development (R&D); and infrastructure undermine U.S. leadership. The United States is at risk of losing its edge as the governments of other countries pour massive resources into R&D, advanced infrastructure, education and acquiring market access for their industries.

U.S. government focus on innovation is lagging.

The U.S. government has grown complacent — resting on legacy achievements while underinvesting in the drivers and enablers needed to build on these achievements in the future. Tight budgets, policy challenges and competing priorities have caused political leaders to avoid or postpone critical investments in human capital and R&D. For example, U.S. federal spending on R&D as a share of gross domestic product (GDP) remains at historically low levels.[1] When it comes to basic research, federal spending levels are less than half of private-sector spending.[2]

1 National Science Foundation, National Center for Science and Engineering Statistics. (2018, May 21). National patterns of R&D resources: 2015–16 data update. Alexandria, VA.

2 Ibid.



Other countries are gaining ground.

Other countries are challenging U.S. leadership in innovation on multiple fronts. There is now a fierce global competition to attract capital and talent, bolster connectivity, set standards and global best practices, and establish dominance in strategic technologies. More than one-half of all patents filed in the United States Patent and Trademark Office originate from outside of the United States.[3] At the same time, unfair and illegal trade practices — including those that enable technology theft on the part of foreign actors — tilt the global playing field. For instance, counterfeit goods, pirated software and theft of trade secrets cost the U.S. economy between $225 billion and $600 billion annually, according to some estimates.[4]

The pace of technological change is accelerating.

The United States cannot remain a global leader in innovation unless its policy and regulatory infrastructure is responsive, adaptive and open and provides the right balance of incentives, support and protections for private-sector innovation. Although core U.S. institutions remain strong, many enabling conditions — regulations, standards and policies — have not kept pace with the accelerating rate of technological change or with the rate at which businesses must adapt and react to compete in the new economy. The Deloitte Center for Government Insights estimates that 68 percent of all existing U.S. federal regulations have not been updated even once.[5] At the same time, new drug development and approval in the United States takes an average of 12 years.[6,7]

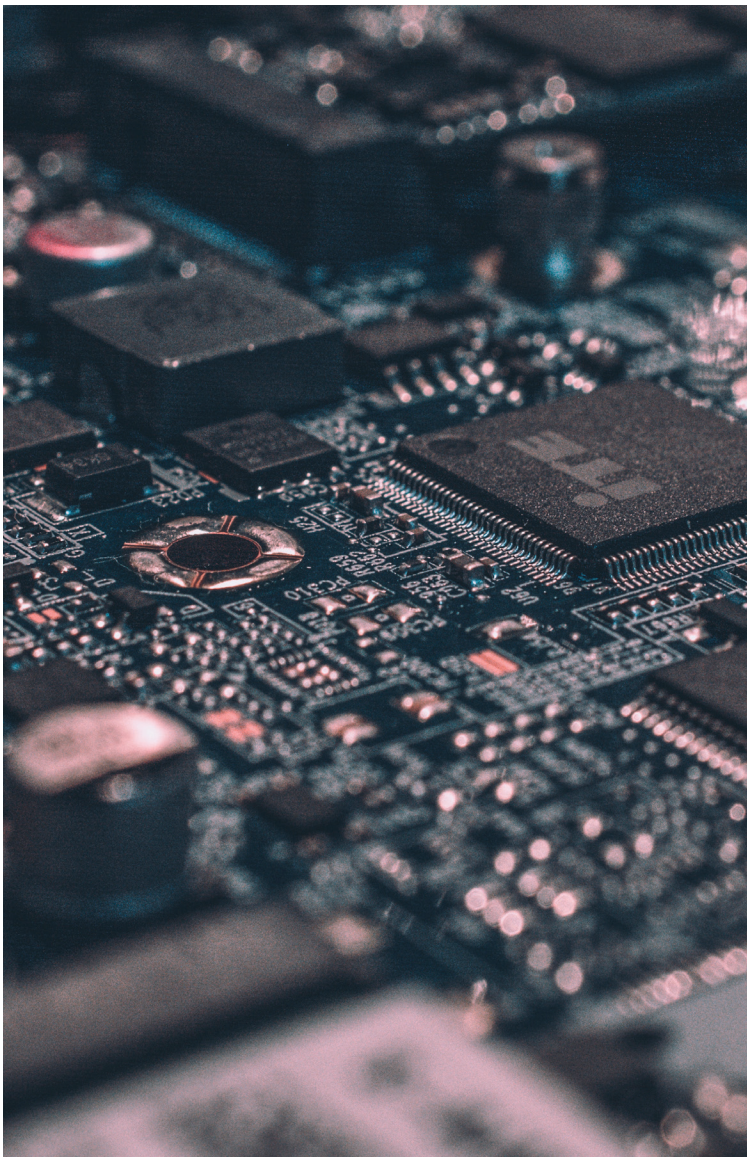
Innovation can have disruptive social and economic effects.

The process and outcomes of innovation can have potentially disruptive and destabilizing effects on society and the economy. If not actively managed, these effects can undermine social support for and the political commitment to innovation. Unfortunately, certain regions of the country and sectors of the economy are experiencing more of the costs of innovation transitions and fewer of the benefits than others. For instance, the manufacturing sector's share of GDP (measured in terms of value added) has fallen from roughly 16 percent to just under 12 percent in the past 20 years, and its share of total U.S. employment has declined from 14 percent to 8.5 percent over the same period.[8,9,10] Furthermore, an analysis from EY found that while every sector across the economy can apply automation to roughly a third of its work, sectors such as finance, administration and customer service are the most exposed.[11]

America needs a national innovation agenda now more than ever.

Given all these circumstances, America needs a national agenda to ensure that the country remains the global leader in innovation. Government and the business community must work together to build a modern and high-skilled workforce, increase support for foundational R&D, modernize regulations for emerging technologies, position America to compete and thrive globally in the innovation race, and pursue innovation inclusively.

For these reasons, business leaders are stepping up to create a cross-cutting innovation policy agenda — and make sure that the United States remains the global leader in innovation across all sectors of the economy and for generations to come.



3 U.S. Patent and Trademark Office. Data series: Number of utility patent applications filed in the United States, by country of origin, calendar years 1965 to present.

4 IP Commission. (2017). Update to the IP Commission report.

5 Deloitte Center for Government Insights. The future of regulation: Principles for regulating emerging technologies.

6 Van Norman, G. A. (2016, April). Drugs, devices, and the FDA: Part 1: An overview of approval processes for drugs. JACC: Basic to Transitional Science, 1(3), 170–179.

7 This process spans the time between preclinical testing and new drug approval.

8 U.S. Bureau of Labor Statistics. Manufacturing sector: Real output (OUTMS) as of Q3 2018.

9 Bureau of Economic Analysis. GDP-by-industry, value added.

10 U.S. Bureau of Labor Statistics. Employment, hours, and earnings from the Current Employment Statistics survey.

11 EY. The future workplace: How to automate intelligently.

Principles for American Innovation

To ensure that the United States remains the global leader in innovation, policymakers must focus on strengthening all components of the national innovation system, including people, institutions, regulations and technology. America's approach to protecting its leadership in innovation should be guided by the following five principles:

1. Invest in people.

America needs to build a diverse, modern and world-class workforce for innovation across all sectors of the economy. The country should have the best education system and the most skilled workforce globally. Over the next decade, the United States needs to significantly reduce the shortage of highly skilled workers. The United States should have an education system that fully unlocks the potential of its human capital and boosts its rank in science and math education to the elite, top 10 level.

2. Make strategic, long-term investments in science and technology.

America needs to strengthen foundational research, make strategic investments in science and technology, and deploy enabling infrastructure to sustain dominance in underlying technologies, such as artificial intelligence, quantum computing, advanced robotics, aerospace and advanced medicine.

The ripple effects of strategic, long-term investment in science and technology are pervasive. The country needs a national innovation strategy to pursue ambitious, exploratory and ground-breaking projects to solve the toughest challenges in fields as varied as health, energy, transportation, education and national security.

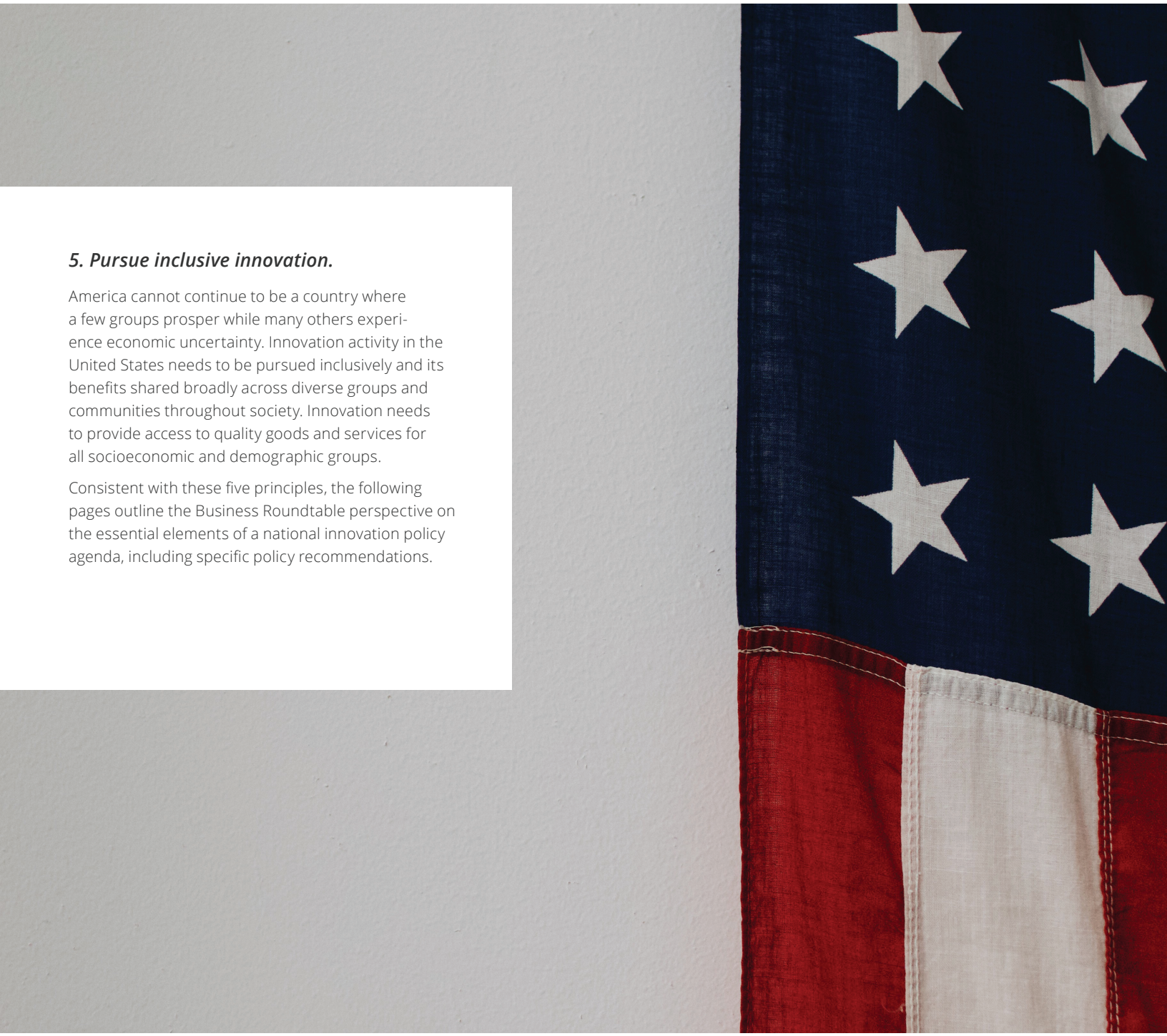
3. Remove roadblocks to innovation.

The United States is the top global destination for developing and bringing to market innovative technologies and processes because of its market-based economy and culture of entrepreneurship and risk-taking. Unfortunately, outdated regulation threatens U.S. competitiveness. Regulation must be agile and light touch as well as clear, precise and enforceable to accommodate a rapidly changing technology landscape. At the same time, regulation must be predictable to avoid creating uncertainty and undermining the investment environment.

The United States needs to create a regulatory environment that encourages and enables innovation. The United States should consistently attain a top ranking for its regulatory transparency and flexibility, preserving its status as the top global destination for innovation.

4. Position America to compete and thrive worldwide.

The country that wins the innovation race wins the future. Other countries are challenging U.S. leadership in the competition to secure capital and talent, bring new products and services to market, set technology standards, and dominate strategic technologies. The United States must understand the scope of other countries' efforts and respond to their actions while promoting market access for U.S. innovations as well as rules to protect those innovations and investments.



5. Pursue inclusive innovation.

America cannot continue to be a country where a few groups prosper while many others experience economic uncertainty. Innovation activity in the United States needs to be pursued inclusively and its benefits shared broadly across diverse groups and communities throughout society. Innovation needs to provide access to quality goods and services for all socioeconomic and demographic groups.

Consistent with these five principles, the following pages outline the Business Roundtable perspective on the essential elements of a national innovation policy agenda, including specific policy recommendations.

Invest in People

Improve Education and Workforce Training

The U.S. workforce propels U.S. leadership in innovation by stewarding the development and deployment of new products and technologies.

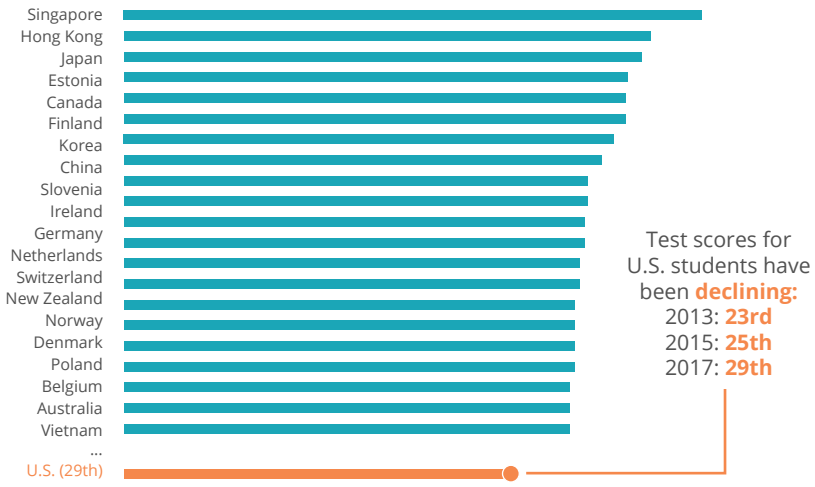
Sustaining this leadership amidst accelerating technological change means recognizing the changing nature of work and responding to new demands for an evolving portfolio of skills. It also means ensuring that the building blocks of U.S. human capital are sound — that the U.S. education system is high performing and broadly accessible and that training resources serve workers through lifetimes of growth and change.

Failure to proactively prepare students and workers with innovation-ready skills — starting with basic educational skills and a more comprehensive focus on science, technology, engineering and math (STEM) — puts the United States at a competitive disadvantage and restricts participation in the innovation economy. Inaction on this front shortchanges the full potential of U.S. human capital, undercuts efforts to benefit from U.S. innovative capacity and increases the likelihood of painful labor market disruptions triggered by economic change. Robust investments in education and workforce training ensure that the benefits of innovation are broadly shared across the workforce and that workers thrive against a backdrop of rapid change. However, when it comes to building human capital, the U.S. approach is far from meeting this challenge.

The K–12 education system falls short of unleashing the full potential of its students.

- Out of 70 countries that participate in the Organisation for Economic Co-operation and Development's Programme for International Student Assessment (PISA), the United States ranks just 24th in reading, 25th in science and 40th in math.[12,13,14]
- In 2013, only 19 percent of all high school graduates had enrolled in a calculus course or higher, though students in the top fifth of socioeconomic status had enrolled at almost twice that rate.[15]

Composite Index of U.S. PISA Test Ranking
Student Test Scores for Science, Math & Reading



Global Innovation Index 2018 (Cornell, INSEAD, WIPO)

12 Seventy-three countries participate in PISA, but the sample sizes in Argentina, Kazakhstan and Malaysia are too small to ensure comparability.

13 The count of 70 countries includes three distinct observations for China because Chinese PISA participation is limited to specific regions and that is the level on which results are reported.

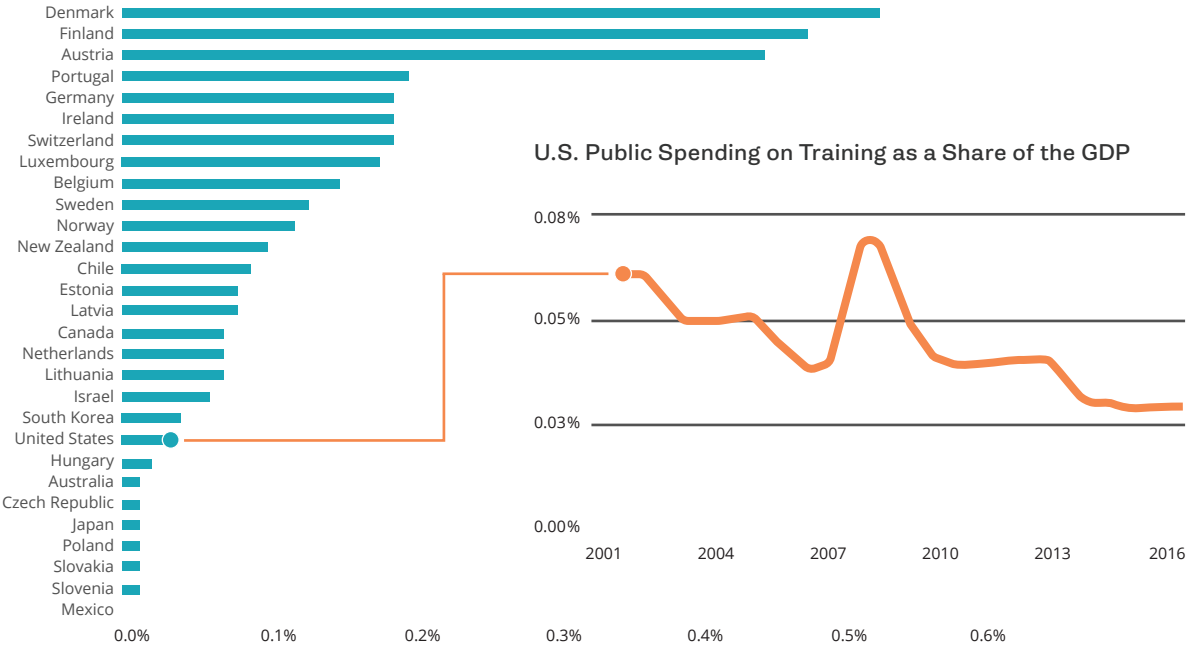
14 OECD. PISA 2015 database, mean score performance.

15 National Science Board. 2018 science & engineering indicators. 1–6.

Workforce training programs, particularly those that do not require a four-year degree, are not up to the task — leaving the full potential of the U.S. workforce untapped.

- The U.S. workforce development system is fragmented, duplicative and incomplete, as federal investments in workforce training programs have declined and stagnated.[16]
- U.S. public spending on training as a share of gross domestic product (GDP) trails that of peer and competitor countries.[17]
- According to the Global Innovation Index, China ranks first in "Knowledge Workers," while the United States lags behind at 13th.[18,19]

Public Spending on Training as a Share of GDP Share of GDP, 2016



OECD Data, Public Spending on Labour Markets

16 National Academies of Sciences, Engineering, and Medicine. (2017). Building America's skilled technical workforce. Washington, DC: The National Academies Press.

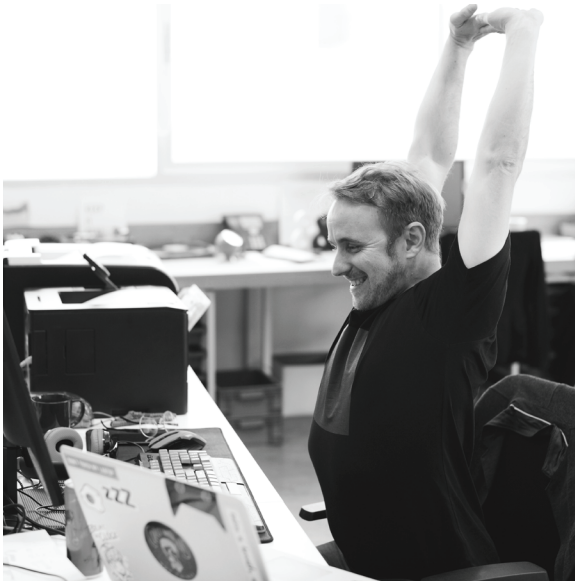
17 OECD Data. Public spending on labour markets.

18 Cornell SC Johnson School of Business, INSEAD & World Intellectual Property Organization. (2018). Global innovation index 2018: Energizing the world with innovation. Ithaca, Fontainebleau and Geneva.

19 The Knowledge Workers Index is a composite index composed of employment in knowledge-intensive services, firms offering formal training, gross expenditure on R&D performed by business enterprise, gross expenditure on R&D financed by business enterprise and females employed with advanced degrees.

U.S. education and training resources fail to meet the evolving needs of the innovation economy, creating a sizable "skills gap" that leaves business with an insufficient supply of qualified workers.

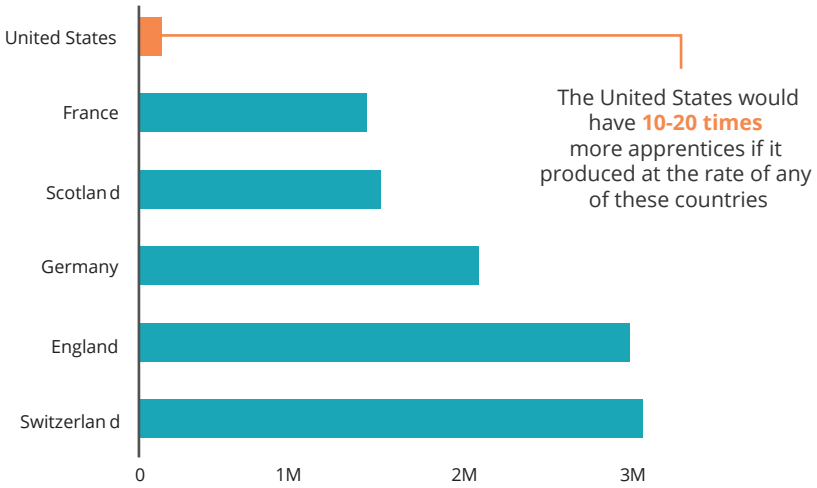
- A 2016 Business Roundtable survey found that among CEOs whose companies employ skilled trade workers, 44 percent of respondents reported difficulty finding qualified candidates for at least one skilled trade occupation.[20]
- A recent survey of senior business leaders found that 56 percent see talent shortages as the greatest barrier to quickly implementing artificial intelligence in business operations.[21]
- In STEM fields, the number of job postings in 2016 was almost 13 times higher than the number of qualified, available workers.[22]
- An estimated 2.4 million manufacturing jobs will be unfilled between 2018 and 2028 due to a skills shortage.[23]



Strategic, cross-sector workforce training investments are needed to help close the skills gap and improve program effectiveness.

- Training models that improve connections between labor supply and demand are well proven and gaining popularity, but broader adoption stands to benefit many students. For example, research consistently finds that students receive meaningful economic returns — due to higher wages, increased likelihood of employment and more hours worked — from credentials earned at public community colleges.[24]
- Internship and apprenticeship programs are also highly effective training programs that align labor supply with the needs of U.S. businesses. However, just 5 percent of U.S. students participate in apprenticeship programs, compared to roughly 60 percent of German students.[25]

U.S Potential Apprenticeships by Per-Capita Country Apprenticeships
Number of Apprenticeships if the United States Matched Its Peers



The Underuse of Apprenticeships in America, Center for American Progress

20 Business Roundtable. (2017, June). Work in progress: How CEOs are helping close America's skills gap.
21 Mazzei, C., & Duffy, N. Putting artificial intelligence (AI) to work: Innovation matters: Insights on the latest disruptive technologies. EY.
22 New American Economy. (2017, March 29). Sizing up the gap in our supply of STEM workers.
23 Deloitte Insights & The Manufacturing Institute. 2018 Deloitte and The Manufacturing Institute skills gap and future of work study.
24 Soliz, A. (2016, December 9). Preparing America's labor force: Workforce development programs in public community colleges.
25 Engelke, P., & Manning, R. A. (2017, April). Keeping America's innovative edge: A strategic framework. Atlantic Council.

Bolster Competitiveness through Immigration Reforms

A highly skilled and adaptable workforce is a prerequisite for creating and sustaining an innovative national economy.

While the first and most important component of investing in human capital is shoring up the skills and capabilities of the domestic workforce, the United States must also compete in the global race for talent by working to attract the best and brightest minds to contribute to the U.S. economy and drive U.S. productivity.

The United States has both a high demand for and a largely untapped global supply of skilled labor, but the mechanism to connect the two — the immigration system — is broken. Failure to continue to attract top global talent to the U.S. labor force represents a missed opportunity for the United States to strengthen its competitive edge in innovation. While U.S. industry has the capacity to lead the world in innovation, the nation risks falling behind in the global race for talent by constraining its own ability to compete.

Highly skilled non-U.S. citizens continue to make important contributions to U.S. innovation leadership and scientific advances.

- Nearly half of U.S. workers in a science or engineering occupation that hold a Ph.D. were foreign born as of 2015.[26]
- Since the establishment of the Nobel Prize, approximately 40 percent of the awards have gone to researchers working at U.S. institutions — 35 percent of whom were immigrants to the United States.[27]
- Immigrants and their children have helped found 60 percent of the most valuable U.S. technology companies, which combined were worth nearly $4 trillion in 2018.[28]

While the United States remains attractive to highly skilled workers, unnecessary barriers hinder the nation's ability to leverage and benefit from the global pool of talent.

- The oversubscription of the H1-B visa program reflects high demand for U.S. employment opportunities on the part of talented professionals. In 2018, more than 100,000 H1-B visa applications were received than were approved.[29]
- Oversubscription of the H1-B program comes as domestic companies face shortages of skilled employees, especially in STEM fields. In 2010, there were 5.4 STEM jobs posted online for each unemployed STEM worker, a gap that more than doubled by 2016 when there were 13 STEM jobs for each qualified, available professional.[30]
- International students at U.S. universities face significant hurdles to using their training at U.S. businesses to drive U.S. output and productivity. Ninety percent of foreign science and engineering doctorate recipients who intend to work outside of academia would prefer to stay in the United States and work, but only about 50 percent are able to do so.[31]

29 U.S. Citizenship and Immigration Services. (2018). Number of H1-B petition filings, applications and approvals, country, age, occupation, industry, annual compensation ($), and educatio FY2007-FY2017.

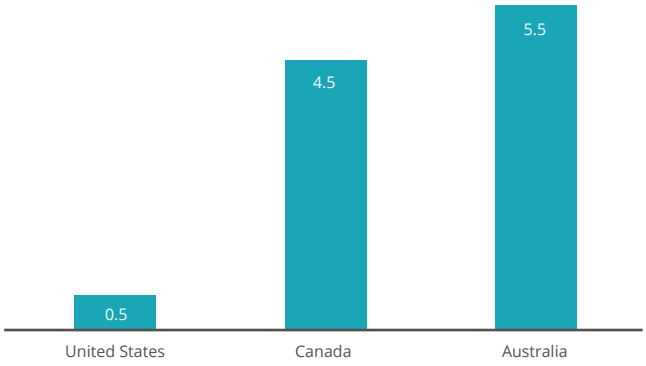
30 New American Economy. (2017). Sizing up the gap in our supply of STEM workers.

31 Han, X., Stocking, G., Gebbie, M. A., & Appelbaum, R. P. (2015). Will they stay or will they go? International graduate students and their decisions to stay or leave the U.S. upon graduation.

These barriers to highly skilled immigration put the United States at a disadvantage, as U.S. firms struggle to meet needs for innovation-ready skills.

- As a share of the overall population, Canada and Australia admit nine and 11 times more immigrants, respectively, through employment or skills-based visa programs than the United States.[32]

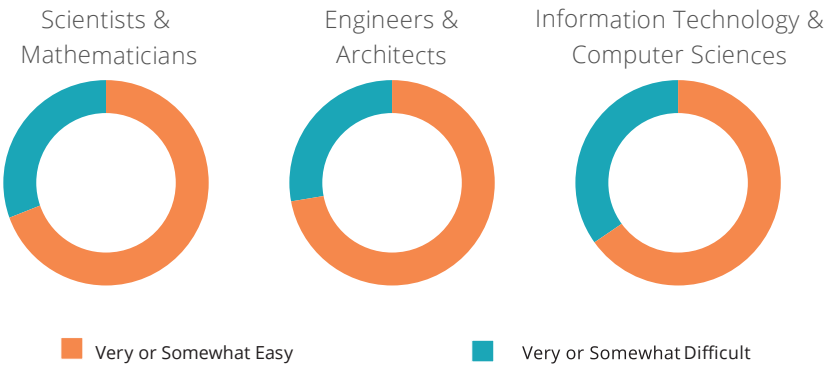
Relative Numbers of Empoyment-Based Immigrants
Per 1,000 Population, 2013 to 2015



Reforming the Immigration System to Promote Growth p. 18 (Mercatus Center at George Mason University), 2017

- Sixty-nine percent of human resources professionals in high-tech fields report experiencing difficulty filling open positions.[33]

Difficulty Filling Full-Time Positions by Job Category
Responses of Human Resources Professionals, Selected Job Categories



The New Talent Landscape: Recruiting Difficulty and Skills Shortages
2017 (Society for Human Resource Management)

32 Griswold, D. (2017). Reforming the US immigration system to promote growth.

33 The Society for Human Resource Management. (2016). The new talent landscape: Recruiting difficulty and skills shortages.

Policy Recommendations

1. ***Build a pipeline of students with globally competitive 21st-century skills.*** The public and private sector should work together to create and maintain partnerships among educational institutions, employers, state and local leadership, and the federal government to promote work-based learning and meet shifting and increasingly dynamic workforce demands.

    a. Increase training at educational institutions for in-demand skills. The United States should expand opportunities for students to gain exposure to and training and/or retraining in the high-demand technical and foundational skills needed to thrive in the new economy in the following ways:

        i. Congress should ensure that the Higher Education Act reauthorization includes expanded Workforce Pell Grants and opens the Federal Pell Grant system to short-term skilled worker education programs.

        ii. Employers and educational leaders should engage with Congress and educational policymakers to align funding priorities with labor market realities. This effort should include partnering with the U.S. Department of Education to ensure that career and technical education programs culminate in meaningful credentials or industry certifications in high-demand, high-skill fields.

        iii. Congress should reform the Federal Work-Study system to allow for off-campus, work-based learning opportunities.

    b. Partner with the education system to shorten pathways to jobs for individuals with recognized skills. Education policymakers should ensure that federal and state workforce preparedness policies, developed in partnership and collaboration with employers, promote standardized credentials that reflect proof-of-skill attainment in high-demand skillsets and are portable across industries. Students and workers should receive credit for mastery achieved in a range of professional careers (e.g., military). They should also have access to high-quality certificate programs that efficiently deliver training resources beyond the framework of bachelor's degree programs.

c. Align education with job opportunities. Education policymakers should create new linkages between educators and employers so that students receive the most up-to-date, relevant education in the foundational and technical skills that are needed in today's workplace. Education systems need resources and incentives to constantly shift their offerings to realign with the workforce of the future and increase the transparency of their employment-related outcomes.

d. Bolster STEM education and digital proficiency at all levels. U.S. leaders across the public and private sectors should build a national culture that strongly values STEM education. Policymakers should update and expand STEM education offerings and graduation requirements, including those in computer science and information technology, and work to increase student participation and representation in STEM. State policymakers and educators should strengthen preparation and professional development programs using research-based practices to improve STEM instruction in K–12 education.

e. Invest in foundational skills and proficiencies. Education policymakers should focus education programs and investments on the building blocks of strong educational performance by working to boost proficiency in fundamental skills such as teamwork, communication and adaptability, as well as literacy, digital skills and mathematics.

2. ***Design workforce training and preparedness for the future.*** Policymakers should make investments in workforce training that reflect the needs of the changing workforce by emphasizing flexible and portable resources that meet workers at any stage of their careers.

   a. Expand pathways between education and the workplace. Congress and state and local policymakers should expand the use of well-proven models of skilled worker training and education, such as community college partnerships and other private-public models, that provide pathways between high school, postsecondary education and training, and entry-level positions. These programs should be responsive to local economies and align training and education with the needs of the evolving labor market.

   b. Expand apprenticeships and work-based learning. Congress and state and local policymakers should support private-sector efforts to expand apprenticeships and work-based learning opportunities, such as internships. These learning and training programs should be continuous and available to workers not just at the start of but throughout their careers.

   c. Leverage company investment in worker training. Congress and state and local policymakers should encourage and facilitate partnerships to leverage private company investments in worker training and life-long learning programs that are consistent with shifts in high-demand skillsets and are customizable to workers' needs and interests, such as portable workforce training accounts.

   d. Leverage technology to improve training options. Employers and credentialing organizations should increase acceptance of digital platforms that award and track certifications to facilitate a skills marketplace for the workforce of the future, enabling the efficient delivery of useful and high-quality skill-building resources (e.g., through massive open online courses).

3. ***Attract and retain the best and the brightest global talent.*** The United States should build a globally competitive workforce and become the top global destination for talent with 21st-century technical and job skills.

   a. Increase visas for skilled workers. The federal government should increase the availability of H-1B temporary visas for high-skilled professionals and maintain the employment authorization for H-4 dependent spouses.

   b. Improve the predictability of adjudications of skilled worker visa petitions. The federal government should improve the transparency and consistency of adjudication processes to ensure predictable treatment of petitions for high-skilled workers.

   c. Retain highly skilled international students. The U.S government should retain highly skilled international students who have advanced degrees in a STEM field from a U.S. institution by:

      i. Providing an automatic green card for graduates in STEM fields, exempting individuals with special skills (e.g., STEM) from the 140,000-visa cap and eliminating the per-country limit for employment-based immigration.

      ii. Maintaining authorization for the Optional Practical Training period for student visas in qualifying STEM fields.


Make Strategic,
Long-Term Investments in
Science and Technology

Fortify the U.S. Research and Development (R&D) Base

Investment in R&D is a foundational building block for innovation.

A sustained historical commitment to making strategic, long-term investments in science and technology over multiple decades put a man on the moon in eight years, created the internet and modern computing industry, and established the United States as the global leader in the development of cutting-edge technologies.

While private-sector R&D investment has accelerated over the past 30 years, the federal government's willingness to make long-term, strategic investments in R&D has diminished. Investments in basic research and foundational science — the early stages of the R&D pipeline, during which federal involvement is particularly important — are key to supporting advances in critical underlying technologies, such as artificial intelligence, quantum computing, advanced robotics, aerospace and advanced medicine. Also key is creating and maintaining the right conditions for American businesses to make what are often risky and long-term investments in developing, testing, commercializing and deploying new technologies.

It is time to apply to the new innovation economy the same ambition and national commitment that enabled the United States' historical leadership role. A shared commitment to making smart, sustained and strategic investments in R&D will mean that more of the world's intellectual property and more high-value jobs are created in the United States and that more American businesses are the standard bearers for innovative technologies and processes.

Total U.S. R&D investment is robust and has increased over time.

- Total U.S. R&D investment — including public, private and other sources of investment — reached a record-high $511 billion in 2016, which is a 3 percent increase over the prior year and an 89 percent increase relative to 2000.[34]
- However, when measured as a share of gross domestic product (GDP), U.S. total R&D investment has barely budged in recent years, remaining at approximately 2.7 percent.[35]
- Federal funding for R&D since 2000 has been characterized by significant volatility from year to year and by slower growth than overall R&D investment. Federal funding for R&D increased only 31 percent from 2000 to 2016, while total national R&D investment grew by 89 percent.[36]

34 UNESCO Institute for Statistics. Science, technology, and innovation: Research and experimental development dataset.

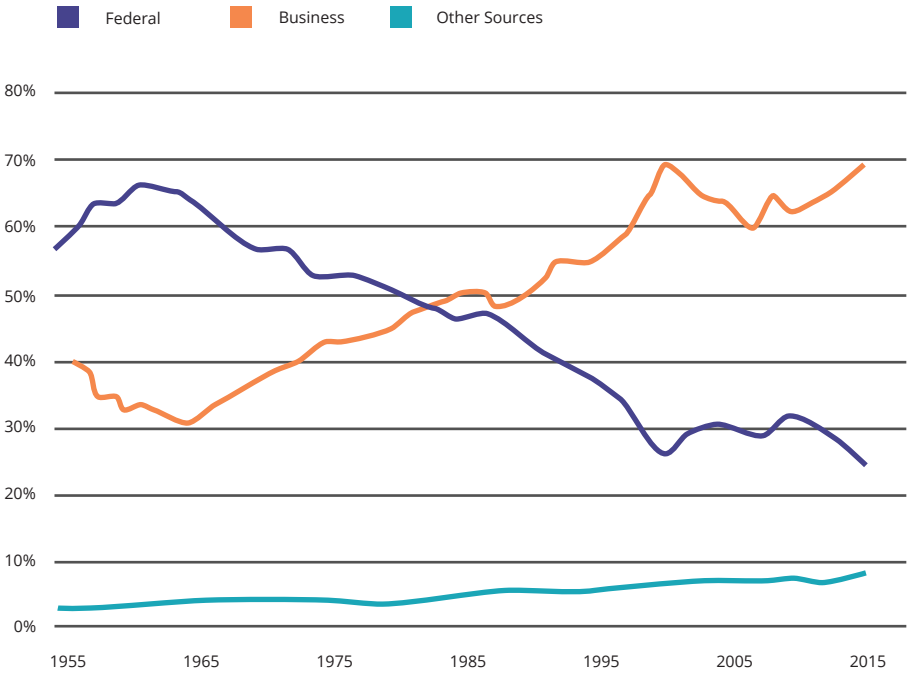
35 Ibid.

36 American Association for the Advancement of Science. Federal R&D budget dashboard: Federal R&D funding by agency; American Association for the Advancement of Science. Federal R&D budget dashboard: National U.S. expenditures for R&D by source.

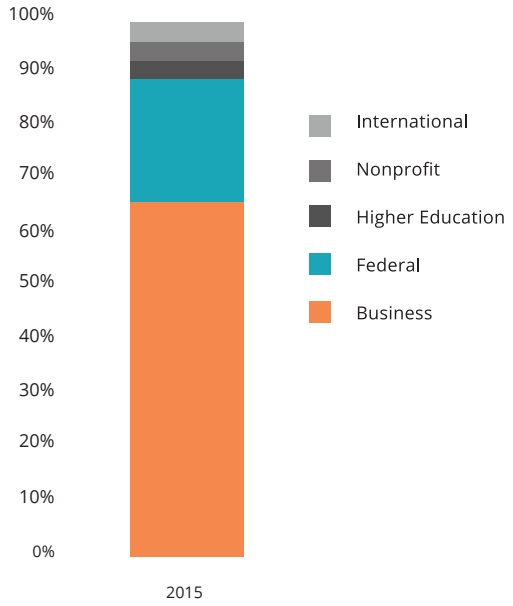
Historically, the U.S. government made a much larger contribution to national R&D investment than it does today.

- Beginning in the early 1980s, businesses began contributing the majority of U.S. funding for R&D, and the gap between private and public funding has widened in recent years.[37]

Historical U.S. R&D Investment
By Funding Source



National Science Foundation, National Patterns of R&D Resources
UNESCO Institute for Statistics -- Science, Technology, and Innovation



UNESCO Institute for Statistics -- Science, Technology, and Innovation

- Today, the private sector funds 64 percent of R&D in the United States, more than 2.5 times what the federal government funds.[38]
- Federal government R&D spending as a share of GDP has fallen from 1.2 percent in the 1970s to just 0.7 percent today.[39]

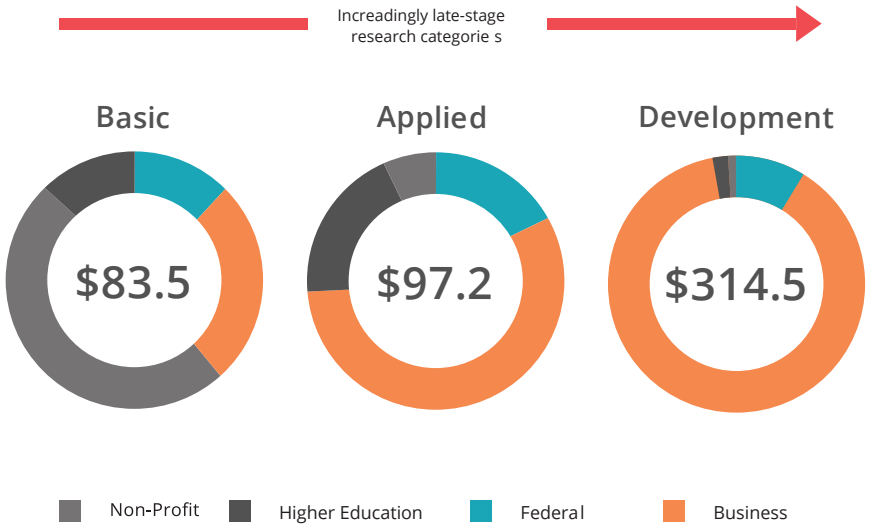
37 National Science Foundation, National Center for Science and Engineering Statistics. (2018, May 21). National patterns of R&D resources: 2015–16 data update. Alexandria, VA.
38 UNESCO Institute for Statistics. Science, technology, and innovation: Research and experimental development dataset.
39 American Association for the Advancement of Science. Federal R&D budget dashboard.

- Although the public sector is typically expected to more actively perform early stage R&D, the U.S. federal government only performs about 12 percent of total basic research — less than half that of the private-sector, which performs 26%.[40]

The United States is still a global leader in R&D, but its lead is diminishing.

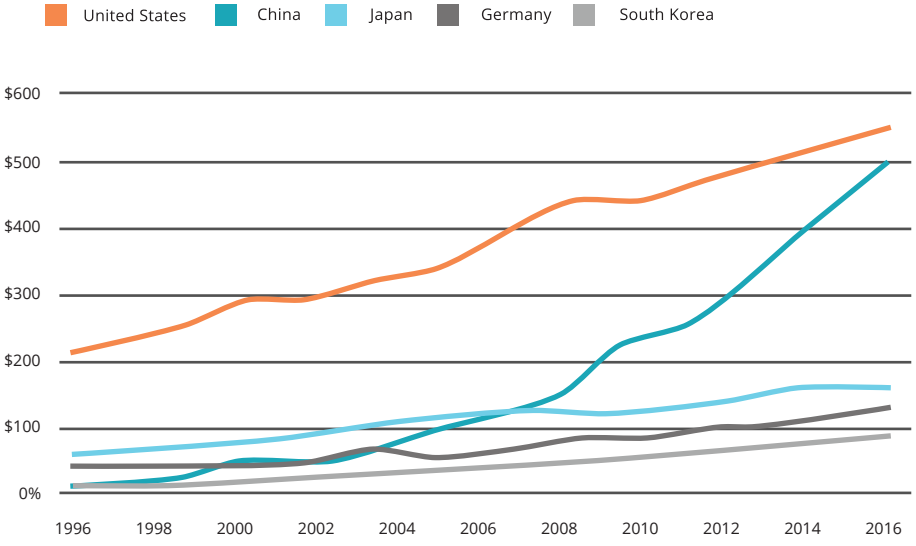
- In terms of total investment in R&D, the United States continues to outpace the world. Other top countries include China, Japan, Germany and South Korea.
- In terms of investment as a share of national GDP, the United States ranks 10th behind nations such as Israel, Japan, Switzerland and Germany.[41]

2015 U.S. R&D Expenditures by Performing Sector Current $Billions*



National Science Foundation, National Patterns of R&D Resources (annual series)
2015 data represent preliminary estimates

Top Five Countries by Total R&D Spending
$Billions, Current Purchasing Power Parity



UNESCO Institute for Statistics Science, Technology, and Innovation Indicators: Gross Domestic Expenditure on R&D (GERD)

- While U.S. government R&D spending declined following the recession, China's federal R&D spending has steadily increased over the past two decades. The gap between U.S. and Chinese federal R&D investment is now almost one-third what it was in 2008 ($34 billion in 2015 compared to $89 billion in 2008).[42]
- The United States currently ranks near the bottom of its Organisation for Economic Co-operation and Development peers on the B-Index, which measures the amount of profit necessary to justify R&D expenditures.[43]

40 National Science Foundation, National Center for Science and Engineering Statistics. (2018, May 21). National patterns of R&D resources: 2015–16 data update. Alexandria, VA.

41 Cornell SC Johnson School of Business, INSEAD & World Intellectual Property Organization. (2018). Global innovation index 2018: Energizing the world with innovation. Ithaca, Fontainebleau and Geneva.

42 UNESCO Institute for Statistics. Science, technology, and innovation: Research and experimental development dataset.

43 OECD. (2017). Science, technology, and industry scorecard 2017, R&D tax incentive indicators: Tax subsidy rates on R&D expenditures.

Policy Recommendations

1. ***Boost federal funding for R&D, with a focus on strategic investments in basic research.***

    a. Develop and implement whole-of-government strategic planning for R&D. The federal government should develop and execute a whole-of-government approach for strategic R&D investment, including a clear articulation of near-, medium- and long-term research priorities. A whole-of-government strategic plan should include clear and specific objectives and benchmarks, results-driven planning and execution, a predictable funding stream, and effective coordination and collaboration across agencies and federal labs.

    b. Increase funding for basic R&D. The federal government should build on last year's increase in funding for basic research to sustain a 4 percent annual growth rate, adjusted for inflation, in federal spending on basic research in the coming years. Such a trajectory would be consistent with long-term historical growth rates in federal spending on basic research that were sustained from the 1970s through the 1990s.

2. ***Improve collaboration among federal research labs, universities and the private sector.*** The federal government should improve and expand collaboration to accelerate the transition of promising technologies from the laboratory to commercialization in the marketplace.

    a. Incentivize and support regional cluster initiatives. The federal government should support regional cluster initiatives by funding grants and innovation challenges that promote local community development, incentivize industry-aligned workforce preparedness programs, and strengthen information-sharing and monitoring efforts around cluster initiatives. This effort should include:

        i. Focusing federal support on providing robust, long-term and predictable funding streams to help scale up innovation clusters and advance a forward-looking vision for local economic growth through innovation.

ii. Maintaining and expanding existing federal funding channels, including competitive matching grant programs. Examples include the Economic Development Agency's i6 and Seed Fund Support programs, which serve as useful "one-stop shops" for funding, information exchanges and expert assistance for local innovators and entrepreneurs.

b. Expand collaborative research partnerships. The federal government and federal research agencies should promote industry-university collaborative research partnerships to ensure that advances in early-stage research can proceed through the commercialization pipeline. The government should expand programs such as the National Science Foundation's Engineering Research Centers and Industry-Cooperative Research Centers, which leverage public-private partnerships to achieve these objectives.

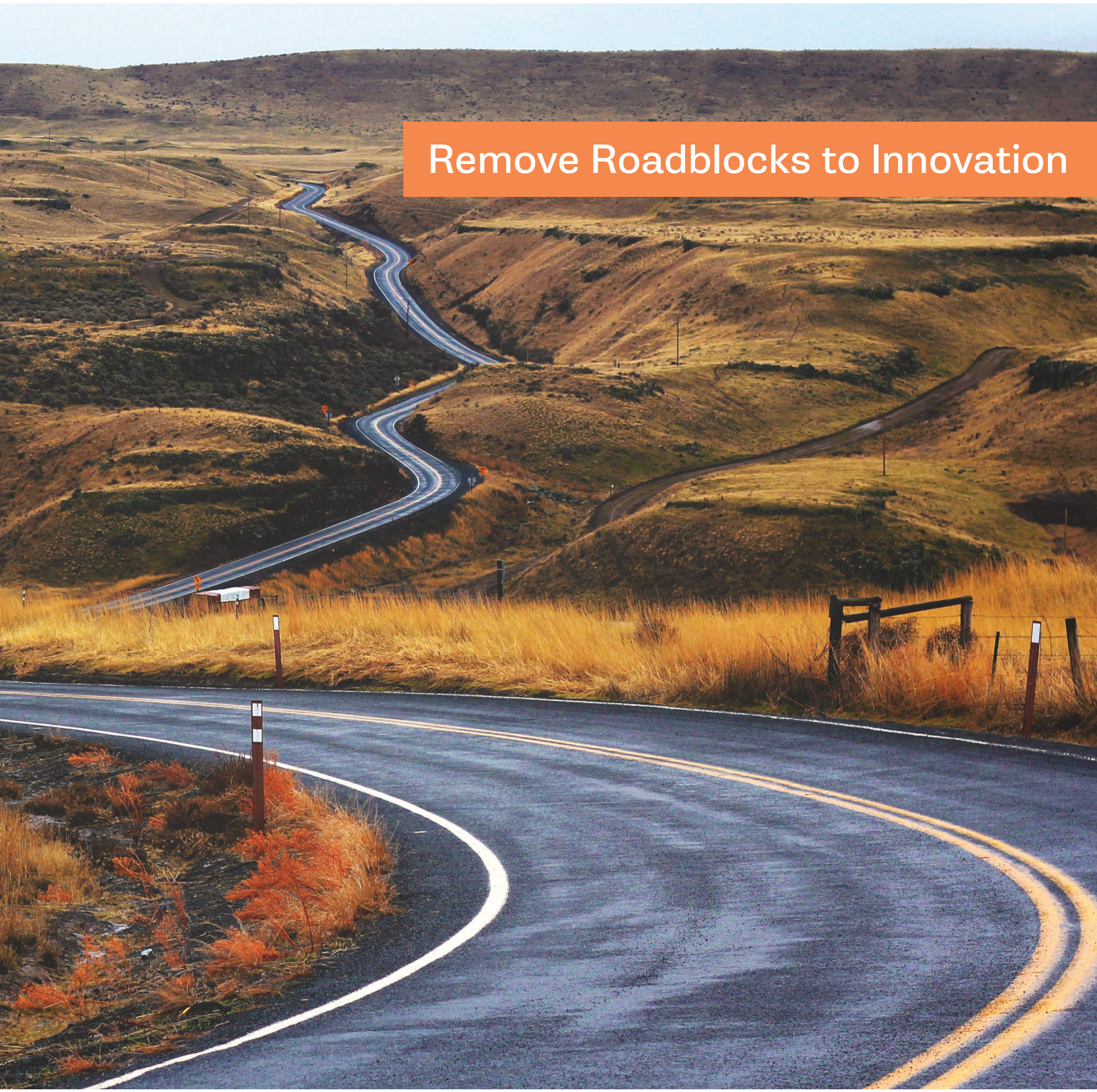
3. ***Incentivize private-sector R&D in the United States.***

   a. Preserve a tax code without systemic barriers to U.S. R&D. The federal government should preserve a competitive corporate tax rate and international tax rules that foster U.S. innovation and R&D.

   b. Ensure tax credit competitiveness. The United States should maintain a tax incentive structure for private-sector R&D investment that equals or exceeds that of other developed economies. This structure should continue to include the ability to expense research expenditures (currently set to expire after 2021) and should streamline the process for claiming R&D tax credits.

   c. Incentivize a long-term view of value creation and R&D. The government should also partner with the business community by supporting corporate governance initiatives to enable companies to focus on long-term growth and risk management rather than pursue short-term gains, a critical condition for undertaking long-term and often-uncertain R&D ventures.

4. ***Ensure the fitness of the patent system.*** The federal government should strengthen the U.S. patent system by promoting the reliability, certainty and quality of patent rights to encourage innovation, business investment and emerging industries.

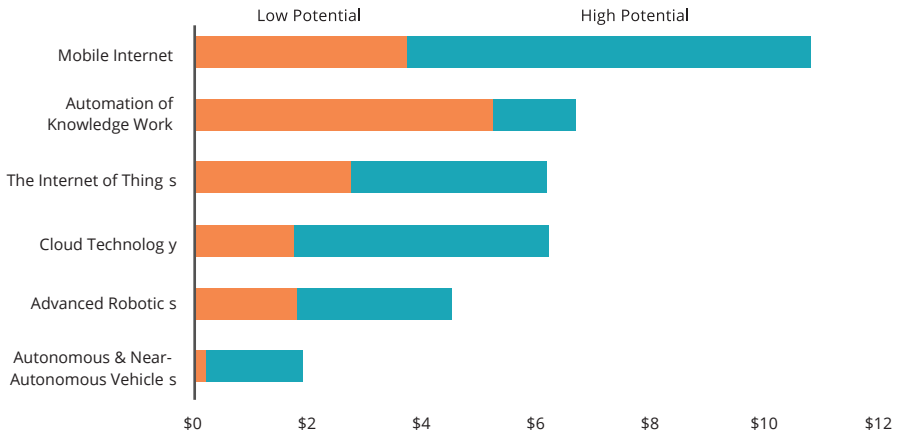

Remove Roadblocks to Innovation

Reform Regulatory Systems for Innovation

While the United States is still the top global destination for developing and bringing innovative technologies and processes to market — thanks to its diverse market-based economy and culture of entrepreneurship and risk-taking — inefficient and outdated regulation threatens U.S. competitiveness. Regulatory fragmentation, outdated and redundant standards, lack of clarity, unnecessary permitting delays, impediments to testing and deployment, and cumbersome rules all stand as serious barriers to innovative activity. They undermine the nation's ability to set the "rules of the road," and they drive up costs and uncertainty in a way that can deter investment.

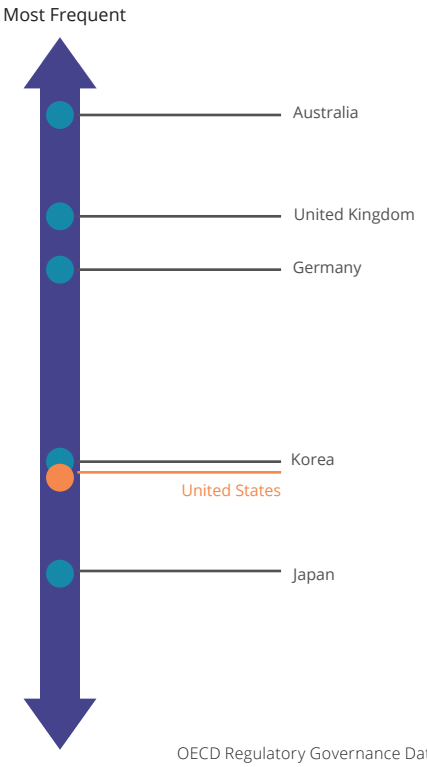
The United States needs to embrace a portfolio of new approaches to modernize its regulatory system for the innovation age. Regulation must be agile and light touch as well as clear, predictable and enforceable to accommodate a rapidly changing technology landscape. Given the importance of early adoption and widespread deployment, speedy reform is key to unlocking the transformative market potential of new technologies and establishing U.S. competitiveness across a wide spectrum of innovative technologies and industries with high growth potential.

Potential Economic Impact of Selected Technology Applications in 2025
$ Trillion, Annual



Disruptive Technologies: Advances that will transform life, business, and the global economy (McKinsey Global Institute)
Includes consumer surplus

Regulatory Updating Frequency
OECD Index Scores



OECD Regulatory Governance Dataset,
"ex post evaluation, Subordinate Regulations"

The rapid pace of technological change stands in stark contrast to the United States' often-sluggish regulatory process.

In 2012, rule-making that required notice and comment periods took an average of 18 months to complete — exactly the same amount of time Moore's law states that it takes to double the number of transistors that can fit on a computer chip.[44,45]

Other developed countries have recently overhauled their regulatory systems and outrank the United States in terms of regulatory quality management. The United States now ranks 15th in the Organisation for Economic Co-operation and Development (OECD) in terms of the frequency with which it updates regulations.[46,47]

For example, more than half of the standards referenced in federal auto safety regulations date back to 1980 or earlier, which is a barrier to autonomous vehicle deployment.[48]

44 Yackee, J. W., & Yackee, S. W. (2012, January). Delay in notice and comment rulemaking: Evidence of systemic regulatory breakdown?

45 These are rules that fall under Section 553 requirements, which govern the process by which federal agencies make policy choices. The median completion time was 12 months.

46 Alden, E., & Strauss, R. (2016, February 1). Quality control: Federal regulation policy. Council on Foreign Relations.

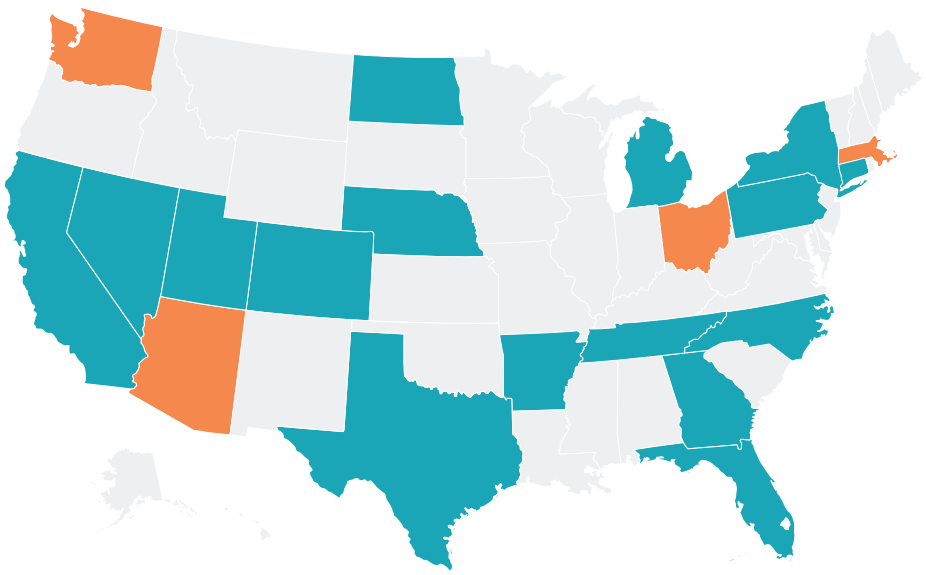
47 OECD. Government at a glance 2017 edition.

48 Scribner, M. (2018, January 9). Modernizing federal motor vehicle safety standards. Competitive Enterprise Institute.

Persistent regulatory challenges flowing from a failure to reconceive the U.S. regulatory model threaten innovation-intensive industries.

- The Global Innovation Index ranks the United States 17th in regulatory quality, behind countries such as Singapore, Germany and the United Kingdom.[49]
- Financial technology ("fintech") firms report that costs to obtain state licenses necessary for operation can range from $1 million to $30 million and that regulatory complexity has delayed or prevented the launch of fintech products in the United States.[50]
- Drone regulations in the United States are advancing toward the long-term goal of commercial integration. However, recent progress still falls short of matching the deployment goals and regulatory conditions in many other countries, creating an opportunity for regulatory arbitrage and incentives for firms at the edge of drone innovation to test and deploy their technologies elsewhere.[51,52]
- Currently, only 20 states have explicit provisions (enacted via legislation and/or executive orders) intended to create the necessary conditions for companies to test or operate autonomous vehicles. While these provisions vary somewhat across states, the near-term focus should be on advancing similar provisions in more jurisdictions and for a wider range of emerging technologies.[53,54]

States Allowing Driving or Testing of Autonomous Vehicles



National Council of State Legislatures Autonomous Vehicles State Tracking Database
Does not include legislation or executive orders that set up committees or studies
Excludes legislation about platooning

49 Cornell SC Johnson School of Business, INSEAD & World Intellectual Property Organization. (2018). Global innovation index 2018: Energizing the world with innovation. Ithaca, Fontainebleau and Geneva.

50 U.S. Government Accountability Office. (2018, March 22). Financial technology: Additional steps by regulators could better protect consumers and aid regulatory oversight.

51 Jones, T. (2017). International commercial drone regulation and drone delivery services. RAND Corporation.

52 For example, other countries permit delivery by drone in some or all areas.

53 National Conference of State Legislatures. (2018, December 17). Autonomous vehicles state tracking database.

54 Excludes legislation about platooning.

Harmonize Approaches to Data Privacy and Security

Overstating the role of data in driving innovation and unlocking economic productivity is impossible. However, the proliferation and importance of data in the innovation economy is also reshaping thinking about privacy, security threats, and regulatory and legal framework requirements. The need for new frameworks that address questions around the governance of data, including privacy and cybersecurity, is clear and urgent.

The wrong regulatory solutions to these challenges can be costly. Fragmentation of privacy requirements creates inconsistent protections for consumers and unpredictability for American companies that must innovate and create new products and services to compete. Getting this piece of the regulatory puzzle right is a critical enabling condition for sustaining and building on U.S. innovation leadership.

Existing privacy and cybersecurity regulations consist of a sector-specific and fragmented patchwork of rules that are a poor fit for the cross-cutting nature of the digital economy and new technologies.

- Every state has enacted its own security breach notification legislation, resulting in differing and sometimes incompatible provisions.
- Additional state-level data privacy proposals — following in the footsteps of legislation in California — threaten to increase complexity.
- The technology landscape is marked by blistering growth in new applications and devices. By some estimates, there could be 50 billion internet-connected devices globally by 2020.

55 National Conference of State Legislatures. (2018, September 29). Security breach notification laws.
56 Federal Trade Commission. (2015, January). Internet of things: Privacy and security in a connected world.

Policy Recommendations

1. ***Undertake a thorough review process of the regulatory system.*** Congress should direct federal agencies to review regulatory processes and procedures and pursue reforms to improve the clarity, speed and agility of regulation. Reforms should ensure that regulations are risk based and facilitate the commercialization of innovative technologies. The review should solicit robust input from industry and research universities.

2. ***Consider the impact of new and existing regulations on innovation.*** Congress should require regulatory agencies, including independent agencies, to analyze the costs, benefits and impact on innovation of new major regulations and tailor new rules to minimize unnecessary burdens on the economy before the rules are enacted.

3. ***Prioritize risk-based, light-touch approaches to regulation wherever possible.*** Congress should direct federal agencies to prioritize risk-based approaches to regulation, requiring them to assess real-life risks under a variety of scenarios and transparently communicate the results. Innovation is not possible without taking informed risk. In many cases, performance standards or voluntary best practices may be sufficient to achieve regulatory objectives.

    a. Determine whether some technologies require national standards. Policymakers should work with regulatory agencies to identify certain emerging technologies — for example, autonomous vehicles, fintech or drones — that may benefit from national standards to promote innovation, investment and commercialization and to ensure an even playing field. In these select cases, federal regulatory agencies should develop and implement carefully scoped enabling regulations.

4. ***Avoid conflicting regulations.*** Congress and the Administration should harmonize the patchwork of regulations governing innovation by identifying and eliminating conflicts in federal law and pre-empting state laws governing emerging technologies such as autonomous vehicles and artificial intelligence so innovators face stable and predictable requirements.

a. Establish a national privacy law. Congress should pass a national privacy law that fosters innovation and economic competitiveness, includes robust protections for personal data, harmonizes regulatory approaches to consumer privacy, and achieves global interoperability between U.S. and foreign privacy regimes. These objectives can be achieved only through a national privacy law that avoids a state-by-state approach to regulating consumer privacy.

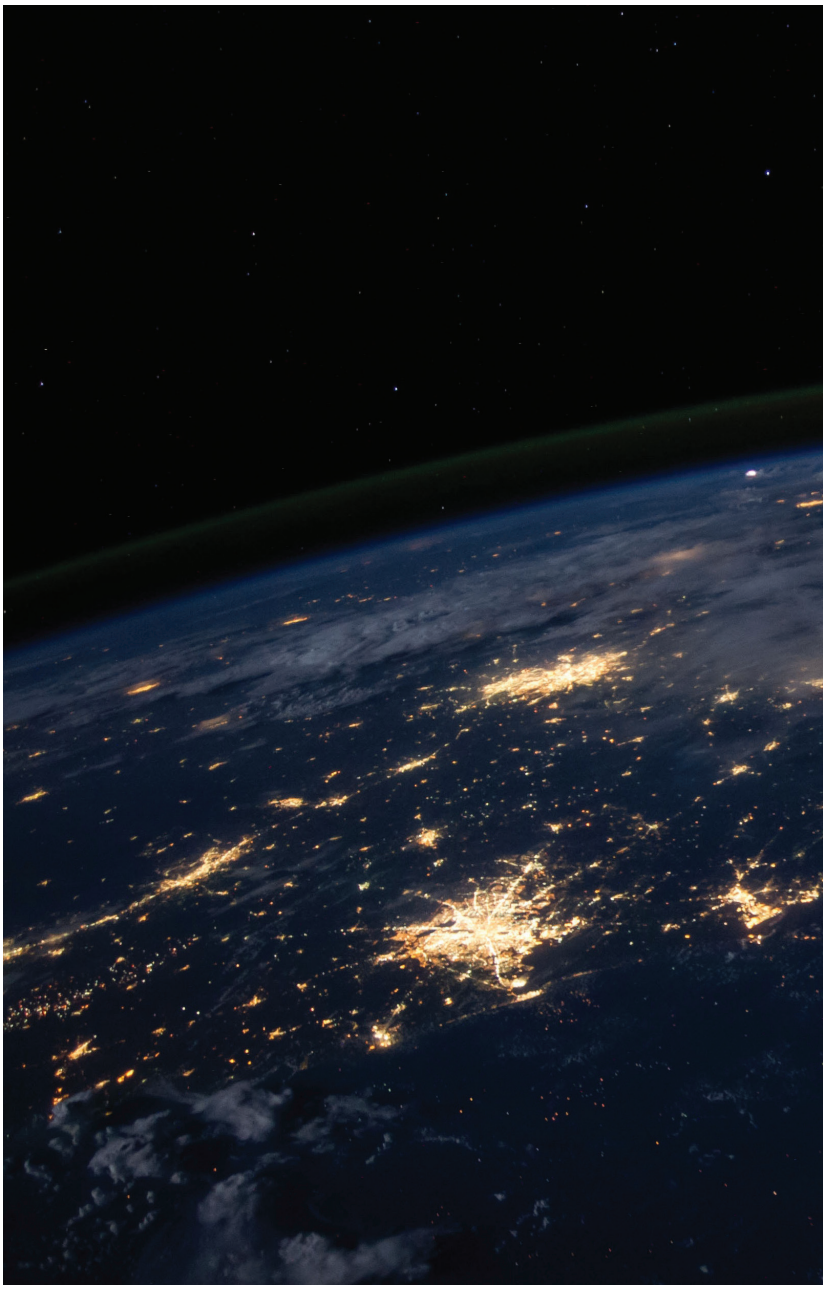
b. Align cybersecurity requirements. Congress and the Administration should seek to align federal, state and international cybersecurity requirements for a more efficient, effective and consistent approach to cybersecurity. The Administration should promote the alignment of cybersecurity regulations and frameworks in ongoing and upcoming trade negotiations to reduce regulatory fragmentation.

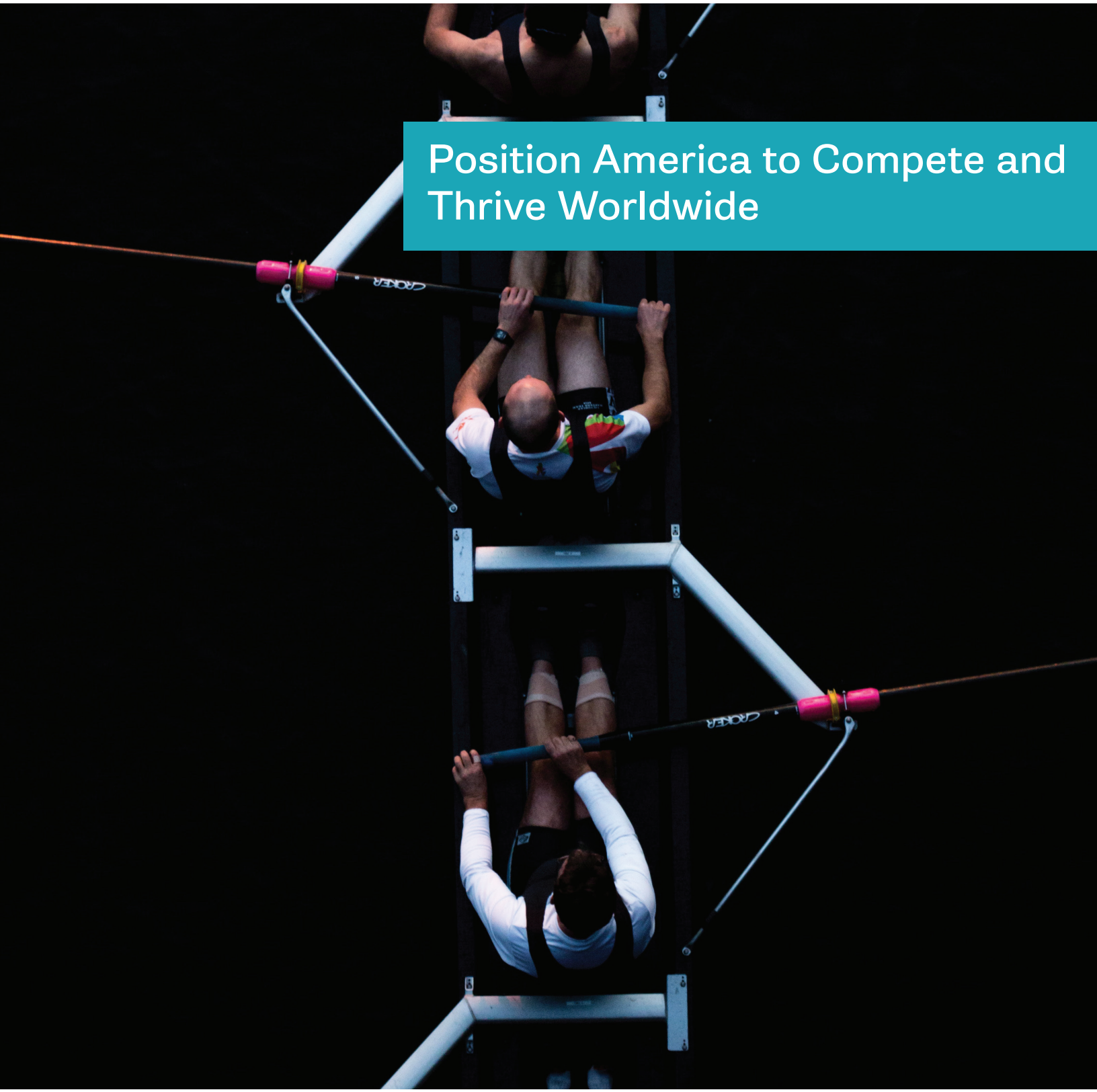
5. ***Create test-beds and regulatory sandboxes.*** Federal and state governments should balance the need for experimentation and testing with the safety imperative by creating technology test-beds (e.g., those established for unmanned aerial vehicles) for testing and deployment of emerging technologies, such as autonomous vehicles, blockchain, artificial intelligence, internet of things, smart cities and smart buildings. Federal and state governments should structure test-beds as regulatory sandboxes to allow businesses to test products, services and business models without excessive legal risk.[58]

6. ***Grow technical capacity at regulatory agencies.*** Policymakers should grow technical expertise at federal and state regulatory agencies by establishing an exchange program that leverages industry and academic subject-matter expertise to support and modernize the regulatory process, in the same way that the Presidential Innovation Fellows program uses private-sector professionals to help modernize federal technology and processes.

7. ***Promote innovation in government.*** The federal government should be an early adopter of new technologies, such as artificial intelligence, blockchain, internet of things, autonomous vehicles, smart buildings and next-generation broadband internet. The government should apply new technologies to solve real-world public policy challenges, such as strengthening open data initiatives and modernizing citizen-centric services.

58 Test-beds are platforms or sites for deployment and experimentation of new technologies and applications. Test-beds create real-life environments for companies to implement specific user scenarios and business processes to verify functionality or identify flaws and new requirements. To truly remain innovation test-beds, sites must remain available for future experimentation rather than be converted to operations.





Position America to Compete and Thrive Worldwide

The global competitive landscape for innovation leadership continues to evolve. Increasingly, countries with competitive innovation profiles undertake large-scale strategic planning, rule-making, subsidy and investment initiatives to attain leadership in emerging technologies. Countries compete with the United States to secure capital and talent, gain an edge in the market for new products and services, and establish standards and rules of the road for emerging and strategic technologies.

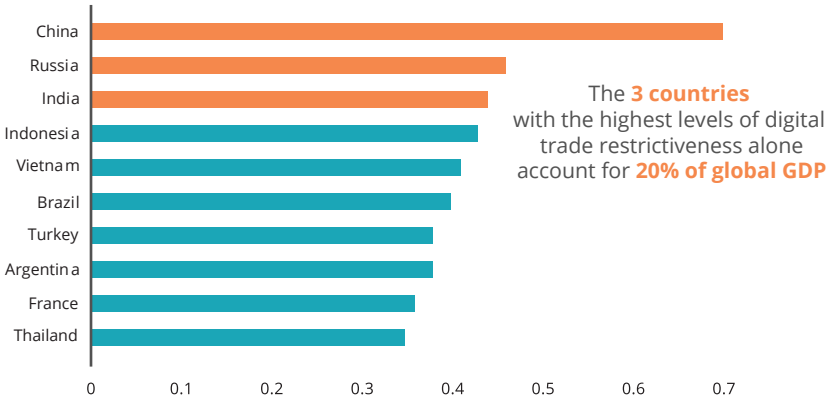
Unfortunately, some countries aggressively pursue innovation leadership in ways that undercut terms set by international trade agreements and seek to push standards and rules that can undermine U.S. innovation and leadership. Some engage in unfair trade and commercial practices designed to advance their innovation and industrial policies at the expense of U.S. companies through heavy-handed data localization requirements, intellectual property theft, barriers to market access, discriminatory licensing requirements and technology transfer demands. These systematic efforts distort fair competition and create an uneven playing field for U.S. firms in innovation-intensive industries, including industries with serious implications for U.S. critical infrastructure and national security.

While the current multilateral trade rules and trade and investment agreements may not address all these issues fully, the commitments made should be upheld, and new commitments should be negotiated to address unfair trade, investment, intellectual property and regulatory practices that harm U.S. innovation. The opportunity to compete on a level playing field according to principles of fair and open market access not only positions U.S. firms and innovators to succeed in the global innovation economy but also promotes an open culture of innovation worldwide, to the benefit of all. The United States must continue its legacy of leadership in setting the rules of trade in a manner that promotes and protects U.S. innovation.

Leading U.S. firms are competing in global markets and face challenges stemming from unfair and market-distorting practices.

- International markets present valuable growth opportunities for U.S. innovators. In the mid-1990s, as much as 97 percent of all global venture capital investment flowed to the United States. By 2017, the U.S. share fell to 50 percent.[59] And the domestic market for industrial robots accounted for just 11 percent of total global shipments in 2016.[60]
- Data flows and digital trade play an increasingly critical role in driving global markets. In fact, global data flows contribute more to global gross domestic product (GDP) growth than trade in goods.[61] Global internet traffic grew more than twentyfold between 2007 and 2017 and is expected to more than triple between 2017 and 2022.[62]
- Countries with high levels of digital trade restrictiveness account for a significant share of global GDP, limiting fair access to key markets. [Chart 4.1] This restrictiveness is driven in part by increasing usage of data localization measures, which can raise the cost of hosting data by 30 percent to 60 percent for affected firms.[63,64]

Digital Trade Restrictiveness by Country
Digital Trade Restrictiveness Index



Digital Trade Restrictiveness Index; World Bank national accounts data, and OECD National Accounts data files

59 Center for American Entrepreneurship. Rise of the global startup city.
60 International Federation of Robotics. Executive summary world robots 2017 industrial robots.
61 McKinsey Global Institute. (2016, March). Digital globalization: The new era of global flows.
62 Cisco. (2018). Cisco visual networking index: Forecast and trends, 2017–2022.
63 U.S. International Trade Commission. (2017, August). Global digital trade 1: Market opportunities and key foreign trade restrictions. 277.
64 Leviathan Security Group. Quantifying the cost of forced localization. (Link)

Unfair trade practices, failure to comply with existing commitments and discriminatory rules impose high costs on U.S. firms, the economy and vital U.S. interests.

- Counterfeit goods, pirated software and theft of trade secrets cost the U.S. economy between $225 billion and $600 billion annually.[65]
- The theft of trade secrets costs the U.S. economy $180 billion to $540 billion each year. [66]
- In a survey of firms that do business in China, 94 percent said they had some level of concern about intellectual property rights protection and enforcement. [67]
- U.S. firms bore the brunt of 35 percent of losses from software piracy in 2015 — approximately $18 billion worth of losses. [68]

International agreements and commitments can establish common standards and best practices for innovative technologies.

- Digital trade is an increasingly critical piece of trade agreements and trade relationships. Countries worldwide have more than 280 bilateral and regional trade agreements, but the United States is party to only 14 with 20 countries. [69]
- Worldwide, more than 80 jurisdictions have established technical standards for the information and communications technology sector that are at odds with global norms and standards.[70]

65 IP Commission. (2017). Update to the IP Commission report.

66 Ibid.

67 US-China Business Council. (2017). US-China Business Council 2017 member survey.

68 IP Commission. (2017). Update to the IP Commission report.

69 World Trade Organization. Participation in regional trade agreements.

70 U.S. International Trade Commission. (2017, August). Global digital trade 1: Market opportunities and key foreign trade restrictions. 312.

Policy Recommendations

1. ***Combat intellectual property theft.*** The United States should strengthen commitments, monitoring and enforcement surrounding domestic and international rules to protect intellectual property from theft, counterfeiting, forced transfer and infringement by working with international partners and foreign governments.

   a. Uphold and reinforce norms of intellectual property protection and enforcement. The United States and its international partners should expand enforcement capacity for intellectual property protection and promote meaningful compliance.

   b. Eliminate technology transfer requirements, including compulsory licensing, and regulatory preferences for indigenous innovation. The United States and its international partners should seek a level playing field by eliminating technology transfer requirements and other regulatory measures that contribute to forced or coerced technology transfer.

2. ***Counter technology restrictions by partnering with like-minded countries and negotiating commitments on forced technology transfers.*** The federal government should work with like-minded countries through engagement and negotiations to counter technology restrictions, protectionist cybersecurity rules, data localization requirements, and requirements for businesses to transfer technology and intellectual property as a condition to access foreign markets.

3. ***Lead in the development and enforcement of international commitments, standards, norms and best practices.*** The federal government and U.S. companies should lead in the development and enforcement of international commitments, standards, norms and best practices for the development and application of emerging technologies to create a stable and level playing field. Examples include cybersecurity, digital privacy, data flows, blockchain, internet of things, and energy and the environment.

4. ***Strengthen participation in international standards setting.*** The federal government and U.S. companies should expand participation in international standards-setting bodies to prevent the development and adoption of discriminatory international and country-specific standards or commitments.

5. ***Counter the use of foreign subsidies targeting innovative technologies.*** The United States and its international counterparts should create and strengthen domestic and international rules to discipline government provision of subsidies to domestic companies that distort competition.

6. ***Take a careful approach when adopting new export controls.*** Policymakers should find ways to address legitimate national security risks in a way that does not slow U.S. innovation, jeopardize U.S. technological leadership or harm U.S. competitiveness.

Pursue Inclusive Innovation

Despite the deep and diverse benefits of innovation, there are also transition costs associated with rapid technological change and advancement. Bringing the U.S. tradition of innovation into the 21st century and securing it for the future requires that the many benefits that flow from innovation are shared and felt by all.

Managed well, the benefits of innovation have the potential to ripple through the whole economy — creating new jobs, seeding new sectors and enhancing economy wide productivity. For example, the invention of the personal computer has created an estimated 15.8 million net new jobs outside of the technology sector in the United States since 1980.[71] The innovation economy of the 21st century has the potential to create tremendous growth and opportunity on a similar scale.

But uneven participation in the innovation economy shortchanges the nation's full innovative potential, jeopardizing future technological progress and leading to an uneven distribution of benefits. The strong link between robust participation and the benefits of innovation underscores the importance of inclusion. A bumpy entry into a period of large-scale technological change could dampen economic growth, forestall tangible benefits for American households and lengthen the period of disruption. On the other hand, policies that help level the playing field across demographic and regional divides, equip all workers with innovation-ready skills, and encourage broad participation in the innovation economy must keep pace with technological change to truly promote prosperity and inclusive growth.

The United States falls short of full and diverse participation in the innovation economy.

- Hispanic and African-American workers have consistently represented around 3 percent of the total entrepreneurial and venture capital talent pools since 1990.[72]
- Women currently make up just 22 percent of the science, technology, engineering and math (STEM) workforce.[73]
- Children from high-income families are roughly 10 times more likely to become inventors than those from families earning below the median income.[74]
- Rural Americans are 7 to 12 percentage points less likely than those living in urban or suburban areas to say they have a smartphone, computer or tablet.[75]
- Nearly 60 percent of U.S. patents awarded between 2000 and 2015 were to applicants living in 20 metro areas that contain just 36 percent of the population.[76]

Gender Ratio in the U.S. STEM Workforce

Women make up just **22%** of the STEM workforce

Brookings (2017). "Eleven Facts About Innovation and Patents"

71 McKinsey Global Institute. (2017, December). Jobs lost, jobs gained: Workforce transitions in a time of automation.

72 Gompers, P. A., & Wang, S. Q. (2017). Diversity in innovation. Harvard Business School.

73 Shambaugh, J., Nunn, R., & Portman, B. (2017, December 13). Eleven facts about innovation and patents. Brookings.

74 Bell, A., Chetty, R., Jaravel, X., Petkova, N., & Van Reenen, J. (2018, February). Who becomes an inventor in America? The importance of exposure to innovation. Washington Center for Equitable Growth.

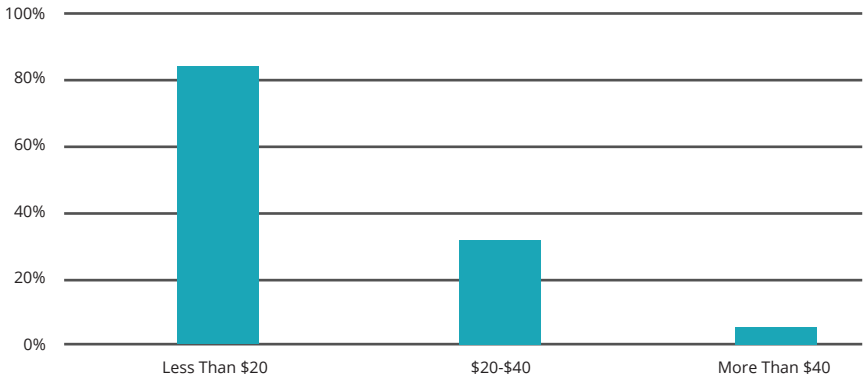
75 Perrin, A. (2017, May 24). There's still a digital gap in America, and it's to do with where you live. World Economic Forum.

76 Shambaugh, J., Nunn, R., & Portman, B. (2017, December 13). Eleven facts about innovation and patents. Brookings.

Many American workers are not well equipped to manage the transition to the new innovation economy.

- Although the precise nature of transition costs associated with innovation is still uncertain, economic disruption can hit certain groups harder than others. Historically, disparate impacts of economic shifts have often been driven by gaps in skills and education.[77]
- One recent study estimated that more than 80 percent of positions making less than $20 per hour could experience significant wage and employment pressures from automation, compared to just 4 percent of positions compensated at more than $40 per hour.[78]
- An estimated 13 million to 54 million U.S. workers may need to switch into entirely new occupation categories through 2030 as technological change disrupts the labor market.[79]
- Closing the skills gap and investing in workforce training is a critical first step toward managing this change. Unfortunately, the current level of investment in worker retraining is low; only 0.03 percent of U.S. gross domestic product (2015$) goes to worker retraining.[80]

Probability of Automation by Median Hourly Wage
Median Probability of Automation, Percent



Jason Furman (2017). "Should We Be Reassured If Automation in the Future Looks Like Automation in the Past?"

77 Acemoglu, D. (2002). Technical change, inequality, and the labor market. American Economic Association.
78 Furman, J. (2017). Should we be reassured if automation in the future looks like automation in the past?
79 McKinsey Global Institute. (2017, December). Jobs lost, jobs gained: Workforce transitions in a time of automation.
80 OECD Data. Public spending on labour markets.

Policy Recommendations

1. ***Revise degree requirements for hiring.*** Companies should reform hiring practices to open opportunities for "new collar" workers, focusing on skills and credential-based hiring for positions that do not require a bachelor's degree. Many low- and middle-income individuals and workers in rural areas have difficulty attaining bachelor's degrees in today's higher education systems but possess the necessary skills and experience to fill jobs — particularly when work-based learning and shorter education pathways are available.

2. ***Develop partnerships to scale inclusive innovation programs.*** The government should partner with private-sector and local stakeholders to support effective and replicable program models for revitalizing local innovation ecosystems and fostering inclusive economic growth, particularly in low-income and rural areas of the country.

   a. Support and expand innovation "residency" programs in underserved areas. The government should explore ways to scale up and support efforts to bring new opportunities to traditionally underserved regions (including rural, noncoastal and lower-income areas) and incentivize entrepreneurial activity. This work includes making competitive grant funding available to programs that match talent with start-ups in areas that lack a well-established start-up community or culture, as well as supporting regional development initiatives that aid entrepreneurial activity.

   b. Deliver training resources more effectively. The federal government should identify and support organizations that have successfully replicated training programs that deliver industry-aligned skill-training and job-matching services to high-need groups across multiple sites or using online platforms. This action helps maximize the impact of workforce training resources by supporting delivery models that meet the range and extent of local resource needs.

3. ***Support diversity in entrepreneurship.*** The government should collaborate with private actors to support diverse entrepreneurial ecosystems and build a national network of inclusive incubators and accelerators beyond traditional innovation hubs such as New York and Silicon Valley. Such ecosystems should promote entrepreneurship among disadvantaged and underrepresented groups.

   a. Facilitate access to finance. Industry should partner with federal, state and local governments to increase the availability of and access to credit to empower entrepreneurs from disadvantaged and underrepresented groups.

   b. Provide mentorship and networking. The public and private sectors should collaborate to provide coaching and mentoring to strengthen business and entrepreneurial skills among diverse entrepreneurs. They should build and bolster networks that enable frequent and enduring interaction between these entrepreneurs and the wider business community.

Conclusion

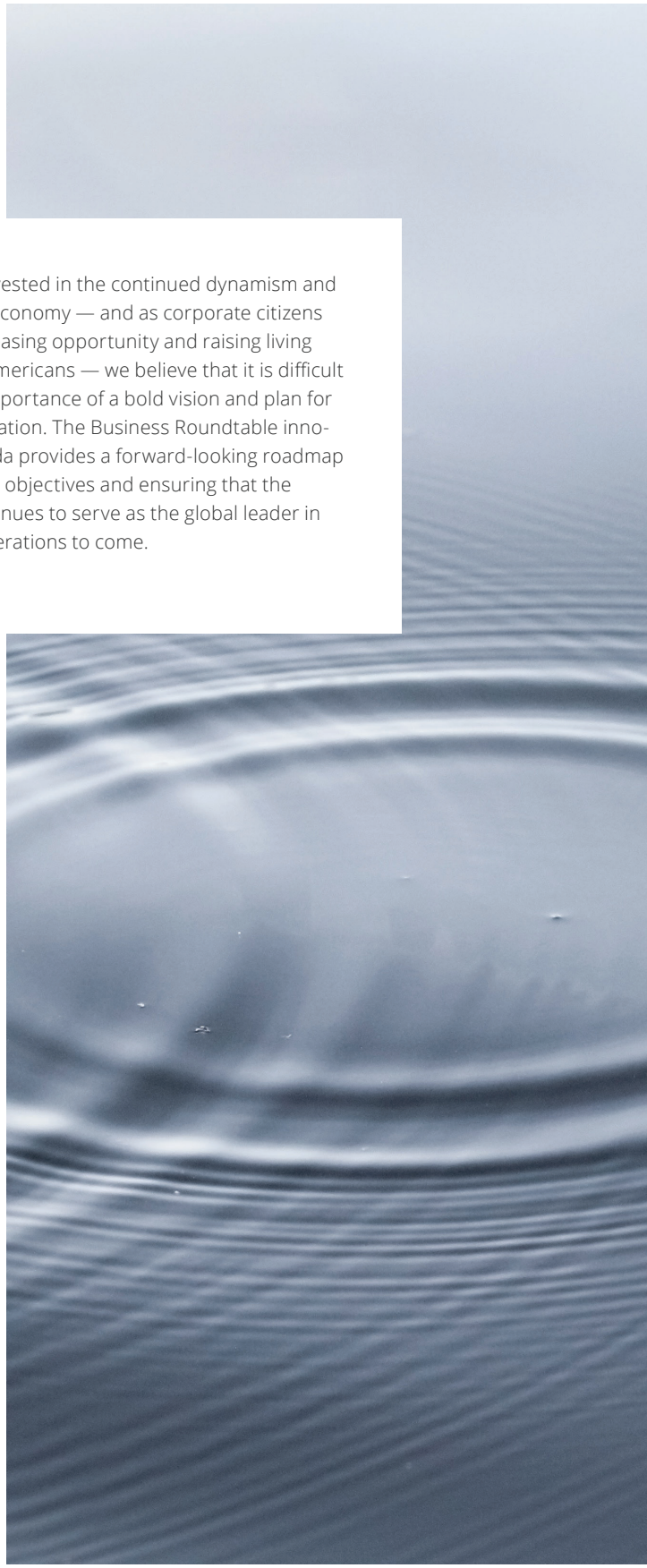
Leadership in innovation is critical to sustaining U.S. economic growth and job creation. It makes the economy more dynamic and competitive, driving productivity and increasing living standards for all Americans. In short, it is a cornerstone of U.S. prosperity and a foundation for future progress.

Unfortunately, America's political commitment to the pillars of an innovative economy — including research and development (R&D) spending; workforce training programs; and science, technology, engineering and math (STEM) education resources — has waned in recent years. When coupled with an accelerating pace of technological change and concerted efforts by other countries to gain ground, this waning commitment means that the United States is at risk of losing its position as the global leader in innovation.

Sustaining U.S. leadership in innovation means recommitting to cross-cutting policies consistent with the principles and recommendations articulated in this agenda. It requires investing in people by providing students and workers with the skills and resources necessary to contribute to cutting-edge industries and technologies. It entails making strategic, long-term investments that lay the groundwork for ideas to develop and flourish and then removing any regulatory roadblocks that would slow or prevent the creation and growth of new markets and the rollout of new products and services. It means positioning America to compete by providing an even playing field on a global scale, and finally, it means ensuring that innovation is pursued inclusively so that the benefits of growth are shared by all.

The imperative for investing in the pillars of innovation is clear, and the returns on this type of investment are vast and long lasting. For example, investment in early-stage R&D today sows the seeds of tomorrow's industries. Investments in shared national assets — such as a best-in-class workforce, modernized regulatory regime and diverse talent pipeline — fuel the engines of innovation. Innovation in turn boosts productivity, creates jobs and catalyzes growth over the long term. Against a backdrop of rapid change and heightened global competition, the time is ripe to invest in innovation and reap these rewards.

As CEOs deeply invested in the continued dynamism and health of the U.S. economy — and as corporate citizens committed to increasing opportunity and raising living standards for all Americans — we believe that it is difficult to overstate the importance of a bold vision and plan for the future of innovation. The Business Roundtable innovation policy agenda provides a forward-looking roadmap for achieving these objectives and ensuring that the United States continues to serve as the global leader in innovation for generations to come.



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