



Tech Policy 2016: What Presidential Candidates Should Be Talking About

To: Democratic and Republican Presidential Candidates
From: Information Technology and Innovation Foundation
Re: The Speech We Would Love to Hear on Tech and the Economy

A year from now, the 2016 presidential primaries will be over, and the nominees of both parties will need to focus in earnest on the broad interests of the American people, not just the parochial concerns of their respective bases. When that time comes, this memo provides the draft of a speech that we believe is critically important for the country to hear on technology and the economy. It is about how America can flourish again, and we invite anyone to borrow from it freely.

We are delivering this memo a year early because, frankly, it covers issues that partisans on both sides need to hear and understand. We realize that some of it will make some people uncomfortable, because it is candid about the shortcomings of commonly held beliefs about how the economy works and what the role of government should be. But we are policy people, not political advisers, so we will leave it to others to decide exactly how and when to deliver these out-of-the-box messages.

To be clear, we are confident that the basic ideas and proposals we outline here will appeal to most Americans. The big picture is, quite simply, that the country must embrace innovation to grow the economy for everyone. Below is an overview of the action plan we recommend to bring this agenda to life:

1. Foster innovation.

- ✓ Increase federal funding for science and engineering research by \$30 billion a year.
- ✓ Expand the R&D tax credit so it is more competitive with other countries, and tax income from innovation at a lower rate.
- ✓ Establish a National Innovation Foundation akin to the National Science Foundation (NSF).
- ✓ Increase federal support for STEM education while rewarding universities for graduating more STEM students.
- ✓ Create a national system of “manufacturing universities.”
- ✓ Expand H-1B visas, green cards, and citizenship for foreign-born scientists and engineers.
- ✓ Charge every federal agency with crafting and implementing an innovation strategy.
- ✓ Pass the Startup Act to promote entrepreneurship.
- ✓ Create a White House Office of Innovation Review.
- ✓ Ensure laws and regulations enable disruption rather than protect the status quo.
- ✓ Create an interagency taskforce to combat corporate short-termism.
- ✓ Revise the 1996 Telecommunications Act to enable broadband innovation.
- ✓ Establish a “flexicurity” system to help workers acquire skills for new jobs.

2. Boost productivity.

- ✓ Bring back the investment tax credit for new machinery and equipment and worker training.
- ✓ Accelerate IT adoption throughout the public and private sectors.
- ✓ Raise the minimum wage to \$10, and index it to per-capita GDP growth.
- ✓ Close the digital divide by helping people pay for computers and broadband.
- ✓ Expand funding for surface transportation by at least \$30 billion per year.

3. Compete globally.

- ✓ Lower the corporate tax rate to no more than 25 percent, and adopt a territorial system.
- ✓ Strengthen the innovative capacity of U.S. firms that do business internationally, in part by expanding financing for scaling innovations.
- ✓ Put trade enforcement at the center of U.S. foreign policy, and increase resources for it.
- ✓ Confront China by raising the cost of unfairly distorting trade investments.
- ✓ Create a National Industrial Intelligence Council to assess competitive challenges.
- ✓ Restructure the World Trade Organization (WTO) to be more effective in fighting mercantilism.
- ✓ Fight currency manipulation.

Implementing any of these proposals on its own would constitute noteworthy progress, but together they would add up to more than the sum of their parts. They would form the framework for a cohesive national strategy to grow the economy and expand opportunities for all Americans by strengthening the underlying fundamentals of our economic well-being in the 21st century.

THE SPEECH WE WOULD LOVE TO HEAR

My fellow Americans, it's great to be back in Ohio. Go Buckeyes!

As I have campaigned across America, I have said over and over again that my goal is to get us back to an American economy that truly flourishes: a super-productive economy where wages grow as they once did; an economy that out-competes every other nation in the world, including China; and an economy that does all that by rapidly innovating—not just in the tech epicenter of Silicon Valley, but in every industry, in every part of the country.

But that is not happening today. The hard truth is that, over the last decade, our economy simply has not been productive enough. Productivity is the fancy word economists use to talk about how many goods people produce, or how many services they provide, in the course of their workdays. If you listen to nothing else I tell you today, then please hear me when I tell you this: We have to boost productivity in America if we want people's wages to go up. It is that simple. You have to create more value if you want to get paid more. That means you need newer and better tools to do your job. Unfortunately, a lot of American workers are not yet working with the newest and best tools, so our productivity has been sputtering. In the last 10 years, it grew at less than 40 percent of the previous decade's pace. No wonder wage growth has been slow.

Meanwhile, we have been losing the global competitiveness race. In the last 10 years, we have racked up a trade deficit of more than \$4.4 trillion—and in the last 15 years, we have lost more than one-third of our high-paying manufacturing jobs. That is in part because U.S. firms have struggled to compete on an unfair playing field. Other countries have tilted the international marketplace to their advantage through innovation-age mercantilism and state-controlled capitalism.

And finally, while we do innovate in many areas, we are falling behind in some that are vitally important. For example, we run a large trade deficit in high-tech products. Our businesses and the federal government have cut spending on basic and applied research, which is the seed corn for tomorrow's innovations. We are starting new businesses at the lowest rate in 30 years. And on a number of global rankings of innovation performance, America's position has been dropping. I don't know about you, but I want an American economy that is second to none.

“We have to boost productivity in America if we want people's wages to go up. It is that simple.”

A central theme of this campaign is how to get our economy back on solid ground. But what that really means and how to do it are very much up for debate. So let me be clear about my position: I believe the next president should put three things front and center—innovation, productivity, and competitiveness—because those are the three main drivers of our economic well-being.

Today, I am visiting the Digital Manufacturing Company here in Columbus, Ohio, because it is emblematic of the direction our economy needs to move. This company produces advanced prosthetics that help people do everyday things like walking or knitting almost as well as folks who have regular use of their arms and legs. Their engineers use 3D printing technology to create prototypes, and then test and refine the designs in incredibly rapid cycles of innovation. The company hires talent and commercializes ideas that have been developed at Ohio State University here in Columbus. It also builds on concepts that the Department of Defense pioneered for soldiers coming home from Iraq and Afghanistan by working with the Air Force Institute of Technology at Wright Patt Air Force Base just 70 miles west of us. This is a confluence of innovative energy, bringing together public and private investment in research, development, and enterprise. The Digital Manufacturing Company may be small—but, pound for pound, it can out-produce and out-compete anyone in the world. We need to create and grow more companies like this, all over America.[†]

[†] Note that everything about the Digital Manufacturing Company is made up, but a presidential campaign advance team should have little trouble finding a real company that is very much like it. They exist. But we really do need to create more of them.

But putting this kind of innovation, productivity, and competitiveness at the center of our economic agenda will mean pushing back against the conventional narratives and agendas of both parties. Many on the left believe in “middle-out” economics. Their big idea is to boost demand for goods and services by putting more money in middle-class pockets, so people can spend more. They decry supposed wage stagnation for the bottom 90 percent of workers and argue for policies that more equitably distribute the wealth in our \$17 trillion economy. They think that is the best way to kick-start growth, because they see middle-class spending as the catalyst for everything else. Many on the right see things the other way around. They believe in “supply-side” economics. Their big idea is to take all restraints off capitalism by shrinking government (except for defense) and lowering taxes (especially on wealthy individuals). They decry regulation, because they think it discourages enterprise, and they think the best way to drive growth is to let “job creators” do what they do best.

These two theories hold a lot of sway, so when you boil it down to a pair of bumper stickers, you have one side being the “party of fairness,” and the other side being the “party of freedom.” Now, I’m all for fairness, and I’m all for freedom. But as an economic strategy to make this country flourish again, I don’t think we should put all our faith in either of those slogans.

Our real challenge is to build an economy with rapidly rising incomes, low unemployment, and a broad-based sense of optimism. That’s what it means to flourish. That’s what I think most Americans want. And that’s why we need to focus on innovation, productivity, and competitiveness—because people care a lot more about tangible results than they do about rigid ideology. Am I right, Ohio?

It’s not just what you know in your gut that makes sense. It’s what we know works. We know that neither the liberal, demand-side strategy nor the conservative, supply-side strategy will do very much, if anything, to drive innovation, productivity, or competitiveness.

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Now, to be fair, there are elements of each party’s doctrine that can spur growth. The liberal agenda of spending more to train workers, create apprenticeships, and raise the minimum wage certainly would spur productivity. And the conservative agenda of limiting regulations and making them smarter than they are today certainly would enable more innovation. But the core of their respective agendas—for the left, making sure more money flows to the middle class, and for the right, cutting taxes on wealthy individuals so less money flows to government—are simply not related in any serious way to increasing innovation, productivity, or competitiveness. With these competing camps, policymakers in Washington now spend most of their time fighting over how to divide up the economic pie we have today. When I am elected president, I will put growth first—because what we need is a bigger pie for each new generation.

Fostering Enterprise

Putting growth first means putting enterprises first. An effective economic strategy is not about boosting consumer demand on one side or increasing the supply of capital from wealthy people on the other; it has to focus first and foremost on boosting demand among *enterprises* like the Digital Manufacturing Company, for the kinds of things that make an innovative economy hum in the 21st century: research and development, skilled workers, and new capital equipment, including computer hardware, software, and other information technologies. It is enterprises that drive growth, not individuals, regardless of whether they are middle class or wealthy. If enterprises are not healthy, then the economy is not healthy. If businesses aren’t productive, then they can’t raise wages. Approximately one-third of American enterprises face foreign competition. If they are losing that competition, then all our firms and workers lose. And if our enterprises are not constantly innovating, then they won’t be able to create the new products and services we all need to flourish in the future. Twenty-five years ago, it was enough to say, “It’s the economy, stupid.” Today, we need to put a finer point on it: “It’s the enterprise, stupid.”

But while the enterprise is the core, government can and must help. So, actually, “It’s the enterprise with a little help from the public sector, stupid.” Today, smart public-private partnerships are the force multiplier for economies around the world. When the private sector leads, but gets the right kinds of support and incentives from the public sector, we can maximize growth. In truth, this has been the best formula for a long time. In the early days of our Republic, there was federal support for canals, railroads, and other internal improvements. Two-hundred years later, during the Cold War, innovation sprang from defense funding—and that included the Internet. All along the way, public-private partnerships have played a key role in making the American economy the most successful on earth.

Today, they are critical in a whole range of ways: There are joint, industry-government research and development projects like the new National Network for Manufacturing Innovation; there is export assistance and supportive financing from institutions like the Export-Import Bank; there are innovative infrastructure projects supported by the Department of Transportation; and there are federal efforts to support key information technology “platforms” like an intelligent transportation system, the smart electric grid, and health IT systems. Unfortunately, our politics has degenerated into a system where one side demonizes the private sector and the other refuses to trust the public sector, and that makes it hard to meet in the middle to expand public-private partnerships. That is a terrible missed opportunity, so I want you to repeat after me: Business is not bad. Government is not bad. And they can and should work together to drive innovation, productivity, and competitiveness.

If we are to start flourishing and winning again, then we need to embrace two other big changes, too. The first is to make the future our friend again. The United States did not get to be the greatest nation on earth through caution or by defending what we already had. We got to be great because we recognized that a big part of what makes us Americans is our willingness to take risks, and our justifiable confidence that, with hard work, a lot of them will pay off. We have always been willing to flip the apple cart with faith and hope that the future will turn out even better. For the most part it has, and it can be that way again, but only if we stop listening to fear mongers, defeatists, and worrywarts.

Second, technology and innovation hold a lot of promise for the future, and they already deliver tangible benefits for all Americans. But innovation is not manna that comes down from heaven. Innovation comes from choosing to invest rather than consume. As Thomas Edison once said, invention is 99 percent perspiration and 1 percent inspiration. We should heed his wisdom. As a society, that means we should invest more sweat equity and consume less of what strikes our fancy, at least until the gains from our investments start coming in. That will be hard. Who among you wants to give up something now for an uncertain payoff in the future? However, you do it every day for your families, when you give up buying that new car so you can save for your children’s college education. We need to do that for this whole generation of children—and that will require all of us to contribute a bit more to our country’s long-term health and ask a bit less for ourselves in the near term. And as a condition for this compact, we should direct our government to invest a much bigger share of our contribution in the future, especially to help our enterprises innovate and compete, even if it raises the budget deficit in the short run.

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Boosting Productivity

So let’s start with the basics: accelerating productivity. Being able to produce more for the same amount of work is the only path to higher living standards. Yet, in the last few years, productivity has gotten a bad rap. Too many people mistakenly equate automation and higher productivity with work speedups and job losses. That’s just plain wrong. Productivity is not about working harder; it’s about working smarter. And just about any economist will tell you that higher productivity doesn’t lead to fewer jobs, it leads to more.

So how do we raise productivity? First, we need a tax code that spurs investments in better “tools” like the 3D printers they use here at the Digital Manufacturing Company. It is through better tools, not just more tools, that we get to be more productive. You all know this from your own lives. When you are doing handy work around the house, you can drill more holes and cut more two-by-fours with a power drill and power saw than you can with old-fashioned hand-tools. The same is true for enterprises. Unfortunately, over the last 30 years, American enterprises have been investing less in new tools, not more—30 percent less, in fact. That needs to change if we are going to restore productivity growth rates.

One way to move things in the right direction would be to reward companies with a tax credit when they invest in new machines, equipment, computers, or software. We did that for 40 years after World War II, and it paid off in robust productivity growth. But then, in the 1980s, under the rigid belief that the business tax code shouldn’t pick “winners,” Congress eliminated the investment tax credit. And guess what happened? Investment in new tools fell. It’s time to bring back the investment tax credit. I propose that we provide our businesses—large and small—with a tax credit of 25 cents on the dollar when they increase their spending on new tools. Companies don’t necessarily make these kinds of investments every year, so we should look at their average spending over the last three years, and then give them the credit for any new investments they make above 75 percent of that amount.

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But new tools are not enough; workers also need the skills to use those new tools effectively. Economists have found that you can have two kinds of economies. A high-road one, which means firms are using advanced tools and workers have advanced skills; or a low-road one, which means workers are using yesterday’s tools with yesterday’s skills. We’ve got too much of the latter in America today and not enough of the former. In fact, we have been going in the wrong direction for 20 years. The amount companies invest in tools has dropped 30 percent, and the amount they invest in training their workers has dropped even more.

That explains much of our anemic productivity growth. And it’s why my investment tax credit won’t just reward investments in new tools, but also in workers’ skills. Companies will get a 25 percent credit for any investment in worker training that goes beyond three-quarters of their average expenditure over the previous three years. This high-road tax credit will boost productivity—and, by lowering the effective tax rate for American companies, it also will help them compete internationally while attracting investment to our shores. Finally, it will help all our workers get the skills they need to better navigate the turbulent seas of this new economy.

Higher wages would create another incentive for companies to invest in new tools and new skills for their workers. When wages are too low, many companies find it cheaper to add more workers than to invest in better tools. This doesn’t create more jobs because these companies are just bidding against each other to find additional workers. It does, however, slow down productivity growth. That’s why, as president, I will call on Congress to increase the federal minimum wage to \$10 an hour and index it to future per-capita GDP growth.

The most effective tools today are information technologies. Think of your own life. You have information technology in your car, your phone, even your dishwasher. It improves everything—and it has that same potential to transform most industries, which will spur productivity and incomes along the way. But too many industries still lag behind in adopting IT.

If we are going to ensure that all industries become digitally powered—using hardware, software, and advanced communications technologies to reengineer themselves—then the private sector will have to drive much of the process. But the federal government can and should play a supportive role. Smart federal policies can spur IT adoption in an array of industries, including transportation, energy, education, and, of course, government

itself. The right policies also can foster the growth of new digital platforms such as mobile commerce, the Internet of Things, electronic identification, the smart electric grid, and intelligent transportation systems. That's why, in my administration, I will direct the Department of Energy and the Federal Energy Regulatory Commission to support incentives for utilities to invest in smart meters and institute variable, time-of-day pricing. I will direct the General Services Administration to require all construction companies that do business with the federal government to use building information modeling systems to help drive productivity and save the government money. I will require the Department of Transportation to make computer chips as important as concrete and pavement in our 21st-century surface transportation network. And I will make sure that every major federal agency develops its own Internet of Things and data innovation strategies to infuse those technologies into the areas of the economy they touch and influence.

It's not enough for enterprises to adopt 21st-century tools; all Americans need to use them—and the most important tools of all are broadband data networks and computing devices. Unfortunately, America is falling behind other developed countries. The problem is not our broadband networks themselves; they are on par with most leading nations, even though we are a much less densely populated nation, which makes it more expensive to install and manage broadband networks. The problem has to do with the share of Americans who own computers. Almost one in five of us don't, so way too many people are not connected, much less connected with broadband. That's unacceptable. We need to close the digital divide in this country by expanding federal programs that support computer ownership and provide discounted broadband for low-income households. That means we should ensure broadband and computers are covered in the Lifeline and Linkup programs that already help low-income people get phone service, and we should partner with Internet service providers to subsidize computers and broadband connections for families with school-age children who are eligible for the reduced-price and free lunches.

We also cannot allow a data divide to take hold in this country; we need to ensure there are no social or economic inequalities because individuals or communities get passed over and miss out on the benefits of data analytics. We have to recognize that a baby born today in a data-rich environment will receive better health care, better education, and better economic opportunities than a baby born in a data-poor environment. Every child should share in the benefits of data-driven innovation, so my administration will tackle data poverty and ensure that productivity-boosting advances like precision medicine, smart infrastructure, and personalized learning are available to all Americans.

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Finally, one tool that all enterprises rely on is robust infrastructure, especially roads, highways and bridges. For too long, we have been unwilling to invest to match our expanding population. It's time to change that. So I will call on Congress to pass a long-term Surface Transportation Reauthorization Act and increase funding for the Highway Trust Fund by at least \$30 billion per year.

Spurring Innovation

We can't drive productivity without also making innovation a key priority. Innovation isn't just about the latest smartphone or vibrant startup firms in Silicon Valley; it's about farmers using bioengineered seeds and GPS technologies to efficiently and precisely plant, fertilize, and harvest crops that are more plentiful and easier on the environment than ever before. It's about manufacturers like the Digital Manufacturing Company embracing the industrial Internet to build smart, connected factories that boost productivity, quality, and safety.

Unfortunately, a growing array of voices now works to thwart these kinds of innovations. Some are speaking from generalized fear that innovation will hurt the environment, eliminate jobs, or intrude on our privacy. But we're Americans; we've always put progress first, because we've had the confidence necessary to manage risks. If America is to regain its position as the global innovation leader, then we need to put aside this new fearfulness and get back to good, old-fashioned American risk-taking that is guided by faith in the future.

But some of these voices speaking out against innovation are motivated by a more specific kind of fear—a fear that innovation will hit them in their wallets. Uber is transforming the taxi industry. Online courses are transforming higher education. And the Internet is changing the face of retail. These and a host of other innovations deliver a tremendous amount of new value and convenience to us as consumers. It is also true that they disrupt some businesses and professions, so let me be clear on this point: We can and should provide assistance to help those hurt by innovation adjust and transition to new jobs. But let me be just as clear on another point: We don't need a president who will try to stave off change to protect the status quo; we need a president who will push Congress, federal regulators, and the states to make sure laws and regulations enable disruptive innovation rather than prevent it. We need more innovation if we are going to succeed in the 21st century, not less. So I will make it a front-burner priority.

One key will be to make it easier for American entrepreneurs to start companies. All enterprises can contribute to innovation, but new startups are especially important. That is why I will call on Congress to send the Startup Act to my desk in the first 100 days of my administration. The bill will make it easier for high-growth startups, a key source of job growth, to get off the ground, in part by expanding the R&D tax credit for new business.

We also need to move beyond the stale fight over regulation, with one side saying we need less and the other saying we need more. What we really need is smart, timely, and efficient regulation that, among other things, reduces regulatory delay. Companies should be able to receive approval or denial of their requests in a timely manner; they should not have to wait years for an answer. That is why my budgets will ensure regulatory agencies, including the U.S. Patent and Trademark Office, are adequately staffed, but also require them to develop operational strategies for streamlining regulatory approval and minimizing delay. I will also create an Office of Innovation Review in the White House Office of Management and Budget, and its job will be to ensure that proposed federal regulations do not hinder innovation. This office will be the “innovation champion” in government, and I will give it the authority it needs to push agencies to either affirmatively promote innovation or achieve a particular regulatory objective in a manner that is least damaging to innovation. I will also ask the Federal Trade Commission to produce an annual report on state laws and regulations that limit innovation, including by unfairly protecting incumbents against innovators.

I will also be especially careful not to over-regulate key emerging technologies, including broadband, which are the central nervous system for our digital economy. One of my first steps will be to call on Congress to rewrite the 1996 Telecommunications Act to include provisions that protect broadband users while enabling further innovation to accelerate the broadband networks of tomorrow. And I will ensure that we free up more spectrum for wireless Internet users, including from broadcasters and the federal government.

We talk about broadband innovation a lot—and rightly so—but it is not the only area of digital innovation. There are a host of other emerging technologies that will be critically important to our future prosperity, including everything from biotechnology and nanotechnology to data analytics, drones, 3D printing, the Internet of Things, mobile payment systems, robotics, and telemedicine. But we won't achieve the promised benefits of these and other technologies if we adopt a European-style precautionary

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principle when it comes to regulation. The notion that we should regulate in advance of speculative harms that often don't even emerge is a guaranteed innovation killer. Onerous regulations force companies to spend more time on lawyers and less on innovators. For example, ill-advised privacy rules can force the medical community to prioritize limiting data use above saving lives. My administration will put patients first and give U.S. researchers the tools and data they need to produce the next generation of medical cures.

It's not enough to reduce innovation-hampering regulation; we need a federal government that proactively supports innovation. To that end, as president, I will have a simple litmus test for everyone I nominate to serve in Cabinet posts and other important positions in my administration: Do they understand the power of innovation, and are they willing to establish and oversee innovation strategies for their respective agencies? That question applies not just to how federal agencies can be more innovative, but also to how they can spur innovation in the economy. For example, the Department of Education should have a fund to support innovative approaches to education by giving states incentives to fund new kinds of innovative K-12 schools, such as project-based learning schools. The Department of Transportation should be giving states more money to build intelligent transportation systems. HUD should provide grants to cities that come up with the most innovative "smart city" proposals. And there should be a unit of the federal government whose sole mission is to support innovative pilot projects in state and local government, so new ideas can be tested, and—if they work—scaled up across the nation. The United Kingdom and other countries do this, and it has been very successful.

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We need to do more through the operations of government in Washington to clear out barriers to innovation and support enterprises that are innovating. But we also need to encourage enterprises to invest more in research and development. Other nations have established more generous incentives for businesses to invest in R&D. But here in America, business R&D has plateaued, and more risky basic and applied research actually has been falling. One reason is that as Wall Street pressures our publically traded corporations for immediate returns, it's harder for our corporate leaders to invest for the long term, including in research and development and workforce training, and even new machinery and equipment. The Business Roundtable says, "[T]he obsession with short-term results ... leads to the unintended consequences of destroying long-term value, decreasing market efficiency, reducing investment returns, and impeding efforts to strengthen corporate governance." But that is what happens when we monitor second-by-second stock tickers as if they are the vital signs of a healthy economy.

We need to create an environment in which enterprises in America are once again investing in the future. To start with, I will create an interagency task force, led by the Department of Treasury along with the Securities and Exchange Commission, to identify steps the federal government can take to limit corporate short-termism and help corporate leaders invest for the future.

But we also need to give innovative enterprises more incentives to make these kinds of investments. That's why Democrats and Republicans worked together in the early 1980s to pass the research and development tax credit. But since then, other nations have copied and outpaced us. So now the U.S. R&D tax credit is only the 27th most generous in the world, behind those of Brazil, China, and India. To restore a climate of innovation in America, I will call on Congress to pass tax reform that includes expanding the research and development tax credit rate from 14 percent to 25 percent and making it permanent. I will also call on Congress to pass legislation modeled on tax laws in at least a half a dozen other nations, where company revenues from innovation-based goods and services are taxed at half the normal corporate rate.

If we want to help our enterprises innovate for the future, then we need to invest more in the building blocks of innovation—scientific research and STEM education. This means putting aside resources to help us

discover the next new things. To do that, we will need to ignore voices in Washington, on both sides of the aisle, who say, “We don’t have the money to expand funding for science, or research and development, because it is more important to expand Social Security or cut taxes.” Indeed, some will argue that we can’t afford to invest in innovation because we have a budget deficit and rising national debt. But we also have an innovation deficit, and closing it should be our priority. Not many families who are forced to make a choice would refuse to spend the money to help their kids go to college because they are worried about their retirement. They would choose to invest in the future, in the kids. As a nation we need to do the same. We shouldn’t be increasing the future “investment debt” by cutting federal support for science and research. That research not only drives innovation, it also drives economic growth, which supports the federal budget. Besides it’s not the absolute level of debt that matters, it’s how much debt we have relative to the size of the economy. If we are rapidly growing the economy, that ratio naturally falls.

As president, I will call on Congress to increase federal support for science and technology by \$30 billion a year over three years—and then keep increasing it at least at the rate of GDP growth. But we also need a new approach to funding science and technology. We need to recognize that some areas of science are more important to our future than others, because they do more to drive economic growth and competitiveness. At the top of the list are life sciences and biotechnology, engineering, and computer science. So those are what I will prioritize in the budgets I send Congress.

At the same time, scientific research will hold the key to solving critical economic and societal challenges such as climate change. The unfortunate reality is that clean-energy technology still costs more than energy from fossil fuels, and until innovation brings down those costs, the world simply won’t shift to cleaner alternatives. Therefore at least 20 percent of my \$30 billion increase for science and technology will go to funding research we need to develop breakthroughs in technologies like solar cells and batteries. And I will work to persuade other nations to make similar pledges in a global race to fund clean energy science and technology.

Here in the United States, we also need a renewed consensus around the importance of defense innovation. We face an uncertain world, not just because of Islamic extremism but also because of a resurgent and increasingly assertive China. The source of American military superiority has long been innovation, but that advantage is under threat as we cut the defense budget—particularly by limiting funding to the key innovation accounts at the Department of Defense, including the famous Defense Advanced Research Projects Agency, known as DARPA. Republicans and Democrats need to come together to significantly increase defense funding in these key areas for research and technology. Doing so will not only ensure that America continues to have the world’s most advanced military but also will spur overall U.S. innovation and competitiveness.

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If we are going to accelerate productivity, it’s not enough just to use the latest tools; we need to keep innovating better and better tools. One of the most important will be robotics. Let’s face it, unless we can get machines to do a lot more work, especially work that’s hard, boring, or dangerous, then eventually we are going to run out of ways to be more productive. That means we will run out of ways to grow our incomes. So as president, I will commit to increasing research funding for the National Robotics Initiative by at least a factor of 10. I know there are fearful skeptics who will tell you that robots kill jobs. But they are wrong. The fact is that nations with more manufacturing robots also have a higher share of workers in manufacturing. Robots don’t kill jobs; they help us prosper.

I know some will say we can’t afford to invest in America’s future. But I say we can’t afford not to. So how will we pay for these investments? First, we need to recognize that it’s okay to increase short-term debt if that money is truly going to investments that provide a strong payoff in the future. That’s why I will call on Congress

to develop an “investment budget” separate from “spending” and exempt increases in it from mandatory budget offsets and caps. But we can and should also try to pay for some portion of our innovation spending. The reality is that we will have to pay part of the expanded investments the way you all pay for investments you make in your own families, like saving for a down payment on your first house. You work a little harder and you spend a little less. For our federal government, that means we will need to raise taxes and cut spending. The first place is to start taxing dividends, capital gains, and carried interest as normal income. Another is to ask middle-class and wealthier Americans to contribute more by capping the mortgage interest deduction at \$100,000. But we also need to spend less and work more. That is why I am for raising the retirement age from 67 to 69, which would not only boost GDP but reduce federal spending.

But we need to go beyond just funding research; we also need to do a much better job of spurring the commercialization of that research. As president, I will call on Congress to pass legislation co-sponsored by Senators Coons, Gillibrand, and Graham to create a system of national “manufacturing universities” that would conduct research and teach subjects in the field of manufacturing. Likewise, I will call on Congress to pass bipartisan legislation to modernize our Department of Energy labs to make them more effective engines of technology commercialization. And I will propose legislation to establish a National Innovation Foundation, like our National Science Foundation, but focused on innovation and technology commercialization.

“We need to go beyond just funding research; we also need to do a much better job of spurring the commercialization of that research.”

Finally, while science and tech-based innovation is driven by enterprises, it is enabled by scientists, engineers, and skilled technicians. Without their hard work, creative thinking, and problem-solving skills, technology innovation would stop. Unfortunately, not enough American students are majoring in science, technology, engineering, and mathematics—the so-called STEM disciplines. Too many are studying subjects such as art history and English literature instead of computer science and engineering. One reason is that our colleges and universities are just as happy to graduate an art history major as a biochemist. As president, I will push for legislation that rewards universities for graduating more STEM students. I will also call on the Department of Education to work with states to triple the number of specialty math and science high schools in America. And I will triple the budget of the National Science Foundation’s Advanced Technological Education Centers program, which funds cutting-edge technical-training programs at our nation’s technical and community colleges.

But we can’t and shouldn’t just rely on our own talent to drive innovation. America is still a beacon for many of the smartest and most talented people from around the world. We need to attract more of these high-skilled foreign STEM workers and students, not fewer. That would help create jobs and drive innovation here in America, and it would give us a leg up over our competitors, because we would have all that great talent, not them.

This can be a huge strategic advantage for America. But we have allowed it to be held hostage by a stalemated debate about broader immigration policy, with many Democrats wanting to let in more people and many Republicans wanting fewer. There are legitimate reasons to slow the flow of low-skill immigrants to our shores. But we need to separate out high-skill immigration from comprehensive immigration reform. As president, I will call on Congress to send me a high-skill immigration bill that expands H-1B visas and makes it easy for foreign scientists and engineers to get green cards and eventually become citizens. That is another reason Congress should pass the Startup Act; it would allow up to 50,000 foreign-born workers who have earned masters’ or doctorate degrees in science, technology, engineering, or mathematics to stay in the United States indefinitely if they are engaged in a STEM field.

I mentioned a few minutes ago that, hand in hand with building our capacity to innovate and embracing “creative destruction,” we have to help people who are displaced by change. People need tools and resources to adapt and take advantage of new opportunities. That is why, as president, I will establish a “flexicurity” system that recognizes employment security is based not on limiting layoffs, but on giving workers greater ability to move to new jobs, in part through support for training to acquire new, more valuable skills and establishing a federal floor under the unemployment insurance system.

Competing Globally

As we get the American economy back to running on all cylinders and producing more good jobs, the last piece of the puzzle is to make sure we are more competitive globally. After WWII, America was the unparalleled economic leader and faced little real competition. Today, it's different. In fact, we are losing the race for global innovation advantage and the jobs and income that come with that leadership. We face competition not only from high-wage nations like Japan, Germany, and the Scandinavian countries, but from rising tigers like South Korea, Taiwan, and Singapore, and from lower-wage nations like China, India, and Brazil. Our competitors are putting in place better policies on taxation, talent development, and technology, and many are reaping the rewards in the form of higher growth, more robust job creation, and rising incomes. But some countries also are taking unfair shortcuts: They are closing their markets to American products, stealing American ideas, and discriminating against American companies. That hits us hard here at home. In a global economy, it's not enough to get by on domestic sales alone; our companies have to be able to compete and win in international markets. So when I am president, I will put in place a national competitiveness strategy that includes fighting back against this kind of innovation mercantilism.

I will start by rebalancing our foreign policy, because all too often it sacrifices American worker and business interests for the sake of foreign policy goals. It's time to recognize that ensuring U.S. national security begins with strengthening U.S. economic security.

I will also work to open up more markets for U.S. exporters. This is why I will push for the completion of a major trade agreement with Europe, a comprehensive Trade in Services Agreement, and expansion of the Information Technology Agreement. But I will also put trade enforcement at the center of U.S. trade and foreign policy. Too often, we sign trade agreements to open up markets for U.S. exports, and then we find out that our trading partners are not living up to their end of the agreements. It's time to redefine success in U.S. trade policy. It shouldn't be about the number of trade agreements we sign, although that is important. It should be about the overall results we achieve. And first and foremost, we need to see real, concrete reductions in foreign mercantilism and protectionism. This is critical if we want to make sure average

Americans get all the benefits of globalization. To do that, I will call on Congress to significantly increase resources for the office of the U.S. Trade Representative (USTR), the International Trade Administration, and Customs and Border Protection. We need to pass the Trade Enforcement Act, which would create a Trade Enforcement Officer and a Chief Manufacturing Officer at USTR while increasing resources for trade-enforcement efforts. I will also charge USTR with developing an annual report that ranks countries on the full extent of their mercantilist practices. And I will make sure any country that refuses to make progress gets real penalties. We should exclude mercantilists from the World Trade Organization's Generalized System of Preferences, and we should cut off U.S. aid and other cooperation. If you play by the global rules of trade and investment, America wants to trade with you and help you. If you don't, we won't. I will also appoint a Treasury secretary who takes foreign currency manipulation seriously, rather than ignoring it as so many secretaries have done for so long.

It's also time to recognize that the postwar system of managing global trade isn't working the way it should. As constituted, the World Trade Organization isn't up to the task of effectively combating the growing mercantilism among many of our major competitors, especially China. For too long, we have relied on a legalistic framework in the WTO to prosecute nations that violate specific WTO trade rules, especially related to tariffs. But many countries have become savvier than that. They rely instead on an array of non-tariff barriers, and they put in place protectionist policies that are not strictly speaking against the written rules. For many nations without a strong rule of law, the easiest way to be an international trade scofflaw is simply to avoid putting too

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much in writing. So when the Chinese government tells the WTO it doesn't have a formal regulation requiring American companies to give away valuable technology as the price of admittance into the Chinese market, it is telling the truth. But that doesn't stop Chinese officials from strong-arming our companies into quid pro quo deals they would never make otherwise. China makes our companies an offer they can't refuse. And that needs to stop because it hurts both our companies and our workers.

This is why one of the top foreign policy priorities for my administration will be working to restructure the World Trade Organization to make it more effective in the fight against mercantilism. But if the WTO cannot come up with a viable plan for doing so within a year, then I will put my vice president in charge of building a coalition with the Europeans, Canadians, Australians, Japanese, and whoever else will come onboard to create a new trading organization that is grounded in and committed to the idea that markets should drive global trade and investment. No one should be allowed to manipulate their currency prices for competitive advantage or look for other unfair ways of sustaining trade surpluses, such as systemically stealing valuable know-how from other nations or massively subsidizing their own companies. Fair international competition and legitimate innovation policies will leave all countries better off.

Finally, I will use U.S. funding and influence to reshape global organizations such as the World Bank, the International Monetary Fund, and the Inter-American Development Bank, so that they fight against, rather than enable, foreign mercantilist practices that hurt American firms and jobs.

Regardless of how that effort goes, one of my top trade priorities will be to more aggressively confront Chinese innovation mercantilism. It should be clear to anyone with more than a passing knowledge of Chinese innovation and economic policy that the Chinese government's goal is to supplant the United States as the world's technology leader in industries such as biotechnology, computers, semiconductors, and aerospace. When China joined the WTO, the hope was that its legal system would improve; it would stop stealing intellectual property; and it would stop forcing technology transfer. But none of that has come to pass. Instead, we see backsliding. China's central government uses an array of tools to shut out American competitors. Officials disingenuously invoke anti-monopoly laws to punish U.S. companies. They create draconian cybersecurity and encryption rules to steal our technology secrets. They conduct campaigns to persuade Chinese companies not to buy American technology. They manipulate internationally recognized technology standards. And they provide massive subsidies to their domestic technology companies to compete unfairly against our companies. So we need a new game plan, a new strategy, new tools, and new institutional approaches to push back more effectively. At the end of the day, we need to raise the costs to China if they continue to pursue these types of market-distorting policies.

“We need lower taxes on our businesses, but that’s not enough. We also need policies to help American firms that compete in international markets, particularly advanced technology firms, become better innovators.”

And China is not the only country that seeks unfair advantage to be more competitive. So we need to make sure we understand these strategies better. That's why I will create a National Industrial Intelligence Council in the White House and charge it with developing a more well-thought-out process and structure to understand the long-term implications of other nations' economic development strategies, so we can respond more effectively.

A related issue is that global fears about U.S. surveillance programs threaten the competitiveness of U.S. technology companies that serve global markets. My administration will confront these concerns head on by proposing a new, multilateral treaty to establish international standards for government access to data. We also need to recognize that weakening encryption and creating vulnerabilities in computer systems hurts the competitiveness of U.S. companies. On my first day in office, I will sign an executive order declaring unequivocally that it is U.S. government policy to improve information security, not weaken it.

We can't maximize our competitive advantage and growth potential without the right policies at home. And that has to start with our corporate tax rate. It is the highest among OECD (Organisation for Economic Co-operation and Development) countries, and we apply it to all income earned worldwide, which puts American companies at a further disadvantage. When I am president, I will work with Congress to pass a corporate tax reform bill that lowers the top rate to no more than 25 percent while at the same time moving to a territorial tax system that taxes domestic income, not foreign income. And I will insist that Congress do this while strengthening, not weakening, the investment incentives I am calling for.

We need lower taxes on our businesses, but that's not enough. We also need policies to help American firms that compete in international markets, particularly advanced technology firms, become better innovators. Congress has passed initiatives that are a good start, such as supporting a system of National Manufacturing Institutes, but they should be greatly expanded. We should increase funding for the Manufacturing Extension Partnership, and start funding a manufacturing skills standards initiative. We also need to ensure that companies can get the financing they need to scale innovation. Former Intel CEO Andy Grove has called for a "scaling bank" to help scale up innovations and produce them in the United States. I think that is a great idea. To make it a reality, I will call on Congress to create a new, federally chartered industrial financing organization. And I will require the Small Business Administration to make at least half of its loans or loan guarantees to firms in industries that sell globally.

Seizing the Moment

We have come through a brutal recession, but we still have much more to do for America to reach its full potential in the innovation-driven economy of the 21st century. We cannot allow ourselves to shrink from that challenge, or misunderstand what our highest priorities should be: We must embrace innovation to grow our economy and expand opportunity for everyone.

As a country, I believe we are uniquely well qualified for this challenge. We must recognize our strengths and build on them, be honest about our weaknesses and solve them, and look to the future the way we always have—with optimism, determination, and a spirit of enterprise.

Thank you, and God bless America!