

Why Don't We Have More Innovation and Innovation Policy?

3.1 percent per year to only 4.1 percent. If we could maintain that rate, the billions stuck in poverty would see their incomes increase by a factor of five in forty-one years instead of the fifty-four years it will take at current rates. Companies and governments across the globe invest approximately \$1.1 trillion a year on research and development (R&D). Why couldn't they invest \$2.2 trillion and more quickly develop cures for major diseases, affordable clean energy, smart robots to do routine work, real-time language translation, brain-computer interfaces, autonomously controlled cars, much faster jet aircraft, and other innovations?

This list of potential innovations could go on and on. All of them will eventually emerge, for the simple reason that science and technology will enable them to and people will want them. But why do we have to wait so long? Only antitechnology Luddites would not leap at the opportunity to wave a magic wand and reach into the future to transport every innovation that will exist in 2042 to the present day. As such, a principal mission of the international community should be to do that—to deliver the promise of the future to the world's 7 billion inhabitants as quickly as possible.

For the United States, the innovation imperative is especially critical because innovation is a key way to effectively compete with the Chinas and Indias of the world. The principal way to spur global innovation and to renew the U.S. industrial economy is to vigorously support innovation and the policies that support it. But all too often the political process in the United States, as in many other nations, fails in doing so. In far too many nations, the forces and ideologies committed to stasis are powerful. As this chapter explores, three key factors particularly limit innovation: interests that fight it, ideologies that oppose it, and governments that ignore it. Given the forces allied against it, it's a wonder that innovation occurs to the extent it does. Maximizing innovation requires understanding these forces and identifying and implementing strategies to overcome them.

Interests Opposing Innovation

Too many interests (businesses, professions, unions, governments, educational institutions, and civic groups, among others) see innovation as a threat to their livelihood and translate that opposition into action that

If innovation is the elixir that amplifies incomes and advances economic competitiveness, and if innovation policy is required for an even more potent elixir, why don't we have more of both? With the proliferation of innovations in our daily lives—iPads, smartphones, and new drugs, to name a few—these may seem like odd questions. But in contrast to some who marvel at the innovations appearing almost daily, we wonder why there aren't more. George Bernard Shaw wrote: "You see things; and you say 'Why?' But I dream things that never were; and I say 'Why not?'" Why is India still so poor? Why can't Japan accelerate its growth? Why does the United States lag behind leading nations in the adoption of digital platform technologies? Why do educational systems in most nations look the same way they did fifty years ago? Why haven't we cured cancer? Why aren't robots intelligent? Why does renewable energy still cost more than coal and oil? The real question is about the innovations that could be here but aren't.

It took almost a quarter century, 1984 to 2008, for world economic output to double. Why couldn't we double it again by 2026 instead of 2034? For this to happen, global productivity growth would have to increase from

retards both innovation itself and the introduction of policies to enable and spur innovation.

Incumbent Opposition

John Stuart Mill once stated: "One person with a belief is a social power equal to ninety-nine who have only interests." Yet, when it comes to technological innovation, ninety-nine persons with a belief in the power and potential of the innovation can be thwarted by just one with a special interest. Given the benefits of innovation, why would anyone be against it? Niccolò Machiavelli provided the answer as early as 1532, when he wrote in *The Prince* that "there is nothing more difficult to execute, nor more dubious of success, nor more dangerous to administer than to introduce a new system of things, for he who introduces it has all those who profit from the old system as his enemies, and he has only lukewarm allies in those who might profit from the new system."¹ Or, as innovation economist Joseph Schumpeter explained in his seminal treatise *Capitalism, Socialism and Democracy*, "The resistance which comes from interests threatened by an innovation in the productive process is not likely to die out as long as the capitalist order persists."² Schumpeter might have been more prescient if he had said that such resistance would only intensify over time, for that appears to have happened, particularly in developed nations.

It wouldn't be so bad if the health of economies did not depend on innovation. But as Schumpeter also famously wrote, "It is the process of industrial mutation—if I may use that biological term—that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of creative destruction is the essential fact about capitalism."³ This creative destruction—that is, innovation—forces individuals, organizations, and even whole regions and nations to adapt or suffer the consequences of not doing so. It turns industries (and occupations) into vestigial "buggy whip industries" with little purpose. For those invested in the old—old products, services, industries, occupations, institutions, forms of work organization, and production processes—innovation is risky and often met with trepidation at best. While the rest of us gain handsomely from innovation—after all, the

definition of innovation is bringing new value to consumers and citizens—those invested in the old sometimes lose. And all too frequently they fight, often vigorously and effectively, to protect their interests against particular innovations.

As Mancur Olson noted thirty years ago in *The Logic of Collective Action*, while the benefits from innovation are widely dispersed, the losses associated with it are usually borne by a small minority.⁴ This risk of imminent economic hanging focuses the mind and the pocketbook, leading these groups to spend time and money to defeat, or at least slow down or limit, innovation. Moreover, it is incumbents who are often hurt by innovation, and they usually have more money, more people to mobilize, and more and better connections with policymakers and legislators. Innovators, because they are in many cases new to the scene, usually have less money and fewer connections. They often have little more than the merit of a new and better idea. In *The Rise and Decline of Nations*, Olson extends this theory to try to explain why some societies innovate more than others. He hypothesizes: "Stable societies with unchanged boundaries tend to accumulate more collusions and organizations for collective action over time."⁵ And they use this collective action to thwart change. While it's not necessary to agree with Olson's mechanistic theory of societal change—that the longer a society is stable the more it will grow the barnacles of resistance—he is right that societies differ in the extent to which vested interests can organize to limit innovation and that this is an important factor in explaining rates of growth and innovation.

Sometimes opposition to innovation is manifest. In 2008, peasant farmers, left-wing activists, environmentalists, and their political supporters in the Indian state of West Bengal demonstrated against the Tata Corporation's acquisition of farmers' land to build a car factory to produce the ultra-low cost Nano car. Tata was forced to abandon the almost-completed factory, wasting \$300 million and losing the potential to create twelve thousand relatively good-paying jobs. The interests of a few farmers trumped the interests of tens of thousands of workers and citizens in West Bengal.

But it's not just underdeveloped nations with socialist political traditions that oppose innovation. It happens in developed nations, too. A case in point is France, a developed nation with socialist political traditions. As many as

three million people, 5 percent of the French population, marched in more than two hundred protests in March 2009, most against plant closings and workforce reductions needed to allow French companies to survive the downturn and remain globally competitive.⁶ Some of the marches were even supplemented by “boss-nappings,” where workers temporarily held company executives hostage to force negotiations to reduce job cuts or stop plant closings.

Opposition to innovation is not always about militant confrontation. More often it is inconspicuous and cloaked in the mantle of the public interest. An example is union resistance to self-checkout scanners. In recent years, many retail stores have installed systems that let consumers scan products and pay without the assistance of a retail clerk. These systems lower costs, but also reduce the number of checkout workers, and not surprisingly cause unions to oppose them. The United Food and Commercial Workers (UFCW) union stated: “We don’t like self-checkout scanners because they put cashiers out of work.”⁷ Knowing it would get little support from legislators if it sought legislation banning self-checkout outright, the UFCW instead pushed for the introduction of a bill in the California legislature that would require alcohol sales be made with the assistance of a cashier.⁸ Instead of it being obvious that legislators were doing the bidding of one union to make the lives of millions of consumers more difficult, the legislators cloaked their actions in the mantle of protecting California’s youth, even though there was no evidence of any problems associated with minors purchasing alcoholic beverages through self-service checkouts in California.⁹ When the bill passed California’s legislature in 2010, then California governor Arnold Schwarzenegger promptly vetoed it. But in 2011, Democratic governor Jerry Brown signed the legislation into law, meaning that California consumers will now pay higher prices and wait longer in lines.

Unions representing grocery store workers are hardly alone in opposing innovation. Unions often oppose innovation that boosts productivity. One International Association of Machinists and Aerospace Workers leader stated: “At this point, the objective is not to block the new technology, but to control its rate and manner of introduction, in order that it is adapted to labor’s needs and serves people, rather than being servile to it or its vic-

tims.”¹⁰ Translation: We want to slow down the introduction of new technology so that none of our members lose their jobs.

It’s not just unions that wrap protectionist claims in the mantle of the public interest; businesses do so as well. U.S. car dealers helped pass legislation in all fifty states prohibiting auto manufacturers from selling directly to the customer, including over the Internet, claiming that such restrictions were needed to protect consumers against rapacious car manufacturers.¹¹ Realtors seeking to protect their 6 percent sales commissions have colluded to keep online discount brokers from getting access to real estate listings, claiming that discounts are not in the consumer’s interest.¹² Optometrists helped pass state legislation making it hard for consumers to fulfill their prescriptions online, purportedly to protect consumers from suffering eye damage.¹³ Travel agents sought to enlist the U.S. Justice Department against the airlines’ formation of the online travel site Orbitz, claiming to “act as the public’s representatives and help keep prices low.”¹⁴ Gas station owners in Oregon and New Jersey have successfully fought legislation allowing self-service gas stations because consumers might cause damage if they pump their own gas. Wine wholesalers have successfully pushed for state laws limiting online sales from wineries and out-of-state retailers to protect against underage drinking.¹⁵ The list goes on and on. Insurance agents, mortgage brokers, investment bankers, securities traders, college professors, music and video stores, radiologists, pharmacists, veterinarians, and even undertakers selling caskets are among the professions and industries that have sought government protection, often successfully, from more efficient and lower cost (frequently e-commerce) competitors, all claiming that they simply wanted to protect the public.

Such restrictions are not limited to the United States. The European Commission is considering rules for member states that would permit manufacturers to require retailers selling their products to maintain brick-and-mortar stores for a certain proportion of sales.¹⁶ To protect small booksellers from larger or online booksellers who can sell at a discount, France prohibits bookstores from giving discounts of more than 5 percent. Germany and Norway go even further, allowing no discounts. Australia imposes “parallel import restrictions” on imported books to limit competition. In Japan, laws limiting the entry of large supermarkets and providing incentives

for small retailers to stay in business explain the country's high share of family retailers, and their low productivity. India also has long precluded competition in its retail sector by keeping foreign competitors such as Walmart out of its markets. In fact, Walmart has only been able to enter India through a \$100 million joint venture with an Indian company, Bharti, which runs Walmart's stores in India on a co-branded basis. Moreover, in an effort to protect smaller merchants, the Indian government astonishingly required that Walmart sell only to wholesalers, business owners, and their family and friends. These buyers then resell the products directly to consumers, often at a substantial additional markup. In December 2011, the Indian government proposed rescinding this protectionist law, but then backed down in the face of ferocious opposition from left-wing politicians and retailers.

We recognize the rational self-interest of people wanting to maintain their livelihoods. Even if they understand that change is inevitable, people often hope that it will occur a little later, as they get closer to a secure retirement. But the examples cited here serve to point out that the proconsumer, prosafety rationales are actually thin reeds used by those whose chief interest is thwarting change. A better approach would be to move forward with an innovation strategy that includes ample opportunities for education and retraining for the jobs that increased productivity and innovation will create. Ultimately, however, it is the responsibility of citizens and their elected officials to keep the long term in mind and support innovation.

"Main Street" Welfare

A national economy can be innovative even if interest groups occasionally fight against innovation, especially if the rule of law applies and the political process is relatively transparent and open. However, it becomes much harder when entire political coalitions are forged for the purpose of redistributing, rather than growing, the innovation pie. American politics in particular has devolved into this kind of zero-sum battleground. While the common view is that Democrats are focused on redistribution and Republicans focused on growth, in fact, both parties have quite formidable redistributionist factions. As each marshals its forces, they collide in politi-

cal battle, each seeking to seize a bit more and each blithely unconcerned with, or even hostile to, efforts to fuel the competitiveness, innovation, and productivity engine—what we refer to as the "CIP Engine."

U.S. economic politics is often framed as a clash between "Main Street" and "Wall Street." Wall Street is portrayed as filled with greedy financiers, and "Wall Street" Wall Street is portrayed as filled with greedy financiers, counting their huge end-of-year bonuses and concerned only with getting rich by manipulating financial deals, even if it means destroying communities, companies, and jobs in the process. In contrast, Main Street, the story goes, is populated by mom-and-pop businesses owned by red-blooded Americans who work hard, create jobs, and drive this great country. This meme has become deeply embedded in the American political culture. Just enter "Main Street vs. Wall Street" in a search engine and one gets statements like those below, the first two from conservative commentators and the second two from liberal pundits:

- "Rising costs and taxes and declining income have mugged Main Street while Wall Street revels in the Fed-engineered 'recovery' in the stock market."¹⁷
- "This bailout [to Wall Street] isn't as bad as Main Street thinks. It's worse."¹⁸
- "My biggest disappointment in President Obama, a man I voted for, is that he has consistently sided with Wall Street over Main Street."¹⁹
- "Wall Street vs. Main Street: Final Showdown Threatens Reform."²⁰

The perceived dichotomy is so embedded that the TV news magazine show *60 Minutes* has even bought into it. In a segment about the suffering of local, small businesses in Newton, Iowa, caused by the closing of the Maytag appliance factory (the washers and dryers will now be made in Mexico), host Scott Pelly bemoaned the fact that these companies weren't getting help: "Three years after the beginning of the Great Recession, with interest rates the lowest they have ever been in history, banks are lending less money to the engines that create jobs."²¹

But this Wall Street vs. Main Street framing misses the point that neither is a CIP engine. What will determine whether America thrives in the global economy is not whether Fred's clothing shop on Main Street sells more pants or whether Goldman Sachs' profits soar even higher. It is

whether companies that export goods and services and compete in tough international markets do well; whether companies that drive productivity in their operations through the introduction of new technology do well; and whether high-growth entrepreneurial companies, especially ones that develop and commercialize innovations, do well. These are not Main Street or Wall Street companies. These are “Industrial Street” and “Office Complex Street” companies; the former being manufacturing firms, particularly those competing in international markets, and the latter being technology-based nonmanufacturing companies (e.g., information industries such as software, Internet, telecommunications, movies and music, and global engineering services firms).

Defenders of Main Street and champions of Wall Street will, of course, argue otherwise. A healthy Wall Street is critical, the latter assert, because it provides the capital that enables companies to grow. To be sure, well-functioning capital markets are important, especially to the extent they channel capital to activities that boost innovation and productivity. But this is a two-way street. Without companies that take in capital and yield high returns from innovation, productivity, and growing sales, Wall Street couldn't make a profit on the capital it manages. As a result, financial markets would shrink. But the last thing Wall Street wants to do is downsize. Like any good redistributionist, it will fight change any way it can, as the industry did in the early 2000s by investing in the Ponzi scheme known as subprime mortgages and collateralized debt obligations and resisting real financial services industry reform legislation. As University of Massachusetts economist Gerald Epstein states: “The usual economists’ argument for financial innovation is that it adds to the size of the pie. But these types of things [like collateralized debt obligations (CDOs)] don’t add to the pie. They redistribute it—often from taxpayers to banks and other financial institutions.”²² Given that Wall Street came close to driving the global economy off the cliff, and would have had taxpayers not bailed it out, its defenders are a bit muted these days. But claims of Wall Street primacy still lurk in the background, ready to be reasserted once the present outrage over the financial collapse and bailout subsides.

Main Street’s backers are even more vocal in their claims. “How can you say that corporations, and not small Main Street businesses, are the CIP

engines?” they will protest. “We all know that Main Street creates the jobs, produces the innovations, and drives the growth.” We may think we know this; but what we know is wrong.

Let’s start with the claim that Main Street is the source of jobs. To understand why the jobs claim is wrong, it’s important to understand the difference between what regional economists refer to as local-serving and export-serving businesses. Consider the closed Maytag factory; it was an export-serving business, meaning that it shipped products outside of the local labor market. While a small share of the washers and dryers coming off the assembly line were sold to local Newton residents, most were sold to customers throughout the nation or even the world, who sent money back to Maytag, who gave some of it to their local workers. In contrast, the local restaurants, dry cleaners, clothing stores, and barber shops are local-serving, as the lion’s share of their output is sold to Newton residents, including Maytag workers. If one of these local-serving “Main Street” businesses had gone out of business, it would have had virtually no effect on the output of the Maytag factory; moreover, another business would more or less automatically expand or emerge to meet local demand. But the Maytag factory closure had an immediate negative impact on the local-serving businesses, whose customers (Maytag workers, its suppliers, and their workers) had much less money to spend locally on meals, haircuts, dry cleaning, and other needs and desires.

The reality is that the majority of U.S. businesses are local-serving. These include, for example, the 219,986 doctors’ offices, 166,366 auto repair facilities, 151,031 food and beverage stores, 115,533 gas stations, 11,028 offices of real estate agents and brokers, 93,121 landscaping companies, 75,606 nursing homes, 36,246 furniture stores, 28,336 veterinary offices, 15,666 travel agencies, 4,571 bowling alleys, 2,463 amusement arcades, 858 radio networks, and 26 commuter rail systems. These and millions of other local-serving businesses will neither prosper nor suffer principally on the basis of economic policies targeted at them. Providing them easier credit, cutting their taxes, giving them subsidies, exempting them from regulations, or any of the myriad “remedies” offered by Main Street backers are largely irrelevant to their collective survival (although perhaps not to their owners’ income) and to U.S. economic vitality. What is relevant is the

strength of the demand for their goods and services. To come back to the 60 *Minutes* story, the small business owners Pelly interviewed weren't in trouble because they couldn't get loans. They couldn't get loans because they were in trouble. And they were in trouble because they had fewer paying customers than before the Maytag factory closed. Let's say that the government decided to help these Newton companies by saying that they could pay taxes at a rate of 10 percent instead of 35 percent. No new jobs would be created because the same number of people would need haircuts and pants. It would even be the same if the government provided them with low-cost loans. If we want to help Main Street create jobs, the best way to do so is to help Industrial Street and Office Complex Street create good-paying jobs while boosting productivity, thereby driving up demand for Main Street goods and services.

Moreover, most small businesses don't create jobs. One study of a sample of companies created from 2004 to 2008 found that only 3 percent added more than 10 employees during that time.²³ Another study found that among small companies in their second, third, fourth, and fifth years of business, more jobs were lost to bankruptcy than were added by those still operating.²⁴ In fact, only a relatively small number of high-growth "gazelle" firms create most of the jobs. So the focus should be on entrepreneurial, high-growth firms, not on small business per se.

In addition to not being the jobs engine, Main Street is not the innovation, the productivity, or the export engine. Firms with fewer than five hundred employees employ 49 percent of U.S. workers but account for just 25 percent of U.S. exports.²⁵ The companies that export and successfully compete against foreign companies in global markets are much more likely to be large Industrial Street and Office Complex Street firms. Main Street firms account for only 19 percent of the funds invested in R&D.²⁶ This is not to say that some small technology-based firms are not highly innovative. But to assume that small always equates with innovative or entrepreneurial is not accurate.

Indeed, small firms are significantly less productive than large ones. Workers in large firms earn 57 percent more than workers in companies with fewer than one hundred workers.²⁷ And besides getting paid more, workers in large companies get 3.5 times more retirement benefits than workers at Main Street companies, 2.7 times more paid leave, and 2.4 times more

health-care benefits.²⁸ The only area where workers at Industrial Street and Office Complex Street companies get less than Main Street workers is workers' compensation and unemployment insurance (9 percent less), presumably because they get injured and laid off less often. This is not in any way to denigrate small Main Street businesses. Their owners take risks, work hard, and contribute to their communities. But we should not let our emotions get in the way of reality. The engines of a nation's competitiveness, innovation, and productivity are not mom-and-pop small businesses, but rather the firms in traded sectors, high-growth entrepreneurial companies, and U.S.-headquartered multinational corporations. Although the latter comprise far less than 1 percent of U.S. companies, they account for about 19 percent of private-sector jobs, 25 percent of private-sector wages, 48 percent of goods exports, and 74 percent of nonpublic R&D investment. And, since 1990, they have been responsible for 41 percent of the nation's increase in private labor productivity.²⁹

In short, it's Industrial Street and Office Complex Street, not Wall Street and Main Street, that predominantly drive the nation's jobs, competitiveness, innovation, and productivity growth. To be clear, Industrial Street and Office Complex Street include companies of all sizes, but they are characterized particularly by companies that compete internationally, that are high-growth and innovative (regardless of their size), and that are manufacturing, research-, or information-based.

Notwithstanding this economic reality, members of both parties continue to swoon over Main Street, while core factions of the Democratic Party go as far as to attack Industrial Street and Office Complex Street. And both parties seek to exempt Main Street from rules and regulations. While it is true that many small businesses have very small profit margins and the costs of taxes and regulations eat into those profit margins, it is also important to remember that this is not a reason to subsidize them or exempt them from regulations, as they usually are today. If some go out of business because of this, other companies with stronger balance sheets and higher productivity will automatically take their place. The one area where government should not pick winners is with regard to firm size.

Let's start with the Republican Main Street business coalition, which fights for policies to redistribute wealth from wage earners to coalition

members (business owners). It is one thing to redistribute wealth in the short run from workers to CIP companies (for example, by increasing the R&D credit so that companies invest more in R&D, which in turn helps the overall economy). If done right, workers and consumers benefit later through more and better jobs, lower prices, and more innovative products and services. It's quite another to redistribute wealth to the owners of Main Street small businesses, with the principal result being a bigger number on line 37 of their 1040 IRS tax form (Adjusted Gross Income) and a smaller number on line 76 (Amount You Owe). And that is largely the goal of the small business coalition supporting the Republican Party. At its center is the National Federation of Independent Businesses (NFIB), the leading organization of small and independent businesses. The NFIB portrays itself as the defender of the companies that create jobs and wealth, and woe to any politician who dares to threaten these American-as-apple-pie economic engines. But while the NFIB's membership may include a smattering of high-growth, innovation-based firms, the lion's share are small Main Street firms that are almost completely dependent on Industrial Street or Office Complex Street companies for their well-being. But to listen to the NFIB and many in the media who have bought into their folklore, it's the family-owned pizza parlors, dry cleaners, print shops, car dealers, and clothing stores that drive the U.S. economy.

This is a mythology that the NFIB plays for all it's worth. Anytime Congress, the administration, or state governments consider action that might require businesses to do anything—such as provide health insurance or unpaid leave for workers having a child—the NFIB fights to ensure that its small-business members are exempt. After all, they object, if you force our members to actually give their workers health insurance coverage, the economic engine would sputter and stall. The NFIB doesn't just lobby to ensure that Main Street is exempt from regulations that apply to Industrial Street and Office Complex Street, it also lobbies to exempt Main Street from taxes. Rather than fight for expensing for all companies (letting companies take a tax deduction for all their capital expenditures in the first year), the NFIB supports this only for its members. Rather than lobby to expand the R&D tax credit that spurs companies to invest more in research, the NFIB lobbies for repeal of the estate tax. Rather than lobby to reduce

the corporate tax rate, which would help Industrial Street and Office Complex Street compete in global markets, it works to lower the top individual tax rate, which, while helping NFIB members, would have virtually no effect on U.S. competitiveness or innovation.³⁰ Rather than support expanding unemployment insurance and workforce training expenditures so that workers are more likely to support rather than oppose automation and globalization, it pushes to cut unemployment taxes.³¹ And NFIB makes sure that anyone who questions their agenda is painted as antibusiness.

Unfortunately the NFIB has been successful. In the two decades before 2010, when President Obama proposed having first-year expensing apply to companies of all sizes, any equipment expensing provisions enacted applied only to small companies. While the NFIB succeeded in getting the estate tax reduced by 50 percent in 2001, the U.S. R&D tax credit remains anemic. While the NFIB worked with Republicans to lower the top marginal individual tax rate, the corporate tax rate is now the highest in the world. And while the NFIB successfully lobbied for reduced unemployment insurance taxes in many states, federal workforce training expenditures have been cut.

Redistributionists also populate the other side of the aisle. Liberal redistributionists, however, see their mission as redistributing money from rich people and corporations to low-income Americans and workers. A case in point is Citizens for Tax Justice (CTJ). CTJ is a liberal advocacy group whose "mission is to give ordinary people a greater voice in the development of tax laws. Against the armies of special interest lobbyists for corporations and the wealthy, CTJ fights for fair taxes for middle- and low-income families . . . and closing corporate tax loopholes."³² Like the NFIB, CTJ, and its allies in the Democratic Party, fight for redistribution, but unlike the NFIB, it is explicit in its opposition to most policies that would help Industrial Street or Office Complex Street boost innovation, productivity, or competitiveness. In fact, it wants to tax these engines even more in order to pay for increased social welfare.

The result is that Washington economic politics has become a redistributionist battleground between the NFIBs on the Right, seeking to funnel resources to their Main Street members (small business), and the CTJs on the Left, seeking to funnel resources to their Main Street members (low- and

moderate-income Americans). The NFIB and CTJ spend much of their time battling over which of these respective redistributionist schemes will prevail. The NFIB fights for “low tax rates so that small business owners keep more of their money.” CTJ calls for its members to “Tell Congress: Don’t Choose Tax Cuts for the Rich over Help for the Unemployed.”³³ The NFIB fights against unionization. CTJ fights for unionization. The NFIB fights against cap and trade legislation. CTJ not only fights for cap and trade but also for making sure that even more of its costs are borne by large corporations. The NFIB fights to weaken tort liability for small business, CTJ to strengthen it. And so on. No wonder the United States has failed to put in place the kinds of innovation policies needed for the CIP engine to thrive in tough global economic competition.

To be sure, in a democracy, the NFIB and CTJ have every right to lobby for societal resources to be redistributed to their members, just as AARP has a right to lobby to funnel more societal resources to retirees. The problem is that not only do they portray these redistributionist policies as growth and innovation policies, but also that too many elected officials believe that helping Main Street helps the CIP engine. Even Democrats have bought into the Main Street small business myth. The Kerry-Edwards 2004 platform promised to help “encourage investments by small business.”³⁴ House Democrats promise to “fight for America’s Small Business” because they are “the engine of America’s economy.”³⁵ The 2008 Obama-Biden platform promised to support “Small Business and Entrepreneurship.” But where’s the platform to ensure high productivity and globally competitive U.S. establishments?

If we want to restore American competitiveness, it’s time to rethink programs designed to help Main Street small business broadly, as opposed to the subset of small manufacturers or high-growth entrepreneurial companies. Why enact bonus depreciation only for small firms? Why exempt small firms from the regulatory requirements that large firms face, such as the Family and Medical Leave Act? Why have procurement set-asides for small business? Why have a corporate tax rate that is progressive, with lower rates on lower levels of income? Why have lower application fees for small business, such as the lower fees small companies pay to file for a patent? Why even have Small Business Administration loans for mom-and-

pop businesses, as opposed to small manufacturers and high-growth start-ups? The sum of these policies results in smaller, less productive, lower-wage nontraded firms being a larger share of the economy than they would be otherwise. But the policies survive, and even thrive, since it’s a way for both parties to be seen as business friendly.

Ideological Resistance to Innovation and Innovation Policy

It’s not just action based on naked self-interest that limits innovation and innovation policy; action based on ideology does as well. By ideology, we mean an organized system of thought that influences views and positions on issues. In many nations, including the United States, many advocacy groups, journalists, and intellectuals have adopted a distinctly anti-innovation worldview, making it harder for businesses to innovate and for government to support innovation. Moreover, even when some ideologies favor innovation, they reject innovation policy. And in some nations, particularly the United States, the ideology of many business leaders compels them to maintain that government has little or no role to play in fostering innovation. Finally, in some nations, particularly the United States, the United Kingdom, and other Commonwealth nations, neoclassical economists’ ideology leads them to question or to reject innovation policy.

Neo-Luddites and Traditionalists

Incumbents fighting to protect their interests are not alone in opposing innovation. A wide array of groups and individuals ideologically oppose innovation. For example, neo-Luddites (named for Englishman Ned Ludd, whose followers destroyed textile machines at the beginning of the Industrial Revolution) view innovation not as a force for progress to be encouraged, but as something to be stopped. They want a world in which a worker never loses a job; consumer rights trump all else, even lower prices; no personal information is shared, even if sharing benefits society and enables a vibrant Internet ecosystem; the environment is protected whatever the costs; and cities are designed for residents who live in apartments and travel by transit to patronize small, local merchants. In short, they want a world

in which risk is close to zero, losers from innovation are few, and change is glacial and managed.

And just like the Luddites of almost two centuries ago, today's Luddites also believe that innovation kills jobs. This has become a pervasive view, even among media outlets, academics, and policymakers who should know better. In a *Forbes* series on the world of 2020, Martin Ford wrote: "The economy of 2020 may well be characterized by substantial, broad-based and ever increasing structural unemployment, as well as by stagnant or plunging consumer spending and confidence."³⁶ In their book *Race against the Machine*, MIT professors Erik Brynjolfsson and Andrew McAfee agree, stating that workers are "losing the race against the machine, a fact reflected in today's employment statistics."³⁷

Even President Obama has bought into this fallacy that technology's ability to boost productivity costs jobs. During a June 14, 2011, interview with Ann Curry of NBC's *Today* program, he suggested that technology and automation were in part responsible for the U.S. economy's sluggish job growth. The president explained that "there are some structural issues with our economy where a lot of businesses have learned to become much more efficient with a lot fewer workers. You see it when you go to a bank and you use an ATM, you don't go to a bank teller, or you go to the airport and you're using a kiosk instead of checking in at the gate."³⁸

These arguments play to people's fears and at first glance appear correct. But they are wrong. The president's suggestion that technology leads to job loss is simply not the case.³⁹ In fact, U.S. productivity gains were higher before the Great Recession than they are now (and productivity gains were higher still in the 1990s, when job growth was booming), meaning that technological-based productivity gains are not the culprit behind recent sluggish U.S. job growth. In contrast, the vast majority of economic studies show that productivity gains—including through self-service technologies such as ATMs, kiosks, and self-checkout machines—actually lead to more jobs.⁴⁰

When innovations (for example, tractors, disease-resistant crops, and chemical fertilizers) boosted agricultural productivity, the nation needed fewer farmworkers; however, as food became cheaper, consumers spent the money they saved on other things like cars, appliances, travel, and enter-

tainment, thus creating employment in other sectors. This is why the Federal Reserve Bank found that "productivity grew noticeably faster than usual in the late 1990s, while the unemployment rate fell to levels not seen for more than three decades. This inverse relationship between the two variables also can be seen on several other occasions in the postwar period and leads one to wonder whether there is a causal link between them."⁴¹

This is not to say that productivity-enhancing technologies do not sometimes result in job displacement or short-term job loss. But on net, most studies find large gains in jobs from productivity-enhancing technologies in the moderate and long run.⁴² A definitive Organization for Economic Cooperation and Development (OECD) review of the impact of technology on jobs found that "technology both eliminates jobs and creates jobs. Generally it destroys lower wage, lower productivity jobs, while it creates jobs that are more productive, high-skill and better paid. Historically, the income-generating effects of new technologies have proved more powerful than the labor-displacing effects: technological progress has been accompanied not only by higher output and productivity, but also by higher overall employment."⁴³ If economies want to create jobs, innovation—including innovation that drives efficiency and productivity—is a key way to do so.⁴⁴

This kind of opposition to new technology is not unfamiliar. What's new is that, in contrast to a generation ago when neo-Luddites were largely confined to the fringes of the U.S. political debate, today they are accorded widespread legitimacy. Twenty years ago, if someone wrote that the U.S. government is hatching a secret plan to forcibly implant radio frequency identification (RFID) chips under the skin of all Americans, akin to the mark of the beast as prophesied in the Book of Revelation, he or she would have been dismissed as a crackpot. Today, one person making this claim—Katherine Albrecht, in her book *Spychips*—is widely quoted by the mainstream media, testifies at government hearings, and contributes to *Scientific American*, a journal that is increasingly a voice for neo-Luddites. One reason for the rise of neo-Luddism is that it sells. Technology pessimist Nick Carr couldn't sell many books or articles titled "IT Does Matter" or "Why Google Is Making Us Smart." Most people think that information technology (IT) does matter, and that Google is making us smarter. Who wants to buy a book or an article that restates the obvious? But saying that "IT Doesn't

Matter" or that Google is making us "stupid" is bound to get your Amazon ranking up. In reality, the evidence is clear that IT does matter, both to firms and to the economy,⁴⁵ and that IT is making us smarter.⁴⁶

Just like self-interested incumbents, today's neo-Luddites couch their opposition to innovation in terms that make it appear they are fighting for general, as opposed to narrow, interests. By equating productivity and innovation with corporate profit, opponents portray the battle as one between big powerful, multinational corporations on the one hand and honorable civic interests (family farms, mom-and-pop Main Street businesses, privacy, a neutral Internet, competition, or "smart growth") on the other. When the choice is presented this way, rather than between increased standards of living and the narrow interests of neo-Luddites, it is much harder for the advocates of innovation to prevail. Moreover, opponents do not just cast progress as damaging to the little guy, but as risky, uncertain, and dangerous, which helps them mobilize constituencies and raise money. Of course, most opponents are quick to deny that they are actually against innovation; they just want to slow it down, control it, manage it, make sure it is introduced fairly, etc.

The epicenter of the neo-Luddite movement is Europe, where organized campaigns oppose a wide array of innovations, including biotechnology, nanotechnology, information technology, and industrialization generally. Perhaps the poster child of opposition to innovation is Switzerland, given its recent decision to regulate research on bioengineered plants on the basis that plants have "feelings" that deserve respect. Now, researchers in Switzerland must get the government's permission to conduct research on plants to make sure that they don't violate the inherent dignity of their subjects. But Switzerland may be just the most extreme case of this anti-innovation sentiment when it comes to biotechnology and food. In another example, police watched as protesters uprooted genetically modified grapevines at France's National Institute for Agronomic Research. In Spain, dozens of people recently destroyed two fields containing genetically modified crops.

The result is that Europe has fallen behind in both human- and plant-based biotech innovation. In Germany, as reported in *Newsweek*, "a powerful coalition of environmental activists, church leaders, politicians, and

journalists mobilized fears against medical biotechnology as a dangerous meddling with nature, an attack on human dignity reminiscent of Nazi eugenics. With much of the public behind them, lawmakers tightened regulations, bureaucrats refused to grant permits, and even academic research facilities became targets of righteous protest."⁴⁷

Unfortunately, since the early 1990s, these movements have gained considerable strength in the United States and in the Commonwealth nations as well, in part because of generous funding by foundations and some wealthy individuals of so-called public-interest organizations (we say "so-called" because their positions often favor a small group of ideologically like-minded individuals, not the broad public interest). In America, conservative neo-Luddites pressed the Bush administration to place severe restrictions on stem-cell research.⁴⁸ While the Obama administration reversed those restrictions, it has been pressured to act in other areas by Luddites on the Left. For example, left-wing organic food activists pressured the U.S. Department of Agriculture to rule that two additives in baby food (omega-3 fatty acid DHA and omega-6 fatty acid ARA) did not meet guidelines for the agency's organic certification. While not contesting the safety of the ingredients, the activists claim that because they are derived synthetically, they should not be considered organic. Now, parents can feed their infants food that is entirely organic. Yet in doing so, they may put their children at risk. The two ingredients, which had been used in more than 90 percent of organic baby food, were originally adopted by baby formula producers because they more closely mimic breast milk and have been shown to promote cognition and eyesight development in babies.

To be sure, consumers have the right to know what "organic" means. But the effort to set a standard should not be a backdoor way to stop innovation. In addition, while it is prudent and rational to ask serious questions about the moral and societal consequences of scientific change, answers should be based on science and not merely reflect discomfort.

Underlying much of the eco-left's opposition to innovation is an ideology of simple living and local self-sufficiency. Ecotopian Bill McKibben is perhaps the intellectual leader of this movement. Regularly quoted by the mainstream media as a leading voice on climate change and solutions to it, McKibben is, in fact, a radical anti-innovationist. Anyone who calls Kerala,

a state in India with a per capita income less than 5 percent of America's, "profoundly more successful" than America and who pins the hopes of solving climate change on rich nations becoming poor and poor nations staying poor doesn't understand the power of innovation, and probably never has been poor.⁴⁹ Only sustained clean energy innovation, not sustained impoverishment (or for that matter top-down regulation), is the answer to climate change. And it won't arise from a bunch of self-sufficient communities composting their kitchen waste and burning cords of hardwood.

Food and the environment are just two areas among many that innovation neo-Luddites fight. Today, they actively oppose information technology even though IT is the source of more innovation than any other technology. These Internet traditionalists believe the Internet is having unintended and dire consequences. They invoke the purported loss of privacy and net neutrality, and complain that corporations are controlling the use of digital content. As such, these groups press for regulations that would severely limit Internet innovation, while making almost no effort to support policies that would fuel the Internet innovation engine—such as policies to support widespread use of IT in health care, transportation, education, government, and industry.

The poster child of the "stop Internet innovation" movement is the net neutrality movement. Net neutrality refers to the notion that broadband networks should not discriminate (either in quality or price) among packets delivered on their networks. The proponents of strong net neutrality regulations (strong in the sense that they would limit good network discrimination as well as bad) fear that the Internet's unique nature is under threat by the forces of incumbent broadband companies. If "Big Broadband" gets its way, neutralists fear that the Internet will go the way of cable TV, the "vast wasteland" where elitist programming such as *The Wire* competes with advertising-supported, Populist programming such as *American Idol*. But the reality is that the Internet still needs substantial amounts of innovation—both in the core and on the edge—including better tools to manage networks to optimize performance, especially for latency-sensitive applications like two-way video communications such as Skype.

But even innovation on the edge of the Internet scares neutralists. A case in point is how Web companies are using new ways to serve up more

targeted ads to Web users in order to better monetize free Internet content and applications. Like over-the-air television, much World Wide Web content is free because, like television, it is supported by advertising revenue. But as the free Web ecosystem has gotten larger (and seen increased costs) and as technologies have enabled consumers to more easily avoid ads (for example, pop-up blockers), Web sites have increasingly tried to deliver ads that are more relevant to users' actual interests, with the idea that users will be more likely to click on them. They do this by matching what you might have clicked on in the past to build a profile, usually an anonymous one (for example, the person visiting this Web site is likely to be interested in sports).

Yet, for many "privacy fundamentalists," this is part of the development of a surveillance society, where people are tracked in order to limit free speech and to boost corporate profits. For many neo-Luddites, privacy is a fundamental human right that should not be traded in exchange for innovation or productivity, or even quality of life or life itself (in the case of health IT).⁵⁰ Even if most ad targeting is anonymous, neo-Luddites see the use of information about themselves for marketing purposes as dehumanizing. For this reason, they seek rules whereby organizations would not be able to use data for more than the most basic purposes without the affirmative consent of the individual involved.

But limiting Internet innovation has clear costs. Avi Goldfarb and Catherine Tucker found that after the introduction of the European Union's Privacy and Electronic Communications Directive, the effectiveness of online ads fell by approximately 65 percent. The authors note that if European advertisers were to reduce their spending on online advertising in proportion to the loss in effectiveness, "revenue for online display advertising could fall by more than half, from \$8 billion to \$2.8 billion."⁵¹

Nevertheless, opposition such as that to directed Web advertising explains in part why so many governments have not implemented advanced IT innovations. When it comes to the collection and use of data by government, Luddites from both the Left and the Right emerge and make common cause in their crusade against "Big Brother." It largely does not matter whether the goal is to crack down on deadbeat dads, catch red light runners, or prevent terrorist attacks: if it involves the government collecting

more information or using existing information for new purposes, these groups will generally oppose it. In protesting against the growing practice of cities installing red light cameras, former Republican House majority leader Dick Armey railed: "This is a full-scale surveillance system. Do we really want a society where one cannot walk down the street without Big Brother tracking our every move?"⁵² In fact, the use of technology to isolate crucial data or to allow a free Internet to thrive is far removed from the terrifying prospect of an Orwellian world. Just the same, the imagery works and the foes of innovation often dominate the debate.

As Mancur Olson's theory would suggest, neo-Luddites thrive in the fertile ground of nations with less support for innovation. And in many nations, the culture of innovation has become less supportive over time. A case in point is the United States, which came to lead the world in innovation in part because it was willing to accept and embrace risk and change, and then not overreact if there was a problem. There was a general belief in the inevitability of social and economic progress. The stirring musical pageant "Our Country 'Tis of Thee," written by Walter Ehret in the 1950s, is filled with optimistic statements such as: "There was no stopping a nation of tinkers and whittlers, long accustomed to making, repairing, improving and changing," and "So when you're spellin' the word America, do not forget the 'I' for the inventors," and "Progress! That was the word that made the century turn." This optimistic sense was reflected not just in story and song but also in the writings of intellectuals who saw technology as a powerful force for liberation and enlightenment. Economist Benjamin Anderson wrote in the 1930s: "On no account must we retard or interfere with the most rapid utilization of new inventions."⁵³

Today, many pundits are more likely to carry on about the risks of technology. In 2009, when Toyota was accused of having made cars with problems with sudden acceleration that initially couldn't be explained, *Washington Post* columnist Eugene Robinson didn't attack Toyota for faulty engineering, he attacked technology itself, writing that cars are "fly-by-wire too, thus equally at the mercy of information age technology, the fire we purloined from Olympos."⁵⁴ Six months later, a definitive U.S. government assessment showed that the electronics were not faulty. New York University's Neil Postman sums up the Luddite view: "I think the single

most important lesson we should have learned in the past twenty years is that technological progress is not the same as human progress. Technology always comes at a price."⁵⁵

Resistance to the future has become so pervasive that it has almost become second nature. One only has to visit the Smithsonian to see it on display. The Smithsonian was once known as the National Museum of History and Technology, but when Roger Kennedy became director in 1979, in a period when technology was equated with nuclear war and Three Mile Island, he dropped "technology" from its name. While the deletion was symbolic, it reflected the new attitude toward technology. Rather than celebrate it, the Smithsonian began to focus on "the social impact of machines and technology," a code for technology's purported negative and disruptive effects. After reviewing a 1994 "Science in American Life" exhibit, one commentator stated: "There is not much on pure science or the thrill of scientific discovery, and there is a great deal on science's unintended consequences."⁵⁶ Again, this is not to say that it's not appropriate to ask questions about the full impacts of innovation, but all too often this becomes a smoke screen for neo-Luddite opposition.

Just as America once led in innovation and no longer does, it used to lead in public attitudes supporting innovation, but now lags. Consider the World Values Survey (WVS), which asks people in more than sixty nations a range of questions about their values, many having to do with attitudes toward economic growth, technology, and innovation.⁵⁷ One question asked what respondents believe the major aim of their nation should be: (1) a high level of economic growth, (2) strong defense forces, (3) greater say in how things are done, and (4) more beautiful cities and countryside. The differences among nations are striking. Not surprisingly, growth is the top goal in many developing nations. After a half century of Communist-controlled economic failure, Eastern Europeans clearly want growth: 80 percent of Bulgarians and Romanians and 75 percent of Russians and Ukrainians put growth first. Likewise, now that they have discovered the benefits of globalization and innovation, most Southeast Asian nations want growth: 82 percent of Indonesians, 70 percent of Taiwanese and Vietnamese, and 65 percent of Malaysians favor growth. Surprisingly, less than half of Chinese and Indians put growth as their top goal, in part because relatively

large shares favor strong defense and a clean environment. But while many of the emerging nations that compete with the United States put growth first, fewer than half of Americans, and even smaller proportions of Western Europeans and Japanese, believe that economic growth should be their nation's top goal. With the exception of civil war-torn Rwanda, no nation has a larger share of citizens choosing a strong defense (30 percent) than the United States.⁵⁸ Europeans and the Japanese rank even lower on growth than the United States because a large share put "having a greater say in how things are done" as a higher priority than growth. When fewer than half of a nation's population favors growth as the most important aim for their nation, it's hard to mobilize support for innovation and innovation policy.

We see similar attitudes when people are asked about whether more emphasis on technology is good or bad. Again, many other parts of the world strongly favor technology. People in Asian nations in particular see technology as an unalloyed good. The net "good" score (the percent of people favoring technology minus those who see it as bad) was 84 percent in Vietnam, 70 percent in Taiwan, and 53 percent in Malaysia and Indonesia. Even the Asian nations that didn't put growth at the top of the list favored technology. Japan's net "good" score was 62 percent, while China's was a whopping 87 percent. In contrast, the United States' "good" score was just 44 percent and Western Europe's about the same. In other words, citizens in most Southeast Asian nations have a much more positive attitude toward technology than those in the United States and Europe. These attitudes appear to matter, as there is a strong positive correlation (0.44) between the extent to which a nation's citizens think that more emphasis on technology is good and those nations' overall per capita gross domestic product (GDP) growth rate during 2000–2010.

To be sure, in an economy and society buffeted by the winds of change and risk, stability has a certain appeal. But in a world in which innovation is consciously limited, incomes will increase more slowly, and technological progress to improve health and provide new products and services will decelerate. Winning countries will be those that embrace risk and change, see neo-Luddite arguments as special-interest pleading, and resist giving in to neo-Luddite pressures. Asian countries seem to have an advantage

here; they appear more aggressively focused on driving economic growth, face fewer social factors inhibiting innovation, and possess a citizenry eagerly clamoring to experiment with and adopt new technologies.

Businessmen Who Distrust Their State

We've seen how both interest-based and ideologically based neo-Luddites fight innovation. Perhaps this kind of opposition is to be expected. But at least industry should be a natural supporter of innovation policy since the goal of such policy is to spur more competitiveness, innovation, and productivity, particularly in enterprises.

However, as David Vogel argues in "Why Businessmen Distrust Their State: The Political Consciousness of American Corporate Executives," because of historical differences in development patterns and the role of the state, nations differ in the extent to which business leaders favor state support of innovation and competitiveness. Vogel writes: "There is, in fact, relatively little principled opposition toward strong government by French, German, or Japanese businessmen."⁵⁹ However, the prevailing view of U.S. (and U.K., as we note in chapter 3) business executives is that government has little role to play, other than to get out of the way and "do no harm." Vogel continues: "What is so striking about American business ideology is the remarkable consistency of business attitudes toward government over the last one hundred and twenty-five years. A sense of suspicion toward the state has managed to survive the most impressive and decisive political triumphs."⁶⁰ Vogel is not suggesting that business should support central government planning. Rather, his point is that if a nation is to win the race for global innovation advantage, its business community should not reflexively reject any action by government (other than cutting tax rates and supporting education and basic science) as inappropriate.

At a recent roundtable on innovation policy, several experts, including Dr. Atkinson, expressed support for a more active U.S. government role to promote innovation, including the development of a national innovation and competitiveness plan that identifies key technology areas, such as electric batteries. One business executive immediately took exception, arguing that the United States didn't need an "industrial policy"; rather, the government

should just “let a thousand flowers bloom.” Ironically, the executive worked for the American division of a Japanese car company that had benefited from the Japanese government’s well-funded strategy to develop batteries for electric cars. Upon questioning, the executive confirmed that, yes indeed, the Japanese government’s “industrial policy” to support battery innovation played an important role in his company’s success in the marketplace, but even so, the United States should not copy these kinds of policies. It was his mind-set as an American executive that shaped his opinion, for such views are in the DNA of U.S. business executives.

It’s not just individual executives who hold such beliefs. Much of organized business views government this way. When the U.S. Chamber of Commerce touts such bromides as “We know that only American free enterprise is capable of meeting this challenge and creating the innovation and opportunities of America’s future,” it sends a clear signal that government policy to spur innovation is not wanted. Despite the fact that U.S. manufacturing has been losing in the race for global innovation advantage, the National Association of Manufacturers (NAM) is hardly any better in its lack of robust support for government policies to spur industrial renewal. NAM proclaims that “the private sector generates economic growth that benefits all citizens. Therefore, a central objective of federal fiscal policy should be to provide a favorable climate in which the private sector can flourish.”⁶¹ For NAM, government just needs to leave its members alone and all will be well. And of course, the National Federation of Independent Businesses is on the same page, as exemplified by Chief Executive Dan Danner’s statement that “politicians do not create jobs. Jobs will be created by the hard working small business men and women when these entrepreneurs have taken enough calculated risks needed to expand their businesses.”⁶²

One could argue that the Chamber of Commerce and the NFIB have these views because they represent Main Street companies that do not need a government supportive of innovation. Indeed, other innovation-based industries are in fact more favorable toward government innovation policy. For example, the Information Technology Industry Council, a trade association representing major IT hardware, software, and device companies, actively supports government innovation policies in the areas of science and science education, trade policy, and technology platforms like health IT and the smart grid.

Surely, the individuals who work in entrepreneurial technology companies must hold a similarly supportive view. After all, the federal government has played a key role in the development of the IT, biotech, and energy industries. But often they don’t. In testimony to the House Science Committee, Paul Holland, general partner at the Silicon Valley venture capital firm Foundation Capital, worried that prior testimony had implied that government should have too much of a role, and argued (incorrectly) that government had nothing to do with the success of companies like Intel, Apple, or Google.⁶³ Paul Mason, managing director for Starnet, LLC, a San Francisco firm that operates R&D partnerships, echoes this dismissive view, stating: “In our system, our government is not organized to innovate. Government . . . only collects taxes and divides up power.”⁶⁴ Michael Arrington, founder of the Silicon Valley blog “TechCrunch,” complained that it was time for Washington to “just leave Silicon Valley alone.”⁶⁵ No need for a more generous R&D tax credit, intellectual property (IP) protections, federal funding of research, or a trade policy to protect open markets? To say that such ideologically inspired statements blithely ignore history is an understatement.

While distrust of a proactive role for government in innovation is deep in the psyche of American business, perhaps this is beginning to change, in part because more business leaders see their own companies challenged by foreign companies that are backed by their states. In 2010, General Electric CEO Jeff Immelt acknowledged that China is becoming increasingly hostile to foreign multinational firms, stating: “I really worry about China. I am not sure they want any of us to win, or any of us to be successful. We are a pathetic exporter . . . we have to become an industrial powerhouse again but you don’t do this when government and entrepreneurs are not in synch.”⁶⁶ Immelt went on to volunteer his time and leadership to chair President Obama’s Jobs Council. Former Intel CEO Andy Grove writes: “Our fundamental economic beliefs, which we have elevated from a conviction based on observation to an unquestioned truism, is that the free market is the best of all economic systems—the freer the better. Our generation has seen the decisive victory of free-market principles over planned economies. So we stick with this belief, largely oblivious to emerging evidence that while free markets beat planned economies, there may

be room for a modification that is even better.⁶⁷ Former Microsoft CEO Bill Gates has called on the United States to develop a major clean energy innovation strategy: "To achieve the kinds of innovations that will be required, I think a distributed system of R&D with economic rewards for innovators and strong government encouragement is the key."⁶⁸ Dow Chemical CEO Andrew Liveris has written a book, *Make It in America*, about renewing American manufacturing.⁶⁹ Only time will tell whether Immelt, Grove, Gates, and Liveris are anomalies or representative of a maturing U.S. business community as it wakes up to the nature and scope of the international competition it faces.

The Neoclassical Economics Naysayers

In most nations, policymakers look to economists for both guidance and blessings on their economic policies in general and innovation policies in particular. Unfortunately, depending on the economic doctrines subscribed to by these economists, policymakers can get very different advice about how or even whether to spur innovation.

It would be one thing if economics were like physics. When the Chinese government wants advice on how photons are transferred on fiber-optic cables, their physicists will tell them the same thing that American, Brazilian, or French physicists would tell their governments. But if they want advice on how to grow their economy, their economists will tell them very different things than would U.S. economists. For the dirty little secret in economics—as much as economists wish it weren't so—is that economics is more an art than a science, and different economists have quite different views. This means that nations whose economists understand the importance of innovation and the need for smart innovation policies will more likely do well in the race for global innovation advantage.

Unfortunately for some nations, especially the United States, the experts charged with dispensing economic advice and passing judgment on economic policy proposals are neoclassical economists, who neither understand nor appreciate innovation. What's worse, they look suspiciously at even the most "light-touch" attempts to spur innovation through proactive policies as being destructive "industrial policy."

Who are neoclassical economists? The short answer is most economists, at least most of those advising policymakers in the United States and Commonwealth nations. The membership card for this club is a Ph.D. in economics, not from just any Economics Department but from one at an esteemed university teaching the right (that is, neoclassical) brand of economics. At the top of the economics hierarchy are either leading scholars at the top economics departments or scholars who have also done a stint in government, usually as secretaries or undersecretaries in Treasury Departments or Finance Ministries, advisers to national leaders (in the United States, this means being on the Council of Economic Advisors or National Economic Council), or heads of budget agencies. Lower-ranking but still top-quality economists hail from less renowned universities and occupy less important government posts (such as assistant secretaries). Members span the political spectrum. In the United States, for example, Greg Mankiw and Glenn Hubbard spent time in the Bush administration before going back to academia (Harvard and Columbia, respectively). Likewise, Robert Lawrence and Alan Blinder served as top advisers for President Clinton before returning to ivy-clad halls (Harvard and Princeton, respectively), while Larry Summers (Harvard), Peter Orszag (Brookings), and Christina Romer (Berkeley) all advised President Obama.

Neoclassical economics is a straitjacket when it comes to innovation policy. To understand why, consider its basic tenets. A guide to help high school students study for the Advanced Placement Macroeconomics test defines economics as "the study of how to allocate scarce resources among competing ends." In other words, neoclassical economists don't study "how societies create new forms of production, products, and business models to expand wealth and quality of life" (that is, innovation). Rather, they study how commodities are exchanged in price-mediated markets—why, for example, one manufacturer sells more widgets than others. Federal Reserve Bank economist Stephen LeRoy notes: "The single most important proposition in economic theory, first stated by Adam Smith, is that competitive markets do a good job in allocating resources."⁷⁰ But the unasked question is how companies produce widgets in the first place. Innovation doesn't come from allocating widgets more efficiently; it comes from making widgets more efficiently and, more to the point, by inventing

better widgets and then developing better models by which to sell them (maybe selling widgets over this new thing called the Internet). In short, the real issue is how to expand the economy's supply potential (in economics speak, how to move the long-run supply curve to the right). Conventional economists know little about this issue, and much of what they think they do know is wrong. As noted innovation economist Joseph Schumpeter once stated: "The problem that is usually visualized is how capitalism administers existing structures, whereas the relevant problem is how it creates and destroys them."⁷¹

U.S. policymakers interested in crafting policies to achieve an additional 15 percent increase in per capita GDP in ten years will get little in the way of guidance from the neoclassical economics guild residing at think tanks or government agencies, especially the Treasury and the Office of Management and Budget (OMB). Seeking such guidance would be a fool's errand because neoclassical economists would just report that there is little the government can do to boost long-term growth. At best, they hope government will avoid missteps that would reduce the fixed rate of growth the "market" will produce on its own. No wonder economics is known as "the dismal science."

Alan Blinder summed up the conventional view when he stated: "Although economics can tell the government much about how to influence aggregate demand, they can tell it precious little about how to influence aggregate supply. . . . Nothing—repeat, nothing—that economists know about growth gives us a recipe for adding a percentage point or more to the nation's growth rate on a sustained basis. Much as we might wish otherwise, it just isn't so."⁷² And it doesn't really matter much whether the economists are Democratic or Republican; the advice is largely the same. Greg Mankiw, former CEA director in the Bush administration, states that "the sources of strong productivity growth [in the 1990s] are hard to identify."⁷³ With advice like this, no wonder the U.S. political dialogue gives scant attention to innovation-led growth and policies needed to promote it.

To the extent that conventional economics focuses on growth at all, it is based on what is called the Solow growth model, named after MIT economist Robert Solow, who in the 1950s tried to explain how the U.S. economy expanded. In this pioneering work, he found that the likely factors (for ex-

ample, capital investment and education levels) accounted for very little. The residual—the part not explained by the variables—was actually much larger. Solow called it "technical change." But this wasn't really saying much, for as Stanford economist Moses Abramovitz famously stated, the residual represented "the measure of our ignorance." And after more than fifty years, this is still the case. Conventional economists continue to look at innovation as Solow did: it falls like "manna from heaven." Or, to put it more formally, conventional economics sees innovation as exogenous—or outside their models—and therefore beyond legitimate economic inquiry. As Harvard's Elhanan Helpman notes in *The Mystery of Economic Growth*, "The subject of growth has proved elusive and many mysteries remain . . . the mystery of economic growth itself has not been solved."⁷⁴

If innovation is so important, why does conventional neoclassical economics ignore it? Akin to the drunk who looks for his keys under the streetlamp, conventional economics ignores innovation because so much of it is in the dark and hard to measure. As Mankiw states, "Knowledge is an unmeasurable variable." For neoclassical economists, if you can't measure it and put it in a complex mathematical equation, it simply doesn't matter. What is under the streetlamp of these economists? Sitting under the bright lights of macroeconomic statistics are measurable processes of exchange (such as investment levels, interest rates, inflation rates, sales of goods and services, and money supply). Consequently, they rely on complex, calculus-filled mathematical models incorporating these variables rather than on actual studies of how businesses, industries, and national economies work.

When neoclassical economists acknowledge any role for government, they envision it as simply to ensure a good business climate, including protecting property rights and providing public goods like science and education. Anything beyond that is derided as "industrial policy," or even worse, socialism. And while liberal economists want the government to intervene, it's not to spur growth but to ensure a fairer allocation than the market will produce. But they see this as coming at a price. As Alan Blinder writes, "Policy changes that promoted equity (such as making the tax code more progressive or raising welfare benefits) would often harm efficiency."⁷⁵ But as a liberal neoclassical economist, he would sacrifice growth for fairness, arguing that "we need not summarily reject a substantial

redistributive program just because it inflicts some minor harm to economic efficiency.”

In other words, conventional economists believe that the pretax marketplace is efficient and that government policy (like taxes, regulation, and spending) distorts Adam Smith’s “invisible hand.” When asked if the government should be focusing on key industries (like robotics), former Obama economic czar Larry Summers reflected this conventional view and dismissed the idea out of hand, claiming: “I think anyone who has studied some of the countries that we compete with, who’s studied our own country’s experience with synfuels, for example, has to recognize that it’s a mistake to think that people sitting here in Washington, no matter how well motivated, are going to be as attentive to what customers want, what can and what cannot be commercialized.”⁷⁶ It’s okay for California (if a country, the world’s eighth largest) to pick winners, but not the United States. In dismissing the need for actions by the government to help boost U.S. competitiveness, Mankiw framed the choice in this overly simplistic way: “Policymakers should not try to determine precisely which jobs are created, or which industries grow. If government bureaucrats were capable of such foresight, the Soviet Union would have succeeded as a centrally planned economy. It did not, providing the best evidence that free markets are the bedrock of economic prosperity.” Thus, he makes a bold leap from having a modest government role in guiding innovation to Stalinism.

If nations want to craft effective innovation policies, they must be guided by economic thinking grounded in the twenty-first century, not the twentieth. As we discuss in chapter 5, the innovation economy is rife with “market failures” and leaving it only to “what customers want” is leaving it to less innovation and competitiveness. This is why an increasing number of nations, including many in Western Europe and Southeast Asia, look for guidance not to neoclassical economics but to “innovation economics,” a new theory of economic growth based on an explicit effort to understand and incorporate innovation into economic models.⁷⁷

Innovation economics reformulates the traditional economic growth model so that knowledge, technology, entrepreneurship, and innovation are central goals, resulting from intentional activities by economic actors, including government. It is guided by three key principles: First, that the

central focus of economics should be on growth as opposed to business cycles or the neoclassical goal of allocative efficiency. Innovation economists focus on the actual processes of production and innovation, such as trying to determine why firms develop and adopt new technologies and what policies can spur them to do more. Thus, while neoclassical economists tend to rely on complex mathematical models, innovation economists care and study more about how businesses, industries, and national economies actually work.

The second principle is that innovation drives growth. In some studies, innovation economists have found that as much as 90 percent of per capita income growth comes from innovation.⁷⁸ In fact, the major changes to the U.S. economy since the mid-1990s have occurred not because the economy accumulated more capital to invest, but from innovation. The economy developed and used a wide array of new technologies, particularly information technologies. Although capital was needed for these technologies, it was not the driver; nor was capital a commodity in short supply, as evidenced by the glut of capital flowing into subprime loans in the 2000s. As such, innovation economics is focused on spurring economic actors—including individuals, enterprises and organizations, industries, and even cities, states, and entire nations—to be more productive and innovative.

Finally, innovation economics holds that while markets are important, left to themselves they will not produce the amount of innovation and growth possible without supplementation by strong public innovation policies. As Harvard’s F. M. Scherer explains, the conventional model “assumes perfect competition, constant returns to scale, and the absence of externalities. . . . All three assumptions have been questioned, often convincingly, by new growth theorists.”⁷⁹ Or, as innovation economists Philippe Aghion, Paul David, and Dominique Foray counter with reference to neoclassical assertions that markets alone almost always get it right, “The empirical foundations for such sweeping statements remain remarkably fragile.”⁸⁰

Governments That Ignore Innovation

Interests and ideologies that support, not oppose, or are indifferent to innovation are key to enabling nations to enjoy robust innovation rates. But

to maximize innovation, nations also need a political system that supports it. Governments that put innovation at the center of their economic policies will do better, all else being equal, than governments that let other issues dominate the political process. And as we discuss in chapter 6, many nations have developed and implemented national innovation policies in order to better position themselves to win the race for global innovation advantage. Yet as we have also seen, in some economies, innovation never makes it on the stage because the stage is crowded with redistributionists. Since the early 1990s, U.S. redistributionists from both the Right and the Left have created a politics that ignores important economic issues in favor of either unimportant or destructive ones. Some interests fight for policies that do nothing to help Industrial Street and Office Complex Street; some fight against policies to help these sectors; and neither side fights for policies that would help them. Even worse, U.S. politics is increasingly dominated by hot-button, red state-blue state issues such as abortion, health care, gun control, immigration, and other sociocultural issues. Innovation policies seem always to remain the bridesmaid, never the bride. Congress talks about making the R&D credit permanent, but never does. Legislators recognize the importance of high-skill immigration, but get caught up in politics over broad-scale immigration reform. Lawmakers pass legislation authorizing more investment in science, but then don't appropriate the funding. They talk about reducing the effective corporate tax rate, but don't. They complain about ineffective trade enforcement, but can't find a way to give the U.S. Trade Representative's Office more resources for enforcement. But why would they do these things when the core economic constituencies of each party are onstage, putting on a passion play featuring Main Street redistributionists? Elected officials have only so much time and attention, and if they are spending most of it on these sidetrack issues, they can't focus on the real issues of how to keep the innovation engine healthy.

But even if we could wave a magic wand and confine the redistributionist NFIBs and CTJs to a small stage over on K Street (the street where many lobbying firms reside), Washington would still find it hard to actively support innovation, because Washington is hamstrung not only by political but also ideological gridlock. Republicans are all too often focused on limiting government's role in the economy, while Democrats want to increase

it, but often in ways that would limit innovation. At the end of the day, both parties see it as the job of businesses to spur innovation. Government's job, if you are a Republican, is to give people "freedom" from taxes and regulations; and if you are a Democrat, it's to give people "fairness," entitlements, and protection from big business. As a result, both conservatives and liberals frequently leave questions of innovation and productivity off the political stage.

For many Republicans, particularly the more conservative "Tea Party" wing, a proactive innovation policy is synonymous with heavy-handed "industrial policy" or even state socialism. They believe that "government failure" is always worse than market failure. As a result, for many conservatives, the best innovation policy is a minimalist agenda focused on creating a favorable environment for the private sector through a simple and less burdensome tax code, limited government regulation, a trade agenda that simply signs more trade deals, and the devolution of many functions back to the states.

While many Democrats support public investment in science and education, social issues such as expanding health-care coverage, regulating carbon emissions, protecting consumers and workers, and helping disadvantaged individuals and communities all too often take precedence. And when tough choices have to be made between promoting innovation and supporting redistribution, their choice is usually for the latter. For example, rather than fund the America COMPETES Act in 2007—which authorized increased funding for science and science education—Congress increased funding for items like farm subsidies, income security, and health care. (Congress did later provide a one-time allocation of funds for COMPETES in the stimulus bill.) Moreover, much too often, their inclination is not to support innovation but to protect Americans from it by erecting regulatory and trade barriers. To be sure, it's important to get social policies right, particularly in an era of increasing income inequality and heightened economic risk. But absent innovation policies to produce desirable economic opportunities for American workers, social policies will be at best a limited backstop.

Both conservatives and liberals need to recognize that their long-standing views are a deterrent to success in the twenty-first-century race for global innovation advantage. Both liberal and conservative anticorporate and

antigovernment stances amount to an abandonment of U.S. corporations and high-growth entrepreneurs in their fight for global market share and U.S. jobs. We should want American establishments and entrepreneurs to win this fight. We should want American establishments to have the best workforce, science, and technology transfer systems in the world. We should want American establishments to benefit from competitive tax and regulatory systems. We should want other nations to pay for U.S. exports and not steal them or force American companies to sell at lower than market prices. We should want U.S. companies to be able to innovate around technology platforms that government helps support. We should want them to have access to the best and the brightest from around the world. And we should want them to be able to access foreign markets, but in nations that are playing by the rules.

Conclusion

Innovation is in some ways quite simple: organizing societal resources (research, finances, knowledge, skills, and entrepreneurial effort) to generate new products, processes, and business models. And the way societies can support innovation is to erect as few roadblocks as possible and devote the resources needed to make it easy to improve the status quo. Recognizing the need for innovation is central. As we have seen, all of this is easier said than done. The next chapter assesses nations' and regions' prospects for overcoming these barriers to innovation.

Can Nations Overcome the Barriers to Innovation?

There is no doubt that winning at innovation involves hard work, although a measure of luck doesn't hurt. Just ask Mark Zuckerberg, who happened to get Facebook to market and gain a critical mass of users faster than the social network's competitors. But at the end of the day, if the result of any individual effort to innovate involves a set of odds, the chances of success escalate if the individual takes the right steps. Societies are no different. If nations are organized so that individuals and organizations have the right incentives to innovate, the resources needed to innovate, and access to the customers who want innovation, then the odds increase significantly that they will be an innovation leader.

Balancing the Yin and Yang of Innovation

As we have seen, national innovation success requires not only putting in place the right policies to support innovation, but also reducing the barriers to innovation. Both depend on finding the right balance between three key sets of potentially competing factors: (1) individual versus collective