America Needs an Industrial Policy

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The phrase "industrial policy" conjures up images of Europe's dirigiste failures, corruption in African and Latin American economies, and the disastrous 1984 presidential campaign of Walter Mondale. In board rooms and think tanks and even university class rooms across the country, the term generates an instinctive revulsion hardwired by decades of listening to laissez-faire and supply-side economic thinkers, from Milton Friedman and Martin Feldstein to George Gilder and Arthur Laffer. The phrase recalls humiliating policy failures from Solyndra and Evergreen Solar at one end to Soviet five-year plans at the other, more sinister end—not to mention the Great Leap Forward.

All this explains why industrial policy has been, by and large, a taboo subject among American politicians as well as economists. That is, until now. There's been a recent shift in mood and attitude about the proper role of government in shaping America's economic destiny. There's a growing fear that limiting government's role to merely umpiring market mechanisms is hurting both our economic future and our national security. There is a growing belief that policy options beyond market fundamentalism must exist, and that a failure to pursue these alternatives might put us on a different road to serfdom.

Those options would be especially attractive if they managed to avoid a radical uprooting of America's basic economic landscape, or supplanting the

normal incentives that foster economic growth and innovation. If, instead, government's attention were simply focused on bolstering the handful of key industries that will determine the global balance of power in the twenty-first century—and where in many cases America already has a lead, though one that will quickly diminish if action isn't taken soon—the notion of industrial policy might gain some new political as well as intellectual traction.

What is industrial policy? Usually it's a term referring to a program of economic reforms that give the government extraordinary authority, as well as fiscal and regulatory powers, to change a country's industrial structure or —less ambitiously—promote a targeted sector of the economy. According to economists Howard Pack and Kamal Saggi, it refers to "any type of selective intervention or government policy that attempts to alter the structure of production toward sectors that are expected to offer better prospects for economic growth than would occur in the absence of such intervention."[I] The goal is to correct what are identified as market failures in sectors where the normal workings of supply and demand, and market competition, aren't able to achieve certain economic or other national goals.

In general, industrial policies in the past have had three characteristics that set them apart from other forms of macroeconomic policies. First, they are usually focused on the manufacturing sector and infrastructure, as well as "infant industries" which are seen as crucial for future economic growth and competitiveness, but which are too small or too nascent to attract the kind of capital investment that would normally foster their growth.

Second, industrial policy often implies direct interventions in the nation's trade policy, by imposing tariffs, quotas, and other restrictions on imports from foreign competitors; controlling the flow of certain materials and goods to purchasers abroad; and sometimes even providing direct subsidies or price incentives for exports. This latter practice is usually denounced by international competitors as "dumping" (a charge brought against Japan, one of the main practitioners of industrial policy, during the 1970s and '80s), just as tariffs are denounced as a form of "protectionism."

Third, reliance on industrial policy is usually more typical of "mixed economies," where the active role of government in economic and business affairs is normal and accepted. Examples include the newly industrialized countries (or NICs) of Asia, which followed the example of postwar Japan, with government directly managing economic recovery and growth; countries in Latin America and Europe; and African countries eager to find solutions to underdevelopment through government action—often to their disappointment (for reasons we will examine later).[2]

In the United States, however, the use of industrial policy measures has been viewed with suspicion throughout most of the twentieth century—conveniently ignoring the fact (which industrial policy advocates never tire of pointing out) that protectionist tariffs helped to spur America's industrial growth in the nineteenth and early twentieth centuries, until the United States finally became the dominant industrial power in the world.

On the other hand, industrial policy's spotty record elsewhere has made suspicion of its methods and goals seem justified. For every Japan or Taiwan

that has made a success of industrial policy, there are Argentinas, Brazils, Ghanas, and Ugandas where industrial policy has proved a failure.

To critics, then, the phrase smacks of government failure, rather than market failure, and socialism. To advocates, however, industrial policies are a useful and necessary way to deal with a declining economic situation, especially a dwindling or uncompetitive domestic manufacturing base, which orthodox free market, laissez-faire policies can't or won't address.

As Dov Zigler remarked in a recent article in *American Affairs*:

> The market system excels at incentivizing economic efficiency, finding and commercializing uses for advanced technologies, and allocating resources to suit preferences. Increasing domestic market freedom might also advance the nonutilitarian goal of securing the rights of citizens. But a more perfect market system in itself is not a substitute for an awareness of national priorities or the strategic pursuit of national goals.[3]

Proponents of national industrial policies can be highly critical of unfettered markets and the necessarily limited effect of government efforts to stimulate economic growth solely through fiscal policies like tax cuts, or monetary policies like adjusting interest rates. But unlike doctrinaire socialists, the goal of industrial policy isn't to curb private enterprise but to spur it in a new direction—an outcome that's vital to national interests but which markets alone are unable to achieve.

Over the past four decades, America has operated under two assumptions that have governed the relationship between government and the private

sector: (1) Left to itself, the private sector will always figure out how to solve our most pressing economic challenges by investing where capital is needed most. And (2) the sector of our economy that has been the most innovative and successful in recent decades, the sector symbolized by Silicon Valley, will always rise to the challenge of sustaining economic growth as well as protecting our national interests.

More recently, however, politicians, academics, and the public are realizing that these assumptions aren't working—especially in the face of the growing threat from China. There's an increasing awareness that the United States needs to readjust its economic strategy in a fundamental way.

Responding to the Rise of China

The progressive rise of China from economic competitor to geopolitical challenger to strategic threat has dramatically shifted attention away from the drawbacks—and toward the virtues—of industrial policy. While other issues like the loss of manufacturing jobs and economic stagnation in America's heartland have stimulated interest in a more active role for government in the economy—one could argue those concerns elected Donald Trump president in 2016—the reality of China's march toward global hegemony at America's expense has generated a sense of urgency to resolving old debates on industrial policy. That includes the belated realization that the first two problems, the loss of jobs and decline of manufacturing industries, can be directly traced back to China's rise as an economic rival.

It's also becoming clear to American political and corporate elites that the expectations they once entertained about U.S. and Chinese economic integration were wrong. Increasing interdependence has not accrued equally to the benefit of both economies. And China's prosperity has not brought political as well as economic reform—i.e., ending the Communist Party of China's (CPC) monopoly on political power and curtailing the influence of state-owned enterprises.

In fact, China and the CPC have pursued very different plans. Far from embracing the laissez-faire approach that is prevalent in the West, the Chinese have set in motion a far-reaching industrial policy of their own, which has culminated in President Xi Jinping's visionary plan dubbed Made in China 2025 (MIC 2025).

As Bonnie Glaser, director of the China Power Project at the Center for Strategic and International Studies, testified to Congress earlier this year: "Although the goal of MIC 2025 is to upgrade industry writ large, the plan targets ten strategic industries in which China intends to foster the development of not only national champions but global champions."[4] The ten priority sectors are

> 1) advanced information technology; 2) automated machine tools and robotics; 3) aircraft and aeronautical equipment; 4) maritime vessels and marine engineering equipment; 5) advanced rail equipment; 6) new energy vehicles; 7) electrical generation and transmission equipment; 8) agricultural machinery and equipment; 9) new materials; and 10) pharmaceuticals and advanced medical devices.[5]

Perhaps not surprisingly, these are all areas in which the United States has been the clear leader for decades, but in which China now intends to overtake us. MIC 2025 is part of Chinese president Xi Jinping's larger strategy for restoring China to what he believes is the country's rightful place as a great power by 2049, in time for the centennial of the PRC's founding. "At the 19th Party Congress in October 2017, Xi even laid out a multi-stage plan with specific goals for 2020, 2035, and 2050," Glaser noted. "By 2035, he said China would be a top ranked innovative nation and by the middle of the century would be transformed into a leading global power."[6]

Americans have finally awakened to what some of us have been arguing for more than a decade: China is not merely an economic competitor, as Japan was in the 1970s and '80s, but a major threat to U.S. global leadership. China's long-standing pattern of serial cyber theft, IP theft, and predatory trade practices; its militarizing of the South China Sea; its "anti-access, area denial" maritime strategy aimed at the U.S. Navy; and its massive One Belt One Road initiative are all linked together in China's national strategy, of which its comprehensive industrial policy is a natural—and increasingly effective—part.

Unfortunately, the U.S. response so far has been fragmentary and uncoordinated. It has featured on-again, off-again tariff wars and dithering about what to do in response to Huawei's dominance of the world's advanced wireless 5G technology. Meanwhile, we have failed to shore up our own decaying defense industrial base. American policy regarding the growing Chinese threat has been less than effectual, even as there is increasing awareness that we are seriously offtrack.

A clarion call has gone out for a change of direction, including a new national economic strategy—one that might seriously be described as an industrial policy. One of the most forceful advocates of this message is Senator Marco Rubio. Rubio's critique is not just aimed at the failure to deal with China, but the deeper misalignment of U.S. corporate incentives and the role of government, or lack of it, in shaping capital investment priorities. As he wrote in the *Atlantic*,

> For too long, government and business leaders alike have stood back and endorsed supposedly unstoppable global forces that have made life harder for working Americans. But inaction will not restore the dignity of work or usher in a new American century that values dignified work and wages like the last one. It doesn't have to work this way. Supply-side theory—that increased investment benefits workers in the long run—only works if investment actually increases.[7]

The *Atlantic* article echoed key passages of a report by the Senate Small Business and Entrepreneurship Committee (which Rubio chairs) from this February, recommending the creation of a national innovation board:

> Properly aligned with national priorities, markets in trade and finance can drive tremendous economic progress. Left to their own devices, expanding for expansion's sake, however, they provide market actors the framework to endlessly seek out new efficiencies, regardless of whether such efficiencies are in the national interest, or in some cases even in the interests of the firm's own product value.[8]

In both the article and the report, Rubio put his finger on one of the key areas of American vulnerability in this regard: the high-tech sector. The Made in China 2025 plan makes clear that China views winning the struggle for high-tech supremacy as a necessary part of its grand strategy to replace the United States as the world's leading superpower. As Trump economic adviser Peter Navarro remarked on *Meet the Press* in April, "What's at stake here . . . is the industries of the future . . . artificial intelligence, robotics, quantum computing. And what's at stake is not just our economic prosperity. If I may, it's also our national security. Because many of these industries of the future have profound military implications."[9]

Is the U.S. economy ready to compete in this struggle—or even see high tech as an arena of geopolitical conflict? Sadly, many indications suggest that we are not.

On the contrary, some of America's largest firms have become allies of China's push to achieve high-tech, and therefore geopolitical, supremacy. Companies such as Google, Microsoft, and Apple have contributed to the building of China's closed internet, or the Great Firewall. Meanwhile, instead of burnishing its image as the engine of innovation for the American economy, Silicon Valley has become a symbol of entrenched interests known to critics as Big Tech. One of the largest of all, Google, has left itself open to charges of being unpatriotic, even treasonous, by supporting China while it refuses to support the U.S. Department of Defense with certain key programs.

Whenever commercial convenience collides with larger national interests, there has been a fairly anemic response to the challenge. Whether we call

this a market failure or not, there has certainly been a failure to decide where American economic resources need to be directed, and to act accordingly.

So if the old paradigm for aligning our high-tech economy with the national interest is broken, what's the alternative? Fortunately, another paradigm exists, and not a theoretical one. It's the one I described in my book, *Freedom's Forge*, on America's transformation into the Arsenal of Democracy during World War II. The book details how the U.S. government harnessed the power and innovation of America's private industrial sector to win the greatest war in history. The new threat from China is more complicated, but the lessons are still relevant. The current geo-economic competition is, in the words of Robert Blackwill and Jennifer Harris, "war by other means."[10] If Beijing achieves its goals, America will be displaced as a superpower.

Perhaps it's no coincidence, then, that the book is finding a new audience in Washington and across the political spectrum. Former secretary of defense Patrick Shanahan has described it as his favorite book; President Trump's special economic advisor Peter Navarro also speaks highly of it.[11] According to the *New Stateman*, *Freedom's Forge* has even been heavily touted by Representative Alexandria Ocasio-Cortez's staff as a model for their Green New Deal.[12] Washington governor Jay Inslee has praised it for the same reason.[13]

Of course, one does not have to support the Green New Deal to recognize the appeal of the green Left's campaign to use an all-of-government approach to restructure our economy and to refocus resources where they will have the most impact. These proposals speak to a deep need among

Americans for an approach to the economy very different from the one that has prevailed since Reagan's day.

The sobering reality is that the old paradigm is broken. The future depends on whether America gets its economic house in order, and sets its strategic sights higher, especially in high-tech sectors and our defense industrial base.

Fortunately, the message of *Freedom's Forge* is not that we need to abandon the market economy. Instead, this successful paradigm *maximizes the advantages of market discipline and private sector innovation and minimizes the disadvantages of government direction and intervention*, while also using the potentially disruptive impact of new technologies as strategic leverage. In short, it aims to secure the virtues of industrial policy while minimizing its shortcomings.

Industrial Policy in American History

The idea that the state should play a major role in guiding a country's economic future is of course not new. Governments performed that function in mercantilist Europe in the sixteenth and seventeenth centuries by promoting investment in export industries and putting up barriers to imports, while also controlling the flow of skilled artisans and raw materials. The assumptions underlying mercantilist policy received a devastating riposte from Adam Smith in his *Wealth of Nations*. The policy that "nations have been taught that their interest consisted in beggaring all their neighbors," was wrong. Rather, Smith argued, the promotion of commercial wealth through foreign trade and the expansion of domestic production of consumable goods were the true sources of national strength. *Wealth of*

Nations became the holy writ of free market capitalism, and the source book for policies based on limiting, not expanding, government control over markets and the larger economy.

But that did not deter the first secretary of the treasury in the new republic of the United States, Alexander Hamilton. Hamilton knew Smith's work well; he by and large agreed with Smith that "fleets and armies are maintained, not with silver and gold, but with consumable goods." But he was also convinced that Smith's hands-off role for government in helping to generate that wealth—though it might be suitable for a globally dominant economy like Britain's—would not work not for a new county like the United States, with its incipient manufacturing base and relatively weak maritime posture.[14]

Instead, a new approach was needed—one which, ironically, bears considerable resemblance to the approach China has taken in recent years. In his groundbreaking *Report on Manufactures* published in 1791, Hamilton urged Congress to promote what we would call America's industrial base, so that the United States could be "independent on foreign nations for military and other essential supplies." In addition to protecting national independence, support for manufacturing would level the playing field in the global markets of the day. Since European governments regularly subsidized their manufacturers, America would only be able to compete by following the European lead.[15]

Hamilton envisioned a future in which the new republic would be in competition with Britain and other European powers, which would necessarily lead to conflict, including armed conflict. This is why Hamilton

also wanted to make sure America had a strong navy.[16] But the principal tool Hamilton believed Washington should use to help manufacturers was tariffs. In fact, the tariffs he set forth in his *Report* were the only recommendations Congress decided to enact.

By and large, tariffs became the principal tool by which the U.S. government protected and fostered its industrial base for the next century. It was under Woodrow Wilson that the paradigm shifted to emphasizing free trade and free markets—not surprising since by the early twentieth century the United States had become the dominant industrial power.[17] Free trade subsequently became more or less an American economic orthodoxy, one that the State Department preached around the world during the FDR administration.

All the same, every president since Calvin Coolidge has also looked for ways to get industry, labor, and government all moving in the same direction, with government policies leading the way. The most extensive, and most notorious, attempt was the National Recovery Administration (NRA) under FDR, which aimed to force industry, labor, and government to work together to set prices and set up "fair practice" codes. Killed off by the Supreme Court, some elements of the NRA, such as price controls, wound up being adopted during World War II.[18] But after the war, fiscal and monetary policy meas-ures were seen as more than adequate to foster economic progress; in fact, after the advent of supply-side economic theory, many believed tax cuts alone would do the trick.

Interest in a more active government role made its comeback in the 1980s. American politicians and some economists gazed with admiration and envy

at the success of countries like Japan and Korea, where economic growth followed important structural reforms that expanded the central government's role in supporting and even subsidizing certain industrial sectors—in other words, industrial policy.

The article that summed up the new trend was written by Robert Reich in the *Harvard Business Review* in 1982, entitled "Why America Needs an Industrial Policy." "Today competitive leadership requires the ability to adapt to a changing world economy," Reich wrote, "and government can help reduce the cost of adaptation in two ways: (1) by smoothing the movement of capital and labor out of declining industries and (2) by ensuring the availability of both capital and labor to promising sectors of the economy—that is, by accelerating the adjustments that capital and labor markets would otherwise achieve more slowly on their own." He continued:

> Industrial policy focuses on the most productive pattern of investment, and thus it favors business segments that promise to be strong international competitors while helping to develop the industrial infrastructure (highways, ports, sewers) and skilled work force needed to support those segments. . . . Proponents of industrial policy argue that an American company cannot achieve international leadership without government support. They do not mean, however, that government should second-guess the strategic decisions of business by picking "winners" and "losers," or that business should depend on government largesse. They mean simply that the strength of the United States economy will increasingly rest on public policies that complement the strategies of individual companies. Industrial policy is emphatically *not* national

> planning but rather a process for making the economy more adaptable and dynamic.[19]

Reich even insisted, "As a theory, industrial policy is closer to the strategic planning models used by many companies than to traditional macro- or microeconomics." With the looming presence of Japanese economic success, and reaction against Reagan's adoption of supply-side economics, the New Industrial Policy became a major issue in the 1984 presidential campaign. Democratic presidential contenders Gary Hart and Ernest Hollings, and nominee Walter Mondale, were NIP enthusiasts; President Reagan was a steadfast NIP opponent.

When Reagan won in a forty-nine-state landslide, the appeal of NIP faded fast. The positive impact of the Reagan tax cuts, as the U.S. economy began growing at an average 3.5 percent clip, also put paid to claims that America's best economic days were behind it—though Reagan's Defense Department, believing the economy was growing less competitive, actually prepared plans for a technology-based industrial policy, never to be implemented.[20]

Following the financial crisis of 2008, there was a flurry of new interest in industrial policy, but critics insisted that it wouldn't work, and that it didn't even work for the countries usually associated with its success, namely Japan and the Little Dragons. Michael Schuman, in a 2010 *Time* magazine essay "Does America Need an Industrial Policy," explained how the rise of Japan had triggered the initial interest in industrial policy. "In the 1960s and 1970s, the bureaucrats in Tokyo were the patron saints of modern industrial policy," he wrote, "who employed special loans, trade protection, and other methods of support to nurture new industries that could compete in

international markets. . . . That's when the calls began in the U.S. urging Washington to adopt similar policies, or lose out to Japan and its supposed superior economic model."

Schuman found, however, in researching his book *The Miracle: The Epic Story of Asia's Quest for Wealth*, that industrial policy probably aided a small number of new industries in Japan, South Korea, and Taiwan. "The reason companies in 'targeted' industries, like shipbuilding in Korea or electronics in Taiwan, have proven so successful is that the private entrepreneurs who launched them used the state support they received wisely and made products that people wanted to buy on international markets." In fact, some of the most successful Japanese industries, such as consumer electronics and motorcycles, never received significant aid from the Japanese government—nor did successful individual companies like Sony or Honda.[21]

In 2016, the left-of-center Brookings Institution published a blog post by Georgetown professor Shanta Devarajan (former economist at the World Bank) entitled "Three Reasons Why Industrial Policy Fails."[22] The first reason Devarajan listed was "existing distortions," meaning failures that were blamed on the inadequacy of free markets were very often due to other more pervasive distortions in the economy, "such as labor market regulations, energy subsidies, and the like. In this setting, correcting the market failure associated with industrial policy may not promote industrialization; in fact, it may make matters worse. . . . [G]overnments would do better to identify the biggest distortions in the economy (such as energy subsidies) and work on correcting them."

The second problem was what Devarajan called "political capture," where "industrial policies are too easily captured by politically powerful groups who then manipulate it for their own purposes rather than for structural transformation." This can also happen in reverse with what's called "regulatory capture," in which the dominant private sector companies and players manipulate the government's interventionist role for their own purposes.

The third problem, Devarajan explained, was that "Industrial policy has typically targeted sectors. The discussion of 'picking winners,' based on some variant of comparative advantage, is usually about which sectors should receive preferential treatment. But sectors don't trade; firms do." Any economic sector is made up of a wide range of separate companies and entities, some large and some small; some badly managed and some well managed; some enjoying more advantages, for example superior intellectual property or lower labor costs, than others. "These observations have led to research on the characteristics of successful firms (such as the quality of management) and the possibility that industrial policy would be more effective if it targeted these characteristics rather than all firms in a sector"—yet this is traditionally what an industrial policy does not do.[23]

By the end of 2016, then, the case against industrial policy seemed largely closed. Yet the threat from China was looming larger and larger, and the U.S. economy remained sluggish and dependent on low interest rates. The 2017 tax cuts did not produce nearly the effect that Reagan's had. Meanwhile, the contradictions of America's approach toward industrial policy were growing more apparent.

In fact, a new book by New York University economist Thomas Philippon, *The Great Reversal: How America Gave Up on Free Markets*, strongly argues that we already have an industrial policy. It is one decided by the largest American businesses who successfully lobby Washington to protect their interests from competition or, in many cases, even innovation—a classic case of regulatory capture. Philippon's conclusion strongly echoes Rubio's: in today's normal business climate, "industry leaders' shares of investment and capital have decreased while their profit margins have increased. This is the opposite of what a hypothesis of superstar firms would predict," including in the high-tech industry.[24] This de facto industrial policy also does nothing to protect American interests vis-à-vis China.

So, whether we call it industrial policy or something else, we urgently need a new paradigm. Urgently, not just because of the immediate China challenge, but because the development of advanced technologies can rapidly transform economies of scale and determine the course of future innovation, without which the U.S. economy is doomed to stagnate—and with it, American power.

Ultimately, we can say that the future of freedom itself may be at stake—not just economic freedom but its political and moral versions. We are rapidly approaching an existential moment eerily similar to the technological competition that occurred in the early stages of the Cold War. Fortunately, our own history can point us to the right model.

Lessons from the Arsenal of Democracy

America's mobilization for World War II is one of the examples of an industrial policy that, nearly every expert agrees, worked. That is one reason why it is invoked so often, along with the race to the moon, even though building the Arsenal of Democracy was far more comprehensive in its reach and impact (for example, the race to the moon never involved sequestering strategic materials or suspending antitrust laws).

It's worth recalling the impressive numbers that the Arsenal of Democracy ran up. From the onset of the mobilization program in July 1940 through August 1945, the United States produced $183 billion worth of war materiel. That included 141 aircraft carriers, 807 other naval surface vessels, 203 submarines, 342,000 aircraft, 88,000 tanks and self-propelled guns, 257,000 artillery pieces, 2.4 million trucks, 2.6 million machine guns, and 41 billion rounds of ammunition—more than two-thirds of all the war materiel used by the Allies in World War II.[25]

Even more impressive was the speed with which this massive government intervention—into nearly aspect of the U.S. economy for more than five years—was dismantled to allow the return to normal civilian life. Indeed, as I pointed out in a 2014 article, the demobilization of America's military-industrial complex provided an efficient glide path to unprecedented growth and affluence for Americans in the 1950s and '60s.[26] One could argue that the American economy returned even stronger than ever, thanks to the experience of being organized for war production. It certainly returned with new innovative tools, from synthetic rubber and jet propulsion to nuclear power. Finally, the Arsenal of Democracy's original imperative—to arm America from an almost standing start—carried its legacy over into the Cold

War, with America commanding an arsenal for the free world unprecedented in scale and depth.

Of course, no one is seriously proposing an industrial policy as sweeping as the mobilization for World War II. But uncovering its lessons will be key to devising an effective industrial policy which targets the key sectors of the U.S. economy that will be essential for preserving our national and economic security, especially in our high-tech industries.

From that perspective, I would identify six important principles crucial to the development of the Arsenal of Democracy that should be hallmarks for any effective industrial policy today.

(1) Clearly define the challenge. Contrary to myth, the goal of American mobilization was not to arm the U.S. military—not at first. In the summer of 1940, when the Roosevelt administration began to gear up our military industrial base, the goal was rather to keep Great Britain alive and fighting. As I detail in *Freedom's Forge*, the war production ramp-up began a full year and a half before December 1941. If the United States had waited longer, Nazi Germany might have consolidated control not only in Europe but in the Mediterranean and Middle East. The most urgent need was first to arm allies against the Axis, which eventually generated the industrial momentum to arm the United States as well, in order to confront the threat directly.[27]

The key lesson is that an industrial policy aimed to deal with a specific threat, in this case competition from China, has a much better chance of succeeding and coordinating resources than one aimed at more vague targets such as "creating jobs" or "making America more competitive."

(2) Find the right talent to plan an overall strategy. From the start, FDR understood that he needed key industry leaders, for example General Motors CEO William Knudsen, to take the lead in devising a strategy and mobilizing resources rather than rely on government bureaucrats, including the experts of his so-called Brain Trust. Knudsen, in turn, asked for the help of the biggest and most productive companies in America to organize the initial effort. Their expertise and experience became the basis upon which an overall plan could take shape.

The actual strategy itself can consist of a number of different elements associated with industrial policy. They could include directed tax incentives to spur capital investment in key sectors and discourage investment in others; formation of joint industry-government boards to oversee the expansion of production (as happened during World War II); actual government investment in research and development, and in physical plants and facilities (similar to how the Defense Plant Corporation financed the creation and expansion of wartime production sites); targeted tariffs or restrictions against foreign competitors; pooling materials and resources, including intellectual property, essential for fostering sector growth; or organizing and investing seed money for fostering incubators and start-ups in critical sectors. In an important sense, what tactics are used are less important than having an integrated strategy in the first place.

(3) Spread the effort as widely as possible, even to companies that have never participated in a sector before. Knudsen relied on the biggest companies (Ford, GM, General Electric, U.S. Steel, AT&T) to lead the way, but not to do the job alone. He encouraged new players to join the effort. This was how companies like Henry Kaiser Co. Ltd., which had built dams but never

maritime vessels, became involved in producing Liberty ships and ultimately built the largest steel plant on the West Coast, and one of the most advanced in the world. It was how Ford became involved in producing an entire aircraft, the B-24; General Electric began designing and producing bazookas; and hundreds of subcontractors were involved in making a variety of war materiel from landing craft and machine guns to search lights and radar sets. This not only sped up overall production by having as many companies involved as possible; it also allowed cross-cutting innovation to take place, as outside companies brought new ideas to old systems and processes.

Today, this would mean, for example, not limiting the effort to build an effective 5G network to telecom companies and their usual suppliers, but including other companies that excel in productivity and technical skills. This also means thinking "outside the sector" in ways that avoid one of the chief problems with industrial policy: simply making the biggest bigger, with a government-sanctioned de facto monopoly. The goal isn't to make the big companies bigger and more powerful; it's to use their knowledge and expertise to guide the rest of the sector forward. It involves diffusing the secrets of production from the top down, while absorbing the instinct for innovation from the bottom up. None of this will work, however, without the proper role of government.

(4) Keep all noses pointed in the same direction. This was Knudsen's homey description of the essential role of the "boss" on an industrial job, or an executive in a corporation: making sure that the diverse activities on an assembly line or in a corporation are all aimed toward the same goal. That also defines the essential role of government, not only in the making of the

Arsenal of Democracy but in any effective industrial policy, which is oversight, not oversteering: not picking winners or losers but rewarding success while punishing failure. During World War II, Washington bureaucracies learned to limit themselves to making sure that production targets were met and resources kept flowing, with price controls and allocations on strategic materials, for example, without directly interfering in the production process itself or micromanaging costs.

Instead, government was able to exercise oversight through an effective combination of both carrots (introducing for the first time cost-plus contracts for the defense industry plus the lifting of anti-trust statutes) and sticks, the most important of which was the Senate Committee to Investigate the National Defense Program, led by Missouri senator Harry Truman, otherwise known as the Truman Committee. Established in 1941, "the committee held hundreds of hearings, traveled thousands of miles to conduct field inspections, and saved millions of dollars in cost overruns."[28] A visit by Truman Committee members became every contractor's worst nightmare; for those who engaged in fraud or abuse, it could mean a jail sentence.[29]

In general, the private sector's freedom of action in advancing war mobilization was balanced by strict accountability to the public sector—and vice versa. One of the principal dangers in implementing an industrial policy, regulatory capture, was studiously avoided. While contractors' responsibilities were carefully defined and their powers limited, so were those of the government.

(5) Devise an exit strategy. The power of the war production machine that Knudsen and American business had built to win World War II was such that by the spring of 1944—more than a year before the end of the war in Europe—the chief problem facing the War Mobilization Board was how to *de*mobilize and return to peacetime production. In fact, by then "reconversion" had become the key catchphrase across wartime industries. Trade publications like *American Machinist* ran entire issues on how companies could handle Termination Day—how to disengage from their contracts with the War or Navy Departments and begin reconverting to their normal business lines. In June 1944, T-Day had become as important as D-Day to the future of the U.S. economy. Fourteen months later, when the war was over in both Europe and Asia, the transition to civilian commerce was extraordinarily smooth, even though many had predicted economic chaos. As I pointed out in *Freedom's Forge*,

> There was a brief hiccup in the last half of 1945 and early 1946, as national output dropped and unemployment rose to 3.9 percent. As price controls were lifted, inflation rose by 20 percent. Then things smoothed out. Private capital investment, which had gone flat and even turned down during the war, tripled from $10.6 billion in 1945 to $30.6 billion in 1946 and never looked back. . . . As one economist [Robert Higgs] has put it, "As the war ended, real prosperity returned almost overnight."[30]

An effective industrial policy must have the same clear lifecycle perspective: one with a starting line and almost a finish line, when either goals are met or when it's clear they won't be, and a new strategy, and policy, is needed.

(6) Find the right leadership. As Joseph Badaracco and David Yofee wrote in their November 1983 *Harvard Business Review* response to Robert Reich's original article, "Proponents of industrial policy know how hard it is to formulate a coherent economic strategy in a democracy."[31] Very true, and the Arsenal of Democracy was as much the accomplishment of two individuals—FDR and William Knudsen—who became the symbols as well as the primary motivators of the wartime production miracle. This was more than just a matter of public relations. It included Knudsen's powerful discovery that we could use America's most important *economic* advantage, its gift of civilian mass production, to offset our opponents' *military* advantage in equipment, experience, and training (as the opposing forces existed in 1940–41). This became the core of the entire Arsenal of Democracy strategy—an offset strategy avant la lettre—which Knudsen reiterated through every part of the war production effort, and which remained its guiding principle until the end of the war.

Likewise, it was President Kennedy's indomitable support for the space race, in the face of constant criticism and resistance within his own administration, that made reaching the moon possible. One could say the same for Ronald Reagan and the Strategic Defense Initiative (SDI).

Is there a need for similar personal leadership of an industrial policy aimed at leveraging our existing advantages in certain high-tech sectors, a person who would express and also embody its core strategy? Absolutely. But first it's necessary to have a look at what areas are in need of such leadership, and how we are destined to fare if we don't make a change of course, and soon.[32]

A Strategy for Reindustrialization

We can start where the Arsenal of Democracy left off, namely our own defense industrial base some seventy years on. Since World War II, Americans have been accustomed to the idea that our country's economic base is always ready to give our armed forces whatever they need, whenever they need it. Such was the legacy of the Arsenal of Democracy: whatever you thought about the military-industrial complex as it existed during the Cold War, it would always be there when needed. A report from the White House released in September 2018, however, revealed that our defense industrial base is in serious trouble, and has been for decades.

In 1961, the same year President Dwight Eisenhower was warning us about a "military-industrial complex," fifteen defense companies were in the top 100 of the Fortune 500. In 2015, only four aerospace and defense companies made the top 100 list, with much of their revenue coming from nonmilitary commercial activities. General Dynamics—number 15 in 1961—barely made the bottom of the list, at number 100.

Since 2000, the report said, the entire defense industrial base has shed more than 20,500 U.S.-based manufacturing firms (along with many more jobs). Much of the work they used to do has been sent overseas, including to China. The U.S. machine tools sector—essential for making anything that requires manufacturing—has been shrinking since at least the 1980s, while China has been surging ahead and is now the world's top producer.

By peering deep into the defense supply chain, the report found more than 280 major supply chain vulnerabilities and an alarming dependency on foreign nations, especially China. (These issues, not surprisingly, are even more pronounced in civilian sectors. At present, nearly 80 percent of the

commercial drones used in the United States and Canada come from a single company, DJI, which is headquartered in Shenzhen, China.)

Today the Navy currently has only one firm manufacturing and refurbishing shafts used by both surface ships and submarines. Only one production line produces all the large-caliber gun barrels, howitzer barrels, and mortar tubes used by our armed forces.[33]

Fortunately, the Defense Department is trying to do something to address the gap. Efforts like its Manufacturing Technology program and the Industrial Base Assessment and Sustainment (IBAS) program are serious attempts to strengthen the industrial base, including training the next generation of machine tool operators and other manufacturing workforce personnel. IBAS, for example, under its director Adele Ratcliff, has launched an effort to gear up manufacturing competitions in twenty-one states (dubbed, significantly, the Freedom's Forge initiative) to encourage younger workers to learn the skills they'll need, and our defense industrial companies will need, to compete internationally in the next generation of assembly line technology, including the onset of 3-D printing as a "just in time" manufacturing application.

These are all skills, and an industrial base, that markets have passed by even though they are vital to our national defense. And though Congress recently gave the effort $20 to $30 million in additional annual funds under Title III of the Defense Production Act, that's a tiny amount compared to the effort made by China to strip industrial capacity away from the United States.[34] The Chinese have been out-planning, outspending, and out-resourcing the

United States—sometimes with the help of our own high-tech industry—to build the defense industrial base of the future.

For example, companies like IBM and Cray used to have a near-monopoly on supercomputers. Over the last decade, however, China has pushed the United States into second place among nations with the most supercomputers. According to TOP500, a project that has tracked supercomputer development for more than two decades, 206 of the world's fastest computers are now in China, compared with 124 in the United States. In fact, two of the four fastest machines on the list—the Sunway TaihuLight and the Tianhe-2A—are in China. America recently regained the top spot with the development of the Summit supercomputer at Oak Ridge National Laboratory, but this is a race in which the number of Chinese contestants is growing while the number of American ones is shrinking.[35]

Microchips are essential for all modern information technology. Again, the field used to be dominated by the United States, and today China's chip industry is still roughly one-ninth the size of ours. But Beijing is spending more than $30 billion to expand its domestic production as part of the Made in China 2025 initiative, even as America's microchip industry is steadily shrinking. China understands that developing the most advanced semiconductor technology will position its chip makers not only to dominate the future market but also to give it a leg up in a third area of the conflict: artificial intelligence (AI).

While Americans still worry about whether AI research will lead to a Terminator-style "rise of the machines" scenario, China has set a national

goal of spending $150 billion to become the AI global leader by 2030. A recent Brookings Institution report notes that "China has become the world's leading AI-powered surveillance state," using voice, facial, and biometric data to keep track of its citizenry while also employing AI in preparation for cyberwar and kinetic war scenarios.[36] Unfortunately, in this endeavor the Chinese are getting help from an American company, Google, that has built a major AI center in China to be staffed by Chinese scientists —just as U.S. chipmakers have been helping China improve its competence and capacity in manufacturing advanced microchips.

In the case of 5G telecommunication networks, which will connect everything from cellphones to home thermostats to driverless cars, and move data roughly twenty times faster than today's 4G (including government data), the United States is just beginning to think about the standards needed for the high-cost infrastructure that 5G networks will involve. China, by contrast, is looking to dominate the 5G future by setting core technical standards that the rest of the world will have no choice but to accept. Today, Chinese IT giant Huawei (which the Trump administration has banned from selling 5G equipment in the United States) has more than ninety countries signed up to either use or test its 5G equipment, including many of our NATO allies.[37] If there isn't a 5G national strategy in place soon, America will be a telecom island unto itself—the equivalent of a 1990s household using Betamax video equipment while the rest of the neighborhood is using VHS.

The fifth and possibly most important area is the race to build the first large-scale quantum computer. By using subatomic particles and the principles of quantum physics to process data, quantum computers will easily outperform

the fastest supercomputers in solving complex mathematical puzzles. They will also be able to unlock, in a matter of seconds, virtually every public encryption system the world uses today. In 2017, China started building a $10 billion facility in Anhui Province to develop quantum technology for both military and civilian uses. Chinese IT giants including Alibaba and Huawei are part of a national quantum-computer development effort, and Chinese applications for patents in quantum technology, particularly quantum-encryption technology, have increased dramatically this year.[38]

Meanwhile, Congress and the White House are just getting around to thinking about how to maintain our current lead in quantum-computing technology, with a quantum information science subcommittee taking shape at the Office of Science and Technology Policy. A bill dubbed the National Quantum Initiative Act, passed by Congress and signed by President Trump, allocates $1.25 billion over the next five years toward research in the quantum field.[39] But that's still only a fraction of what the Chinese government is already spending, to say nothing of what Alibaba and Huawei will do at Beijing's behest.

A Larger Strategic Vision

Today the United States is engaged in a struggle with China that dwarfs the stakes of the War on Terror. In terms of its potential to shape the future, it is a struggle approaching the significance of the Cold War.

The difference is that this one is being fought not with tanks and armies on the battlefield, nor with submarines and carriers at sea, nor even with ballistic missiles armed with nuclear warheads guided by satellites in space—

although these are still important, as is keeping them supplied and working. The bigger conflict is being waged right now on computer screens, in research labs, in corporate boardrooms, and on factory floors—the arena where competing economies of scale and national interests collide.

Increasing government budgets alone isn't the best answer; a national strategy is. Whether we call this an industrial policy, or a New Arsenal of Democracy, it will be vital not only for our economic security but for our national security as well. The same technologies that drive the global economic future will enable us to defend our country and allies. Failure to prepare for one will inevitably destroy the outlook for the other.

Of course, we should have a clear understanding of what can go wrong. We've seen the folly of governments trying to pick winners and losers in advanced technologies like clean renewables. We've also seen how entrenched bureaucracies, both government and corporate, can frustrate change. We are right to worry about industrial policy leading to de facto corporate welfare by which national policy regarding a specific industry is dominated by a handful of oligopolistic players for whom any real change of the status quo is a direct threat.

Of all these dangers, regulatory capture, through which public priorities and resources are held captive by private interests, probably looms largest in today's Washington. But this problem is manifestly present already, and the threat stems less from government intervention per se than from a lack of a strategic vision, one that aims to stretch capabilities but also accepts and embraces economic and national security realities.

Given these caveats, and given the global competition with China, what would be required to fit the *Freedom's Forge* model to today's circumstances, for an industrial policy dedicated to fostering critical sectors and technologies? Four primary issues stand out.

First, of course, there needs to be a clear, comprehensive strategy that leverages existing advantages into offset factors in global competition, much as Bill Knudsen and American business did with flexible mass production during World War II. The Obama Pentagon attempted to do something similar with their Third Offset Strategy launched in 2014–15. But there was never time to integrate the Pentagon's push for adopting the advanced warfighting technologies it needed (like AI, robotics, and unmanned systems) into a larger economic strategy—let alone to address the Pentagon's needs as a stakeholder in future technologies like 5G and quantum.[40] Such a comprehensive approach—developing a visionary program such as "Restoring American Leadership 2025" to offset "Made in China 2025"—is even more needed now.

Second, there has to be firm and persistent presidential leadership aimed at making private and public sectors work together rather than at cross purposes. President Trump or his successor needs to become the face, and driving force, of a high-tech industrial policy in the same way that FDR was for the Arsenal of Democracy, Kennedy for the race to the moon, and Reagan for SDI.

Third, there has to be close coordination with allies. During World War II, America had the industrial base to single-handedly arm ourselves and our allies. As we've seen, that self-sufficient base no longer exists. Even in

advanced technologies, we live in an age of global supply chains with a much more level playing field in terms of the global distribution of technical expertise and research. We need to plan and work closely with allies like Britain, Canada, Japan, and South Korea in these critical areas, while also working to limit technology and knowledge transfers to our leading antagonists, especially China.

Fourth, there has to be a firm commitment to reforming the status quo rather than simply trying to patch it up and move on. "Resiliency" is no longer enough, whether we are talking about protecting the cybersphere from future quantum attack or securing our defense industrial base or deploying the vanguard technologies of the future. Economist Bruce Scott once observed that a coherent industrial policy is more of a political than an analytic challenge.[41] It's an issue too big to be left to economists, or even politicians. Unity of effort is key: establishing common ground between government and industry is where leadership and political will are the most important resources we have.

By following the *Freedom's Forge* paradigm, it's possible to renew the innovative strengths that built the Arsenal of Democracy, nurtured America's post-Sputnik scientific and engineering renaissance, enabled the moon landing, spurred the growth of nuclear power and the birth of the internet, and which can now revive our defense industrial base and secure our high-tech future. As Bill Knudsen observed, "We can do anything if we do it together." It became the watchword of World War II. It can exercise the same power in the twenty-first century.

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[3] Dov Zigler, "Radical Markets versus Sensible Politics," *American Affairs* 2, no. 3 (Fall 2018): 53–63.

[4] *Made in China 2025 and the Future of American Industry*, 116th Cong. (2019) (statement of Bonnie S. Glaser, Director, China Power Project, Center for Strategic and International Studies).

[5] Glaser.

[6] Glaser.

[7] Marco Rubio, "America Needs to Restore Dignity of Work," *Atlantic*, December 13, 2018.

[8] *Made in China 2025 and the Future of American Industry*, Project for Strong Labor Markets and National Development (February 2019).

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[10] Robert D. Blackwill and Jennifer M. Harris, *War by Other Means: Geoeconomics and Statecraft* (Cambridge: Belknap, 2016).

[11] Jeff Schogol, "This One Book Will Tell You Everything You Need to Know about Acting SecDef Patrick Shanahan," *Task and Purpose*, January 27, 2019.

[12] Paul Mason, "Alexandria Ocasio-Cortez's Green New Deal Is Radical but It Needs to Be Credible Too," *New Statesman*, February 13, 2019.

[13] Jay Inslee, "Why the Climate Campaign Is the Most Important Campaign," interview by Chris Hayes, *Why Is This Happening?*, NBC, July 25, 2019.

[14] *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton: Princeton University Press, 1986).

[15] *Alexander Hamilton's Famous Report on Manufactures* (Boston: Home Market Club, 1892).

[16] Gerald Stourzh, *Alexander Hamilton and the Idea of Republican Government* (Stanford: Stanford University Press, 1970).

[17] Arthur Herman, *1917: Lenin, Wilson, and the Birth of the New World Order* (New York: Harper, 2017).

[18] Gary Dean Best, *Pride, Prejudice, and Politics: Roosevelt versus Recovery, 1933–1938* (New York: Praeger, 1991).

[19] Robert B. Reich, "Why the U.S. Needs an Industrial Policy," *Harvard Business Review* (January 1982).

[20] But even Reagan couldn't resist the appeal of a more active role for government to make America more competitive with its global rivals, particularly Japan. A classified U.S. Defense Intelligence Agency program established in 1983 and dubbed Project Socrates aimed at finding a strategy for coordinating resources to make the United States more competitive in world markets through advanced technologies, while remaining true to the spirit of free market capitalism (the program never caught on, and was axed by Reagan's successor George H. W. Bush). But the program's progenitor, Michael Sekora, did use the effort to raise awareness that America's declining competitiveness wasn't just because the Japanese weren't playing fair, but had deeper structural causes.

[21] Michael Schuman, "Does America Need an Industrial Policy," *Time* (September 17, 2010).

[22] Shanta Devarajan, "Three Reasons Why Industrial Policy Fails," *Future Development* (blog), Brookings Institution, January 14, 2016.

[23] Devarajan.

[24] Thomas Philippon, *The Great Reversal: How America Gave Up on Free Markets* (Cambridge: Belknap, 2019).

[25] Arthur Herman, *Freedom's Forge: How American Business Produced Victory in World War II* (New York: Random House, 2012), 335–36.

[26] Arthur Herman, "How America Got Rich," *Commentary* (September 2012).

[27] Hence the term Arsenal of Democracy which FDR coined in December 1940: "democracy" meant primarily Great Britain (and also China resisting Japan).

[28] United States Senate, "The Truman Committee" (overview).

[29] Herman, *Freedom's Forge*, 197–98, 205–8.

[30] Herman, *Freedom's Forge*, 339. See also Herman, "How America Got Rich."

[31] Joseph L. Badaracco Jr. and David B. Yoffie, "'Industrial Policy': It Can't Happen Here," *Harvard Business Review* (November 1983).

[32] I do not mention funding not because it isn't important, but because it is more important that the right strategy is arrived at. Sometimes that doesn't require government funding, let alone active support. The fracking revolution unleashed the animal spirits of the energy industry without federal largesse and even despite resistance by the Obama administration; indeed at a time when federal largesse was directed at clean renewables. The fracking revolution was instead driven by the desire to reduce U.S. dependence on foreign oil and push prices down.

[33] Arthur Herman, "Could We Launch Another D-Day Now?," Fox News, June 6, 2019. See also: Interagency Task Force in Fulfillment of Executive Order 13806, *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*, U.S. Department of Defense, September 2018.

[35] Herman, "The High-Tech War with China."

[37] Arthur Herman, "America Needs to Win the Battle for 5G Supremacy," *National Review*, September 24, 2019.

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[39] National Quantum Initiative Act, H.R. 6227, 115th Cong. (2018).

[40] Arthur Herman, "The Pentagon's 'Smart' Revolution," *Commentary* (June 2016).

[41] Bruce R. Scott, "How Practical Is National Economic Planning?," *Harvard Business Review* 56, no. 2 (March/April 1978).