

A Manufacturing Renaissance:

*Bolstering U.S. Production for National Security
and Economic Prosperity*

Report of the Task Force on National Security
and U.S. Manufacturing Competitiveness

November 2021

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“In some cases the disruptions of a changing world economy have caused personal hardship for America's workers. And in those cases it’s our commitment to help those workers move into healthy and growing industries, and we’ll meet that commitment... Given a level playing field, Americans can outproduce and outcompete anyone anywhere on Earth.”

- President Ronald Reagan, May 29, 1986, Remarks to the Annual Meeting of the National Association of Manufacturers



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This report was prepared over the course of a year-long study and includes input from a diverse set of Task Force members, briefers, and senior advisors. Opinions and conclusions expressed herein do not necessarily represent those of each of these individuals or their organizations.



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EXECUTIVE SUMMARY

America is in the midst of reinvigorating its economy and faces a rapidly evolving set of security challenges. Confronted with significant dislocation in the workforce and an ever more complex strategic competition with the People's Republic of China, we must adapt to maintain our competitive edge. At the same time, the American economy continues to undergo dynamic transformation due to technological innovation and a changing global security environment.

The COVID-19 pandemic underscored manufacturing's essential role in ensuring our national health, safety, security, and economic vitality. It also revealed how vulnerable the global supply chains are to shocks and disruptions. These dynamics have occurred at a moment when new technologies, process innovations, input trends, and demand patterns are reshaping manufacturing worldwide, creating opportunities and challenges for America's companies and workers. Against this backdrop, the United States must build an agenda that recognizes the importance of domestic manufacturing for national defense and economic strength, both today and in the future.

Our economic competitiveness depends on creating more manufacturing capacity and capability in the United States, which benefits our national security and strengthens our leverage and positioning in global competition. Whether we can do this more successfully than our rivals, primarily China but also others, will determine the future of American interests and the nature of our interconnected world. A free and open international system that provides the basis for relative peace, security, and stability in both the economic and security realms is at stake.

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America's manufacturing ecosystem has been a vital engine of economic growth and innovation for more than two centuries. It played a critical role in developing and driving the technologies that sustain our national security and economic competitiveness. Unfortunately, that engine no longer fires on all cylinders. A rising China's industrial production and military capabilities are beginning to challenge, and in some cases eclipse, those of the United States. Chinese leadership is leveraging state industrial and technological planning to achieve global economic and military power. In doing so, it has made substantial progress in achieving its stated goals of supplanting America as the world's foremost economy and recasting the rules-based international system.

Our declining manufacturing competitiveness leaves America's economic infrastructure and defense capabilities underprepared for geopolitical events, global competition, and even major armed conflict. To revive our manufacturing base and maintain our edge as the world's leading economy, the United States must employ innovative thinking from both the public and private sectors. This is a national challenge that transcends political boundaries and traditional approaches—and we must marshal our full strength to overcome it.




KEY CHALLENGES FACING THE U.S. MANUFACTURING SECTOR

Americans have long understood that manufacturing and national security are inextricably linked. In his 1791 “Report on Manufactures,” the nation’s first Secretary of the Treasury, Alexander Hamilton, urged congressional action to support American industrial strength for economic and military reasons. Nearly two hundred years later, a report on industrial competitiveness commissioned by President Ronald Reagan made a similar observation. Recent assessments ordered by President Trump and President Biden, along with the bipartisan House Armed Services Committee’s Defense Critical Supply Chain Task Force, have reinforced the urgency of strengthening America’s manufacturing sector and supply chain resiliency to the benefit of U.S. national and international interests.

In the spirit of this tradition, our Task Force on National Security and U.S. Manufacturing Competitiveness, comprised of experts from the fields of national security, manufacturing, capital markets, supply chains, and public policy, has focused on fully understanding the challenges involved in revitalizing America’s manufacturing competitiveness and devising solutions to support economic growth, supply chain resiliency, and national security. This report outlines our findings and highlights a set of signature recommendations.

We believe the United States will need to address six major challenges impeding our global competitiveness:

- 1. A significant technical skills gap in manufacturing.* We believe that the future of U.S. manufacturing competitiveness and national security begins with investments in the American worker. Winning the war for talent and ensuring our workforce has 21st-century manufacturing training are critical to prevailing in geopolitical competition. As production technology changes, so too must the workforce. However, America needs to address the underlying factors that have made talent attraction and retention so challenging. Today we have a unique window of opportunity to close the critical skills gap facing the nation and, in doing so, sustain the economic growth necessary to maintain U.S. military and technological supremacy over global competitors. Industry surveys repeatedly highlight the skills gap as a top cause of derailed manufacturing plans and a problem that business leaders are unsure of how to address on their own.
- 2. Unsatisfactory productivity gains.* While the United States enjoys high overall labor productivity, our gains have slowed substantially. U.S. labor productivity growth was 2 percent per annum from the 1990s through 2010 but fell below 1 percent from 2010 to 2020, and now lags the average productivity growth of other G7 nations.¹ This erodes the competitiveness of American products in foreign markets. To ensure cost-competitive goods on the global market, the United States will need to boost productivity across the entire manufacturing sector, from scale-based to R&D-based manufacturing, by embracing process improvements and bolstering leading-edge digital technical capabilities.
- 3. Inadequate capital investment in manufacturing.* Limited returns have historically diminished the attractiveness of many fixed capital and infrastructure investments. Although U.S. firms in capital-intensive manufacturing industries average higher return on invested capital than their European and East Asian counterparts, they have failed to sufficiently reinvest in plants, property, and equipment. Years of lagging investments now mean that U.S. firms have significant ground to make up to modernize their equipment and facilities. Estimates suggest that the U.S. semiconductor industry, for example, must invest \$3 trillion in R&D and capital improvements to remain competitive.



4. *An exceedingly fragile supplier ecosystem.* Many strategic manufacturing sub-sectors in the United States rely on a single small- or medium-sized manufacturer for parts and supplies—and these suppliers are constantly vulnerable given their reliance on a small, unpredictable stream of orders to keep the lines running. From 1998 to 2017, the United States lost nearly 70,000 small- and mid-sized manufacturing firms, many of which fell in industries critical to national security.

5. *Insufficient coordination among federal, state, and local actors.* A lack of coordination, integration, and accountability on region-specific manufacturing issues, like permitting and infrastructure investment, often produces a ripple effect across an entire national industry, undercutting higher-level innovation and manufacturing growth goals. Tackling these challenges requires integrated effort among all actors and stakeholders.

6. *Inadequate architecture for international cooperation.* As Beijing uses debt diplomacy and other tools of economic statecraft to influence state behaviors, it is incumbent upon the United States to bring together like-minded democracies to address issues at the intersection of national security and economics. Working in conjunction with trusted allies and partners will unlock a future of collective competitiveness vis-à-vis China and other competitors. Some multinational structures are already in place to advance this goal, but those structures must be strengthened and expanded.



SIGNATURE RECOMMENDATIONS

There are no “silver bullets” to solve these challenges, nor did this Task Force address all areas of economic competition or opportunities for cooperation with China. There is significant ongoing debate surrounding a number of related topics, including tax policy, energy policy, labor costs, and infrastructure spending, which have major implications on manufacturing competitiveness. We have considered expert testimony, recommendations from other task forces and commissions,² and existing legislation when crafting these recommendations. Our recommendations may overlap with those of other bodies but should not be considered an exhaustive set of all feasible solutions. Instead, the recommendations in this report identify targeted, mutually reinforcing actions we can take now to generate the momentum necessary to accelerate a broad-based renewal of American manufacturing competitiveness. Our signature recommendations include:

1. Scale up workforce development programs to credential more workers for high-demand trades and accelerate the U.S. manufacturing renaissance

America must dramatically expand our investments in the most important piece of the manufacturing puzzle: the talent and capabilities of the American workforce. U.S.-headquartered manufacturers should focus their Environmental, Social, and Governance efforts on American workforce development, including through a commitment to fund 500,000 new graduates of trade school and apprenticeship programs over the next decade.³

In particular, we must expand employers’ roles in workforce training by repurposing existing federal education grant programs. The U.S. should allow high school graduates to use federal education grants to earn credentialed skills offered by employers, and we must allow employers to compete for federal funding that traditionally subsidizes college degrees to support credential programs, apprenticeships, and internships.



2. Stand up a public-private capability to finance investments in domestic manufacturing sectors critical to national security

The federal government must develop the capability to work with private sector employers, as well as state and local governments, to provide liquidity and low-cost capital to critical domestic manufacturers and infrastructure. This is essential to spurring domestic manufacturing and related workforce training initiatives. Efforts should focus on critical sectors such as aircraft and defense equipment, autos and parts, basic metals, communication equipment, electrical equipment, electronics, fabricated metals, general machinery, medical devices, petrochemicals, pharmaceuticals, precision tools, railroad and maritime equipment, semiconductors, specialty chemicals, and special purpose machinery.

This capability could take a variety of forms, including a new government-sponsored investment entity like the proposed Industrial Finance Corporation, changes to existing institutions such as the U.S. International Development Finance Corporation, direct bond buying programs, a sovereign fund, or private capital funds focused on the on-shore manufacturing ecosystem.

3. Modernize the Defense Production Act (DPA) for the 21st Century

The DPA was a critical 1950s-era innovation that removed bottlenecks in the defense supply chain during wartime, but it has become outdated as the United States has entered a new era of enduring, tech-enabled superpower competition. As a result, there are a small number of key industries that require the establishment of new, enhanced policy measures to support supplier ecosystems and strengthen government coordination.

We should update the DPA to enable holistic solutions for critical manufacturing facilities, such as targeted visa approvals for STEM talent, direct project financing, automatic fast tracking of permitting by federal agencies like the Army Corps of Engineers and the Environmental Protection Agency, and investments in workforce training.

4. Establish new forum of G7 + Quad countries to coordinate on geoeconomics issues

To promote meaningful international cooperation, the United States should lead in establishing a new forum of the G7 and Quad countries to promote enhanced coordination among the world's largest economies and democracies on issues like growth, data governance, technology standards, and supply chain security. Areas of effort must also include non-market and trade-distortive practices, semiconductor supply chains, investment screening, export controls, artificial intelligence, and 5G/6G communications. The recent inaugural session of the U.S.-EU Technology and Trade Council is a great first step. The U.S.-EU discussions should be expanded to include important countries like the United Kingdom, Australia, Japan, and India.



METRICS FOR SUCCESS

To measure progress across all of these challenges and recommendations, the Task Force recommends setting the following goals to use as metrics of success over the coming decade:

- Bring 2 million new or retrained workers into strategic manufacturing sectors by 2030 to address the critical skills gap in the current workforce, prepare for future manufacturing needs, and ensure a broad base of inclusive economic growth.⁴
- Improve American productivity growth in critical industries to 3.9 percent, which would represent a return to the historic average for manufacturing growth.
- Invest \$100 billion annually in plants, infrastructure, and related capabilities to accelerate the adoption of Industry 4.0 digital technologies and processes—the investment level needed to reach full potential output levels.⁵
- Add 35,000 new small- and medium-sized enterprise (SME) manufacturers in critical subsectors by 2030 to strengthen the core of the American supplier base and replace half of the small business capacity lost since the late 1990s.⁶
- Demonstrate improved coordination on geoeconomic issues among major democracies on topics such as global tech standards, data governance, and supply chains resiliency.

Facing Challenges, Enabling Success: A steadfast defense supplier during COVID-19

When COVID-19 turned the world upside down, Doug Carlberg feared that his business would go belly up. A disabled-veteran and owner of aerospace manufacturer M2 Global Technology Co., Carlberg provided employment and livelihood for his 65 workers and critical capabilities to his customers. Based in San Antonio, Texas, M2 Global Technology is a small business supplying aircraft parts to both civilian and U.S. military customers—including 900 critical pieces for the F-35 stealth fighter. As commercial flights ground to a halt during the pandemic, so too did the contracts that kept Carlberg’s company afloat.

A company that provides for our national security and the transportation that keeps our world connected was soon to disappear, potentially putting at risk both our national security and the financial wellbeing of the local manufacturing workforce. What prevented this? A Pentagon accelerated payments plan provided billions of dollars to defense contractors with an emphasis on covering the losses of specialty-part, small business suppliers. Large-scale contractors accelerated their Department of Defense payments down to companies like M2, providing the up-front funds that allowed Carlberg and other suppliers to continue production, maintain their workforces, and even “surge ahead” with future technology and development that stabilizes the supply chain and our defenses.

The growth and stability of our manufacturing base and the associated workforce are critical to our national security. When the government partners with the private sector to meet challenges, even a global pandemic cannot halt the productivity and innovation that define the American spirit.

INTRODUCTION

This Task Force considered the causes and implications of the continued erosion of American industrial and manufacturing capabilities in sectors critical to national security, such as defense equipment, semiconductors, telecom supplies, and pharmaceuticals. Renewing the health of the manufacturing sector is critical to ensuring resilient supply chains, driving overall economic output,⁷ and renewing prosperity for American workers by training them in the skills they need to thrive in a 21st-century digital economy.⁸

Ultimately, this Task Force believes that addressing America’s manufacturing challenge has taken on new urgency given the emergence of sustained, strategic, and technological competition with China. The elements of China’s strategy are well-established. Past administrations, congressional commissions, and independent sources have documented Beijing’s strategy to outproduce the United States and achieve technological advantage through state subsidies, industrial espionage, intellectual property theft, and forced technology transfer. These tactics have put China on track to build the world’s largest military and secure its position as a strategic competitor to the United States.⁹ In a seminal 2020 speech, Chinese Communist Party General Secretary Xi Jinping reinforced the point, “We must sustain and enhance our superiority across the entire production chain ... and we must tighten international production chains’ dependence on China, forming a powerful countermeasure and deterrent capability against foreigners who would artificially cut off supply [to China].”¹⁰



The United States has always been a standard-bearer for market-driven innovations and the free and open international system. Now, America must work cohesively with allies and partners to address the current challenge from state-centric economies whose industrial policies undermine those ideals and tilt the global economy in their favor.

The time for action is now, and we are optimistic about the path ahead. The daunting challenge before America also brings with it an opportunity to usher in a new era of productivity and economic growth through new technologies, human capital, managerial innovation, and updated business models. History has shown that the American workforce, under the right conditions and with appropriate support, can overcome even the harshest domestic and global challenges. The workforce realignment currently underway—along with investments unlocked, in part, by stimulus spending—presents a unique window of opportunity to take coordinated and decisive action.

This Task Force on National Security and U.S. Manufacturing Competitiveness is confident that a renaissance of American manufacturing is possible if policy makers and business leaders make the necessary choices for our economy and our long-term security.

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A DANGEROUS STATUS QUO

At the highest ranks of the U.S. federal government, consensus is emerging that the continued degradation of America's industrial base is creating domestic vulnerabilities and weakening our ability to compete.

The 2018 U.S. Department of Defense (DOD) Executive Order 13806 report, "Assessing and Strengthening the Manufacturing and Defense Industrial Base," found that a combination of sequestration, declining U.S. manufacturing capability and capacity, U.S. government practices, industrial policies of competitor nations, and diminishing STEM and trade skills have led to a deterioration in the U.S. defense manufacturing industrial base.¹¹ More recently, the House Armed Services Committee's Task Force on Defense Critical Supply Chains found that "a significant amount of material in the Defense Industrial Base is sole-sourced from the People's Republic of China."¹² Practically speaking, these macro forces have resulted in America being ill-prepared to act in a time of crisis, with insufficient shipyard capabilities, lack of surge capacity, and uncompetitive pricing.

As America moves slowly, China is accelerating ahead. In 2019, China led the world in global manufacturing output at a level 12 percent higher than the United States. That same year, China's share of global research and development spending began outpacing the United States, including on military technologies. China is already ahead of the United States in shipbuilding, land-based conventional ballistic and cruise missiles, and integrated air defense systems. The DOD reports that China's long-term goal is to create an "entirely self-reliant defense-industrial sector...that can meet the [Chinese] People's Liberation Army's needs for modern military capabilities."¹³ China's push for self-reliance starkly contrasts with America's increasing dependence on imports, including in supply chains critical to national security such as rare earth minerals and semiconductors.

American defense spending may be greater than Beijing's in absolute terms, but government spending is only part of the picture. Chinese defense and manufacturing growth results largely from purchasing power and labor cost advantages, which allow them to outpace U.S. military and manufacturing development with significantly less financial investment. For example, in 2017 China realized 87 percent of the purchasing power of the U.S. defense budget, despite spending hundreds of billions of dollars less.¹⁴

Moreover, the global playing field is far from level: China's top-down approach relies on self-prescribed conditions with significant market and non-market intervention. That system allows China to use its state-driven production strength and market control to sway the political decisions of other actors and expand its military capabilities.

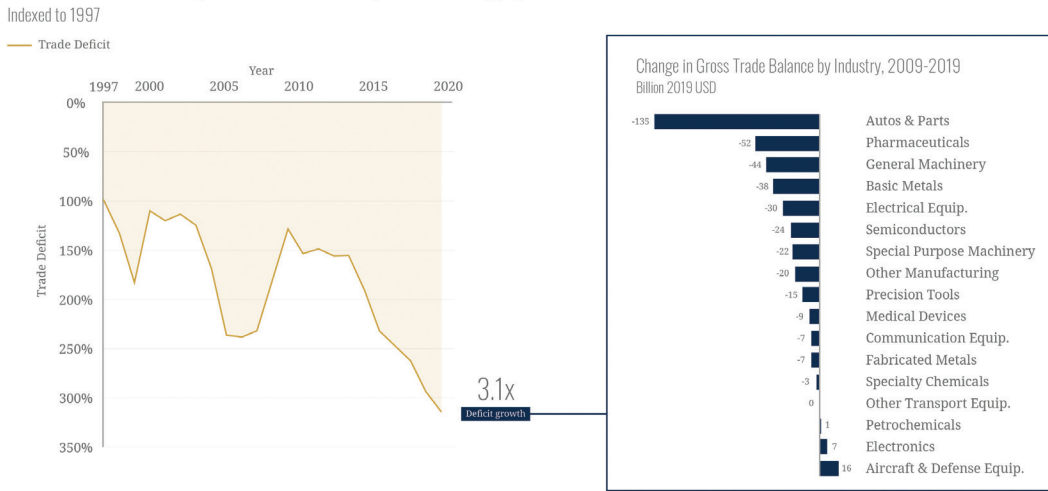
A recent McKinsey Global Institute report¹⁵ highlights that while absolute output of U.S. manufacturing has grown over the past two decades, U.S. shares of global manufacturing GDP and gross sales have declined. In real value-added terms, growth has slowed dramatically over the past three business cycles, from 4.9 percent in the 1990s to 1.4 percent in each of the last two decades. Design, software, and services have driven much of the little remaining growth rather than physical production.

Today there are roughly 25 percent fewer U.S. manufacturing facilities than there were in 1997, reflecting not only closures but also fewer manufacturing start-ups. From 1999 to 2009, 5.8 million manufacturing jobs were lost, compared to 1.3 million added from 2010 to 2019.¹⁶ Although U.S. shares of global manufacturing GDP, output, and exports all stabilized during this decade, the U.S. trade deficit more than doubled in manufactured goods, reaching \$833 billion per year (see Figure 1).

While the story of America's industrial decline has typically been in "scale-based" manufacturing,¹⁷ such as the basic metals and auto part industries that depend on high volumes of heavily repeatable tasks, the greatest declines over the past two decades have been in "learning-curve" industries.¹⁸

A Rapid Increase in Trade Deficit for Manufactured Goods has Left the United States Exposed to COVID-19 Driven Supply Shocks

Figure 1



Source: McKinsey Global Institute.

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These include semiconductors and communications equipment and are characterized by rapidly evolving production processes, high costs of capital, and highly specialized talent. They are also critical to national security. Failure to domestically produce these evolving technologies has left the United States vulnerable to swings in global supply, and American consumers have felt the impact firsthand.

In a complex environment that lacks a one-size-fits-all solution, the wide range of these economic risks complicates the challenge at hand. High-tech fields like semiconductor chips and networking equipment have captured recent headlines, but the competitiveness of the manufacturing sector at large depends on a supplier base that spans a much wider range of industries. McKinsey Global Institute (MGI) research helps to narrow this problem to an addressable scope of 16 manufacturing industries that make outsized economic contributions and have strategic importance (see Figure 2).¹⁹

Four Manufacturing Archetypes to Describe How Firms Compete

Figure 2

Scale-Based

Standardization and specialization for mass production

Learning-Curves

Process engineering and experience via exponential learning

R&D-Based

Research, design, and conception of new products

Flexible

High-value, low-volume production using flexible capacity

Percentage point change in global GDP share of U.S. firms, 1995-2020:

-6

-11

+4

-4

Steel
Auto components
Generic pharmaceuticals

Semiconductor foundry
Biotechnology
Advanced batteries

Fabless semiconductor design
Scientific R&D
Computer system design

Aerospace & defense equipment
Personalized medical devices
Custom machinery

Source: McKinsey Global Institute.

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Digitally-Enabled Flexible and Customizable Manufacturing in the Defense Sector

In the 20th century, the “American Way of War” was associated with mass mobilization and scale-driven production. While the capacity of the industrial base will remain important in the 21st century, DOD will also rely increasingly on manufacturers’ digital capabilities to keep America’s technological edge on the battlefield. Indeed, as Dr. Will Roper, the former Assistant Secretary of the Air Force for Acquisition, Technology and Logistics, identified in *Take the Red Pill: The New Digital Acquisition Reality*: “[t]his ‘digital trinity’—digital engineering and management, agile software, and open architecture—is the true successor to stealth: the next big paradigm shift for military tech dominance.”

The U.S. Air Force has come out with a handful of programs using digital acquisition approaches, most notably the T-7A RedHawk, Ground Based Strategic Deterrent (GBSD), and Next Generation Air Dominance (NGAD) programs. Other military services are moving in this direction as well. For example, the U.S. Navy is employing digital designs on the Columbia-class submarine, and the U.S. Army is using digital approaches on the Future Vertical Lift program. Perhaps not surprisingly, DOD’s newest branch, the U.S. Space Force, aspires to create a fully digital service to drive innovation.

To deliver on these aspirations, DOD must continue to reform and improve how it approaches major acquisition programs. As noted in the 2020 House Armed Services Future of Defense Task Force report: “To incorporate the technology necessary to maintain the United States’ military supremacy, the Pentagon must continue refining its acquisition process to be more agile and less risk averse so that it can fully leverage emerging technologies and capabilities at scale.”

This shift towards digital acquisition not only requires new behaviors by DOD, but also by industry players throughout the supply chain. U.S. firms have been slower than their counterparts in Western Europe and East Asia to adopt the Industry 4.0 technologies that drive this manufacturing archetype.

The United States does enjoy a number of competitive advantages within these 16 industries, but it must overcome headwinds as well. Suzanne Baker of the Massachusetts Institute of Technology argues, “Even in an Internet-connected world, proximity to innovation and users matters for industry.”²⁰ Fortunately, the United States remains a center of innovation. MGI’s research notes that America’s presence continues to grow in portions of manufacturing value chains that are dominated by R&D and product design. Unfortunately, proximity to this innovation alone has been insufficient to maintain leadership in physical production. The most advanced semiconductor chips in the world, for example, may be designed in the United States, but they are often manufactured overseas. The core of the challenge at hand is to address the economic barriers that have allowed this decoupling and to unlock the full promise of the American workforce.

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TWO FUTURES FOR AMERICA

America stands at a fork in the road, facing a choice between two distinct futures. Policymakers, industry leaders, and other stakeholders have control over which path we choose. Our Task Force believes it is important to understand how events are likely to play out depending on the actions America takes—or fails to take.

Mounting National Security Risk and Economic Vulnerability

If we allow current trends to continue hollowing out the U.S. industrial base, economic modeling suggests that by 2030, the United States will lose roughly 2 million jobs per year and \$700 billion of annual GDP.²¹ The potential economic and secondary impacts to communities that have already experienced decades of dislocation would be immense.

In addition, the decline of manufacturing capabilities and competitiveness would undermine our military and technological advantage. Our defense supply chains would be at grave risk as geopolitical tensions increase with China and other state and even non-state actors. If the United States and its allies fail to diversify supply chains and maintain leverage in trade negotiations, our greatest adversaries could create choke points to the detriment of domestic manufacturers.

Without a change of course, the impacts of industrial decline will ripple throughout America's economy and infrastructure. Consumers will see a combination of increased prices, decreased innovation, and diminished data privacy. Firms will see declining margins tied to the tightened supply of parts and materials, forcing many to close. This leaves more workers jobless and further increases import dependence. U.S. defense firms, in particular, will be left with a smaller set of qualified suppliers. The cost of maintaining a world-class military would increase starkly—a burden taxpayers would be forced to bear.

A Better Way Forward: Strength, Renewal, and Prosperity

This Task Force rejects the inevitability of that future and believes that there is a realistic path to renew American manufacturing in strategic sectors relevant to national security. The United States can choose to be a global leader in the advanced manufacturing ecosystem of the future, just as we did in previous generations.

If we take the steps necessary, we will have a workforce fluent in the digital technologies needed to advance American innovation in critical sectors and preserve the U.S. strategic advantage. This is the essence of securing our global competitiveness. President Reagan's 1985 Commission on Industrial Competitiveness articulated this aspiration when it wrote: "Competitiveness is the degree to which a nation can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens."²²

In this future scenario, we will meet that test. Our future will be marked by leaders of government, industry, and partner countries working jointly to strengthen our shared manufacturing capabilities. It will see us rebuild our manufacturing sector and ensure global competitiveness by leveraging the existing strengths of our system—competitiveness, openness, and dynamism—to deter any potential adversaries. The approach will be coordinated and based on a foundational recognition that the United States and each of its allies have distinct relative advantages, which together can quell this threat and lead to a brighter future for ourselves and the world.



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CHALLENGES AND RECOMMENDATIONS

Significant Technical Skills Gap in Manufacturing

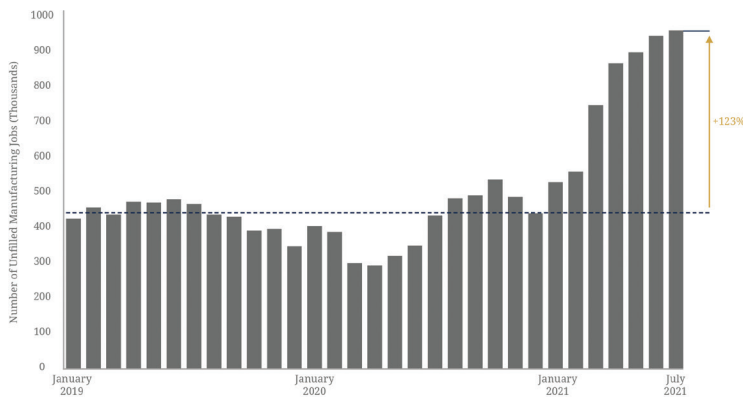
The Problem: Winning the war for talent is the central prerequisite to prevailing in the geopolitical competition with China. As production technology changes, so too must the workforce. Manufacturing's position at the forefront of innovation also places it at the forefront of the human capital shortage. As the pace of innovation accelerates, digitization and automation are creating demand for new skills faster than our current workforce training system can keep up.

One industry survey found a “technical skills gap” to be the single most likely cause of derailed manufacturing plans in the next two to four years.²³ A separate survey in 2020 by McKinsey and Company reported that 87 percent of executives complained about the skill gaps in the workforce, and less than half said they knew how to address the problem. We must meet three primary challenges to mitigate this growing problem: up- and re-skilling the workforce, addressing the growing wage gap for U.S. workers, and attracting and retaining foreign skilled workers.

Unfilled manufacturing jobs skyrocketed in 2021, reaching a new high in July of 974,000 openings (see Figure 3). This figure is 537,000 openings higher than the 2019 average.²⁴ All the while, manufacturing unemployment was on the rise, and in July 2021 was 142,000 jobs greater than the 2019 average.²⁴ The nation has seen spikes in both the number of people looking for work and the number of available jobs in manufacturing. While that sounds like a paradox, it is broadly indicative of the core workforce challenge: those looking for jobs are either in the wrong place or have the wrong skills to fill the openings.

U.S. Manufacturers Are Struggling to Fill Openings Nationwide

■ Monthly Unfilled Job Openings - - - - 2019 Average



Source: Bureau of Labor Statistics.

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Figure 3

974 Thousand

Unfilled manufacturing job openings (July 2021)

More than double 2019 average

Up- and Re-Skilling the Workforce: Perhaps the most important component of the technical skills gap is the current status of workforce training, which fails to ensure that up-skilling and re-skilling are both continuous and dynamic, with the ability to scale as required. Up and re-skilling the workforce will also drive labor productivity growth. The responsibility for workforce preparedness should not rest solely with companies; rather, it should be shared across the public and private sectors. Some companies have already begun building out their talent pipelines, including through partnerships between defense companies and technical and community colleges. Such efforts are often localized, however, and best practices are rarely shared across industries and regions. In addition, apprenticeship programs with proven track records of success at creating a skilled base of workers are often the first expenses on the chopping block during a crisis.²⁵ Ultimately the focus should be on developing people—not just saving jobs.



Addressing the Wage Gap for U.S. Workers: America's workforce challenges also contribute to low productivity growth in the U.S. manufacturing sector. The manufacturing workforce is down 291,000 jobs relative to the 2019 average. One explanation is that manufacturing jobs may not appear as attractive as they once did. In real terms, wages have stagnated since 1995 and have declined in most distressed industries. As productivity slows, so too does the pace of wage growth. For example, wages declined by 20 percent in the auto industry.²⁶ Real wages for production workers increased by only 6 percent from 1997 to 2019, though that number grew over the past year due to the diminished supply of talent.²⁷ Another study found that one-third of all manufacturing production workers rely on food stamps or other federal assistance programs to make ends meet.²⁸ For there to be a skilled manufacturing workforce, we must address these clear economic problems for workers.

Attracting and Retaining Foreign Skilled Workers: There are several dynamics at play in the effort to attract skilled foreign talent for America's domestic manufacturing sector. First, other countries make it easier than the United States to immigrate as a skilled worker. Australia, for example, reformed its permanent and temporary migration policies to prioritize certain skills, and recruited foreign entrepreneurs to launch seed-stage startups. Canada implemented a similar program by creating a startup visa program that provides immediate permanent residency eligibility to immigrants who attain startup funding from Canadian venture capital firms or investment groups.²⁹

A second dynamic is the United States' increasing denial of H1-B visas. Between 2015 and 2019, denials for initial applications rose from 6 percent to more than 20 percent,³⁰ while denials for continued employment applications rose from 3 percent to 12 percent.³¹ At the same time, documentation processing time is getting longer. The average response time for an employment-based adjustment application (I-485) rose from 7 months to 9.5 months between 2017 to 2020.³² This combination paints a bleak future for attracting and retaining foreign talent.

A third dynamic affecting foreign skilled talent are the new trends in international student populations. America's share of the total international student population decreased from 28 percent in 2001 to 21 percent in 2019, while China's share increased from 3 percent to 9 percent³³ due in large part to its Thousand Talents program.³⁴ From 2007 to 2018, the percentage of Chinese students who returned to China after studying abroad rose from 30.6 percent to 78 percent as a direct result of China's investment in the Thousand Talents program.³⁵ At the same time, the number of students staying in the United States after their education is dwindling. In 2017, international students accounted for 56 percent of graduate STEM enrollments in the United States, but foreign-born workers accounted for only 18.5 percent of the skilled technical workforce.³⁶ ³⁷ Thus, foreign students educated in the United States are leaving to work elsewhere. Proper vetting remains the best way to protect against any potential espionage threats while also benefitting from the global migration of talent that has historically advantaged U.S. innovation.



Task Force on National Security and U.S. Manufacturing

Signature policy recommendations matrix

Challenge	Desired Outcome	Signature Policy
1. Significant technical skills gap	Reform education system to focus on skills, not degrees, to better match manufacturing needs	<p>Scale up workforce development programs and increase worker credentials. Scale up workforce development training programs eligible for Pell Grants. This would help address the skills gap, as students can use federal funds that trade degrees to fund credentials and internships in training.</p>
2. Unsatisfactory productivity gains	Return to historic average manufacturing labor productivity growth levels	
3. Inadequate capital investment	Investment spending to accelerate adoption of Industry 4.0 digital technologies and processes	<p>Stand up a public-private investment fund for critical to national security technologies. Explore a variety of forms, including a national investment entity, charitable foundations, direct bond issues, or a public fund, or incentivized private investment.</p>
4. Fragile domestic supplier ecosystems	Strengthen the core of American supplier base with a focus on small- and medium-sized enterprises (SMEs)	
5. Lack of coordination within government	Streamline regulatory burdens and deduplicate responsibilities between local, state, and federal entities	<p>Modernize the Defense Production Act for the 21st century. Enable solutions for manufacturing facilities, such as targeted project financing, automation, and investments in workforce.</p>
6. Insufficient architecture for international partnerships	Establish U.S.-led forums to coordinate allies on geoeconomic topics, including global tech standards, data governance, and supply chains	



ing Competitiveness:

Recommendations

Key Actor(s)

Success Measures

Development programs to credentialing. Make shorter-term eligible for federal programs like and help close the manufacturing and employers could access additionally subsidize college vocational programs, apprenticeships, and skills.

Private sector employers; federal government

2 million new or retrained workers in strategic manufacturing subsectors by 2030

500,000 new graduates of trade schools and apprenticeship programs

Private capability to finance domestic manufacturing sectors security. Could take a variety of new government-sponsored changes in authorities to existing and buying programs, a sovereign private capital funds.

Private sector; federal, state, local governments

Labor productivity growth levels of more than 3.9 percent (average in 1990-2000 “steady state” period)

Invest \$100B+ annually in plants, infrastructure, and related capabilities

Base Production Act for the 21st provisions for critical manufacturing expedited visa approvals, direct automatic fast-tracked permitting, workforce training.

Federal (Congress/ Executive), state, local governments

35,000 new SME manufacturers in critical subsectors by 2030 (address 50 percent decline in number of suppliers since 1990s “steady state”) to improve supply chain resiliency

of G7 + Quad countries. TTC efforts by enhancing standards, data governance, and ce. In addition, extend “Canadian to NTIB countries.

Federal (Executive)

Improved coordination on geoeconomic issues among the major democracies



Skills Gap Recommendation

Scale up private sector and government workforce development programs focused on accelerating the U.S. manufacturing renaissance. The United States must dramatically expand our investments in the most important piece of the manufacturing puzzle: the talents and capabilities of the American workforce.

- U.S.-headquartered manufacturers should focus their Environmental, Social, and Governance efforts on American workforce development, including through a commitment to fund 500,000 new trade school and apprenticeship programs over the next decade.
- The U.S. Department of Education should take steps to make student federal education grant programs more transferrable to credentialed skills training. This should allow U.S. high school graduates to use federal education grant programs to earn credentialed skills offered by employers, while also allowing employers to compete for federal funding that traditionally subsidizes college degrees to fund credential programs, apprenticeships, and internships. One proposed mechanism would expand the U.S. Department of Education's Pell Grant authority to cover workforce credentialing outside of degree programs. We believe this must be universal, rather than means-tested, to be successful and enduring.³⁸
- The U.S. Departments of Labor and Education must provide direct financial incentives to students to earn credentials or advanced degrees in specialized STEM fields related to advanced manufacturing, including targeting physical sciences, applied mathematics and data analytics, electrical and mechanical engineering, and machinery operations.
- The Department of Education should require colleges and universities receiving federal funds to develop "stackable" credential pathways, while states should require community colleges to develop similar pathways. We believe that federal oversight will be required to ensure credentialing is universally accepted and prevent a patchwork of state and local initiatives.
- The federal government should incentivize private investment in the talent pipeline by offering an outcome-based reimbursement or matching program for firms that invest in accredited career and technical education programs at both the secondary and post-secondary levels.
- U.S. states should explore the merits of merging elements of their Labor and Education Departments to provide more integrated workforce development processes to drive the efficient roll-out of the aforementioned programs.
- The Department of Labor must encourage states to include investments supporting state and regional manufacturing development in the Workforce Investment and Opportunity Act (WIOA) strategic plans that each state is already required to produce.
- These efforts should address a significant absence of women and minorities in the manufacturing workforce and improve the attraction and retention of top international talent.

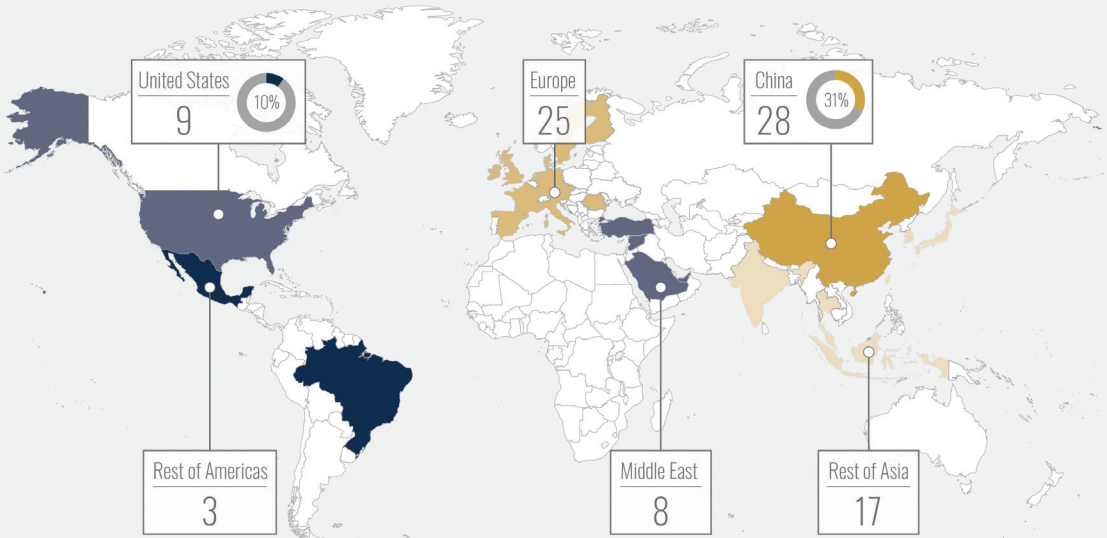
Unsatisfactory Productivity Gains To Keep American Products Competitive

The Problem: Current indicators reveal a troubling lack of U.S. leadership in manufacturing productivity. For example, the World Economic Forum Global Lighthouse Network highlights factories that serve as aspirational targets for the adoption of Industry 4.0 digital manufacturing technologies, which include automation of industrial processes through the Internet of Things and machine-to-machine enabled speed and data analytics. Currently, just 9 of 90 lighthouses operate in the United States, whereas 28 are in China—a glaring issue given that the United States is a global leader in many of the digital technologies that enable these factories (see Figure 4).³⁹

World Economic Forum Recognized Manufacturing Lighthouses
As of September 2021

Figure 4

1-5 Lighthouses 6-10 Lighthouses 11-15 Lighthouses 16-20 Lighthouses 21-25 Lighthouses 26-30 Lighthouses




Source: World Economic Forum and McKinsey and Company.

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To ensure cost-competitive goods on the global market, the United States must boost productivity across the entire manufacturing sector—from scale-based to R&D-based manufacturing—by embracing process improvements and bolstering leading-edge digital technical capabilities.

Cost of Labor: A major factor at the forefront of manufacturing productivity is the cost of labor and its general role in advanced manufacturing. In the United States, labor costs are cited as the primary reason for offshoring, but that notion paints an incomplete picture. Today, U.S. unit labor costs, a measure of productivity weighted labor costs, sit at 52 percent.⁴⁰ This is on par with Japan and just ahead of Western European countries like France, Germany, and the Netherlands—yet a staggering 7 to 16 percentage points more costly than China, Mexico, South Korea, and Taiwan.⁴¹ While this gap has declined somewhat over time, that has had more to do with increasing wages elsewhere than with productivity growth at home. The United States has averaged just 1.4 percent real productivity growth per year since 2000, compared to 4.9 percent per year through the post-Cold War 1990s.⁴² Paired with these figures, the rise in unfilled manufacturing job openings suggests that U.S. firms on average are not seeking to downsize their workforce, but rather are struggling to find the talent needed to drive productivity growth and, in turn, reduce the gap in unit labor cost.

Industry 4.0 Technology: Domestic producers have been slower than some European and Asian counterparts to adopt Industry 4.0 technologies due to a combination of productivity problems and shortage of capital. U.S. investors tend to favor lean investment models, marked by relatively low capital investments that yield higher margins, such as investments in technology companies.



This is a particular disadvantage to scale-based manufacturing, which relies on repeatable manual tasks that have been increasingly automated over the past two decades. While the average U.S.-based manufacturing firm saw a return of 13 percent in 1995 grow to 19 percent in 2018, expenditures on plants, property, and equipment declined over the same period, indicating that the industry's U.S. infrastructure may be aging relative to that of other countries.

The lagging state of process improvement in U.S. manufacturing is further compounding the delayed investment in Industry 4.0. Processes, of course, depend greatly on the type of manufacturing. Scale-based industries, for example, rely on deep supplier relationships and continuous improvement, whereas original equipment manufacturer (OEM) supplier relationships remain more arms-length and transactional. In other countries, cross-shareholdings between industrial firms, OEMs, and large suppliers tend to promote technology sharing and long-term relationships that help raise productivity in the supply chain.⁴³

Meanwhile, learning-curve activities favor specialized firms over broader-scope, vertically integrated firms by achieving production breakthroughs and faster yield improvement. The semiconductor industry has already trended this way with self-selection—for example, through “fabless” design-only firms or “pure-play” foundries that primarily reproduce the designs of other players—yet many integrated firms nonetheless remain. Electric vehicle manufacturers may also soon be forced to decide whether to produce their own batteries or procure them elsewhere. Likewise, biotech firms may have to determine whether to license out emerging technologies or fight through the challenges of production curves.⁴⁴

Role of Government: Government also has a role to play in improving manufacturing productivity. Long-term investments in transportation infrastructure, education and training, digital networks, and energy can all increase productivity. The public sector can be impactful: fast-growing economies are likely to invest in building competence, remain agile and open to regulatory experimentation, and be willing to adapt global macroeconomic practices to local contexts.⁴⁵

Inadequate Capital Investment in Manufacturing

The Problem: The United States prevailed in the Cold War due, in large part, to its global leadership in the innovation and development of key technologies. As it was then, capital investment remains a critical piece of the R&D equation today, but emerging trends in manufacturing investments are cause for concern. For the United States to compete from a capital perspective, we need to adopt innovative methods of financing capital investments in manufacturing.

Low expectations for returns among U.S. investors have historically limited the attractiveness of many fixed capital and infrastructure investments. While funds have been raised in record sums over the past few years for investments in other sectors, the manufacturing sector continues to face pervasive underinvestment, due in large part to higher capital requirements. Additionally, manufacturing and, specifically, defense-related ventures, often lack key evaluation factors for early-stage investment, including addressable market limitations, defense budget uncertainty, margin compression concerns in production settings, and challenges in scalability given the reliance on government contracts. In many ways, the disincentives for investors in these industrial settings mirror those that steer top STEM talent away from advanced manufacturing: other sectors offer faster, better returns.

Although U.S. firms in capital-intensive manufacturing industries average higher return on invested capital than many European and East Asian counterparts,⁴⁶ they have failed to reinvest in plants, property, and equipment. Depreciation of this existing capital stock is outpacing investment, resulting in a net aging of equipment and facilities. This fact raises a set of challenging questions for U.S. policy makers: How can we incentivize increased private investment? Where is public capital investment necessary and wise to fill in the gaps? How do we keep the signaling effect of capital markets when the government intervenes?



State Subsidies: Forms of alternative investments that are gaining traction in other countries have yet to take hold in the United States. State subsidies, for example, typically represent a significant contribution to foreign company investment.

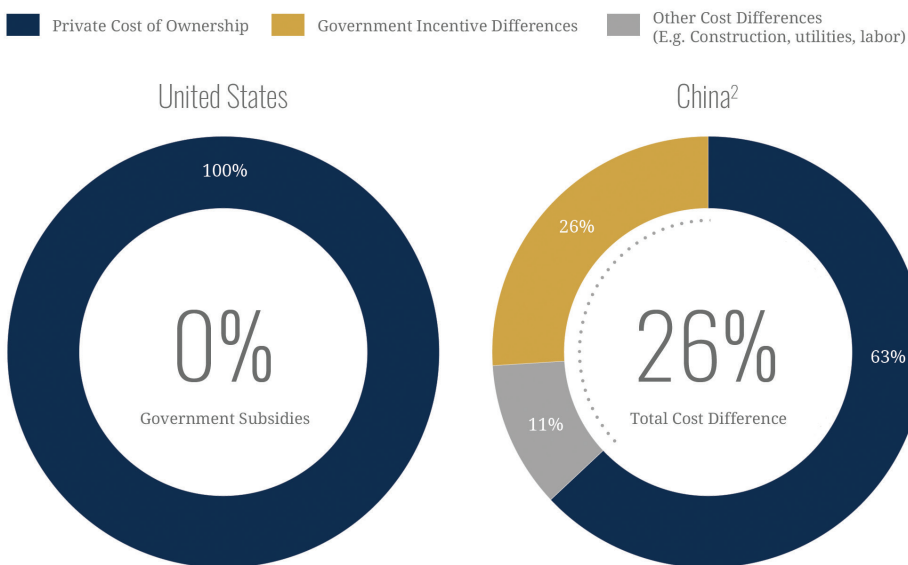
One notable example is the global semiconductor industry. The Semiconductor Industry Association found that the industry will need to invest about \$3 trillion over the next ten years to meet the increasing demand for semiconductors.⁴⁷ It is difficult for U.S. firms to compete against state-subsidized foreign companies, which deters potential entrants in the market and incentivizes large multinational corporations to concentrate infrastructure. A semiconductor industry report estimated that subsidies account for 70 percent of the cost differential between a U.S. leading-edge chip fabrication facility (“fab”) and one based in mainland China. Government incentives amount to 26 percent of the total cost of ownership of Chinese fabs (see Figure 5).⁴⁸ Democracies like Taiwan and South Korea also provide subsidies for semiconductor fabs. In China, these subsidies are part of the broader “dual circulation strategy” to transfer and localize foreign capabilities in China.⁴⁹ It is important, however, to note that China is not alone in this practice, and the United States must work with a broader coalition of nations to define clearer standards around subsidies for fabs. In simple terms, the playing field is tilted and will remain so until we make a change.⁵⁰

Investment in foreign firms also comes from state-owned development banks, such as the KfW in Germany. Domestically, KfW developmental activities include the financing of SMEs, startups, energy-efficient construction and refurbishment of residential buildings, barrier-free housing and educational finance, as well as working with municipalities to finance communal infrastructure and environmental protection. Furthermore, it acts as an agent for different agencies of the German Federal Government. KfW, together with other development banks, could serve as a model for a new U.S. entity to fund the build-out of domestic manufacturing capacity.

Funding for Semiconductor Fabs: A Comparison

Figure 5

10-year total cost of ownership¹ differences for advanced logic fabs by location (U.S. indexed to 100)



1. Total cost of ownership includes capital expenditure (upfront land, construction and equipment) + 10 years of operating expenses (labor, utilities, materials, taxes)
 2. Includes technology sharing agreements that give access to additional incentives such as equipment lease back with advantageous terms

International Examples of Manufacturing-Oriented Public-Private Capabilities

State-owned finance institutions can enable the flow of capital to SMEs. Advocates note that they may also help to reduce government expenditures on certain services, including infrastructure development. The KfW in Germany and the Japan Finance Corporation are both state-owned financial corporations that play important roles in their respective economies.

Germany's KfW (originally Kreditanstalt für Wiederaufbau, "Credit Institute for Reconstruction") is the largest national development bank in the world. Formed after World War II as a part of the Marshall Plan, it is wholly state-owned and the third largest bank in Germany as of 2018. The bank's purpose is to support the federal government's development policy goals both domestically and internationally. KfW covers 90 percent of its borrowing needs in the capital markets, mainly through bonds that are guaranteed by the German federal government. The KfW Mittelstandsbank subsidiary also specializes in supporting German SMEs by financing start-ups, corporate innovation, education, and public works.

Source: KfW 2020 Annual Report

The Japan Finance Corporation (JFC) "aims to complement financial activities carried out by private financial institutions and contributes to the improvement in the living standards of Japanese people." JFC is a newer institution, formed in 2008 with the passage of the Japan Finance Corporation Act. While the bank does operate internationally, its primary purpose is to serve domestic SMEs and start-ups. JFC's annual loan operations more than tripled in 2020 relative to the previous four years, a sign of the flexibility that public banks can offer in times of turmoil and crisis.

Source: JFC 2020 Annual Report

Productivity & Capital Recommendation

Stand up a public-private capability to finance investments in domestic manufacturers in national security-critical sectors.⁵¹ The entity should be empowered to work with private sector employers and state and local governments to provide liquidity and low-cost capital for the purpose of spurring domestic manufacturing, workforce training, and infrastructure in critical manufacturing sectors. We believe these new financial supports will be critical to attracting the private capital and investments necessary to catalyze the growth of high-productivity, digital American manufacturing capabilities. We also recognize the need for clear guidelines regarding the use of funds to ensure that public investment is put to productive use.

Models to consider include:

- ***A new government-sponsored entity.*** Modeled on the German KfW or Japan Finance Corporation, this entity would operate as an independent financial institution with defined investing guidelines focused on aiding small and mid-sized manufacturers. It could provide liquidity for investments with long breakeven times that, while productive, may not be attractive for private capital.⁵²



- **An expanded purview for the Development Finance Corporation (DFC).** The DFC extends financing and insurance for economic development projects in partnership with private sector investors. Its investments are focused on developing economies. Through an expansion of DFC's funding and purview to include domestic investments, public capital could be used in a similar way that attracts additional private investment in critical but underserved markets.
- **A manufacturing bond guarantee program.** The government can provide liquidity to manufacturers at lower borrowing costs using a federal bond guarantee program. One proposal is for the Department of Commerce to house a manufacturing bond program and require that recipients work collaboratively with the Department's Manufacturing Extension Partnership.⁵³
- **A sovereign fund.** A mission-focused, government-backed fund, modeled after a range of sovereign wealth funds that have been established globally, could provide long-term, stable capital to strategic sectors through loans, grants, and equity investments. This vehicle could, for example, focus on the development and adoption of Industry 4.0 technologies and investments in other productivity-enhancing innovations in domestic manufacturing. Like other sovereign funds, it could also serve as returns-driven central forum, connecting public financing with private capital, research centers, and allies and partners.
- **Private capital funds.** The U.S. government should facilitate establishing new, dedicated private capital vehicles that would invest exclusively in domestic manufacturing capabilities, with a focus on sectors of national strategic importance, such as those identified by the McKinsey Global Institute and in this report. Through favorable tax structures that incentivize private investment, these private funds could help meet the required investment levels necessary to accelerate productivity growth and catalyze investments in digital manufacturing at scale in the United States.

An American Industrial Policy?

The debate over American industrial policy is as old as the Republic itself. Alexander Hamilton's focus as the first Secretary of the Treasury centered on the use of federal power to reshape the American economy from agricultural to one with strong international finance and manufacturing centers. Thomas Jefferson and James Madison, who feared such an expansive role of the federal government into private economic life, largely opposed this approach.

Industrial policies are targeted government interventions with the aim of bolstering sectors of the economy. In theory, industrial policies address market imperfections. With full information and strong governance, policymakers should invest selectively to take advantage of externalities and spillovers that some activities have relative to others. In practice, governments face two key issues: imperfect understanding of existing constraints, incentives, and opportunities, and vulnerability to corruption, manipulation, and rent-seeking.

Industrial policies can vary between "vertical" policies that favor specific firms or economic niches and "horizontal" policies that target broad sectors of the economy by improving the general business environment. The more "horizontal" these policies are, the more they appear to be public goods.

The focus of recommendations in this report are more in line with the "horizontal" approach. Rather than "picking winners and losers," the Task Force advocates creating ecosystems of talent, capital investment, suppliers, and infrastructure, where firms can compete to win, governed by the accountability of the market. As such, the policies that will drive competitiveness across U.S. industries and sectors relevant to national security and enhance economic cooperation among like-minded allies and partners.

Fragile Domestic Supplier Ecosystems

The Problem: The global COVID-19 pandemic revealed the true cost of supply chain dependencies for life-saving medical equipment. The stakes are no lower when it comes to our defense and national security supply chains. Firms thrive in ecosystems flush with suppliers, but the supplier ecosystem in many critical U.S. manufacturing sub-sectors is exceedingly fragile—often with one supplier (typically a small- or medium-size manufacturer) reliant on a small, unpredictable order book to keep the lights on.

In particular, the reliance on overseas trade during the COVID-19 pandemic underscored a festering problem. Consider the pandemic-driven spike in prices for commodities that serve as key inputs not only for defense firms, but all domestic manufacturers. Prices for rare-earth elements such as neodymium doubled between June 2020 and August 2021.⁵⁴ China controls 90 percent of these elements, which are needed for a range of defense and industrial applications. Further, given the gradual decline in U.S. shares of steel manufacturing over the past several decades, our nation had little leverage to ensure manufacturers could maintain supply at reasonable prices. The impacts hit firms in defense and civilian industries alike—a fact that points to the need for stronger collaboration between the defense industrial base and other manufacturers in supporting a shared domestic supplier network.

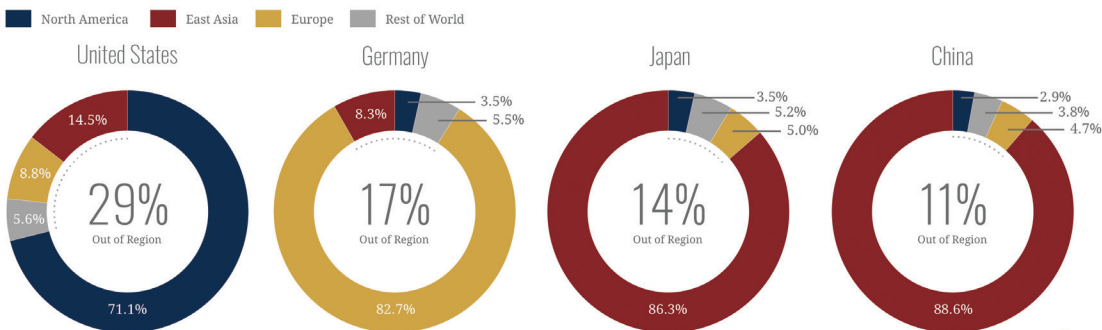
While only recently laid bare by the pandemic, this challenge is decades in the making. From 1998 to 2017, the United States lost nearly 70,000 small- and mid-sized manufacturing firms.⁵⁵ Fewer than 200 of these firms explicitly fell within the “aerospace products and parts” industry, yet many operated in related industries that supply primes and their subcontractors. The DOD must understand the critical role it plays in protecting its suppliers and use its leverage wisely. It must be a model customer, providing more consistent demand signals, communicating specification changes in a timely manner, and properly valuing quality materials and components. Meanwhile, smaller firms that have become increasingly dependent on the DOD as a single customer should evaluate alternative channels for their products, recognizing that reaching other markets can provide the scale necessary to better serve the DOD. In short, strengthening our existing supplier base is a critical first step in avoiding a fragile supplier ecosystem fraught with national security concerns.

Fragmented Supply Chains: A fragmented supply chain also has an undeniable effect on national security. China has worked to expand international dependency with its Belt and Road Initiative.⁵⁶ It has already had success in Asia, Africa, and the Middle East, and it is expanding in Central American countries with new Chinese-funded port and road projects. During the pandemic in particular, Russia and China were able to increase influence through relief programs, specifically targeting South America through the donation of COVID-19 vaccines.⁵⁷ U.S. firms and policy makers alike would be wise to answer China by fostering a robust Pan-American Manufacturing ecosystem through improved transportation routes and coordination with allied governments (see Figure 6).

29 Percent of Manufacturing Value-Added in U.S. Consumption Comes From Out of Region, Roughly Twice as Much as in Germany, Japan, and China

Figure 6

Percent of value added by major regions in country's final demand



Source: Organisation for Economic Co-operation and Development and McKinsey Global Institute.



Lack of Coordination, Integration, & Accountability Within Government

The Problem: America's federalist structure of governance was designed, in part, to make coordination among different levels of government challenging, thus preserving power for the states. As is the case with workforce development programs, the federal government's support is often limited to providing funding to state and local entities to design and implement specific programs within federal guidelines. Once they receive the funding, state governments typically do not integrate their post-secondary education and lifetime workforce development investments, instead organizing and implementing them in a fragmented manner across multiple departments or agencies. Furthermore, state governments develop their programs to reflect local priorities, not a more strategic national economic or security perspective. These dynamics impact state-level investments ranging from infrastructure to workforce development to key process improvements. Lastly, a significant share of post-secondary educational and workforce investments is directed and delivered by local governments and community institutions, including local workforce development boards. Across all levels of government, we lack clear and consistent priorities, guidance, and measures of progress to sustain a competitive national manufacturing strategy. These gaps prevent effective coordination between federal, state, and local governments.

State and Federal Policy: The Obama Administration released a report highlighting the scope of the challenge for manufacturing firms.⁵⁸ On the domestic front, for example, the report indicated the need to strengthen talent bases and collaborations between firms and the private sector—but it also indicated that permitting delays significantly slowed the process of upgrading and repurposing existing facilities.

Supplier Ecosystems & Government Coordination Recommendation

Modernize the Defense Production Act (DPA) for the 21st Century. The DPA was a critical 1950s-era innovation that removed bottlenecks in the defense supply chain during wartime, but it has become outdated as America's global leadership has evolved. The United States has entered a new era of enduring, tech-enabled superpower competition, and as a result there are a small number of key industries that require the establishment of new, enhanced policy measures to support supplier ecosystems and strengthen government coordination. We believe doing so will accelerate growth in these industries while preventing a wholly top-down federal industrial policy from emerging.

The Defense Production Act: History and Capability

The DPA originally passed in 1950 at the onset of the Korean War. Similar to the War Powers Acts of the World War II era, the DPA grants the president authority to control sectors of the domestic economy when necessary for national security. It provides authorities to “take appropriate steps to maintain and enhance the domestic industrial base” to bolster national preparedness. Some of the most commonly exercised DPA authorities are:

- **Title I: Priorities and Allocations.** Allows the president to require persons (including businesses and corporations) to prioritize and accept contracts for materials and services as necessary to promote the national defense.
- **Title III: Expansion of Productive Capacity and Supply.** Allows the president to incentivize the domestic industrial base to expand the production and supply of critical materials and goods.
- **Title VII: General Provisions.** Includes several distinct authorities, including to establish voluntary agreements with private industry; block proposed or pending foreign corporate mergers, acquisitions, or takeovers that threaten national security; and employ persons of outstanding experience and ability while also establishing a volunteer pool of industry executives who could be called to government service in the interest of the national defense.

Re-authorized over 50 times, the current DPA authority stands to expire in 2025.

PRESIDENTIAL POWERS

The DPA allows the president to “expedite and expand the supply of materials and services from the U.S. industrial base needed to promote the national defense.” This includes authorities for emergency preparedness, restoration, investment in and protection of critical infrastructure, and efforts to mitigate acts of terrorism. Under the DPA, the president has the following powers:

- Allocating goods, services, and facilities for national security
- Offering preferential loans and guarantees with congressional approval
- Making purchases and commitments to firms
- Allowing for companies to coordinate with each other in special ways that might otherwise violate antitrust laws

Source: Anshu Siripurapu, What Is the Defense Production Act, Council on Foreign Relations, January 2021.

HISTORICAL EXAMPLES

Korean War:

- Established the Office of Defense Mobilization, controlled wages and prices of goods, and regulated manufacturing industries for wartime production

Cold War:

- Capital and interest-free loans helped establish national aluminum and titanium industries, geographically dispersed to protect against key-region strike
- Diversified U.S. energy dependency and funded energy research

Emerging Technologies:

- Seed money to develop new technologies for national security and domestic strength, including semiconductors, microelectronics, and mining and processing of rare earth minerals

General Uses:

- Fulfilling contracts for Air Force One and presidential armored vehicles
- Federal Emergency Management Agency (FEMA) relief responding to national disasters, i.e. purchasing food, water, shelter materials

21st Century:

- Increasing production of medical equipment during the COVID-19 pandemic
- Supplementing the supply of firehoses for wildfires



Thus, we recommend reimagining the DPA to enable holistic solutions for critical manufacturing facilities, such as targeted visa approvals for STEM talent; direct project financing; automatic fast tracking for federal, state, & local permitting; and workforce training.

- Empower federal and state officials to designate “special manufacturing zones” with fast-tracked, simplified permitting, preferential tax treatment, focused workforce programs, and capital investments.⁵⁹
- Require Federal agencies like the Army Corps of Engineers and Environmental Protection Agency to automatically expedite permitting requests associated with DPA projects.
- Enable manufacturers and government agencies to develop facilities and hire employees in economic empowerment zones and emphasize the hiring and retraining of veterans as they transition from active service.
- Develop a centralized DPA supplier database where previous DPA beneficiaries and producers are cataloged and current suppliers who can readily convert and produce critical supplies across industries and states can register. Database registration entitles firms to be eligible for DPA program benefits and reduces crisis and production response time, enabling improved communications and funding between key suppliers and the Defense and Commerce Departments in the event of an emergency.
- Widen the talent base for U.S. manufacturing by attracting new, skilled human capital sources and creating new visas and citizenship pathways for skilled immigrants working in critical manufacturing sectors,⁶⁰ including:
 - Simplify and accelerate visa and green card reviews for high-skilled applicants and create a visa for well-vetted talent to support U.S. manufacturing and national security-oriented innovation, with an emphasis on long-term retention of U.S.-educated foreign students.
 - Increase the number of I-495 green cards available for skilled workers, with a focus on technical skillsets; mandate that green card reviews are completed in six months; and guarantee provisional residency to foreign-born students in relevant STEM graduate programs.
 - Evaluate the potential for a new points-based or standards-based model that offers green cards to all who meet certain criteria.
- Fund the Competitiveness Policy Council (authorized under Competitiveness Policy Council Act, 15 U.S.C. §4801 et seq.) to provide future recommendations to the president and oversee progress against the outcomes outlined in this Task Force report.
 - This council should assemble an independent advisory group composed of business, labor, and government leaders to develop policy recommendations that benefit the workforce across their sectors, like President Reagan’s Commission on Industrial Competitiveness.
- Task the National Security Council and National Economic Council with publishing an integrated economic statecraft and competitiveness strategy at the beginning of each presidential administration, which should include recommendations to better prioritize existing federal investments—including from the Departments of Education, Labor, and Commerce—and build institutional capacities at the federal, state, and local levels to better coordinate on economic security issues.



Insufficient Architecture for International Partnerships

The Problem: With the interconnected economies of the 21st century, the challenge of competitiveness is inherently global. Despite our economic strength, the United States does not have a monopoly on the keys to manufacturing competitiveness. Working in conjunction with trusted allies and partners will unlock a future of collective competitiveness by leveraging this key U.S. advantage over China. While some architecture is already in place to wield the advantage of our international partnerships, we should strengthen and expand those structures.

Setting Standards: Broadly, the United States is lagging behind in setting standards for global manufacturing and trade that ensure a level playing field and enhance American competitiveness. In addition to better DOD procurement guidelines and export controls, we need to develop and enforce stronger production and technical standards across a range of critical manufacturing sectors. Moreover, the United States and many of its closest allies hold their manufacturers to high standards in terms of mitigating environmental impact, avoiding child labor, and guaranteeing labor rights. However, global enforcement of these same standards remains a challenge, and free trade with nations that do not play by the same rules places U.S. firms at a disadvantage.

The United States and its closest allies must reevaluate current mechanisms for enforcing standards globally. International agreements without enforcement mechanisms may set aspirational goals, but they also have the potential to create unfair market environments if only some member nations adhere. We must consider diplomatic approaches that align financial incentives to encourage all nations to sign on and comply.

Technical standard setting may be an effective policy tool. In contrast to the United States, where technical standards are developed by industry in response to commercial needs and adopted by consensus, Chinese state agencies formulate standards and use them to advance industrial and foreign policy objectives. Historically, Beijing has prioritized developing mandatory and unique domestic technical standards as a barrier to market entry for foreign firms and to help grow domestic industry. It is also coordinating industrial policy and diplomatic strategy to expand its influence in international standards-making bodies—a goal written explicitly into China’s 2017 Standardization Law—for the purpose of both increasing adoption of Chinese technology abroad and influencing norms for how technology is applied. This goal will likely be extended into a comprehensive strategy in the China Standards 2035 plan, which will outline China’s nation-level objectives in standardization much like “Made in China 2025” did for emerging technology.⁶¹

Foreign Government Incentives: Direct subsidies provided by foreign governments also present distinct challenges for U.S. firms. A 2020 report published by the Semiconductor Industry Association indicates that the total cost of ownership for an advanced logic chip fabrication facility is about 29 percent higher in the United States than in Taiwan or South Korea and about 59 percent higher than in China. They estimate that 70 percent of these gaps stem from government incentives.⁶² In the United States, a bipartisan and bicameral group of legislators succeeded in their efforts to include provisions for a grant program in the FY21 National Defense Authorization Act. With widespread support by industry, the executive branch, and Congress, the provisions are likely to be funded.

Content Requirements: It is also important to investigate local content requirements and the involvement of allies in building out such requirements. It is crucial that such requirements are co-developed with international allies and do not lock out valued suppliers in an anti-competitive manner. For large investments in physical capital to produce returns, U.S. firms must continue to grow sales through exports. The United States will need to foster free trade with allies, leaving room in the U.S. market for imported components to ensure that goods made domestically can be consumed at reasonable prices overseas.



International Partnership Recommendation

Establish new forum of G7 + Quad Countries to coordinate on geoeconomic issues. The forum would enable enhanced coordination among the world's largest advanced economies and democracies on issues like technology standards, data governance, growth, and supply chain security. Areas of focus should include non-market, trade-distortive practices; semiconductor supply chains; investment screening; export controls; and AI and 5G/6G communications. The recent inaugural session of the U.S.-EU Technology and Trade Council is an important first step. The U.S.-EU discussions should be expanded to include important countries like the United Kingdom, Australia, Japan, and India. Policy recommendations include:

- Extend the “Canadian Exemption” for U.S. classified International Traffic in Arms Regulation (ITAR) to National Technology and Industrial Base (NTIB) countries, such as the United Kingdom and Australia, to augment the industrial base in strategic sectors.
- Establish a data governance structure whereby partners agree to key principles on privacy and the free flow of data in strategic sectors. The Department of Commerce and the U.S. Trade Representative should engage the G7 countries, the Quad, and potentially New Zealand and South Korea on a data governance framework.
 - Create a coalition of like-minded partners, beginning with the Five Eyes and Japan, that agrees to data principles, including setting rules for valuing and determining the origin of data, protecting user privacy, and enabling the free flow of data across borders.
 - Focus on easing the exchange of data in strategic sectors and maximizing international cooperation among allies that demonstrate sufficient data privacy standards and firm commitments to safeguarding data internally.
- Strengthen America’s regional leadership and supply base resilience through the creation of a “near-shore” Pan-American manufacturing ecosystem. This could include targeted modernization of road/rail linkages in the Pan-American Highway connecting South, Central, and North America.⁶³



CONCLUSION

The recommendations in this report provide a blueprint for how America can reinvigorate our manufacturing competitiveness, ensure our national security, win the global economic competition, and catalyze a new era of American prosperity and innovation. Our country has always been a nation not just of dreamers, but of doers—of those who use their hands to create, build, and design. We are a nation that thinks great things and does great things, but that also makes great things. And that is what we must remain.

The task of rebuilding our manufacturing capabilities does not fall to any one sector alone. Implementing the recommendations will take commitment from a range of actors: U.S. executive agencies and Congress, state governments, local governments, private sector manufacturers and investors, and our global partners. Top-down federal policy cannot be a silver bullet on its own. This Task Force believes the focus should be on coordinated, horizontal policies across sectors.

Together, the solutions outlined in this report will help achieve the key metrics of success: developing and activating a 21st-century American digital manufacturing workforce, leveraging recent spending on economic relief and infrastructure to relieve manufacturing and national security vulnerabilities, retaining America's military advantage, advancing the frontiers of science and engineering, and reestablishing the United States as a competitive and innovative industrial power.

Achieving these metrics will be a challenge, but it is one we must rise to meet. Our world is changing. We face renewed threats from competitors who do not share our values and who seek to surpass our economic might. The American spirit has always prevailed against such threats. America has always stood, in the words of President Reagan, as the shining city on a hill. Our Task Force remains confident that we will continue to shine for many years to come.



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¹⁸ "Learning-curve" activities invest time, capital, and engineering to achieve exponential process improvements. See: McKinsey Global Institute (2021).

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