

THE CHOICES WE FACE

REINDUSTRIALISE:

Building Capacity, Security,
and Prosperity in a
De-globalising World

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Reindustrialise:

Building Capacity, Security, and Prosperity in a De-globalising World

Austin Bishop & Blake Seitz

Today politicians and pundits speak of “the Rust Belt”, the deindustrialised swathe of the American northeast and Midwest that has been in decline since the middle of last century. The term evokes urban blight, shuttered factories, and “deaths of despair”.

Few living today remember what came before. It is worth briefly chipping away the rust to see what lies underneath—and what has been lost.

Cleveland, Ohio is perhaps the quintessential Rust Belt town. At the turn of the twentieth century, Cleveland was one of the richest cities on the planet, rivalling London, Paris, and St. Petersburg. Ideally situated on Lake Erie and the Cuyahoga River, the city benefited from extensive, state-subsidised canals and railroads. This infrastructure network linked Cleveland to far-flung customers and suppliers, giving it access to cheap energy and inputs. The city also benefited from a surge in demand for its manufactures during the Civil War. By some accounts, half of the world’s millionaires lived in Cleveland at the height of the Gilded Age, including such legendary names as John Rockefeller and Samuel Mather.¹

Many of these men made their fortunes in manufacturing, logistics, and resource extraction. In the parlance of our day, they were builders. Rockefeller built Standard Oil from the ground up, eschewing dividends to plough profits back into his growing trust. Mather was a metals and shipping magnate, operating mines in the Iron Range and a fleet of lake freighters to feed the hungry blast furnaces of companies such as US Steel.

The proceeds from this industry funded mansions on Cleveland’s Euclid Avenue—known as “Millionaire’s Row”—but also churches, cultural institutions, and other public monuments. A personal check for one million dollars from Mather completed the financing of Trinity Cathedral, an English Gothic pile on Euclid Avenue.² Similar benevolence by John Severance, a businessman who made his fortune in oil and other commodities, established one of the nation’s finest orchestras, which plays to this day

in Severance Hall. In this and many other cases, the proceeds of industry were transformed into civilisation.

The city's faith in industry, technology, and commerce is reflected in the Hope Memorial Bridge, completed in 1931. The bridge is adorned by the "Guardians of Traffic", Art Deco figures carved by the eminent sculptor Henry Hering. In the hands of these Guardians are symbols of transportation, from the covered wagon to the stagecoach to the automobile. In 2021, the Cleveland Indians, seeking a name more in keeping with the times, rebranded as the Cleveland Guardians in their honour.

By that time, Cleveland was a very different city, and not only in its sensitivity about mascots. It had rusted over.

Cleveland's population peaked at more than 900,000 in the 1950 Census.³ In 2020, it had shrunk to roughly 370,000, a 60% decline. The surrounding area experienced a similarly severe decline. The Federal Reserve Bank of Cleveland found that, over the past half-century, the population of the Cleveland metropolitan statistical area ("MSA") shrunk even more than similarly situated MSAs in the industrial heartland.⁴

The residents who remain live in a city that is a shadow of its former self. Cleveland is the most distressed large city in the country, according to an index maintained by the Economic Innovation Group.⁵ 96% of Cleveland residents live in a distressed zip code, characterised by high unemployment, low income and educational attainment, vacant neighbourhoods, and other pathologies. Cleveland was an early victim of the opioid crisis, with rates of OxyContin prescribing that still exceed the national average despite a recent clampdown.⁶

Much of this blight can be attributed to the steady loss of economic opportunity, particularly manufacturing jobs. Manufacturing employment in Cleveland has plunged by half since the end of the Cold War, both in absolute terms and as a share of the overall workforce.^{7,8} As late as the 1980s, the three largest private employers in the Cleveland area included two manufacturers: Ford and LTV Steel.⁹ Nearly forty years later, the list was topped by two hospital systems and a temp agency.

Cleveland was an unusually vibrant city at its peak; its decline and fall have been unusually severe. But Cleveland's story is hardly unique. It could be replicated across the former industrial heartland of the United States—and indeed, across the wider Western world.

Birmingham, for instance, was the birthplace of the steam engine, an early player in the Industrial Revolution, and the workshop of the British Empire. In the two decades after the Second World War, the city was Britain's Detroit—an automotive powerhouse second only to the United States. Nearly half of the workforce was in manufacturing, and the area “boasted one of the lowest unemployment rates and highest wage levels in the country”, according to the city council.¹⁰ Yet a half-century of Cleveland-style malaise has taken its toll. Manufacturing employment has shrunk by 80%. A recent report by the United Kingdom's Social Mobility Commission rated Birmingham among the country's “least favourable” cities for economic opportunity.¹¹ Birmingham's troubles are symbolised by its famed Longbridge auto plant, which mobilised during the Second World War and employed tens of thousands of workers at its peak but sputtered to an end after multiple changes of management. The plant's current owner, a Chinese state-owned enterprise, moved all manufacturing to China in 2016.¹²

Once-great industrial centres like these are the worst victims, but far from the only victims, of the West's deindustrialisation. We are all worse off in a world where the West does not have the ability to manufacture goods in abundance. By necessity, this fact means we are more reliant on the good graces of far-away foreign powers to meet our needs. It means our militaries are less capable of deterring aggressive enemies or equipping vulnerable friends. And it means our fellow citizens—especially those who will never read this report or qualify for a job manipulating symbols on a screen—have less access to stable and decent employment. Cleveland and Birmingham are vivid warnings of the dysfunction that deindustrialisation causes. But these consequences are hardly isolated to a few areas of our countries. They weaken entire countries and threaten our civilisation.

This report aims to describe the problem of deindustrialisation, trace its causes, and map a path back to production, abundance, and sovereignty.

Industrial decline is now frequently lamented by politicians and policymakers but often treated as if it were a consequence of vast historical forces beyond our control. This is to let ourselves—perhaps more appropriately, our leaders—off the hook too easily. The truth is that deindustrialisation was a choice, a consequence of bad policy decisions and flawed ideology, compounding over decades to the present crisis.

Since the 1960s, stifling regulation and red tape, particularly environmental regulation, have made the construction and operation of industrial plant slow and difficult, while reducing the incentive to invest in such projects. The cost of energy and the burden of regulatory compliance are several times greater in Western countries than elsewhere.

Our uncompetitive business environments led to waves of plant closures and outsourcing, self-servingly justified by neoliberal economic theories that deemed such outcomes most efficient. As factories moved overseas, the network effects and local supply chains that had been built by our ancestors over generations weakened. Great industrial clusters, like those of Cleveland and Birmingham, fell apart. And on the other side of the world, new industrial clusters formed, built in some cases by Western firms, but increasingly by a native class of industrialists primed to compete with our workers and companies. It is scarcely exaggeration to say the West sold its industrial birthright for short-term financial gains, better quarterly earnings, and a jobs programme for regulators and lawyers. What we lost was sovereignty over production.

Reversing these mistakes, restoring our industrial bases, and regaining sovereignty are urgent projects. They will require us to recognise mistakes made to this point and correct course by implementing an agenda that brings costs down, speeds construction, and facilitates investment, public and private, into domestic manufacturing. It will require leaders who are committed to the well-being of our nations, our neighbours, and to places like Cleveland and Birmingham.

If we do not act, then the blight in Cleveland and Birmingham will spread to other cities. Our international influence will weaken. The fracturing of our societies will continue. But if we take bold action, we can rebuild an economy that serves our citizens and produces worthy and lasting monuments to our civilisation.

Evidence of Industrial Decline

The West's production problems were ignored and downplayed by politicians and policymakers for many years. Recent events have challenged this posture of denial.

First, the COVID-19 pandemic demonstrated the West's abject dependence on manufacturing in Asia, particularly China. Chinese lockdowns and export bans led to acute shortages of personal protective equipment, medicine, and much else. This event alerted Westerners to the fact that our health and wellbeing now depend on fragile, globe-spanning supply chains and the policies—effectively, the whim—of a hostile foreign power. In short, it was a wakeup call about a significant loss of sovereignty.

Second, Russia's war in Ukraine has demonstrated the West's inability to make weapons in the quantities needed to win a modern war. Russia has put its economy on a war

footing, sustained by a constant flow of microelectronics, machine tools, and other supplies from China. The West's mobilisation has been half hearted and ponderous by comparison. Ukraine has fought the entire war with dramatic material deficiencies, including persistent shortages of NATO-standard artillery shells, a relatively simple manufacture that industrial powers schooled in the wars of the 20th century should be able to make in abundance.

The emergency defence supplemental signed into law by President Joe Biden in April 2024 earmarked more than \$5 billion to rapidly increase production of these shells. The Pentagon's plan is to increase production to 100,000 per month by 2025, up from 30,000 last year.¹³ Russia currently produces 250,000 comparable shells per month, more than double this goal.¹⁴ Quite the comedown for the Arsenal of Democracy of the Second World War—or even the post-Cold War US Army, which in 1995 could produce 867,000 artillery shells per month.¹⁵

The Ukraine war also highlighted Europe's dangerous dependence on foreign energy. Industrial energy prices in the United States are low and competitive, thanks to large amounts of baseload nuclear power built in the 1970s, and cheap and abundant natural gas and coal. The picture is different in Europe, which has been shuttering nuclear plants for years, increasing reliance on intermittent renewables and imported natural gas. Before the war, much of that gas came from Russia. That supply has since evaporated, due both to Russian coercion and the dramatic sabotage of the Nord Stream II pipeline in 2022. Europe's already high energy prices skyrocketed, and manufacturers felt the pain alongside ordinary citizens. An EU report by former Italian Prime Minister Mario Draghi estimates that European companies pay two to three times more for energy than companies in the United States—and four to five times more for natural gas.¹⁶

The situation is particularly severe in Germany, long the strongest industrial power in Europe. The war in Ukraine coincided with Germany's shutdown of its last three nuclear reactors, deepening the energy crisis. As a result, German industrial production is at its lowest level in a decade, pandemic excepted.¹⁷ Major manufacturers have announced plant closures and layoffs, including Volkswagen, which is contemplating factory closures in Germany for the first time in its history.¹⁸

A third event, the attacks on merchant shipping in the Red Sea by Yemen's Houthi rebels, has underscored the fragility of globalised supply chains. Container shipping through the Red Sea plunged by 90% between December 2023 and February 2024.¹⁹ Shipping companies have routed much of that trade around the Cape of Good Hope,

reverting to commercial patterns last seen in the age of sail. This diversion has added “about 11,000 nautical miles, 1-2 weeks of transit time, and approximately \$1 million in fuel costs for each voyage”, according to the United States Defense Intelligence Agency. If a band of rebels with relatively unsophisticated weapons and methods can reroute a substantial portion of global trade, one wonders what a more sophisticated adversary or a more serious crisis could do.

These striking events have shaken the West’s confidence and opened many eyes to our vulnerability. But industrial decline was evident long before to those with eyes to see.

Manufacturing has played a steadily diminishing role in Western economies for decades. In the mid-1990s, with deindustrialisation already well underway, manufacturing accounted for about 15% of gross domestic product (“GDP”) in the United States and United Kingdom; by 2023, those figures had dropped to 11% and 9%, respectively.²⁰ Similar declines, by similar magnitudes, can be observed across the Western world.

Manufacturing employment has also plunged. At the dawn of the millennium, more than 17 million Americans were employed in manufacturing. Today, the number is less than 13 million, despite a growing population. As many economists rush to point out, counting jobs is an imperfect way to judge the health of any sector. But that is certainly not how the decline is viewed by workers whose towns and career opportunities have worsened, or by manufacturers and industrial unions that have seen their influence diminish. Whatever else its effects, the loss of so many well-paying manufacturing jobs has contributed to rising resentment and backlash that continues to roil Western politics. Economists may be indifferent to these consequences; citizens are not.

If Western manufacturing were healthy, we would expect that fact to be reflected in rising productivity and output. But that is not the case, either. Labour productivity in American manufacturing has been stagnant since the global financial crisis (“GFC”), even as productivity overall has steadily increased.²¹ Manufacturing output has stagnated over the same period.²² These facts are more remarkable the more one thinks about them. The world has undergone dramatic technological change in the past decade and a half, thanks to the explosion of digital technology. The United States invented many of those technologies. Evidently, they have not had much effect on American manufacturing, which has roughly the same output and output per manhour as it did during the presidency of George W. Bush.

A lost decade and a half is bad enough, but in fact the problem extends further back. Manufacturing productivity growth in the two decades before the Great Recession was driven mainly by a single, standout sector: computers and electronics.²³ Productivity growth in other industrial sectors was far weaker. In other words, if not for a technology jackpot, the manufacturing productivity slowdown would have been evident in topline statistics much earlier.

The performance of other Western countries has been similarly troubled. The Draghi report notes that overall European productivity growth diverged from the United States in the mid-1990s, and now stands at 80% of United States levels, due largely to the American advantage in information and communications technology.²⁴ Manufacturing productivity growth has generally been stronger in the United Kingdom and Europe than in the United States, but growth has slowed since the GFC.²⁵ The compounding effect of low productivity takes its toll over time. This year, the United Kingdom fell out of the top 10 countries for manufacturing output by value, behind Mexico and Russia, but ahead of Indonesia.²⁶

Intimately related to this “productivity puzzle” is a longer-term decline in public and private investment in manufacturing. During the Cold War, net private investment in fixed assets like equipment, machinery, and property in the United States averaged about 8% of GDP.²⁷ That figure began to fall in the 1990s—and fell off a cliff during the GFC. By 2019, private investment had plunged by half and settled at a consistently lower level. The value of property, plant, and equipment as a proportion of large companies’ total assets has shrunk consistently for the past four decades, from about 30% of assets in the mid-1980s, to about 10% in 2018. The Adam Smith Institute finds a similar trend of underinvestment in Britain, which “had the lowest level of private investment in fixed capital as a share of GDP in the G7” every year from 1998 to 2015.²⁸

Practically speaking, this decline in investment means that Western manufacturers have been relying on ageing facilities, machine tools, equipment, and workers during a period when manufacturing was being transformed by new, capital-intensive practices and technologies. The productivity slowdown we see today is partly the consequence of yesterday’s failure to invest in these necessary upgrades.

China versus the West

Perhaps the most dramatic evidence of the West’s industrial decline can be seen in relative terms, when our output is compared with that of the developed countries of

east Asia, in particular China. Asia has taken a much different view of the importance of manufacturing, embracing its role as “the world’s factory” and investing heavily in infrastructure, logistics, and other critical supports of a manufacturing economy.

China, Japan, South Korea, and Taiwan are among the world’s strongest manufacturing powers, positions they gained through massive state-directed investment, export-oriented industrial policy, and technology transfer. Manufacturing plays a substantially larger role in East Asian economies, accounting for larger shares of GDP and employment than virtually any Western country except Germany. But recently, the manufacturing sectors of Japan, South Korea, and Taiwan have been under increasing pressure from China, whose immense size affects all other countries as if by a gravitational field.

China’s case is worth highlighting, both because it is the largest industrial power in the world and because it is a communist power bent on revising the world order and humbling the West.

Today, China produces nearly 30% of the world’s manufacturing value add, a greater share than the United States, Japan, and Germany combined.²⁹ Manufacturing accounts for 26% of China’s GDP, the highest proportion of any country remotely China’s size and level of development.³⁰ That figure has declined from a high of 32% in the mid-2000s, a source of consternation among leaders in the Chinese Communist Party (“CCP”), which has identified manufacturing as “the mainstay of the national economy”, “an instrument of rejuvenation”, and “the foundation of a world power.”³¹ China has devoted extraordinary resources to the maintenance and promotion of manufacturing through state-subscribed and operated industrial guidance funds, among myriad other incentives.³²

For more than two decades, China has had a dominant position in low-end, commodity manufacturing for all manner of goods, a fact that can be confirmed by examining the shelves of any big-box retailer. This dominance is only beginning to be shaken, due to geopolitical tensions and the rising cost of labour in China.

Many dismiss this manufacturing as cheap, dirty, and therefore unimportant, but it was a critical stepping stone of China’s development and a major source of subsequent innovation. Low-end manufacturing created the industrial clusters, infrastructure, supplier networks, and workforce that support higher-end manufacturing today. Many of China’s star companies began as “low-end” cogs in the supply chains of Western

multinational machines. They used that on-the-job training to become innovators and world-leading companies.

As a consequence of this struggle up the value chain, today China excels in producing higher-value goods of obvious strategic significance, such as ships and cars.

In 2023, Asia produced virtually all the world's seagoing merchant ships by tonnage (63 million out of a total 65 million tons produced worldwide).³³ China delivered 33 million tons, more than its next-largest competitors (South Korea and Japan) and the rest of the world combined. For comparison, the United States delivered 65,000 tons. Adding naval shipbuilding would increase that number somewhat but would hardly make a dent in the disparity. According to the Office of Naval Intelligence, China has more than 200 times greater shipbuilding capacity than the United States.³⁴

The global automobile industry is more fragmented and competitive than the shipbuilding industry, but China still has a strong hand. China has long been the world's largest producer of cars due to the size of its domestic market, but the quality of Chinese autos was considered inferior and exports were low. Lately, quality has improved and Chinese autos have started flooding foreign markets. In 2023, China overtook Japan as the largest exporter of automobiles in the world.³⁵ Most of the exports were for traditional, gas-powered vehicles, but China also exported millions of electric vehicles ("EVs"). These EVs are cheaper than Western competitors, often significantly, and technologically comparable, if not superior. BYD, China's EV champion, is the industry leader in batteries, which has allowed it to produce EVs with excellent range and performance, at prices far lower than comparable Western offerings. The company began in the 1990s as a producer of commodity batteries for consumer electronics, showcasing how China's humble beginning in "low-end" manufacturing laid the groundwork for its present leadership in high-end technology. As icing on the cake, an infusion of Western capital from Berkshire Hathaway in 2008 helped BYD build its EV empire.³⁶

China's companies are supported by a government research and development ("R&D") complex that has made the country competitive at the frontier of science and technology. In 2021, China spent \$661 billion on R&D, almost triple what it spent one decade ago.³⁷ It is in a close race for top spender with the United States, which spent just over \$800 billion. Most of China's R&D spending is from public sources, unlike in the United States, where businesses pay for most R&D and government spending has flatlined the past decade.

China's R&D spree has started to produce results, challenging the long-held view that the country is weak in innovation. Since 2020, China has originated the most international patent applications under the Patent Cooperation Treaty ("PCT") of any country.³⁸ Huawei alone applied for more patents (7,689) than the United Kingdom (5,739) in 2022. By some metrics, China also has taken the lead in high-impact research into many dual-use technologies. The Australian Strategic Policy Initiative found that China leads in 37 of 44 research fields it identified as critical, including research into explosives, advanced materials, radiofrequency communications, robots, drones, and nuclear energy.³⁹

China faces its share of challenges, notably a disastrous demographic outlook, heavily indebted local governments, and overcapacity in some sectors, such as steel. But so far, at least, China has skilfully managed to transition from a poor, low-tech manufacturer into a rich, high-tech, and formidable "manufacturing powerhouse", as the CCP dubbed its goal in Made in China 2025. If Chinese manufacturing is used as a benchmark, then the West's performance looks poor by comparison. In fact, as Chinese companies lock in advantages in frontier technologies like batteries, solar, nuclear, shipbuilding, and drones, Western industry risks a worse fate than a lacklustre performance review. It risks obsolescence and irrelevancy.

Causes of Industrial Decline

Fundamentally, manufacturing at speed and scale requires a robust industrial ecosystem. Unlike in strategy video games, factories do not spring out of the Earth *de novo* and they do not exist in isolation—at least not for long. Factories depend on deep and lasting pools of capital and skilled labour. The availability of labour depends in turn on a host of factors, including whether there are vocational schools, engineering colleges, other factories, affordable housing, and family amenities in the area to support a manufacturing workforce. The availability of capital depends on taxes and the existence of alternative investments that may be judged more attractive. And those are just two of the independent variables that determine whether a factory will be viable. Factories also depend on reliable and affordable electricity and water, transportation infrastructure such as rail and ports, and increasingly industrial-grade internet connectivity to manage supply chains and operate networked tools, such as robots.

The story of the nineteenth and early twentieth centuries was the West's creation of robust industrial ecosystems in places like Cleveland and Birmingham. Manufacturers

in those places benefited from access to patient capital, skilled craftsmen, rail and canal systems, and cheap energy. Their competitive positions in turn generated the proceeds to employ countless workers and expand their empires.

The story of the mid-twentieth century to the present, by contrast, has been the collapse—in many cases, the dismantling—of these industrial ecosystems. These were local tragedies, but they also contributed to a vicious cycle with systemic effects on our nations as a whole. Today, one of the greatest hurdles to opening factories in Western countries is the absence of other factories and manufacturing workers available to support them. Apple, for instance, struggled to build the Mac Pro in Austin, Texas, because it could not find an American company capable of making enough screws; the machine shop it contracted had sold its tooling for mass production to focus on smaller, specialised projects.⁴⁰ Apple ended up ordering screws from China.

The unravelling of the West's manufacturing ecosystems occurred roughly in two waves, with two related but distinct causes.

First, beginning in the 1960s, an increase in regulation, litigation, and bureaucracy conspired to raise the cost of inputs and delay or kill new projects. These man-made burdens have accreted over time—like barnacles on the hull of a ship—to make heavy industry a punishing sector in which to invest and operate.

Second, beginning in the 1980s, corporations reacted to the darkening business environment at home by defecting overseas to less regulated and expensive jurisdictions. Investors likewise reacted by shifting their money to overseas manufacturers or to less regulated, capital-light sectors such as software. These responses, however logical in any particular case, starved and depleted industries already groaning under the weight of oppressive regulation. Predictably, the sudden shift in capital and know-how to foreign countries produced competing industrial ecosystems that made it harder for domestic industry to survive. This new ethos of offshoring and disinvestment would have been incomprehensible to the baron builders of past generations, but it was justified by an emboldened neoliberal ideology that downplayed the significance of place in favour of conceptualising countries as generic economic zones, and which preached that free trade and globe-spanning supply chains were the route to maximum efficiency and prosperity.

The back-to-back blows of overregulation and globalisation shattered the industrial ecosystems of the West. These two ills conspired in our decline, one commonly associated with the left and the other with the right. This is a story, then, with few

heroes and few storytellers motivated to relay it in full. But it is a story worth telling. Understanding the root causes of deindustrialisation will give us a better sense of what needs to change to kickstart a revival.

Strangling Industry

Beginning in the 1960s and accelerating in the 1970s, government's posture toward industry and development underwent a dramatic change. Before, Western societies were organised in such a way as to facilitate development. Governments and regulators were far from supine actors, but their bias was toward development. The state worked closely with business to nurture, protect, and—especially in wartime—supercharge its industrial base. Government also independently undertook development projects, such as the Hoover Dam and Tennessee Valley Authority, on a scale unimaginable today outside of China.

Corporate leaders, too, had a sense of purpose grounded in place and nation; a noblesse oblige. Often, this took the form of quasi-aristocratic obligation, as industrialists poured their wealth into charitable and cultural institutions for their fiefs. But often, too, it was motivated by patriotism and a conception of the corporation that would seem alien and perhaps illegal to C-suite executives today. Henry Ford, one of the more extreme representatives of this view, described his decision to stop paying a dividend in order to reinvest in his company as an attempt to “employ still more men” and, in so doing, to “spread the benefits of this industrial system to the greatest possible number, to help them build up their lives and their homes.”⁴¹ Leaders such as Ford believed they were engaged, together with their workers and government, in the project of building the nation and perpetuating its values. It is a matter of some dispute whether Charles Wilson, the president of General Motors, actually said the interests of his company and the interests of his country were indistinguishable, but at the highest levels of industry some version of that belief was certainly present.⁴² One does not have to agree with currently fashionable notions of “corporate responsibility” and “stakeholder capitalism” to conclude there was something worthwhile about this older, patriotic tradition.

Starting in the 1960s and 1970s, this symbiosis of state and industry started to come undone. A cavalcade of crises and social problems tarnished the reputation of industry and led to calls for regulation and reform. Before, the focus of government had been on facilitating development. Now, the government stepped in to manage industry and

inhibit development. The resulting web of regulation, bureaucracy, and litigation slowed industrial projects to a crawl while raising the price of major inputs.

Nowhere is this phenomenon seen more clearly than in environmental regulation. The modern environmentalist movement came onto the scene with swiftness and force in the 1960s, channelling the age's scepticism of the established order and desire for a return to a more natural and "authentic" existence.

The movement responded to genuine environmental disasters caused by a century of intense heavy industry. In 1969, Cleveland's Cuyahoga River caught fire, which was nothing new to Clevelanders accustomed to this feature of life in a factory town, but which garnered attention among the nation's increasingly environmentally conscious press.⁴³ The same year California suffered the worst oil spill in its history off Santa Barbara, which broadcast images of oil-covered birds to the nation.

Outcry over these and other disasters led to the 1970 creation of the Environmental Protection Agency and passage of new laws, notably the National Environmental Policy Act ("NEPA") (1969), Clean Air Act (1970), and Clean Water Act (1972). As the writer William Murray has documented, these laws dramatically raised compliance and litigation costs on manufacturers.⁴⁴ They introduced into law the "precautionary principle", or the notion that exceeding certain thresholds of pollutants was presumptively harmful to humans and the environment and could therefore be prohibited, even if actual, particular harm was not established. Subsequent court precedent also expanded standing so that non-affected third parties could sue to stop potentially polluting projects. This opened the door for activist groups, such as the Sierra Club, to slow development to a crawl through litigation, which they have happily done in thousands of cases. In 2016, it took five years, on average, for industrial projects to complete NEPA-mandated environmental impact statements, which practically all infrastructure projects receiving government support must complete. Much of the delay was attributable to litigation. The Clean Air Act's New Source Review process, required for all major new sources of emissions, is another source of headaches and delays—particularly perverse because, by definition, it affects new construction while leaving older, often dirtier, facilities untouched.⁴⁵ Such delays have been the death knell of many new factories and upgrades. The mere prospect of such delays has been enough to discourage many more.

The harmful effect of regulation and bureaucracy can also be seen in defence, where timelines for new weapons and platforms have been telescoping since the 1970s. William Greenwalt and Dan Patt of the Hudson Institute find that "time-to-market" in

military aviation, or the time it takes for a new airplane to go from the drawing board to operations, has more than doubled in the past half century, to ten years on average.⁴⁶ They attribute this slowdown to the seismic defence procurement reforms of the 1960s and '70s, which empowered the Department of Defense to impose much stricter requirements and testing standards on programs—regulations by another name. Defence contractors were not exempt from other, economy-wide regulations affecting industry during that period, either, which means they faced an especially complex web of regulations.

The burden of this regulation has compounded over time. Despite periodic movements for reform, few landmark laws have been repealed and many have been added, in a kind of one-way ratchet. The incidence of this regulation falls disproportionately on manufacturers. The National Association of Manufacturers found in 2023 that federal regulation cost all United States firms about \$12,000 per employee.⁴⁷ The cost-per-worker was far greater for manufacturers, at more than \$29,000. The cost of complying with environmental regulation was the key driver of this disparity, although manufacturers faced a higher regulatory cost in every area except tax compliance.

Over time, these regulations have rendered domestic manufacturing increasingly unattractive and unviable. In the United States, capital rerouted to more promising alternatives, namely the unregulated realm of cyberspace. The venture capitalist Peter Thiel described this shift as follows: “We basically outlawed everything in the world of atoms; we’ve left the world of bits relatively unregulated.”⁴⁸ As we have seen, the digital revolution propped up American growth and productivity. But it could not fully mask the worsening state of manufacturing, which faced new pressures and new crises from the 1980s on.

Selling Out Industry

A new school of thought emerged from the overregulated 1970s: a swaggering neoliberalism embodied by the economist Milton Friedman and Ronald Reagan’s famous line, “Government is not the solution to our problem. Government is the problem.” After the collapse of the Soviet Union, this anti-statist ideology fused with a related belief in globalisation, or the idea that nation states themselves were outdated and that the future belonged to multinational corporations with global value chains, capable of exploiting the comparative advantages and cost differentials between different jurisdictions. Jack Welch, the former CEO of General Electric (“GE”)—coincidentally, the very company where Reagan refined his political speaking ability as

a spokesman—epitomised this view when he stated that, “ideally, you’d have every plant you own on a barge to move with currencies and changes in the economy.”⁴⁹

Reagan’s diagnosis, at least, was partly correct. Regulations and ham-fisted attempts at command-and-control weigh heavily on industry, then and now. But it was always an incomplete judgment, disregarding the considerable, positive role that government had played as a partner of industry the century before. It was easy to excoriate government in the abstract; it was harder to explain Apollo or the Transcontinental Railroad without it.

Moreover, the new crusaders’ efforts were not channelled mainly into deregulatory efforts that might have improved the position of manufacturers. Outside of extractive industries like mining and energy, heavy industry was not a notable ally or priority of the neoliberals, who professed to be agnostic about what kind of economic activity their reforms stimulated (a belief summarised by Michael Boskin, one of President George H.W. Bush’s economic advisors, as follows: “Potato chips, computer chips, what’s the difference? A hundred dollars of one or a hundred dollars of the other is still a hundred dollars.”)⁵⁰

The neoliberals were more successful in liberating trade and capital from government oversight. For instance, in 1982, the Securities and Exchange Commission promulgated Rule 10b-18, eliminating restrictions on the ability of corporations to buy back their own stock. Likewise, the two decades following the Cold War were a seemingly never-ending series of dialogues and summits about free trade, resulting in the North American Free Trade Agreement (“NAFTA”) (1992), the World Trade Organisation (“WTO”) (1995), and, perhaps most significantly, the extension of Permanent Normal Trade Relations status to China in 2000, followed by China’s accession to the WTO in 2001.

These coups for free trade resulted in historically low tariffs. Western leaders believed that a commitment to free markets demanded nothing less. However, there was nothing “free” about the new, globalised markets these agreements created. Lowering trade barriers in the face of heavily subsidised, state-directed Chinese imports was a choice to allow Western economies to be shaped by industrial policy set in Beijing. The resulting flood of imports swamped domestic manufacturers, leading to the “China Shock” of the mid-2000s.

Globalisation also changed the character of the corporation and the economy in unhealthy ways, diverting capital and attention from productive activities toward shareholders and speculative pursuits. This was the era of shareholder primacy’s

ascension, or the notion that corporations existed solely to generate returns for their investors; the title of Friedman's treatise on the subject puts it bluntly: "The Social Responsibility of Business Is to Increase Its Profits." This theory was embraced and marshalled into action by emboldened corporate raiders, who took on positions in ungainly companies and agitated for payouts. Corporate boards and executives eventually embraced the doctrine, as well, leading to a laser focus on stock performance and liberal rewards for investors. In many cases, employee compensation became tied to stock performance, leading to even more obsessive focus on that metric to the exclusion of others. Long gone were the days of Fordism and the patriotic corporation. Now corporate leaders were increasingly MBAs rather than builders, with a corresponding difference in priorities.

This new leadership class, in the C-suite and on Wall Street, effected many changes to the corporations under their control. The goal was to improve financial performance at the lowest possible cost—often, with as little investment as possible.

One such change was a marked increase in "contracting out" capital-intensive business functions, like manufacturing, while retaining lucrative work such as final assembly and design. The sociologist Gerald F. Davis refers to this phenomenon as "Nikefication", after Nike's practice of extracting rents by licensing its intellectual property to contract manufacturers.⁵¹ Under this model, Nike is not so much making shoes as licensing the swoosh. The consequences of this disaggregation may not be so severe in the case of injection-moulded plastic footwear. It is surely more consequential in the case of "fabless" semiconductor companies that rely on manufacturing on the contested island nation of Taiwan, or airplane companies that offload door-plug installation to third-party contractors.⁵²

Another change was a rise in financial activity by companies that were, in theory at least, not supposed to be in that business at all. As a report on investment trends authored by Senator Marco Rubio noted in 2019, "nonfinancial corporate companies' balance sheets look increasingly like financial institutions' balance sheets, that is, they increasingly borrow and lend for profit."⁵³ This fact explains why many car manufacturers now offer customers a loan as well as a car, and why, within the last decade, GE had thousands of employees in a division, "GE Capital", labelled a "systemically important financial institution" by the United States Treasury.

The results of this sea change in thinking and policy can be seen in soaring stock valuations, which of course was the point. Less cheerily, they can also be seen in investment data. In 1980, buybacks and dividends represented about 2% of GDP; nearly

40 years later, they accounted for 6% of a much larger pie.⁵⁴ Business investment, by contrast, shrunk from 15% of GDP to about 12%. What this means, practically, is that money was flowing out of the nation's already ailing industrial companies into the hands of investors. Optimising for short-term financial success ended up, in many cases, not being in the long-term interests of the firm, much less the country.

While investment in heavy industry at home declined, investment in less-regulated jurisdictions boomed. Many countries, including Taiwan and Mexico, benefited from an influx of foreign investment. None benefited more than China. According to the Rhodium Group, in the three decades after 1990, more than \$350 billion in American foreign direct investment and venture capital poured into China.⁵⁵ Ownership of Chinese securities brings the total into the trillions.⁵⁶ Most of the direct investment was "greenfield": brand-new factories, tools, warehouses, and infrastructure for China, often in joint ventures with state-owned companies. These were upgrades that factories at home were not getting, and the difference was hardly made up by investment going the other way. Chinese investment in the United States over the same period, while considerable, was almost entirely for acquisitions. Increasingly wealthy Chinese investors were snapping up heirlooms at the American yard sale, while American investors were funding the world's factory.

The twin waves of overregulation and globalisation have reshaped Western economies and the incentives that determine business investment, productivity, and growth. This fact explains why recent attempts to spur business investment and manufacturing—both from the right and from the left—have produced mixed results.

The orthodox solution to low investment from the right is tax cuts that leave more money in the hands of businesses. In theory, those businesses will use the tax savings to upgrade their capital stock and workforce, boosting productivity and growth. This theory was tested most recently with the 2017 Tax Cuts and Jobs Act ("TCJA"), which reduced the corporate tax rate from 35% to 21% and provided immediate, full expensing for purchases of capital goods, among other changes. TCJA was billed as a spur to investment and growth. As Gary Cohn, director of the National Economic Council, said in 2017, "we want companies to invest back in the economy, not give money back, or sit on money because they don't think there's anything to do with it."⁵⁷

However, this hoped-for investment bonanza failed to materialise. As the economist Oren Cass points out, using data from the Bureau of Economic Analysis, growth in business investment was slightly lower in 2018 and substantially lower in 2019 than it had been in the preceding eight years.⁵⁸ Growth in investment in capital equipment was

also lower, despite a short-lived rush of investment in late 2017 and early 2018 to take advantage of the tax bill's full expensing provision.

Where did the money go instead? The Congressional Research Service noted that much of it went to "a record-breaking amount of stock buybacks, with \$1 trillion announced by the end of 2018."⁵⁹ This disappointing result is only to be expected, absent broader changes to the incentives that businesses face. Giving companies more money, in a business environment hostile to manufacturing, will not in itself lead to more investment in manufacturing. Companies will merely take the path of least resistance by paying it out as a reward to shareholders, as in fact happened.

Another response has been the accommodative monetary policy pursued by central banks since the Great Recession, which saw rates hovering at—or even below—zero for more than a decade before inflation necessitated a change of course. In theory, this policy should be good for investment and growth in much the same way as a tax cut; accommodative monetary policy reduces the cost of borrowing, facilitating investments that may not have been profitable in a higher interest rate environment. In reality, no such investment occurred. The decade following the Great Recession was a period of particularly disappointing business investment.⁶⁰

The effect of low interest rates is reflected instead primarily in soaring stock valuations, led by a handful of superstar technology companies, such as NVIDIA, trading at values many times greater than earnings. The dominance of the FAANG technology companies, and most recently the so-called "Magnificent Seven", underscores how the investment playing field has shifted to favour capital-light, lightly regulated software and design companies over capital-intensive, heavily regulated industrials. Of those top-performing stocks, only one, Tesla, is a manufacturer (NVIDIA is involved only in the design of semiconductors). The others are primarily information technology companies that rely on contract manufacturers, predominantly in Asia. Investors seeking the highest return on their capital in a low-yield environment have piled into companies that promise the moon, unburdened by much in the world of atoms beyond server racks.

Even recent, ambitious attempts to revive manufacturing have encountered problems due to the structural impediments standing in their way. President Biden's sweeping Inflation Reduction Act ("IRA") created hundreds of billions of dollars in tax breaks and other incentives for renewable energy manufacturing, such as EVs and solar. The more targeted CHIPS Act directed nearly \$40 billion in grants to bolster the United States's

shrinking semiconductor manufacturing base. Not to be left behind, the EU announced a strikingly similar Chips Act in 2022.

These laws have spurred a tremendous rise in private spending on construction for manufacturing.⁶¹ However, as one would expect, this increase is confined to the relatively narrow subset of manufacturing targeted by the laws—particularly computer, electronic, and electrical manufacturing—with little observable increase in other important sectors.⁶² And many projects supported by this funding blitz are mired in problems. The Financial Times found that 40% of IRA and CHIPS Act-supported manufacturing investments—projects worth a combined \$227.9 billion—have been delayed.⁶³ TSMC has pushed back the projected start dates of its first two Arizona semiconductor fabrication plants, citing skilled labour shortages that required it to import hundreds of Taiwanese engineers. An embattled Intel, meanwhile, has paused no fewer than four projects in Germany, Poland, Italy, and France that were supposed to be centrepieces of the EU Chips Act.⁶⁴ The European Commission had hoped its semiconductor strategy would boost the European Union’s share of global chip production from roughly 9% at present to 20% by 2030; last summer, it admitted Europe was on track to increase its share to just 11.7%.

These projects, and others like them, may nonetheless succeed in creating enduring supplier networks and manufacturing clusters.⁶⁵ At the very least, they are rays of hope that Western elites have realised they are in a hole and have decided to stop digging. But if they succeed, they will do so despite considerable obstacles, many self-imposed. Environmental reviews and other permitting processes are imposing significant delays. This fact has put President Biden and Secretary of Commerce Gina Raimondo, the dispenser of CHIPS Act grants, in the awkward position of supporting regulatory waivers for these projects over the loud objection of their party’s green faction.⁶⁶

And then there is the problem of China, looming over these debates like a giant. China’s outsized position in targeted industries has ignited ferocious debate about whether, and to what extent, its companies can be involved in the West’s reindustrialisation effort. Ford’s joint venture with CATL, a Chinese battery giant, will likely qualify for IRA funding despite protests from hawks on Capitol Hill. This raises the uncomfortable possibility that dollars intended for United States reindustrialisation could end up flowing back to China, anyway.

Meanwhile, Western companies’ dependence on China as a manufacturing hub and overseas market has turned many into *de facto* advocates of the Beijing line in debates surrounding subsidies and trade restrictions. When Europe voted to impose new tariffs

on Chinese EVs, it did so over the protest of Germany—and more to the point, Volkswagen. Now Beijing is ordering its auto companies to withhold investment in countries that supported the tariffs, sowing further division on the continent.⁶⁷

A successful reindustrialisation agenda will have to face up to the limitations and poor design of policies to this point. More important, it will have to address the root causes of overregulation and globalisation that have made Western industry slow, uncompetitive, and exhausted. This will require the undoing of a half century's worth of mistakes and adopting the use of unfamiliar tools.

Rebuilding

Getting serious about rebuilding will require embracing a variety of policies, some of which do not fit neatly in preexisting ideological boxes or have a natural, existing interest group to champion them. The aim of these policies—the goal that unites them despite their heterogeneity—is to enable the manufacture of goods at home, at scale, and at globally competitive prices. Achieving this aim, in turn, will require lowering the cost of inputs to manufacturing, rerouting investment to manufacturing, and rebuilding industrial ecosystems that are essential for innovation and mass production.

Naturally, many existing proposals of this sort focus on goods at the very top of the value chain, such as cutting-edge semiconductors, widebody commercial aircraft, automobiles, and large ships. Attention is also paid to defence and “dual-use” articles, which include a wider galaxy of goods: munitions, so-called “legacy” semiconductors, small commercial drones, and the like. Finally, renewable energy and other clean tech are often targeted, particularly by left-wing parties trying to wrangle unruly coalitions that include such disparate groups as environmental activists and old-school labour organisers.

Plausible cases can be made for the importance of all these goods. In a world of finite resources, policymakers clearly must exercise judgment over which technologies deserve special attention and encouragement. It is hard to imagine a prosperous and safe future without maintaining the ability to manufacture advanced semiconductors and aircraft, for instance.

Categories like these can be limiting, however, when they focus solely on the bleeding edge of technology and dismiss goods lower down the value chain. China's example, as

well as the earlier examples of Japan, South Korea, and Taiwan, shows that the manufacture of “low value” or commodity goods are a precondition for a robust industrial base and an unexpected font of innovation. Such manufacturers play a critical role in a healthy industrial ecosystem, serving as suppliers and employee-training facilities for manufacturers higher up the food chain. Often, they are sources of process and product innovation. “Low value” companies can grow to become large, lucrative companies if they catch the right wave, as was the case with BYD. And their location on home soil means they are in proximity to corporate clients and retail customers, leading to process and customer-service improvements, respectively.

“Low-value” manufacturing also has a way of turning into high-value manufacturing overnight when disaster strikes. The United States defence industrial base is learning this the hard way, as it grapples with the reality that mass production of munitions and platforms depends not only on prime contractors, but on thousands of secondary and tertiary suppliers, often small machine shops and assembly lines with aging equipment and workforces. Likewise, when the pandemic began, the United States relied on masks, nitrile gloves, and other “low value” goods from China until assurances could be granted to domestic manufacturers to fire up long-dormant production lines.⁶⁸ Many of those companies subsequently struggled when the crisis petered out—a poor reward for companies that had answered the call in their country’s time of need.

Manufacturing clearly must look different in wealthy, developed countries than in developing countries. It will rely less on warm bodies and more on automation to account for insurmountable differences in labour costs and working-age population size. And it may require short-term demand-side supports, like domestic-content-value requirements, to encourage upstream manufacturers to source more from local suppliers despite inevitable disparities in cost. But there is no fundamental reason why Western countries cannot have the full spectrum of manufacturing and must instead serve only as “integrators” of parts made halfway around the world. Rebuilding strong industrial clusters will require concern for the health of relatively unassuming manufacturers, as well as the industrial giants that stitch their products together.

An effective reindustrialisation agenda therefore needs to include both broad, sector-wide reforms to improve the business environment for all manufacturers, plus targeted interventions aimed at supporting specific sectors deemed critical by policymakers. The specific policy mix will inevitably vary by country, but general, broadly applicable suggestions can be made.

First, serious efforts must be made to eliminate regulations, permitting requirements, and activist litigation that slow projects and increase the cost of production. Government today acts as the inhibitor of manufacturing; it must rediscover its former role as partner of industry and enabler of manufacturing.

For many goods, especially high-technology goods, speed is the differentiator between success and failure. The West performs poorly on this variable in comparison to East Asia. For instance, TSMC began construction of its first Arizona fab in 2021; it is expected to enter service next year, in 2025. For comparison, TSMC's Japanese subsidiary began construction of a fab in 2022 that is expected to begin production this year, in 2024. This two-year difference is worth potentially billions of dollars in sales and depreciation. Clearing bureaucratic obstacles out of the way is essential if Western countries are to bring their companies home or attract foreign investment.

Any serious effort at deregulation and permitting reform is certain to encounter opposition from environmental activist groups. But if anything, this policy is one of the most feasible, given the coalitions that could be assembled in support. Deregulation appeals to traditional pro-business elements as well as newer, more heterodox factions interested in industrial policy. Already, permitting reform is picking up steam as a bipartisan issue in the United States. In October, President Biden signed into law the Building Chips in America Act, a bipartisan bill that waives NEPA reviews for CHIPS Act projects and limits the timeline for activist litigation. The passage of this bill indicates that majorities can be assembled to remove obstacles from the path of manufacturing, at least in high-value, high-technology areas of obvious relevance to our security and prosperity. Whether broader reform is possible, politically, remains an open question.

Second, Western countries need to change the incentive structure for investment in manufacturing. Proactive industrial policy is necessary to “crowd in” private investment and backstop industries essential to the national interest, but it is a tool with potential for abuse, particularly in its simplest form of direct grants to industry. A better model, proposed in the United States by Democrat Senator for Connecticut, Chris Coons, is a government-run industrial finance corporation authorised to invest public funds and organise private-sector capital partners in support of worthy manufacturing projects.⁶⁹ Such an organisation could leverage public funds into a far-larger pool of investments by making and guaranteeing loans, issuing bonds, taking equity stakes in promising ventures, and the like. More important, it would reassure private capital partners of the government's commitment to supporting industry, freeing up capital that might otherwise be parked on the sidelines.

Targeted industrial policy should be paired with broader, industry-wide incentives to invest in domestic manufacturing. Full and immediate tax-expensing for equipment and structures is one such policy with broad bipartisan support. Expanding IRA-like tax treatment to a broader range of manufactured goods is another possibility.

Third, policymakers must support rapid deployment of new sources of energy to suppress the price of electricity for industrial customers. This recommendation is especially relevant in Europe, which suffers electricity prices several times greater than the United States. But it is still relevant for the United States, where the grid is already coming under strain from EV adoption and Artificial Intelligence applications.

Nuclear power is the obvious candidate to provide steady, baseload power for industrial end users. Nuclear has the added benefit of supply chains that are independent of China, as Australia and Canada are major producers of uranium and a host of established Western companies have experience designing and building reactors. The same cannot be said for renewable energy, particularly solar.

Rapid deployment of nuclear power will require regulatory streamlining to speed the licensing of new projects and new reactor designs, particularly small modular reactors that could be placed on site at factories for dedicated use. Policymakers should also examine the rolls of inactive nuclear facilities to determine which could be returned to service, as the United States is doing by restarting a decommissioned reactor at Three Mile Island. Such efforts are a bandage, however, not a substitute for new construction.

Nuclear is also attractive because it is carbon free and thus has supporters even among advocates of Net Zero and other emissions-reduction schemes. But Western countries should embrace a diverse energy mix, which will naturally include renewables and carbon-intensive sources like natural gas and coal. This is a strategy pursued by none other than China, which has trumpeted its massive deployment of renewable energy while downplaying its simultaneous, massive deployment of coal-fired power plants.⁷⁰ Clearly, China is prioritising industry over climate commitments when the two come in tension. Western countries should be equally realistic.

Fourth, Western countries must invest in engineering and vocational training to recreate a viable manufacturing workforce. Rich countries will never compete with the developing world on labour costs, and never have; attempts to do so by importing a workforce of low-skilled immigrants have produced the very crisis that now consumes Western politics, without obviously strengthening manufacturing. We can, however, compete on quality, which will require public investment in engineering and the skilled

trades. Producing more and better engineers and tradesmen is essential to breaking the bottlenecks currently slowing production, as we have seen with TSMC.

This goal will require the rewiring of education systems that, at least in the American context, are oriented toward higher education and biased against technical fields. Vocational pathways should be introduced and encouraged at an early stage, so that young people who will not succeed in college are exposed to useful alternatives. Partnerships between schools and local employers and trade unions should be established so these students can receive training and ultimately employment. Employers should be financially incentivised to train and retain employees, including through wage subsidies.

Students who attend college should be encouraged and indeed steered to technical fields, particularly engineering. Higher-education institutions compromised by unconditional public subsidy, useless bureaucracies, and in some cases foreign influence will not make these needed changes on their own. Lawmakers will need to insist on a renewed focus on technical training, as they did in the United States through the National Defense Education Act in the early days of the Cold War.

Finally, Western nations must get serious about cutting China out of our supply chains and relying more on like-minded democracies as trading partners. Reindustrialisation will not succeed if Beijing is able to play off compromised Western companies against their governments. Likewise, it will be a Pyrrhic victory if we reshore industry at one end of the supply chain but leave the other firmly in Beijing's grasp, leaving us vulnerable to export restrictions and bans.

Western countries must continue to erect a tariff wall that shields our industry from Chinese goods in critical sectors. We must pair this blunt instrument with equally forceful measures to prevent Western capital from flowing to China, for example by raising taxes on capital gains incurred in China, as has been proposed by Republican Senator for Florida, Marco Rubio, and Representative for Michigan, John Moolenaar, and blocking investment outright in high-technology and dual-use sectors of the Chinese economy.⁷¹

Ending dependency on China is not the work of a day. The RTX executive who said that decoupling with China is impossible could be accused of lacking courage, but his view is grounded in the reality of China's industrial dominance. Decoupling will in fact take herculean effort and quite possibly painful inflation. It will be all the more difficult

because China is now virtually the sole participant in some supply chains (e.g., solar) and the technology leader in others (e.g., batteries).

Western countries need to begin the difficult and time-consuming work of developing alternative, ex-China supply chains. We can speed these efforts by integrating our defence industrial bases, beginning with trusted countries like the Five Eyes and trusted industrial powers like Japan. Reindustrialisation is properly a nationalist project, but the recovery of economic sovereignty from a much larger opponent will have to be a team effort by necessity. To recycle a uniquely American slogan, Western nations will have to hang together, or else we will certainly hang separately.

The Second City

Observing the state of Western manufacturing, it is easy to be pessimistic, if not defeatist. We choose to end on an upbeat note.

Manufacturing is indeed in crisis, but for the first time in decades the crisis is widely recognised by policymakers and industry leaders, even if there is considerable disagreement about what should be done. The last two presidents of the United States have made credible commitments to rebuilding manufacturing—and they have put their money where their mouths are. Under President Trump, tariffs and export controls were imposed on China. They were largely retained by President Biden, complemented by an extraordinary injection of public funds.

Also encouraging are the entrepreneurs and innovators who are trying to lead us out of our present malaise. They may do so, if we give them the support.

El Segundo, California sits on the opposite end of the country from Cleveland, but it is linked to that Rust Belt town by a spiritual and historical connection.

El Segundo, literally “The Second”, was the site of Standard Oil’s second refinery, a complex still operated by Chevron to this day. During the Second World War, the town was a vital centre of airplane manufacturing, producing the Dauntless dive-bomber at the Douglas Aircraft Corporation’s massive factory, expanded with investment from the government-run Defense Plant Corporation.⁷² The city retained its aerospace focus through the Cold War to the present, with manufacturing facilities for practically all the primes and many other household names besides. To the extent the United States

retains strong industrial clusters, El Segundo is one of them, thanks to decades of sustained policy support and private-sector innovation.

More interesting than the legacy names are the scores of startups operating in El Segundo, staffed by unabashedly patriotic engineers who have rejected Silicon Valley's historic focus on consumer software applications in favour of hard tech—small-modular reactors, mass-produced drones, and the like. “We’re sick of nihilism and goofy software products”, one founder told *Vanity Fair* earlier this year.⁷³ These engineers are more likely to be inspired by Elon Musk than Mark Zuckerberg; they want to build the next Starship, not the next Facebook. And so far, they have benefited from a windfall of interest and funding from venture capital, which has poured more than \$100 billion into defence and hard tech as part of the post-COVID “time to build.”⁷⁴ One suspects more than a few have benefited from under-the-table support from the Pentagon, as well, whether from the Replicator Initiative or other sources.

Cynics have accused these startups of being part of a hype bubble, inflated by overeager funders until their attention inevitably turns to the next supposed frontier. A more charitable read is that they are a sign of vitality and untapped potential. Whether in Rockefeller’s day or our own, building great things has always started with outlandish beliefs and messianic figures.

The success of these ventures will not come solely from bootstrapping and “sweat equity”, however. It will require public support, patient capital, and a host of other factors to manage the scaling process from garage startups to mature industrial companies.

The raw potential for industrial renewal is still here, in other words, but it exists amid the ruins of broken institutions and a half century’s worth of policy mistakes. If we are going to build the Second City to greater heights, and rebuild Cleveland and other symbols of our decline, we will need to make new and better choices, quickly.

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