Chapter 1

Techno-Nationalism

This book is about how governments pursue technology as a power multiplier and how tech-competition between nations is reshaping global affairs in the twenty-first century.

Call it 'techno-nationalism;' a mindset that equates the technological prowess of a state's chosen actors with the strength of its national security, its economic prosperity and its social stability. Techno-nationalism seeks to attain competitive advantage for its stakeholders, on a local and global scale, and to leverage this advantage for geopolitical gain.

This is not a new phenomenon. As long as there have been nation-states, especially with the evolution of modern states in seventeenth- and eighteenth-century Europe, governments have sought to harness the power of technology to advance their interests.

It was the French writer, Antoine de Saint-Exupéry, who famously wrote: 'Every *nation is selfish, and every nation considers its selfishness sacred*'.

The twentieth century saw firsthand the effects of techno-nationalism with two of the bloodiest, most definitive wars in history, a forty-year

Cold War between America and the former Soviet Union, a race in space and to the Moon, a nuclear arms race, the rise of computers and artificial intelligence, and the beginnings of geopolitical competition linked to the semiconductor.

Robert Reich used the term 'techno-nationalism' in a piece for *The Atlantic* in 1987, in which he reflected on its paradoxical nature. At the time, the U.S. political establishment had stymied the sale of Fairchild Semiconductor Corporation to Fujitsu, a Japanese company. Washington had singled out Japan's technological prowess as a threat to U.S. economic hegemony.

Make no mistake: Twenty-first century techno-nationalism is on a scale and level of significance that is orders of magnitude greater than that of the twentieth century.

Consider the differences. During its rise in the 1980s as an economic juggernaut, Japan was a liberal democracy. It followed a constitution, largely imposed by the U.S. after Japan's defeat in World War II, that prohibited the expansion of its military—in fact, Japan relied upon the U.S. for its security needs—and Tokyo certainly had no ideological or geopolitical aims of displacing America as the leader of the rules-based international order. None of these things can be said about the rise of China. Its pervasive techno-nationalist apparatus and the rapid build up of its military, combined with the ideology of 'socialism with Chinese characteristics' has become a direct challenge to the existing Western rules-based order. Great power competition is on full display.

At the centre of techno-nationalism are six core elements, or behaviours, each of which effects a wide swathe of the international landscape. They are:

- The 'weaponisation' of supply chains
- Strategic decoupling and 'de-risking'
- Re-shoring, near-shoring and friend-shoring
- State-funded innovation and talent wars
- Tech-diplomacy, strategic partnerships and tech alliances
- Tradecraft and 'hybrid cold war'

We will discuss all these things extensively throughout this book. But first, we must identify the key categories of 'foundational' technologies, of which there are twelve.

Technology	Description
Advanced Materials	Composite materials, coatings and chemicals that enable heat resistance, strength, reduced weight, stealth, superconductivity, and improved performance. Includes smart 'self-healing' materials; explosives and energetic materials, novel metamaterials, advanced magnets, processed rare earths and minerals.
Advanced Manufacturing	Nano-scale manufacturing, atomic layer deposition, additive manufacturing, AI enabled production, advanced manufacturing robotics.
Artificial Intelligence (AI)	Machine learning, including neural networks and deep learning, 'cognitive' machines, natural language processing, including large language models (LLMs) with speech and text recognition and cognition, advanced algorithms and high-performance super-computing.
Aerospace	Reusable rocketry and space vehicles for transportation and habitation, deep space exploration; satellites, ballistic missiles, hypersonic aircraft and missiles, autonomous unmanned spacecraft.
Biotechnology	Biological manufacturing and synthetic biology, vaccines, genetic engineering and pharmacogenomics, germ warfare and DNA weaponisation.
Connectivity & Communications	5G and 6G wireless broadband, the Internet-of-Things (IoT), space-based Internet and low earth orbit (LEO) constellations, neuromorphic computing, and brain-computer interfaces (BCI); Light-Fidelity (Li-Fi) communications.
Energy	Electric batteries, photovoltaics and supercapacitors, biofuels, nuclear fission and fusion technologies, directed energy (lasers); hydrogen and ammonia power.
Propulsion	Nuclear thermal rockets, plasma drives, and hypersonic engines. Underwater propulsion systems including super cavitation drives and magnetohydrodynamic propulsion.
Quantum	Computing, sensing (which includes light, motion, temperature, pressure) and communication, including quantum key distribution (QKD).
Robots & Drones	Includes unmanned, autonomous aerial vehicles (UAV) and unmanned underwater vehicles (UUVs); drone swarms and machine biomimicry (machines that copy natural design for efficiency of locomotion, dexterity and lethality), ground-based military robots; and all manner of remotely operated and autonomous machines.
Sensing, Timing & Navigation	Includes biomimetic and neuromorphic sensors; ultra-stable oscillators and optical clocks; satellite-based augmentation systems and light and detection ranging (LIDAR).
Semiconductors	Also called 'chips' or 'microchips', semiconductors are the heart, brains and nerve centres of virtually anything that has an on-off switch. Chips are vital for logic, memory, power and overall functionality.

Figure 1.1 Foundational and Strategic Technologies of the Twenty-first Century.

These are all Fourth Industrial Revolution (4IR) foundational technologies.

Their power-multiplying effects drive economic competition, but more importantly, they determine winners and losers in that most basic of all human preoccupations: warfare. In this regard, nothing has changed for millennia.

These are referred to as foundational technologies because they are an essential ingredient for all other applications of leading-edge tech. Many are interrelated; where there is one there are others. One of these, AI, is especially critical because it is pushing the boundaries of knowledge in research and design, engineering, manufacturing, medicine, communications, operations and management, and, of course, the many different aspects of national defence.

More fundamentally, none of the above technologies are possible without access to semiconductors. This is why these tiny microchips find themselves at the centre of every element of techno-nationalist competition.

We will discuss all these technologies in separate chapters and how techno-nationalism is affecting their development and use.

It is important to note that technology, by itself, is not deterministic. In other words, those who create it must choose how to use it, whether for good or for evil. As we will see, however, virtually every technology can be used for both commercial and military purposes, thus we encounter the 'dual-use' dilemma—a challenge to businesses, traders, innovators and policymakers.

THE POWER OF THE STATE

Nation-states are the most powerful and influential actors in the international system. We begin the discussion about techno-nationalism, therefore, by recognising that a small number of states wield inordinate amounts of power.

Consider that in 2022, the Group of 7 (G7) countries—the U.S., Japan, Germany, France, the U.K., Canada and Italy and the European Union (E.U.), as a non-enumerated member—together with China, accounted

for 60% of global GDP.[1] Such a disproportionate amount of wealth, as it's channelled towards techno-nationalist objectives, is profoundly changing the international landscape.

These same countries are now at a historic inflection point. Great power rivalry and modern realpolitik has sparked an onslaught of techno-nationalist policies and agendas.

Technology-oriented spending around the world has been consolidating within a few power centres. Consider that from around 2020 to the end of 2023, the U.S., the European Union and China, alone, budgeted somewhere between US$6–8 trillion in public funding for technology-related initiatives—not counting high-tech military expenditures. Much of this public spending was focused on large infrastructure projects that emphasised digital connectivity, AI, computing, and automation, as well as sustainable energy, clean transportation and sustainable manufacturing.

In 2023, China, by itself, spent just under US$1 trillion on clean energy development.[2] Special emphasis went to electric vehicles (EVs), batteries, high-speed rail, electricity grids, energy storage, solar and wind power.

Semiconductors and AI are now the most publicly contested technologies, with hundreds of billions of dollars being spent collectively in China, the U.S., South Korea, Japan,[3] Taiwan and the E.U. But the implications of losing out on cleantech are just as serious, as these technologies are also important geopolitical power multipliers, as we will discuss in Part III of this book.

In the big picture, China, America and the E.U.'s technology-related expenditures, together, account for more than the combined tech-budgets of a hundred of the world's less developed countries, and a large chunk of so-called middle tier nations, such as India or Malaysia.

These numbers become more consequential when we factor in the additive value of tax breaks and other incentives offered through public–private partnerships (PPP), which are designed to pile private investments on top of government funding.

In the U.S., for example, less than two years after the passage of the *CHIPS and Science Act*[4] in 2022—which budgeted US$280 billion for

leading-edge technology, including US$52 billion in funding for semiconductor R&D and chip production—private industry had already invested more than US$300 billion towards new chip fabrication projects.[5]

A sizeable chunk of this new private money came from Taiwan Semiconductor Manufacturing Company (TSMC), the largest and most advanced microchip manufacturer in the world, largely in response to Washington's diplomatic arm-twisting.[6]

These are the early rounds of funding. The CHIPS Act will require more infusions of capital over the next decade-plus. It is fortunate for techno-nationalists, then, that semiconductors have been deemed an essential element of national security. America's spending on defence exceeds the annual military budgets of at least the next 10 largest countries, combined.[7] In 2022, for example, it accounted for around 40% of all the world's defence spending.

Thus, putting semiconductor production (or any other technology) under the national security umbrella means funding will be available—so long as squabbles in the U.S. Congress do not derail disbursement of future monies.[8]

Techno-nationalism continues to spill over into climate change policies and the decarbonisation of the global economy. Large-scale capacity-building initiatives in clean technology, such as lithium batteries, electric vehicles (EV) and alternative energy infrastructure, are increasingly a point of contention amongst trading partners.

Here, huge public funding in green initiatives in the U.S., Europe and China will fragment the geopolitical playing field and push it towards regionalisation and localisation. This is not to say, however, that new coalitions of countries will not coalesce around creative, mutually beneficial trading arrangements.

In America, the *Bi-Partisan Infrastructure bill* provided a funding conduit for cleantech and green infrastructure that has attracted secondary investors from Europe and Asia. As of 2023, the bill had funded 40,000 different projects worth about US$400 billion.[9] Other legislation advancing U.S. strategic policy interests included the massive *Inflation Reduction Act* (IRA), which aims to raise at least US$300 billion over a decade from corporate taxes, to fund different kinds of

cleantech. In the E.U., The *Green Deal* seeks to raise and invest over *US$1 trillion* in public and private funding for cleantech initiatives by 2030.[10]

Meanwhile, the scale of China's production capacity in green technologies, from EVs to photovoltaic cells, lithium batteries and wind power, dwarfs that of its rivals. This dominance allows Beijing to weaponise these supply chains the same way Washington has weaponised semiconductors.[11]

All this underscores the trend towards re-shoring, near-shoring and friend-shoring, which involves moving supply chains and activity hubs from overseas back inside national borders or closer to home, within the geographic confines of neighbours and trusted allies. Thus, European, Japanese and North American cleantech sectors look to reduce their dependence on China-sourced supply chains.

The six elements of techno-nationalism have produced a wider set of themes that are unfolding throughout the international landscape. They have instigated a fundamental reorganisation of the global economy, whereby strategic supply chains are bifurcating around U.S. and China-centric technology hubs.

Fuelled by a historic paradigm shift in the 'West', this reorganisation and bifurcation is prompting a gradual decoupling from China (beyond so-called 'de-risking') which, in turn, has exposed an epic paradox.

States and firms must now operate in a grey zone, where they are both strategic partners and adversaries with home and host governments, depending on where the geopolitical winds are blowing.

As such, as we seek to better understand techno-nationalism, we must take a closer look at each of these trends, below.

THE GREAT REORGANISATION

Techno-nationalism, along with climate change and the lingering effects of COVID-19, has accelerated a general recalibration of the global economy. Put another way: the world is undergoing a reorganisation. This effectively ends 30 years of what has been referred to as 'hyper-globalisation', which thrived from the late 1980s to around

2009. In hindsight, hyper-globalisation was a historic anomaly that owed its existence to the convergence of a unique combination of forces.

The first was the rapid diffusion of technologies of the 4IR, which delivered gains in computing power and connectivity along with a simultaneous decline in costs. The result was the lowering of barriers to entry across the global economy to a host of new participants, large and small. The second was the end of the Cold War and the implosion of the Soviet Union in 1991, which led to the brief American unipolar moment and paved the way for the third factor, China's accession to the WTO in 2001 and its rise to superpower status.

4IR technologies enabled dispersion of global value chains and the offshoring of complex operations to far-flung places, especially China. For Beijing, this was a major power-leveller, and China was able to make up ground on a longstanding power disparity between the 'West versus the Rest', a term made famous by the historian Niall Ferguson.

Serendipitous timing of the 4IR, then, allowed the absorption of massive transfers of wealth, knowledge, technology and critical professional expertise, all in record time, and at spectacular scale.

Yet even as the free world became increasingly intertwined with China's statist economic model, leadership in Beijing was working hard to advance modern history's most ambitious and comprehensive techno-nationalist agenda.

America's brief unipolar moment, from the 1990s to the 2010s, is clearly over. As it turned out, it was not just an anomaly, it was a false promise. But the ensuing backlash against China's rise is fuelled in the West by a strong sense of betrayal (naïve, of course, from a realist's point of view) which holds that China's technocrats achieved ascendancy, in no small measure, through deception, stealth and trickery.

Hyper-globalisation began a steady decline with the onset of the global financial crisis of 2008/09. Its unravelling accelerated in 2016 with the BREXIT vote in the U.K. and the election of Donald Trump in the U.S.

There should be no mistake about the primacy of nationalism. We may have convinced ourselves that it went away during the height of globalisation, but that was self-deception.

Consider that during the COVID-19 pandemic from 2019 to 2021—a time, if ever there were one, for nations to come together and fight a common enemy—China, the E.U., the U.S., the U.K. and India all restricted the export of protective gear and medical equipment.[12] This was quickly followed by vaccine nationalism and then vaccine diplomacy, with developed nations leveraging their stocks of vaccines as bargaining chips with poorer nations.

After the Russian invasion of Ukraine in 2022, shortages of wheat and other food commodities ensued. Within four months of the start of the war, some 35 nations had resorted to some form of 'food protectionism', which included export bans and taxes on critical foodstuffs.[13]

THE GREAT BIFURCATION

To be clear, the world is not 'deglobalising'; instead, it is reorganising and reconfiguring around opposing techno-nationalist and geopolitical agendas. That reconfiguration largely involves a bifurcation into two technology blocs—one centred on the U.S. and its allies and the other centred on China. This bifurcation phenomenon is occurring around the twelve categories of foundational technologies, yet, paradoxically, non-strategic goods may see continued or even increased trade, even among rivals, so long as the world is not roiled in conflict. The question is, to what extent will decoupling from China occur before such a conflict arises?

In the physical realm, the tech bifurcation entails the fragmentation and restructuring of well-established supply chains. In the digital realm, the same forces are fracturing cyberspace: increased government intervention and activism are disrupting cross-border data flows and Balkanising the Internet and the platform economy, and this affects everything from banking and finance to social media networks.

No country anywhere can escape this reality. The inevitable outcome is not just a reorientation of the commercial landscape but of geopolitical realignments, as nations coalesce around mutual interests and attempt to navigate around new obstacles.

This has shaken up an already unsteady geopolitical status quo, as rifts widen between the G7 and BRICS countries (Brazil, Russia, India, China and South Africa) over, for example, sanctions on Russia for its invasion of Ukraine.[14] By extension, Beijing's support for Moscow has deepened these rifts, which will have consequences for technology transfer and the who-gets-what in the regrouping of supply chains and strategic partnerships.

Meanwhile, middle-tier countries such as Singapore, India, Vietnam and Mexico will have to navigate a more complicated landscape, even as they have become the destinations of choice for restructured supply chains. China's path is far from certain, while many of the world's less-developed countries will feel the brunt of a more fragmented, less inclusive international environment.

But the G7 and a handful of other liberal democracies are undergoing a moment of geopolitical 'creative destruction'—if I may stretch Joseph Schumpeter's economic term—and while this will erase some hard-earned gains in trade and commerce in the short term, the reconfiguration of global value chains will also present new growth opportunities for a lot of businesses.

A paradigm shift in the West is displacing an almost dogmatic belief in free markets and has moved the pendulum back in the direction of 'managed trade' and those two contentious words: *industrial policy*. Consequently, Washington's weaponisation of supply chains through export controls and sanctions has produced a bitter clash between techno-nationalists and traditional neoliberal economists.

Meanwhile, an innovation race between Beijing and the West is further accelerating the fragmentation of strategic supply chains. Some, including the technology scholar Rob Atkinson, have called this *innovation mercantilism*.

Unlike mercantilism of the seventeenth and eighteenth centuries, however, the bifurcation of R&D and innovation around great power rivalry is not a zero-sum game. This is because of a superabundance of overlapping commercial interests, many of which thrive on change and disruption, even as others are disrupted. Thus, reorganisation of the global landscape and bifurcation of technology ecosystems calls for new investments in re-shoring and friendshoring, which stimulates other economic activity.

Another reason for the great bifurcation is that governments are linking technology transfer to security alliances. One example is the AUKUS defence pact, comprising the U.S., the U.K. and Australia. AUKUS' security pact includes technology transfer for everything from nuclear submarines to hypersonic missile technology, to quantum and machine learning, which, of course, means that semiconductors will also factor into the calculus.

Here, private investors are accelerating bifurcation by piling on their investments to publicly funded projects and joining public–private partnerships that link markets with defence-related initiatives.

PARADOXES AND CONTRADICTIONS

Will China's rapid rise as a technological power and its challenge to American hegemony inevitably lead to military conflict? Graham Allison, in his widely read book *Destined for War*, argues that throughout history, an ascendant power's challenge to an established incumbent creates a 'Thucydides Trap', which often results in the two going to war.

But the China–U.S. rivalry is far more complex than that between the ancient city-states of Athens and Sparta or Germany's challenge to British hegemony before the First World War. The Sino-American story involves much more deeply intertwined economic relationships on both the supply side and the demand side.

There are huge sunken costs in supply chains and production hubs that American and other G7 multinational firms have anchored in China, and, by extension, these hubs feed into a wider network of value chains stretching across the planet.

Never before have two superpowers with such fundamentally incompatible models become so deeply intertwined. The Cold War between the U.S. and the former Soviet Union (USSR), for example, featured two entirely different political and economic systems. They had virtually zero trade and economic exchange, and each operated almost exclusively within its own well-defined sphere of influence.

In contrast, China and the U.S. share the same global system and encounter each other everywhere. Some scholars, such as Joseph Nye, argue that since China and the U.S. have grown so economically

interdependent, we cannot say they are in a 'cold war'. By this reasoning, the two countries must accept their mutual dependence and figure out how to coexist.

But despite these economic co-dependencies, Washington and Beijing are in fact, in a much messier, potentially more risky kind of *hybrid cold war*. Hybrid cold war is a witches' brew of economic, cyber and information-related actions, all of which fall below the threshold of armed conflict but are nonetheless disruptive to the workings of the international system.

General economic interdependencies are unlikely to prevent an escalation of hostilities or, at the very least, a protracted process of bifurcation.

As the U.S. and China square off in this hybrid cold war, a parallel struggle between governments and multinational enterprises (MNEs) is unfolding. After decades of largely unrestrained offshoring and investment in China, Washington must somehow bring to heel the world's most dominant and wealthy non-state actors—American tech giants such as Apple, Intel, Qualcomm, Microsoft and IBM—who derive billions in revenue annually from China.

Beijing also must grapple with its own MNEs, but compared to U.S. MNEs, Chinese firms have much smaller, or even non-existent footprints in overseas markets. At home, Beijing's authoritarian government can bludgeon its heavyweights such as Alibaba, Tencent or even Huawei—into submission far more easily than Washington can control its key corporate players.

A STEADY SHIFT TOWARDS DECOUPLING

Disagreements between technology hawks on Capitol Hill and CEOs in affected sectors, everywhere, will cause friction for years to come. But the eventual outcome is likely to be more rather than less decoupling from China. Wall Street, which has long held high hopes for wealth-creation possibilities in China, is slowly coming to terms with this reality.

Beginning in 2022, for the first time, talk about a possible blockade or even a hot war in Taiwan became a regular topic in corporate boardrooms.

Beijing's shift to hard authoritarianism marks a tipping point, especially with its passage of the Anti-Espionage laws in 2023, its raiding of foreign company offices and its targeting of American companies such as Micron, Apple and Tesla for selective sales-bans. For the first time, well-established investors in China have begun to question their long-term prospects. Geo-economics, not liberal economics, has become the benchmark for business decision-making.

Clearly, there continue to be reasons for American companies in, for example, the fraught semiconductor sector, such as Nvidia and Applied Materials, to try and preserve market share in China as long as possible. Profit-driven, geopolitically agnostic MNEs will seek ways to circumnavigate export controls through supply chain makeovers, legal loopholes and corporate lobbying efforts for as long as they can.

The steady shift towards China decoupling has been a roller-coaster ride. Just three years prior to the imposition of China's Anti-Espionage laws, corporate America was keen on sidestepping Washington's efforts at decoupling. In 2020, even as the Biden administration was mobilising 'China-free' supply chain initiatives and adding Chinese companies to lists of restricted entities, Wall Street ploughed more than US$75 billion into China's financial markets.[15] After Beijing removed foreign ownership caps in April of 2020, companies such as Goldman Sachs, JP Morgan, Citigroup and Morgan Stanley jumped at the chance to take 100% control of their joint ventures with local firms.

By the summer of 2021, BlackRock, the American investment firm, announced it would set up a US$1 billion mutual fund, the first fund in China fully run by a foreign firm.

In July 2021, the American Chamber of Commerce in Shanghai conducted a survey of American companies and reported that 60% had increased their investments in China over the preceding year, and more than 70% of American manufacturers said they had no plans to move their production out of China.[16]

Despite all the talk about the end of globalisation and decoupling and Washington's onslaught of sanctions and export controls, 2022 witnessed a surge in bilateral trade between the U.S. and China. In the first eight months of 2022, the U.S. sent US$3 billion more than it had in 2021. Meanwhile, China accounted for the largest share of

U.S. imports of any country—and, as usual, ran a notoriously large trade deficit.[17]

Much of this surge in trade was attributable to corporate jubilation about China's post-COVID-19 opening, and after years of lockdowns, delayed projects and pent-up investment money, Western firms were eager to jump back in and resume business.

In January 2023, when Chinese President Xi Jinping relaxed the country's COVID-19 restrictions, BlackRock, JP Morgan and Germany's Allianz Global Investors, among many others, released a barrage of advertisements and publications exhorting investors to put their money into China. As the Morgan Stanley publication put it: 'Where to Invest When China Pulls Back From COVID-Zero'.

But then things began to take a dramatic turn for the worse. FDI in China dropped by 16.13% in the first seven months of 2023, compared to the same period in 2022—the largest drop in FDI in China since the 2008 financial crisis. Some of the notable 2023 FDI drop-offs were: U.S.: −25.3%, Japan: −18.4%, South Korea: −17.2%, Germany: −16.5% and the U.K. −15.8%—all clear indications of de-risking and eventual decoupling.

These numbers represented the first net outflows of foreign corporate accounts since China opened its doors to foreign investment, going back at least three decades. Of course, not all MNEs were taking their money out: some were increasing their inflows—but this was to better ring-fence their operations aimed at the domestic Chinese market, and to shore up their 'in-China-for-China' strategies—which, in fact, is evidence of a wider fragmentation of global value chains.

STATES AND FIRMS IN A GREY ZONE

By 2023, the message was loud and clear. Washington was committed to decoupling strategic supply chains from China, even though the process would be clumsy and disjointed and opposed by many. Officially, the word was that U.S. officials were aiming to 'de-risk', rather than fully decouple, and they would work to preserve trading benefits whenever they could.

In the meantime, multinational companies face the problem of managing thousands of dual-use goods lingering in a grey zone, where they may be unrestricted one day, but potentially off-limits the next.

With the ratcheting up of export controls in 2022 and 2023, the U.S. Department of Commerce (DOC) gradually restricted U.S. technology transfer to the Chinese semiconductor industry—at least on paper. Japan and the Netherlands, meanwhile, two key U.S. allies in what I call the 'Group of Five' elite semiconductor club (the U.S. Taiwan, Japan, South Korea and the Netherlands), agreed to cooperate with Washington's export control regime and block designated technologies from their own countries to China.

By 2023, Washington had blacklisted almost every Chinese technology company of consequence. This included Semiconductor Manufacturing International Corporation (SMIC) and Yangtze Memory Technologies Company Ltd. (YMTC), along with virtually all of China's other leading semiconductor companies. It also included DJI Technology Company (DJI), which had 80% of global market share in commercial drones, as well as Hikvision and Dahua, which controlled 60% of the global market in facial recognition cameras and surveillance-tech.

Others rounding out Washington's blacklist included SenseTime, one of China's premier AI companies, and Zhong Xing Telecommunications Equipment Company (ZTE) and, of course, Huawei, the world's leading telecommunications equipment manufacturer.

By 2023, Washington had rolled out the U.S. Outbound Investment Transparency Act, intended to block monies destined for a wide cross-section of the tech sectors in China and other countries of concern.[18] U.S. investors would soon be required to perform due diligence to affirm that investments in China were not somehow linked to the Chinese military—an impossible task, given the opaque nature of China's system of civil–military fusion initiatives that involve the Chinese Communist Party (CCP) and the PLA in virtually any enterprise of consequence.

Here, depending on how far U.S. policymakers intend to enforce these laws, we are likely to see more financial decoupling due to the onerous nature of these investment controls.

Eventually, public officials will have to figure out how to extend their enforcement efforts to offshore financial centres, tax havens and places where shell companies and holding companies continue to facilitate the trade of restricted trade and capital into China.

This next phase in the confrontation between CEOs and techno-nationalists will, therefore, be every bit as significant as the wider, overarching techno-nationalist competition between China and the West. In fact, the legal tussles, lobbying and public relations campaigns pitting MNEs against governments will have a substantial impact on how substantially strategic decoupling from China occurs.

The conflicts between MNEs and national governments will play out not only in Washington but also in Brussels, Tokyo, Taipei, Seoul and beyond.

At this turning point, most CEO 'old China hands' and senior corporate board members are in their 50s and 60s and have had careers like mine, spanning the halcyon decades of hyper-globalisation. For this cohort, China has always been an obvious and irresistible target for global growth strategies.

But that era is now over.

China's geopolitical ambitions present disturbingly incongruent and dangerous scenarios for those striving to maintain trade linkages. An arms race in Asia and the Indo-Pacific is underway. Even as commercial exchange continues between the two superpowers, the PLA pushes ahead with the development and deployment of hypersonic 'carrier killer' missiles, designed for one single purpose: to attack and destroy American aircraft carriers and push American naval power out of the region.

When a high-altitude Chinese spy balloon the size of a school bus was shot down by a U.S. fighter jet off the coast of South Carolina in February of 2023, the question was: Why was the spy balloon necessary?

Meanwhile, advances in supercomputing and AI have made cyberwarfare an ever present threat and spawned a new wave of cyberweapons of mass disorganisation and disinformation.

Such behaviour means that nations are preparing for war. Allison's Thucydides Trap, therefore, is alive.

These, then, are the overarching themes, core elements and undercurrents that are interwoven with twenty-first-century techno-nationalism, which leads us to some big questions.

THE BIG QUESTIONS

- Can the U.S. and China achieve competitive coexistence and continue mutually beneficial trade while engaging in a hybrid cold war?
- To what extent will decoupling occur across strategic supply chains, cyberspace and financial markets?
- Can middle-tier countries avoid 'choosing sides' and forge independent trading ties, free from big-power coercion?
- Can re-shoring, friend-shoring and ring-fencing of technology supply chains succeed after decades of offshoring and globalisation?
- Is an in-China-for-China strategy sustainable in the long-term for foreign multinationals?
- How will universities and other institutions be affected by techno-nationalism? What role will they play in talent pipelines and innovation races?
- What does the geo-economic 'Grey Zone' look like—the zone in which governments and corporations form symbiotic relationships and also become targets of hostile actors?
- What are the prospects for India to become a global high technology hub?
- How are climate change and war accelerating techno-nationalism?

In this book, my spotlight is on the early decades of the twenty-first century, although I occasionally travel back in time to highlight important historical examples and antecedents of modern techno-nationalism.

I have approached this topic as a realist. As such, I assume that governments, like people, always act in their own perceived self-interest.

Through the lens of realism, then, I regard the rise of China and its path to power as a matter of simple realpolitik. This is Darwinism on a state level, in a Hobbesian world.

This book is not about picking winners or losers or making moral judgements. Nor is it seeking to answer big theoretical questions

about why some nations become powerful while others do not. The reasons behind the rise and fall of empires go well beyond technology.

Jared Diamond, in his book *Guns Germs, and Steel*, argues that aspects of geography (climate, indigenous diseases, insularity, etc.) determine why certain cultures and nations have achieved power while others did not. Whether or not one accepts Diamond's arguments, the underlying truth in the affairs of nations remains constant: ending up on the wrong end of an adversary's superior technology—regardless of who originally invented it—can be a terrible and cruel fate.

Again, technology, by itself, is not a singular determinant of power. What matters is how it is used and, more specifically, the values and objectives it serves and the will of the people who yield it.

Paul Kennedy, in his epic, *The Rise and Fall of The Great Powers*, tackles the topic of power and empire but emphasises the primacy of economics. Daron Acemoglu and James Robinson explore the origins of power, prosperity and poverty in *Why Nations Fail*, acknowledging the key role of technology in a wider suite of interconnected elements.

Still others have kept the story of technology and national power confined to military affairs. Martin Van Creveld's *Technology and War*, and Max Boot's *War Made New*, for example, are authoritative works of encyclopaedic breadth and depth.

Interestingly, history's most timeless writings on warfare, Sun Tzu's *The Art of War* and Clausewitz's *On War*, focus almost exclusively on the human dimensions of strategy, tactics and planning, including the role of psychology, emotion and deception. Technology is barely mentioned. Had either of these two great thinkers witnessed the destructive power of twentieth- and twenty-first-century technologies, I am certain they would have given the topic more attention.

Approaching the subject from a dark, dystopian perspective is Yuval Noah Harari, whose *Homo Deus* examines a world where humans lose control of the machines they create, largely because of the will to power, greed and FOMO (fear of missing out). As nations get caught up in an AI arms race, self-learning computers and autonomous robots have now become an existential threat.

On a more contemporary note, pivoting back to the foundational technologies that function as power multipliers, Chris Miller's 2022 book, *Chip War*, masterfully lays out the evolution of the microchip and how they have become so central to geopolitical competition.

In this book, I attempt to look at the wider landscape of techno-nationalism, focusing on a core group of the most important foundational technologies while keeping semiconductors central to the conversation.

OVERVIEW OF SECTIONS AND CHAPTERS

This book is divided into four parts.

Part I, *The Elements of Techno-Nationalism*, introduces its key features, including its historical development in the early modern period and the early twenty-first-century dynamics that make it such a disruptive and paradoxical force. These introductory chapters examine themes that animate techno-nationalism, such as the historical technology feedback loop, a paradigm shift, export controls and the 'in-China-for-China grey zone'. Part I closes with a deep dive into semiconductors and their central role across the different facets of techno-nationalism, focusing specifically on China and the U.S.

Part II, *Undercurrents and Power Multipliers*, begins with the story of Huawei, which is a microcosm of the hybrid cold war between the U.S. and China. Throughout this section, we examine the group of distinctive technologies at the heart of the twenty-first-century technology race, from AI and biotech, to quantum and hypersonic science, to the commercialisation and militarisation of space. We examine themes that have remained constant throughout the late twentieth and early twenty-first century, most notably tradecraft—the stealing of secrets using technology, very often to steal technology.

Part III, *Climate, Cleantech and Agritech*, examines how techno-nationalism and climate change have converged to reshape the global economy. This is affecting the top, middle and bottom of supply chains for cleantech, most notably EVs, largely because of the strategic value of critical minerals and rare earths, lithium batteries, magnets and semiconductors.

In Part IV, *Innovation, Academia, Alliances and Diplomacy*, examines techno-diplomacy, focusing on how the U.S. and its allies are working together to form strategic partnerships and alliances. Here, we look at the innovation races between nations and how universities and academia have become an increasingly important link in public–private partnerships. We discuss India, Taiwan and other 'middle' countries that see their roles shifting in the technology landscape and the global order.

More generally, we also discuss the emerging blocs around China and the BRICS countries, and the U.S. and the G7 countries.