The Hoover Institution's
Survey of India

Edited by Šumit Ganguly and Dinsha Mistree

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Introduction

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Mark Twain once described India as "the land of dreams and romance, of fabulous wealth and fabulous poverty, of splendor and rags, of palaces and hovels, of famine and pestilence, of genii and giants and Aladdin lamps, of tigers and elephants, the cobra and the jungle, the country of a hundred nations and a hundred tongues, of a thousand religions and two million gods, cradle of the human race, birthplace of human speech, mother of history, grandmother of legend, great-grandmother of tradition, whose yesterdays bear date with the mouldering antiquities of the rest of the nations—the one sole country under the sun that is endowed with an imperishable interest for alien prince and alien peasant, for lettered and ignorant, wise and fool, rich and poor, bond and free, the one land that *all* men desire to see, and having seen once, by even a glimpse, would not give that glimpse for the shows of all the rest of the globe combined."

Although contemporary India has transformed considerably since Twain's time, very few Americans have taken more than a passing glimpse at this nation of nations. This neglect was perhaps defensible if not shortsighted in the decades after India's Independence in 1947. Indeed, the noted American anthropologist Harold Isaacs, quite aptly if poignantly, described India (and China) during this period as "scratches on our minds."[1] In those decades following Independence, India's leaders mostly chose to focus on reversing the damage that nearly two centuries of rapacious British colonialism had wrought on India. Independent India rightly prioritized domestic issues; on the international stage, India's main goal was to chart an independent and nonaligned course from the major world powers. US policymakers during this time made their peace with India's reluctance to engage: they did not see much strategic value in *working with* India or its leaders. Not surprisingly, these decades from the 1950s through the 1990s translated into a generation of misunderstanding and distrust between the US and India.[2]

However, as India has prospered in recent decades, it has simply become too important to ignore. Today India is home to more than one in five of the world's people, making it the largest country on Earth. It boasts the fifth-largest economy and the world's fastest-growing major economy at that. Its commitment to democracy has provided decades of political order for a diverse populace, even as some institutions have at times been accused of overstepping their bounds. And as US policymakers shift from focusing on terrorism and insurgency emanating from the Middle East and South Asia to the challenges of a rising China, an increasingly hostile Russia, and the difficult necessity of preserving a free and open Indo-Pacific region, the awesome potential of India's ascent demands US engagement.

A Chapter from The Hoover Institution's Survey of India

Since the 2000s, there has been bipartisan recognition that the US must deepen its partnership with India. A major stepping stone toward this goal occurred in 2008, when the two countries signed a historic civil nuclear agreement. Under this agreement, India would split its civil and military nuclear infrastructure and would allow international inspection of its civilian nuclear facilities. In return, previous sanctions placed on India would be suspended and India would be allowed to acquire nuclear technologies and materials for civil purposes from foreign sources. Even though the US and India ultimately failed to advance much nuclear cooperation, the negotiations that brought this agreement to fruition established a new timber of trust in the relationship that had sorely been lacking.

But trust cannot be built on good faith or common enemies alone. Trust—or at least the kind of trust that can bind two nations in a robust partnership—also requires a deep and intimate understanding of the counterpart society. It remains to be seen whether the two countries can successfully work together, but US leaders in government, in the private sector, and in academia have a responsibility to learn about India.

It is in this spirit that we have prepared *The Hoover Institution's Survey of India*. The chapters thematically present eight of the most important aspects of India's political economy. Although the chapters are rigorously researched, the contributors were not asked to present a definitive history of their subjects. After all, entire books could be written on each of these areas. Our contributors were instead tasked with presenting what an educated US policymaker should know about a given issue area, with a bias for presenting and explaining recent developments in India. Although they are short and easy to read, the chapters are not just a mere glimpse of a policy space. Each chapter has been written to inform US experts in that area as well as more general readers who are simply interested in India.

The first chapter by Eswaran Sridharan examines India's domestic politics. In June 2024, India completed its general election, the world's largest exercise in democracy with almost 650 million voters. Narendra Modi and the ruling Bharatiya Janata Party (BJP) won a third term, although Modi and the BJP will have to rely on coalition partners after a decade of ruling alone.

In chapter 2, Jack Goldstone and Leela Visaria present India's demography. After a long struggle to curtail its population, India now finds itself with what has been described as a demographic dividend: an ample number of young adults who are ready to enter the workforce. However, as this glut of young adults struggles to find opportunities—even as the economy grows—birthrates have slowed down. India is estimated to be close to its replacement rate, meaning that its population is stabilizing rather than growing.

Nirvikar Singh surveys India's economy in chapter 3. After briefly describing India's infelicitous history with Soviet-inspired economic planning and the countervailing albeit fitful liberalization in the early 1990s, Singh turns to India's economic trajectory under Modi and the BJP. Over the last decade, India has continued to enjoy GDP growth rates between 6 and 7 percent and emerged from the COVID-19 pandemic with a relatively light balance sheet. This growth trajectory is likely to continue at least in the short term but could be derailed as India and its leaders also have to contend with the related challenges of education, employment, and inequality. Singh highlights that the decisions and bets that are currently being made will likely make or break India's medium- and long-term economic prospects.

Chris Ogden provides an analysis of India's foreign policy establishment in chapter 4. The most important decisions in India's foreign policy have traditionally been determined by a small set of elected ministers and senior bureaucrats who have risen through the ranks of the Indian Foreign

Service. The same is especially true of the present, where it seems as though the locus of India's foreign policy decision making is concentrated in the Prime Minister's Office (PMO). Other important institutions such as the Ministry of External Affairs and the Ministry of Home Affairs, along with the finance and commerce ministries in their realms, are in close sync with the PMO, forging a cohesive foreign policy. This coordination-veering-on-centralization also means that Modi can use India's instruments of foreign policy to present a new narrative of India, one that celebrates the country's ascendancy and further develops the nationalist ideals that are central to Modi's political project.

In chapter 5, Andrea Malji considers India's trajectory of health and education, where there have been remarkable and admirable strides over the last several decades. With some exceptions, health and education are treated as state-level subjects in India's federal system, with private actors also emerging in these spheres. As Malji summarizes, despite considerable overall progress in health and education, certain marginalized groups appear to be getting left behind. Critics have also warned of a "saffronization" in India's health and education, whereby Hindu nationalist ideologies may be shaping human development policy in new ways.

Jahnavi Phalkey examines India's science and innovation policies in chapter 6. To situate the dramatic changes that India has pursued in this area over the past ten years, Phalkey first summarizes India's science and innovation policies since Independence. Despite the Indian government's serious and sustained commitment to science and technology in its early years, any fair account needs to recognize that India never fully realized its potential. Most research funding flowed into highly vertical government laboratories and organizations with the result that few technologies translated into commercial success. At the same time, a brain drain undermined the massive investments made in the education of a select group of scientists and engineers. Successive reforms—including reforms that are currently under consideration—continue to target these issues but will require considerable political capital and/or creative solutions.

In chapter 7, Varun Rai examines India's energy portfolio. As India's middle class emerges and as India pursues energy-intensive industries such as advanced manufacturing, semiconductors, and data storage, India's growing demand for energy may complicate the country's ambitions. At the same time, Indian leaders are acutely concerned about the public health issues related to certain forms of energy production (such as electricity generated from coal plants) and to a lesser extent on carbon emissions. Rai not only presents the bleeding-edge possibilities for India's energy domain but also examines how various policy reforms and infrastructure investments could advance a more robust energy framework.

Finally, Manoj Joshi examines India's defense policy in chapter 8. India under Modi and the BJP is making a concerted effort to modernize its military organization. After decades of relying on foreign equipment and systems, India is also developing an indigenous defense industry. The US has emerged as an important partner in furthering India's efforts to modernize and indigenize, offering a maturing deal flow that supports technology transfer and India-based production. India will continue to be keen to work with the US in strengthening its defense capabilities, if it can do so while also preserving its posture of strategic autonomy—putatively a commitment to maintaining an independent foreign policy free of external pressures or constraints.

Taken together, these chapters present the contours of a rapidly ascending power. India's trajectory over the past several decades has been downright enviable, and the country is likely to continue its ascent across multiple dimensions. But the pressures that the country faces are also apparent. As India approaches its eighth decade

of independence, India's biggest challenges seem to be internally sourced. Contending nationalist visions between liberalism and secularism on the one hand and majoritarian Hindu nationalism on the other not only shape the country's electoral outcomes but also emerge across India's political economy. To be sure, the US is no stranger to such growing pains. As the US approached its eighth decade of independence it would soon descend into the vortex of a sanguinary civil war. Although India is unlikely to experience anything as painful as a civil war, given its inherent cultural and religious pluralism, the country will ultimately have to reconcile what it means to be Indian. What India chooses to pursue will not only affect these eight policy areas but will also shape the US-India relationship more broadly.

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In summary, the main goal of this survey is not to simply inform a US policymaker or two at a particular point in time regarding some trivial summary statistics. After all, one can already look up basic information from other sources. Instead, our contributors provide a sense of the underlying dynamics—political, institutional, societal, and otherwise—that are collectively shaping the trajectory of India. By raising the overall level of awareness on India's political economy, we hope that this *Survey of India* will inspire Americans to learn more about India and its people.

Our push could not come at a more critical time. Despite the widespread recognition that the US-India partnership will be one that defines this century, and the equally widespread recognition that India's internal dynamics will shape its engagement with the United States, it seems to be an open secret that many leaders in the US do not have substantive exposure to India. This should come as little surprise: very few US students have had the opportunity to visit India, and even today, there are only a handful of scholars across the country who teach classes on India or its political economy. The US and India will continue to struggle in advancing this critical partnership unless and until US expertise on India matures and deepens.

NOTES

1. Harold R. Isaacs, *Scratches on Our Minds: American Images of China and India* (Routledge, 1980).

2. See, for example, Andrew J. Rotter, *Comrades at Odds: The United States and India, 1947–1964* (Cornell University Press, 2000); also see Rudra Chaudhuri, *Forged in Crisis: The United States and India Since 1947* (C. Hurst and Company, 2013), and Srinath Raghavan, *The Most Dangerous Place: A History of the United States in South Asia* (Penguin, 2019).

1. India's 2024 Election and the Renewal of Coalition Politics

Eswaran Sridharan

In this chapter I will attempt to analyze the implications of India's 2024 national election for Indian politics in the present and near future. Because the chapter was written in the immediate aftermath of the election, first it will be necessary to put this election in perspective. I will, therefore, first outline in the next section the evolution of India's party system in long-run historical perspective, describing the four main phases so far. Then I will describe the run-up to the 2024 electoral contest over the past two years since the formation of the principal opposition coalition, led by the Indian National Congress (Congress), that sought to defeat the ruling Bharatiya Janata Party (BJP), which has been in office for two full (five-year) terms since 2014.[1]

THE EVOLUTION OF INDIA'S PARTY SYSTEM AND RUN-UP TO THE 2024 ELECTION

After Independence in 1947, India adopted an essentially liberal-democratic constitution in 1950, with the usual democratic rights and freedoms for citizens, equal citizenship, and rights without discrimination on grounds of religion, race, caste, sex, or place of birth but with population-proportionate quotas in parliament, state legislative assemblies,

and government jobs for historically disadvantaged and discriminated-against groups like Scheduled Castes and Scheduled Tribes. The political system adopted was that of a federal parliamentary democracy based on elections to parliament and state legislatures every five years using the single-member district, simple-plurality system, in common parlance the first-past-the-post system.

Eighteen national elections have been held from 1952 to 2024 along with corresponding elections to the state legislatures that might or might not have coincided with national elections. The first-past-the-post federal system led to the evolution of the party system in the following four broad phases. The 2024 election was possibly the beginning of a new phase.

THE FIRST PHASE, 1952–67

This was the phase of the dominance of the Indian National Congress, the party that had spearheaded the Indian Independence Movement (hereinafter referred to as "Congress" or the "Congress party"). The Congress party, led before 1947 by Mahatma Gandhi and Jawaharlal Nehru and a galaxy of other leaders, was a broad, inclusive, internally diverse but largely centrist umbrella party during this phase whereas the varied opposition parties,

the largest being the Communist Party, were much smaller and had significant bases only in one or a few states each. The other main opposition parties were the socialists, the Bharatiya Jana Sangh (or BJS, a Hindu nationalist party and precursor of the BJP), and then-minor regional parties. Under the leadership of Nehru, India's first prime minister (1947–64), the Congress won two-thirds majorities based on only a plurality of the votes (percentages in the forties) against a diverse and divided opposition in the 1952, 1957, and 1962 elections. It also won similar plurality vote-based majorities (sometimes majority votes) and formed the government in all states except for a couple of state elections during this period when state assembly elections were held simultaneously with national elections.

THE SECOND PHASE, 1967–89

The second phase saw the gradual erosion of Congress hegemony and the rise of a range of opposition parties that began with the 1967 election. The Congress dropped to a low of 41 percent vote share and a bare majority of seats and lost power in eight of the then sixteen major states in the simultaneous assembly elections, leading to variegated opposition coalition governments in those states. During this phase, national elections seemed to follow the same pattern as in the earlier Congress-hegemonic phase; that is, seat majorities were won based on vote pluralities with vote shares in the forties. Thus, the Congress won majorities in the (early) 1971 elections and in 1980 and 1984 (with a three-quarters majority and a highest-ever 48 percent vote share) while the Janata Party, a unification of five opposition parties including Congress splinter groups, formed to oppose the suspension of democracy in the 1975–77 Emergency declared by Prime Minister Indira Gandhi, won a Congress-like victory in reverse, getting a majority based on 42 percent vote share.

However, Congress's reemergence was only the case in national elections. The real action in this phase was in the states. During this phase the opposition space, state by state, began consolidating behind a single non-Congress opposition party that varied state by state, for both state assembly and parliamentary elections. This was due to the dynamic of Duverger's law playing itself out in a federal system. Duverger's law posits that in a first-past-the-post electoral system (i.e., a single-member district, simple-plurality system as used in the United Kingdom and the United States for legislative elections), parties getting below a certain varying threshold would receive disproportionately fewer seats and that voters would tend not to waste their votes on unviable challengers to the main party but would consolidate behind the most viable challenger, leading to two-party or bipolar systems (leading party versus a coalition, or two opposed coalitions). This phase saw Duverger's logic playing itself out in more and more states, leading to the emergence of two-party or bipolar party systems and thus laying the ground for state-level challenges to Congress dominance not only at the state level but potentially nationally by an opposing coalition.

Bipolar state-level party systems emerged for both state and national elections, principally of three types. It was Congress versus BJS (later BJP) from 1967 in Delhi, Madhya Pradesh, Himachal Pradesh, and Rajasthan; Congress versus the Left Front in West Bengal, Kerala, and Tripura; and Congress versus a regional party in Tamil Nadu, Punjab, Jammu and Kashmir, Assam, Andhra Pradesh, and Goa during this phase.

The Congress split of 1969 in which much of the organizational machinery went out of the party as well as the centralization of the party under Indira Gandhi and the suspension of annual intraparty elections and deliberations, which led to the exit of disgruntled factions as well as its failure to incorporate newly mobilized constituencies like farmers and intermediate castes in the northern states, all led to further erosion of Congress strength in more

and more states. The delinking of national and state assembly elections in more and more states after the midterm fall of coalition governments in 1969 in many states also helped the opposition as the focus was on state-level issues in standalone state elections. Congress predominance was also eroded by the emergence of a broad-front anti-Congress coalition of diverse opposition parties from 1967 at the state level, followed by the emergence of a national anti-Congress coalition—the Janata Party, technically a single unified party—before the post-Emergency 1977 election. This trend continued in the 1989 election when a Congress splinter group, the Janata Dal led by former Congress leader V. P. Singh, won that election in an alliance with both the BJP on the right and the Left Front. By 1990, the Congress was dominant in the old sense in only seven states, but that was soon to change.

THE THIRD PHASE, COALITION AND/OR MINORITY GOVERNMENTS, 1989–2014

The 1989 election saw the Congress losing to a broad preelectoral alliance, slipping to below a 40 percent vote share, and not getting a majority for the first time (except for the 1977 election on both measures). The next twenty-five years saw the continuation of the trend toward bipolar party systems at the state level in more and more states and, related to this, a quarter century of coalition and/or minority governments nationally with no single party getting a majority of seats.

Three megatrends were the highlights of this phase. First, the Congress vote share declined by about 20 percent, from 39.6 percent (1989) to 25.8 percent (1998), recovering to 28.6 percent (2009) before plunging again to 19.6 percent (2014). However, it remained the single largest party by vote share, losing that position in 2014 to the BJP. The Congress, despite a recovery enabling a minority coalition government led by it for two terms, 2004–14, also lost power in more and more states during this period to the BJP and regional parties.

Second, the BJP rose in vote share from 11 percent (1989), which it won due to its pre-electoral alliances with the Janata Dal and some regional parties (the first time it had ever crossed the 10 percent mark), to 31 percent (2014), its gain over the period almost exactly the Congress's loss though the state-wise picture is more complex. And because its votes are more regionally concentrated in the northern, central, and western states, it was more easily able to convert votes to seats, winning the single largest number of seats in 1996, 1998, 1999, and 2014. Apart from growing on the basis of its Hindu-nationalist ideology, the BJP also spread its base across states and deepened its base within states by skillfully leveraging preelectoral alliances as well as governing coalitions.[2] Historically an upper-caste, urban, and middle-class party, it now sought to become a pan-Hindu umbrella party by expanding its appeal "downward" to the lower castes and classes and into rural areas and to the eastern and southern states where there were strong regional parties and either allying with them or eating into their bases. This phase also saw the emergence of BJP-led national governments for the first time in 1998–99 and 1999–2004, both led by Prime Minister Atal Bihari Vajpayee, a relatively moderate figure.

Third, the quarter century of coalition and/or minority governments saw regional parties, and up to 2009 the Left parties, play an important role as members or supporters of coalition governments at the national level. Leveraging their state-level vote shares to become key players in alliances with either the Congress or the BJP, some regional parties at various times allied with both the Congress, their historical adversary, and the BJP.[3] The combined vote share of non-Congress and non-BJP parties from 1989 to 2014 was in the range of 44 to 52 percent, although they never constituted a bloc. In each election several of them were allied with either the Congress or the BJP.

THE FOURTH PHASE, BJP MAJORITY GOVERNMENTS, 2014–24

The BJP-led National Democratic Alliance (NDA) coalition of eighteen parties won the 2014 election with the BJP getting a majority on its own of 282 seats (halfway mark 272/543) and with its allies winning 334 seats across 38.4 percent votes in the Lok Sabha (lower house of parliament). This would appear to be the beginning of a fourth phase, that of majority governments of a single party except that it would now be of the BJP, not the Congress. The BJP got 31 percent votes, a huge 12 percent swing compared with 2009, and received 52 percent seats, the highest vote-seat conversion ratio in Indian national elections (1.65).[4] This was the first time the BJP had crossed two hundred seats and 30 percent vote share. This was due to the geographically skewed nature of its victory, which consisted of a near-clean sweep in the Hindi-speaking states of north and central India and the western states of Gujarat and Maharashtra but with very few seats in the south and east, reflecting its historical strongholds and areas of weakness. This geographical skew was also reflected in the Rajya Sabha, where neither the BJP nor the NDA as a whole could attain a majority. The Congress party fell to its lowest-ever vote share (19.3 percent, the first time below 20 percent) and a mere forty-four seats.

This victory was repeated with greater success in 2019 when the BJP-led NDA coalition of nineteen parties won again and the BJP formed a majority government on its own but retained its allies in the council of ministers.[5] The BJP won 37.4 percent of votes and 303 seats, and the NDA as a whole won 352 seats and 44.9 percent of votes. The geographical skew was less extreme in 2019. The BJP got most of the seats in Karnataka in the south, 18 out of 42 seats in West Bengal, and 9 out of 14 in Assam plus all the seats in three other small northeastern states, although this still did not enable the BJP or the NDA as a whole to attain a majority in the Rajya Sabha during this second term. The Congress remained stuck at 19.7 percent of votes and marginally increased to 52 seats.

At first glance, the 2014 and 2019 elections would appear to have ended the quarter century (1989–2014) of coalition and/or minority governments and begun a phase of BJP majority governments and the end of the coalition era. However, on closer examination and retrospectively in the light of the 2024 election, discussed further below, this conclusion would be misleading. Coalition politics still remained relevant because these majorities were based on preelectoral coalitions. Of the BJP's 282 seats, a 10-seat majority, in 2014, 57 seats were won in states where preelectoral alliances were significant. And in 2019, of its 303 seats, a 31-seat majority, 42 seats were won in three states (Maharashtra, Bihar, and Punjab) where preelectoral coalitions were significant. So coalitions remained important despite BJP majorities.

CHANGES IN THE NATURE OF POLITICS?

Did BJP majorities over two terms, 2014–24, change the nature of politics in India? This is a complex question and the answer is both yes and no. At a broad level, the Constitution and its basic structure remain intact as amendments need two-thirds majorities in both houses of parliament. Amendments affecting states' powers need half the state assemblies to approve them and then have to go through judicial review. The BJP governments, even if they had been inclined to make fundamental changes, did not have a two-thirds majority in the Lok Sabha even with allies and lacked a majority in the Rajya Sabha (upper house). The courts remain formally independent. Appointments are made by a collegium of the five senior-most judges who make appointments that the prime minister can only delay approval of

but not reject. The proposal, in 2015, to set up a National Judicial Appointments Commission that would have been weighted in favor of the executive was shot down by the Supreme Court on the grounds of maintaining judicial independence.

However, the Supreme Court during 2019–24 did rule in favor of the BJP's positions in the Babri Masjid case, upholding the allotment of the site of the demolished mosque to the Hindu side for the construction of a Ram temple (dedicated to Rama, one of the most important deities in the Hindu pantheon) while allotting an alternative nearby site for the construction of a mosque. Also, in 2023 it upheld the 2019 abolition of Article 370 of the Constitution to remove the special autonomous status of the Muslim-majority state of Jammu and Kashmir. The Supreme Court also accepted the downgrading of the state from full statehood to the status of two Union Territories, for which there was no precedent, those of Jammu and Kashmir and a separate one of Ladakh.[6] This was done without an elected state assembly in place and hence no consultation took place with the elected representatives of the people. This has implications for all other states and is controversial because it would appear to contradict the basic structure doctrine—that is, that the basic structure consisting of essential features, one of which is federalism as repeated by the court on many occasions, cannot be amended.

However, the Supreme Court did strike down, in early 2024, the opaque Electoral Bonds scheme begun with effect from 2018 under which parties could collect unlimited amounts without having to disclose donor identities and amounts, a scheme that overwhelmingly favored the ruling BJP. And the BJP did lose several state assembly elections during this decade and/or lost control of state governments even in its stronghold states in the Hindi belt and Maharashtra. Just before the 2024 election, the BJP had chief ministers in twelve out of twenty-eight states and was the

second most important party in the governments of two major states, Maharashtra and Bihar, but it cannot be said to have been hegemonic in India's federal system. Hence, democracy and institutions cannot be said to have been entirely eroded as in electoral autocracies.

However, a number of developments, especially in the second term, 2014–19, have been, taken together, seen as evidence of democratic backsliding both by international democracy assessment agencies like Freedom House, the Economist Intelligence Unit (EIU), and V-Dem and by a range of domestic critics. Broadly speaking, the government has been considered to have weakened parliament and strengthened the executive, weakened and in some cases toppled state governments, used the tax-investigative and criminal-investigative agencies in a biased way overwhelmingly against the opposition, coerced the media into conformity and avoidance of criticism, and created a climate of fear for minorities, especially Muslims.

More specifically, during the second BJP term, Freedom House downgraded India from "fully free" to "partly free," the EIU from a full democracy to a flawed democracy, and V-Dem from an electoral democracy to an electoral autocracy.[7]

The reasons for the downgrading and some examples given are as follows. The sixteenth (2014–19) and seventeenth (2019–24) Lok Sabhas spent less time in sittings, passed bills with less discussion, and saw fewer references to parliamentary committees, including passing over 80 percent of budgets without discussion. The role of the speaker was seen to be partisan and the seventeenth Lok Sabha failed to elect a deputy speaker through its term. In the final year before the 2024 election, in late 2023, 146 members of parliament (MPs), or most of the opposition, were suspended from parliament by the Speaker on grounds of disruption and vitally important bills were rammed through. In addition, an

opposition MP was expelled from membership in parliament on the grounds of a report by the Ethics Committee to which she was not adequately permitted to respond to the charges.

State governors appointed by the central government were also seen to have played a partisan role in several opposition party–ruled states, including Karnataka, Kerala, Tamil Nadu, Maharashtra, and West Bengal. State financial powers were sought to be eroded.

The tax-investigative agency (Enforcement Directorate [ED]) and the criminal-investigative agency (Central Bureau of Investigation [CBI]) have been extensively used and overwhelmingly against opposition politicians. It is alleged that several defections to the BJP have resulted from this pressure, in addition to financial inducements made possible by huge and opaque donations to the ruling party from corporate sources under the Electoral Bonds scheme legislated in 2017 and operative from January 2018. Donations to parties were made completely confidential, protecting donor identities and amounts with the erstwhile ceiling on corporate donations as a percentage of their net profits (earlier 7.5 percent) being removed. These would be administered only by the state-owned State Bank of India. Thus, this information would be accessible informally to the ruling party but not to the opposition and would also tend to deter donations to the opposition by donors afraid of annoying the ruling party.

The media, particularly television channels, have largely been conformist, not questioning or criticizing the government or ruling party. This is said to be at least partly because of pressure on media owners from the same agencies. There have been a record number of internet shutdowns in what are considered disturbed areas (parts of the country where normal life is affected by separatist, terrorist, or left-wing extremist activities) and also use of laws like the Information Technology Act of 2000 and the Information Technology (Intermediary

Guidelines and Digital Media Ethics Code) Rules of 2021 to pressure the online and social media to take down critical posts. The BBC was raided by tax authorities in 2023 after it screened a documentary critical of Modi's role in the 2002 Gujarat riots in which around a thousand people, mostly Muslims, were killed (though the Supreme Court–ordered investigation exonerated him later). Civil society organizations, particularly foreign-affiliated ones and those investigating human rights, have been pressured, and Amnesty International and the Commonwealth Human Rights Initiative have been forced to suspend operations.

On the treatment of minorities, an important criterion for democracy-rating bodies, the following observations can be made. Although there have been no major Hindu-Muslim riots except for the northeast Delhi riots of February 2020 in which fifty-three people were killed, there have been a large number of mob lynchings of Muslims, a new phenomenon, some of them linked to allegations of cow slaughter in violation of various state laws, as well as biased application of hate speech laws that are not enforced against people making hate speeches against Muslims, including those associated with the ruling party. This has been seen to have created a climate of fear among minorities in many states.

All in all, although V-Dem's electoral autocracy rating is an exaggeration since the BJP lost half the state assembly elections during its two terms in power and suffered a significant reverse in 2024, it can be said that there has been a slide toward illiberalism in terms of democratic freedoms.

All this is not to say that there was no progress on other fronts. India's economy continued to grow at a respectable rate, faster than the world average and thus raising its ranking by GDP size from tenth in 2011 to fifth in 2022. Despite the pandemic downturn, it bounced back as one of the fastest-growing large economies. There has

been significant progress on physical and digital infrastructure, as India attracts large inflows of foreign direct and portfolio investments, accumulating a large foreign exchange reserve in a world in which half the countries have needed emergency loans since the pandemic began in 2020. All this has added to India's geopolitical heft and to the support base of the ruling BJP despite uneven development, employment, and inequality issues, which contributed to a groundswell of discontent in parts of the electorate as the 2024 election approached. There is no space to get into four overlapping economic debates that have been going on about growth rates, employment, poverty, and inequality, as well as about the reliability of statistics. But growth patterns can be read to have both added to the BJP's base and contributed to its relative decline in 2024.

THE RUN-UP TO AND RESULTS OF THE 2024 ELECTION

The run-up to the 2024 election began as early as August 2022 with the start of the Congress's Bharat Jodo Yatra (Unite India Journey) undertaken by Congress leader Rahul Gandhi. This was an attempt at mass contact and mobilization against the BJP in a south-to-north march across India. The five-month march and its associated public meetings and rallies were aimed at opposing the politics of fear and hate and policies that resulted in unemployment and inequality. The march saw the large-scale participation of both common people and some celebrities. Ending in January 2023, it helped create a diffuse oppositional groundswell that also sowed the seeds of a broad non-BJP coalition of diverse parties. Rahul Gandhi's public approval ratings rose sharply as a result of the Yatra.[8] This was later followed by the Bharat Jodo Nyay Yatra (Unite India Justice Journey), a two-month sequel from January to March 2024, just before the election, from Manipur in the northeast to Mumbai in the west, also led by Rahul Gandhi.

However, the major development in the run-up to the 2024 election, starting as early as June 2023, was the formation of a broad, multiparty opposition coalition in which the Congress was the leading and central party, if not the formal lead party, called the Indian National Developmental Inclusive Alliance, or INDIA. The INDIA at the time of the 2024 election consisted of a diverse array of forty-one parties, united on a broad anti-BJP platform emphasizing the inclusive and federal character of India and pitching for left-of-center policies, in some ways a coalition of the disadvantaged. Despite being a diverse and unwieldy alliance, it managed to negotiate seat-sharing arrangements among its member parties in most states, although not everywhere. Seat-sharing arrangements are those in which allied parties agree to contest only some seats each in a state, leaving other seats for partners, thus enabling vote pooling to try to defeat an opposed party.

The ruling BJP, despite enjoying a majority, also put together, state by state, a large NDA alliance consisting of twenty-five allies including some major regional parties (see table 1.1). Its campaign emphasized India's economic growth and welfare programs, its growing global recognition, Modi's leadership, the construction and consecration of the Ram temple at Ayodhya on the site of the demolished sixteenth-century Babri Masjid (mosque), as well as both direct and dog-whistled hate speech against Muslims.

The main features of the results of the 2024 election are the following. First, the BJP contested 441 seats, four more than in 2019, and its allies another 100, or 541 for the NDA. The Congress contested 328 seats, while its allies contested most of the rest. In an election with 66 percent turnout, the BJP lost 0.8 percent vote share (36.6 percent compared with 37.4 percent in 2019) but fell 63 seats from a majority on its own of 303 (halfway mark 272 out of 543) to 240 seats necessitating the formation of a coalition government. The NDA won 293 seats, or 53 won by BJP allies. The Congress

TABLE 1.1   THE BJP-LED NATIONAL DEMOCRATIC ALLIANCE IN 2024

Party	State/UT	Seats contested	Total contested	Seats won	Total won
Bharatiya Janata Party	Uttar Pradesh	75 [2]	441 [3]	33	240
	West Bengal	42		12	
	Madhya Pradesh	29		29	
	Maharashtra	28		9	
	Gujarat	26		25	
	Karnataka	25		17	
	Rajasthan	25		14	
	Tamil Nadu	23		0	
	Odisha	21		20	
	Bihar	17		12	
	Telangana	17		8	
	Kerala	16		1	
	Jharkhand	13		8	
	Punjab	13		0	
	Assam	11		9	
	Chhattisgarh	11		10	
	Haryana	10		5	
	Delhi	7		7	
	Andhra Pradesh	6		3	
	Uttarakhand	5		5	
	Himachal Pradesh	4		4	
	Arunachal Pradesh	2		2	
	Dadra and Nagar Haveli and Daman and Diu	2		1	
	Goa	2		1	
	Jammu and Kashmir	2		2	
	Tripura	2		2	
	Andaman and Nicobar Islands	1		1	
	Chandigarh	1		0	
	Ladakh	1		0	
	Manipur	1		0	
	Mizoram	1		0	

(*continued*)

TABLE 1.1 (*Continued*)

Party	State/UT	Seats contested	Total contested	Seats won	Total won
	Puducherry	1		0	
	Sikkim	1		0	
Telugu Desam Party	Andhra Pradesh	17		16	
Janata Dal (United)	Bihar	16		12	
Shiv Sena	Maharashtra	15		7	
Pattali Makkal Katchi	Tamil Nadu	10		0	
Lok Janshakti Party (Ram Vilas Paswan)	Bihar	5		5	
Nationalist Congress Party	Maharashtra	4	5	1	1
	Lakshadweep	1		0	
Bharath Dharma Jana Sena	Kerala	4		0	

gained slightly from 19.5 percent in 2019 to 21.2 percent but jumping from 52 seats to 99 seats. The INDIA won 234 seats including three allies winning in double digits: the Samajwadi Party of India's largest state, Uttar Pradesh, 37 seats; the Trinamool Congress of West Bengal, 29 seats; and the Dravida Munnetra Kazhagam (DMK) of Tamil Nadu, 22 seats (see table 1.2). The state-wise pattern varied considerably, but the BJP suffered reverses in several of its stronghold states. It lost most of the seats in Uttar Pradesh and several seats in Rajasthan, Haryana, Karnataka, West Bengal, and Maharashtra while making gains in Odisha and Telangana as well as winning a seat in Kerala for the first time. Although on the whole its wins were by smaller margins than in 2019, the BJP has largely retained its base including crossing the 10 percent vote share mark in all major states now, including in Tamil Nadu and Kerala.

Second, postelection survey data from the Centre for the Study of Developing Societies (CSDS)/Lokniti Survey indicate that two broad developments are in progress. The first is a consolidation of a pro-Hindu nationalist ideological constituency that has grown since 2014 and 2019 despite still being a minority opinion/attitude among Hindus nationally, extending into disadvantaged sections like the Scheduled Castes and Scheduled Tribes. The second is the growth of a very diffuse non-Hindu or not-as-yet Hindu nationalist majority of Hindus primarily concerned about economic issues like unemployment and inflation. An emblematic indicator of the latter phenomenon is the BJP's losses in the Faizabad constituency where the Ram temple was consecrated by Modi, and in Banswara where hate speech against Muslims was used.

The CSDS/Lokniti data showed that 22 percent of all respondents (which included about 20 percent non-Hindu minorities), or roughly about a quarter of Hindus if one assumes minorities would not favor this response, felt that the most important achievement of the government was the construction of the Ram temple in Ayodhya. Nineteen percent

TABLE 1.2 THE CONGRESS-LED INDIA IN 2024

Party		Lok Sabha	Base
AAP	Aam Aadmi Party	3	National Party
CPI(M)	Communist Party of India (Marxist)	4	National Party
INC	Indian National Congress	99	National Party
DMK	Dravida Munnetra Kazhagam	22	Puducherry, Tamil Nadu
AITC	All India Trinamool Congress	29	West Bengal, Meghalaya
SHS(UBT)	Shiv Sena (Uddhav Balasaheb Thackeray)	9	Maharashtra
SP	Samajwadi Party	37	Uttar Pradesh
NCP(SP)	Nationalist Congress Party (Sharadchandra Pawar)	8	Maharashtra, Kerala
IUML	Indian Union Muslim League	3	Kerala and Tamil Nadu
JKNC	Jammu and Kashmir National Conference	2	Jammu and Kashmir
CPI	Communist Party of India	2	Kerala, Tamil Nadu, Manipur
JMM	Jharkhand Mukti Morcha	3	Jharkhand
KEC(M)	Kerala Congress (M)	0	Kerala
VCK	Viduthalai Chiruthaigal Katchi	2	Tamil Nadu
RSP	Revolutionary Socialist Party	1	Kerala
RJD	Rashtriya Janata Dal	4	Bihar, Jharkhand
MDMK	Marumalarchi Dravida Munnetra Kazhagam	1	Tamil Nadu
CPI(ML) L	Communist Party of India (Marxist–Leninist) Liberation	2	Bihar
PWPI	Peasants and Workers Party of India	—	Maharashtra
AIFB	All India Forward Bloc	—	West Bengal
PDP	Jammu and Kashmir Peoples Democratic Party	—	Jammu and Kashmir
MMK	Manithaneya Makkal Katchi	—	Tamil Nadu
KMDK	Kongunadu Makkal Desia Katchi	—	Tamil Nadu
RD	Raijor Dal	0	Assam
AJP	Assam Jatiya Parishad	0	Assam
APHCL	All Party Hill Leaders Conference	0	Assam
AGM	Anchalik Gana Morcha	0	Assam
VBA	Vanchit Bahujan Aaghadi	0	Maharashtra
BGPM	Bharatiya Gorkha Prajatantrik Morcha	0	West Bengal
MNM	Makkal Needhi Maiam	—	Tamil Nadu
ISF	Indian Secular Front	0	West Bengal

(continued)

TABLE 1.2 (*Continued*)

Party		Lok Sabha	Base
GFP	Goa Forward Party	—	Goa
ZNP	Zoram Nationalist Party	—	Mizoram
MPC	Mizoram People's Conference	—	Mizoram
MD	Mahan Dal	—	Uttar Pradesh
RLP	Rashtriya Loktantrik Party	1	Rajasthan
HP	Hamro Party		
PLP	Purvanchal Lok Parishad	0	Assam
JDA	Jatiya Dal Assam	0	Assam
SGP	Samajwadi Ganrajya Party	0	Maharashtra
INL	Indian National League	—	
INDIA	Indian National Developmental Inclusive Alliance	234	INDIA

fully and 31 percent somewhat agreed that in a democracy the will of the majority *community* must prevail (emphasis added). Of the 45 percent that felt close to a political party, 43 percent felt close to the BJP, or about a fifth of Hindus by the above assumptions. Twenty percent fully agreed and 30 percent somewhat agreed that minorities should adopt the customs of the majority. From these responses it appears that some 20 to 30 percent of Hindus nationally are very roughly in agreement with Hindu nationalist majoritarian attitudes.

On the other hand, 38 percent fully and 36 percent somewhat agreed that government should treat minorities in the same way as it treats the majority. And 34 percent fully and 36 percent somewhat agreed that even if not liked by the majority, the government should protect minority interests; only 6 percent fully and 14 percent somewhat disagreed with this. Even if responses by about 20 percent of respondents belonging to minorities are factored in,

it appears that a large majority of Hindus nationally still hold accommodative attitudes to minorities.[9]

Third, the key development that will shape politics is the emergence of a coalition government in which the BJP is dependent on its allies for a majority, which I discuss in the next section.

INDIA'S FIRST SURPLUS MAJORITY COALITION WITHOUT A MAJORITY PARTY

The new BJP-led NDA government of 2024 is the first of its kind in India. It is a surplus majority coalition without a majority party, that is, a coalition in which there are parties in the council of ministers that are not necessary for a majority, hence the term "surplus majority," sometimes just called a surplus majority coalition. This is different from a surplus majority coalition with a majority party, like the 2014 and 2019 governments, often called an

oversized coalition. This is significant since each type of coalition has its own dynamics. I elaborate below.

When no single party gets a parliamentary majority in an election, or loses a majority due to a split, there are two solutions. One is to form a single-party minority government dependent on external support from other parties that might be preelectoral and/or postelectoral allies. In the Indian case, the two instances of single-party minority governments were the Chandra Shekhar government (1990–91) and the Congress government (1991–96). The other solution when no single party has a majority is to form a coalition government of two or more parties. At this point let me define for clarity what the literature means by a coalition government: it counts member parties of the executive coalition—those in the council of ministers—as the coalition and not the broader legislative coalition of supporting parties, pre- or postelectoral, which stay out of the ministry but offer external support to enable a majority in the legislature even if the coalition were part of a preelectoral alliance (e.g., the Telugu Desam Party [TDP] stayed out of the BJP-led NDA government of Atal Bihari Vajpayee, 1999–2004, but offered outside support).

There are four types of coalitions in the international experience. First, the minimal-winning coalition, which India has not had yet, is a type of coalition that has only the minimum number of parties needed to attain a parliamentary majority, with no redundant surplus parties that are not needed for a majority, thus making each coalition partner pivotal since the exit of even one means loss of majority. This is based on the assumption of parties being office/power-seeking; a redundant party means sharing power with an unnecessary partner reducing the power shares of existing partners. However, this view tends to ignore policy-seeking motivations; additional partners might enable broader consensus building to enable legislative changes toward policies that

parties seek and hence could incentivize expanding the coalition, though it would mean sharing power with more partners. India has not had a minimal-winning coalition government.

Second, there are surplus majority coalitions with no party having a majority. What this means is that while no single party has a majority, the largest party puts together a coalition ministry that has a surplus majority, that is, has parties over and above those needed for a parliamentary majority or, in other words, redundant partners. This is usually because of preelectoral alliances for which there are strong incentives in a first-past-the-post electoral system where vote aggregation through such alliances is very helpful in getting the single largest number of votes in constituencies needed for winning seats. In a federal system this incentivizes state-level alliances. This, in a federal first-past-the-post electoral system with multiple parties, leads to diverse preelectoral coalitions on a state-by-state seat-sharing basis in which the incentive to band together against the largest party leads parties to de-emphasize ideological and policy differences. Examples are the anti-Congress alliances of the 1960s and 1970s that included parties of the left and the right (including at one time an Akali Dal-Jana Sangh-Communist Party of India [CPI(M)] government in Punjab) and the 1989 seat-sharing arrangement in which V. P. Singh's Janata Dal was supported by both the BJP and the Left.

Third, there are surplus majority coalitions with a majority party, called oversized coalitions, for example, the BJP-led NDA coalitions in 2014 and 2019 in which the BJP won a majority on its own (see table 1.3) but kept its preelectoral coalition partners in the ministry (executive coalition). This type of oversized coalition existed in West Bengal for several terms during the erstwhile Left Front governments when the CPI(M) kept its preelectoral coalition partners in the ministry even though it had a majority on its own. Oversized coalitions, like surplus majority coalitions, reflect the need for preelectoral alliances

TABLE 1.3 THE CONGRESS-LED UNITED PROGRESSIVE ALLIANCE AND THE BJP-LED NATIONAL DEMOCRATIC ALLIANCE IN 2014 AND 2019

2014

UPA	Seats contested	Seats won	Vote share	NDA	Seats contested	Seats won	Vote share	Left	Seats contested	Seats won	Vote share
UPA	**540**	**59**	**23%**	**NDA**	**540**	**335**	**38%**	**Left**	**210**	**12**	**5%**
Congress	464	44	19%	BJP	428	282	31%	CPI	67	1	1%
NCP	22	5	1%	SHS	20	18	2%	CPI(M)	93	9	3%
RJD	28	4	1%	TDP	30	16	3%	Other parties	50	2	<1%
Other parties	26	6	<1%	LJP	7	6	<1%				
				SAD	10	4	1%				
				Other parties	45	9	<1%				

2019

UPA	Seats contested	Seats won	Vote share	NDA	Seats contested	Seats won	Vote share	Left Front	Seats contested	Seats won	Vote share
UPA	**525**	**91**	**27%**	**NDA**	**541**	**352**	**45%**	**Left Front**	**152**	**1**	**2%**
Congress	421	52	20%	BJP	436	303	37%	CPI	46	0	<1%
DMK	23	23	2%	SHS	23	18	2%	CPI(M)	66	1	2%
NCP	19	4	1%	JD(U)	17	16	1%	Other parties	40	0	<0.1%
IUML	3	3	<1%	AIADMK	21	1	1%				
Other parties	59	9	<1%	LJP	6	6	<1%				
				SAD	10	2	<1%				
				Other parties	28	6	<1%				

Note: Party abbreviations not provided in tables 1.1 and 1.2 are offered below:

NCP = Nationalist Congress Party   SAD = Shiromani Akali Dal

BJP = Bharatiya Janat Party   JD(U) = Janata Dal (United)

TDP = Telugu Desam Party   AIADMK = All India Anna Dravida Munnetra Kazhagam

LJP = Lok Janshakti Party

as well as the anticipation that such allies will be needed for future elections and hence need to be accommodated.

Fourth, there are minority coalitions in which the parties in the ministry fall short of a majority and depend on outside support from a wider legislative coalition, pre- and/or postelectoral.

The Indian record on types of coalition governments formed is as follows. There have been twelve coalition governments since 1977. Of these, none have been the classic minimal-winning coalitions in which each party is pivotal for a majority. Eight have been minority coalitions in which the executive coalition forming the ministry has needed external support for a majority. These were the Charan Singh government (1979), which included All India Anna Dravida Munnetra Kazhagam (AIADMK), the Janata Dal–led National Front government of V. P. Singh, the United Front governments of Deve Gowda and I. K. Gujral, the BJP-led NDA governments of 1998–99 and 1999–2004, the Congress-led governments of 2004–09 and 2009–14. Three have been oversized coalitions with a majority party. These were the Janata Party, 1977–79, technically a single unified party with a majority, with a separate coalition partner in the Akali Dal, and the two BJP-led NDA governments of 2014–19.

There has not been, until 2024, a surplus coalition without a majority party, a configuration that has just happened. Although such a coalition is less stable than an oversized coalition, it is more stable than a minimal-winning coalition in which each partner is pivotal or a minority coalition. However, in the Indian case, three minority coalitions—NDA (1999–2004), United Progressive Alliance (UPA) I and II—lasted full terms owing to at least partial lock-in effects on supporting parties because of state-level alliances and/or the main national opposition party being the

ideological adversary of the supporting party (e.g., the Left while supporting UPA I to keep out the BJP) or its main state-level adversary (e.g., TDP while supporting NDA, 1999–2004, to keep out its state-level rival, Congress).

The power dynamics in a surplus majority coalition favor the dominant party because usually no single partner is pivotal for a majority. In the present case, the largest party has 240 seats and can achieve the majority mark of 272 with the three largest allies having 16, 12, and 7 seats, the rest being a surplus majority that offers an insurance policy in case some ally or allies quit. The executive coalition (total of BJP plus nine allies in the ministry) is 287 and with the other five NDA partners is 293. Assuming at least partial lock-in effects for the above-described reasons on the smaller allies and taking 293 as the effective coalition, no ally is pivotal. To deprive the coalition of a majority of 272, it would need the exit of at least two allies, given that the four largest partners have 16, 12, 7, and 5 seats, the rest being twos and ones. This would require considerable coordination in the normal course, including factoring in state-level repercussions, unless some serious crisis arises, which precipitates broad disenchantment among the allies. However, the dominant party will also have to tread carefully in such a power configuration so as not to precipitate such disenchantment.

So as of early July 2024, a month after the results, the BJP seems to have asserted its dominance in the coalition government formed, retaining all the major portfolios—finance, home, defense, and external affairs—and including ideologically important ones like education and culture as well as dominating the cabinet and the wider Council of Ministers. It is too early to say how politics will play out over the whole term and whether this coalition will see stronger checks and balances on its exercise of power.

NOTES

1. For a detailed analysis of the evolution of the Indian party system and coalition politics, see Eswaran Sridharan, "Coalition Politics in India," in *Oxford Handbook of Indian Politics*, ed. Šumit Ganguly and Eswaran Sridharan (Oxford University Press, 2024).

2. For the early but critical phase of the BJP's expansion, see Eswaran Sridharan, "Coalition Strategies and the BJP's Expansion, 1989–2004," *Commonwealth and Comparative Politics* 43, no. 2 (July 2005): 194–221.

3. For coalition politics in the post-1989 period, see Sanjay Ruparelia, *Divided We Govern: Coalition Politics in Modern India* (Oxford University Press, 2015); Eswaran Sridharan, "Why Are Multi-party Minority Governments Viable in India? Theory and Comparison," *Commonwealth and Comparative Politics* 50, no. 3 (July 2012).

4. For detailed analyses of the 2014 election that brought a BJP majority government to power for the first time, see Eswaran Sridharan, "India's Watershed Vote: Behind Modi's Victory," *Journal of Democracy* 25, no. 4 (October 2014): 20–33; Eswaran Sridharan, "Class Voting in the 2014 Lok Sabha Elections: The Growing Size and Importance of the Middle Classes," *Economic and Political Weekly* 49, no. 39 (September 27, 2014): 72–76.

5. For a detailed analysis of the 2019 election in which the BJP returned to power with an enhanced majority, see Eswaran Sridharan, "Understanding Voting Patterns by Class in the 2019 Indian Election," *Indian Politics and Policy* 3, no. 1 (Spring 2020).

6. Union Territories are directly ruled by the Central, that is, federal, government.

7. See Freedom House, *Freedom in the World*, various years, 2020 to 2023, https://freedomhouse.org/report /freedom-world; Economist Intelligence Unit (EIU), *Democracy Index*, various years, 2020 to 2023, https:// www.eiu.com; University of Gothenburg, V-Dem Institute, *Democracy Report*, various years, 2020 to 2023, https:// www.v-dem.net/publications/democracy-reports/.

8. See NDTV, "Public Opinion: Rahul Gandhi's Popularity Up After Bharat Jodo Yatra, PM Still Supreme," updated May 23, 2023, https://www.ndtv.com/india-news/ndtv -public-opinion-rahul-gandhis-popularity-up-after-bharat -jodo-yatra-pm-narendra-modi-still-supreme-4060232.

9. Centre for the Study of Developing Societies, Lokniti, *Social and Political Barometer: Postpoll Study 2024–Survey Findings*, 2024, https://www.lokniti.org/media/PDF-upload /1718435207_67606300_download_report.pdf.

2. India's Demographic Trends

A Turning Point for India's Future

Jack A. Goldstone and Leela Visaria

POWER AND PARADOXES

In 2024, India became the most populous country in the world, passing China and comprising 18 percent of the world's population. This chapter details how India reached that point, the policies that have shaped India's population, and the impact of various aspects of India's population—age structure, labor force participation, education, urbanization, caste and gender—on India's economic and political prospects.

India is becoming a major world power, fueled by a combination of its large population and a recent surge in technical manufacturing and information technology (IT) prowess. Yet India is still hamstrung by major paradoxes—whether it can resolve them will determine how great an impact India's growth will have on its own people and the world.

Among those paradoxes: India is the world's largest democracy; yet for much of its post-Independence existence, it has been dominated by a single political party, either the dynastic secular Indian National Congress Party led by the Nehru/Gandhi family (1952–77, 1980–88, 1991–95, and 2004–14) or the Hindu nationalist Bharatiya Janata Party (BJP) led by Atal Bihari Vajpayee and Narendra Modi (1999–2004 and 2014–29,

respectively). In religion, India's 200 million Muslims comprise the world's third-largest Islamic population of any country in the world, behind only Indonesia and Pakistan; yet India's Muslim population increasingly feels like a threatened minority. India has the largest working-age population of any single country; yet because of gender discrimination and poor education, it has a much smaller *effective* working population than it should. India has one of the fastest-growing information technology sectors among developing countries, yet at the same time its employment in agriculture has been *increasing* in recent years after a slow but steady decline for two decades, the opposite of what we normally expect for a modernizing economy. In this chapter we note these and other paradoxes in the context of India's demographic trends and seek to detail their impacts on India's economy, democracy, and global status.

INDIA'S DEMOGRAPHIC TRAJECTORY SINCE INDEPENDENCE: FROM RAPID GROWTH TO SLOWING DOWN

India is probably the only developing country with decennial population censuses going back to 1872. The last census, conducted in 2011, was

the fifteenth in the series. However, owing to the COVID-19 pandemic during 2019–21 that resulted in widespread disruption and lockdown in India, the 2021 census was postponed to 2024 or beyond, thereby interrupting the series for the first time in 150 years. However, the Indian government carries out regular surveys (the National Family Health Survey) to provide more frequent and current information on the structure and characteristics of Indian households.

The 1951 census, completed shortly after independence was granted in 1947, and after tens of millions had migrated East or West in the wake of partition of the subcontinent between India and Pakistan, showed that India was left with a population of 361 million, with 83 percent living in rural areas. Males exceeded females by about 10 million, or 3 percent of the total. Owing to a high birthrate and low life expectancy, the country had a young population, with a median age of just 20 years. On average, women had nearly six children each (fertility was 5.7, producing a crude birthrate of 43.8 births per 1,000 population), but life expectancy was only 41.7 years (42.6 for males and 40.8 for females). Even so, population growth was rapid, at about 2.2 percent per year.[1]

Throughout the 1950s and 1960s, this high fertility was maintained. India's total fertility rate increased slightly, peaking at 5.98 in 1964 and remaining above 5.6 through 1970. Life expectancy began its long and steady increase, rising to 45 by 1960 and 48 by 1970. Much of that increase was due to lower infant and child mortality (infant mortality fell by 1 percent per year from 1950 to 1970), so that the population grew even younger—median age hit a low of 18.2 in 1969. Through the early 1970s, the population growth rate remained well over 2 percent per year, reaching 2.31 percent in the early 1960s and still as high as 2.26 percent in 1973 and 1974. These trends in the 1950s and 1960s meant that India's population doubled to 705 million in the thirty-one years

from 1950 to 1981, by which time one in six of the world's population lived in India.

Projections made by demographers in the 1960s showed that if India's demographic trends from Independence were maintained, India would have a population of 1.4 billion by 2010 and 2.8 billion by 2040. These projections created something of a panic about global population growth. (China, even larger, was on a similar trajectory from the 1950s to the mid-1970s, so that by 1980 India and China together already made up 38 percent of the world's population.) As a result, demographers urged India and other developing countries to promote fertility reduction.

Recognizing that population increases would very likely put pressure on resources, in 1952 the Indian government launched its family-planning program to control population growth and improve maternal health. Indian planners set a target for the birthrate to decline from around 45 per 1,000 population in the 1950s to 25 by 1973, or by almost 50 percent in twenty years. To achieve this highly ambitious goal, the Indian government set national method-specific targets for use of contraception (female and male sterilization, intrauterine devices [IUDs], condoms, and oral pills). The targets were passed down to field-based functionaries for implementation.

However, these initial efforts had little impact. When the 1961 population census revealed that during the decade of 1951–61, India's population had grown at 2 percent per annum, it sent an alarm bell to the government. The Planning Commission sought to more vigorously spread the use of contraception, promoting IUDs, condoms, and male sterilization (vasectomies). Yet through the 1960s, there was little popular enthusiasm for these measures, which were deemed intrusive by most of India's population.

From 1966 to 1970, India's birthrate hovered around 40 per 1,000 population, and the

population grew by 2.5 percent per year from 1961 to 1971. In 1970, a survey supported by the Family Planning Ministry found that less than 10 percent of all married women in the reproductive ages of 15–49 years were using contraceptives. Such dismal performance raised a question in the minds of many whether, without overall socioeconomic development, family planning could become a mass movement. This sentiment was articulated by the health minister of India at the 1974 World Population Conference held in Bucharest when he said that "development is the best contraceptive." Notwithstanding this proclamation, the program became more coercive after Prime Minister Indira Gandhi declared a state of emergency and suspended the Constitution in June 1975.

Indira Gandhi's younger son, Sanjay, a member of the Indian Youth Congress, then announced that family planning was a key element in his five-point program to take the country forward on the path of development. (The other elements were promoting literacy, tree planting, eradication of casteism, and abolition of dowry.) He, along with many, believed that if India's population continued to grow at the prevailing rate, all the progress made in the agricultural and industrial sectors would be nullified. Therefore, vigorous promotion of family planning was a must even if it involved some element of compulsion. Consequently, the Ministry of Health and Family Welfare fixed a target of 4.3 million sterilizations for 1976–77 and allotted them to the states, considering the population size, rural-urban distribution, female literacy, performance of previous years, and so forth.

Many states, too eager to comply with the wishes of Sanjay Gandhi, raised the targets on their own. They galvanized their entire machinery of government by giving targets not only to the health department functionaries but also to schoolteachers, police, railway workers, and others. They were all given quotas and, if they did not fulfill them, they were threatened with withholding payment of their salaries or promotions. Thus, during the Emergency the program became coercive. The central government did not dissuade the states from taking any measures they deemed fit. Nationally, during 1976–77, 8.3 million sterilizations—mostly male sterilizations—were performed, the majority in the six months between July and December 1976. The Emergency lasted for twenty-one months during 1975–77.

After the defeat of Indira Gandhi in the election in 1977, although initially the voluntary nature of family planning was emphasized by the new government, in reality nothing much changed. Although officially the government was against compulsion, the goal of lowering fertility continued, expressed in terms of attaining replacement-level fertility (then estimated at 2.3 children per woman) by the end of the century. Indira Gandhi, who came back to power in 1980, declared that the country could not wait for social and economic changes to bring about "an appropriate motivational environment in which a small family norm becomes the rule." Given the backlash that male sterilization faced, the government introduced female sterilization through laparoscopy as the method to be promoted. Female sterilization became the backbone of India's family planning program in the 1980s. In fact, for a majority of couples, sterilization was the first and the final method of contraception. Laparoscopy camps were held at primary health centers where field-workers were responsible for motivating and bringing women to the camps. They were given method-specific targets and were rebuked or punished if they failed to meet the targets. This led to falsification of data and exaggerations of performance.

The 1990s were marked by two major changes in India's population dynamics. First, facing pressures from research organizations who documented human rights violations by the health functionaries, and vocal opposition from women's rights groups, the Indian government

acknowledged that an emphasis on target setting and centralized planning, along with poor training of family care workers, was providing a disservice to Indian families. By then the NGO health and human rights sector and women's groups had become quite active and vocal, dominating the 1994 Cairo International Conference on Population and Development. They vociferously argued that ethical considerations, proper procedures while promoting contraceptive methods, and quality of care cannot be compromised in order to pursue demographic goals, and that policies relying on set targets for fertility reduction violated human and reproductive rights. The government announced in 1996 that the family planning program would become target free and, with the help of members of NGOs and other civil society groups, developed other evaluation indicators while focusing the program on women's health needs.

Second, after decades of resisting contraception and high fertility, Indian families began to accept that smaller families were desirable. This seems to have been mainly a cultural shift, rather than being driven mainly by education or jobs (as we note below, women's labor force participation in India remains extremely low, even without large families to care for).[2] The 1991 census count showed India's population had reached 844 million, implying a growth rate of 2.2 percent per annum in the previous decade. But thereafter growth began to slow noticeably. Owing to government measures, fertility in India had already fallen from about 6.0 children per woman at Independence to 4.0 in 1990. However, this did not change India's growth rate right away; this was in part because the steady fall in mortality offset the decline in births (life expectancy soared from forty-one years to fifty-nine years in this period, an increase of almost 50 percent) and in part because with each cohort larger than the last, there were more women of childbearing age in each new generation. India's annual population growth rate had been 2.2 percent per annum in 1958; it remained at 2.2 percent or

slightly higher until 1989. It was only during the 1990s that the decline in births began to accelerate and reduce the overall growth rate.

From 1990 to 2001, India's fertility fell from 4.0 children per woman to 3.22. By 2011 (the year of the most recent census), it fell to 2.54 and is estimated to have fallen below replacement, to 2.0 by 2020. (Replacement level requires slightly more than two children per woman, about 2.1, because some children still die before reaching adulthood and reproductive age.) India's population growth rate also fell, from just over 2 percent per annum in 1990 to just 1.35 percent per annum in 2011, and an estimated less than 1 percent per year by 2020.

There is great diversity within India, and this is reflected in fertility. The southern states of Kerala and Tamil Nadu were in the forefront in lowering their total fertility rate to less than 2.0, whereas the northern states lagged considerably, with total fertility rates in the late 1990s still greater than 4. In 2005, the government therefore launched the National Rural Health Mission in eighteen states where the health indicators and infrastructure were weak, increasing funding and providing integrated comprehensive quality primary healthcare services to the poor through a scheme of community health volunteers.

The most recent National Family Health Survey (NFHS), held in 2019–21, reported that India's fertility had fallen to 1.6 in urban areas and 2.1 in rural areas. The surveys have shown that despite the universality of marriage of girls in India, the transition to a typically small family has been achieved. The percentage of women with two living children who reported that they did not want to have any more children exceeded 82 percent in all the states except for Bihar and Uttar Pradesh, according to the latest available data from the 2015–16 NFHS survey.

Although India's fertility and growth rate have declined, its population growth is projected

FIGURE 2.1   India's population and annual growth rate, 1950–2020
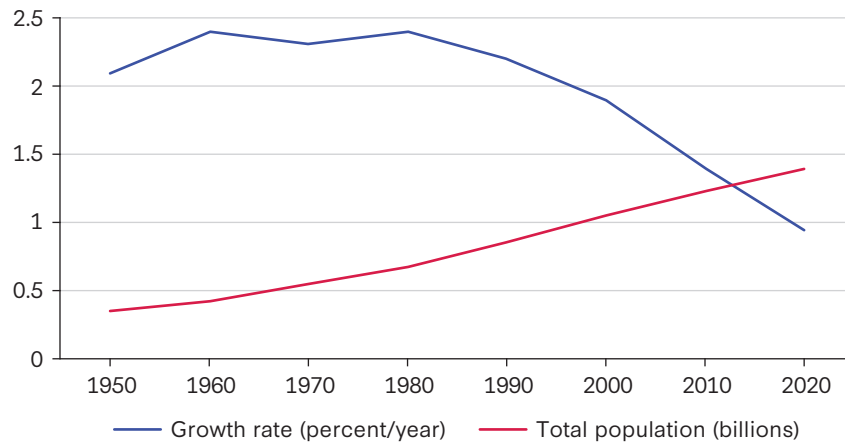
to continue, albeit at an ever-slower pace, for another four decades. This is because even as fewer babies are being born (annual births peaked in 2001 at 28.6 million and are now falling by roughly 150,000 per year), better healthcare, small numbers of elderly, and longer life expectancy mean that death rates are also low, so that births continue to slightly exceed deaths. Only when births fall further, and population aging starts to push up total deaths, will the number of deaths match the number of births. As a result, growth will not cease entirely for another generation. India's population growth rate will continue to decline, but its total population will continue to increase, if ever more slowly (see fig. 2.1). India's population growth is projected to finally end in 2064, with its population peaking at 1.7 billion, then entering a slow and long decline.

INDIA'S DEMOGRAPHIC TRAJECTORY 2024–50: A SLOWDOWN AMID DIVERSITY

India's population has garnered considerable attention since 2023, when India overtook China as the world's most populous nation, at 1.422 billion. That event led optimistic observers to suggest that India

would soon catch up with China in other ways, including economic growth and global power. Yet a country's total population is not a good indicator of other characteristics. It matters more whether that population is young or old, whether it is educated, skilled, and participating in the workforce or not, and whether it is improving uniformly or unevenly. Moreover, in the coming three decades India's demographic trends will show a sharp change from those that dominated the twentieth century. India is now a maturing country, in which the youngest working-age groups have already started to decline in size, and most of the growth in population is coming from older age groups. India's median age, which is still only 28 today, is projected to rise rapidly until 2056, when more than half the population will be 40 or older.

The United Nations projects that fertility in India will continue to fall, reaching 1.78 by 2050, while life expectancy will increase to 77.9 years.[3] India never had the extreme sex selection that was seen in some other countries, so that males exceeded females by no more than 3 percent of total population; that is expected to fall further to just 2 percent by 2050. Total population is projected to rise from 1.42 billion today to 1.67 billion by 2050. That will, however, be virtually peak size

FIGURE 2.2   India's age pyramids, 2024 and 2050
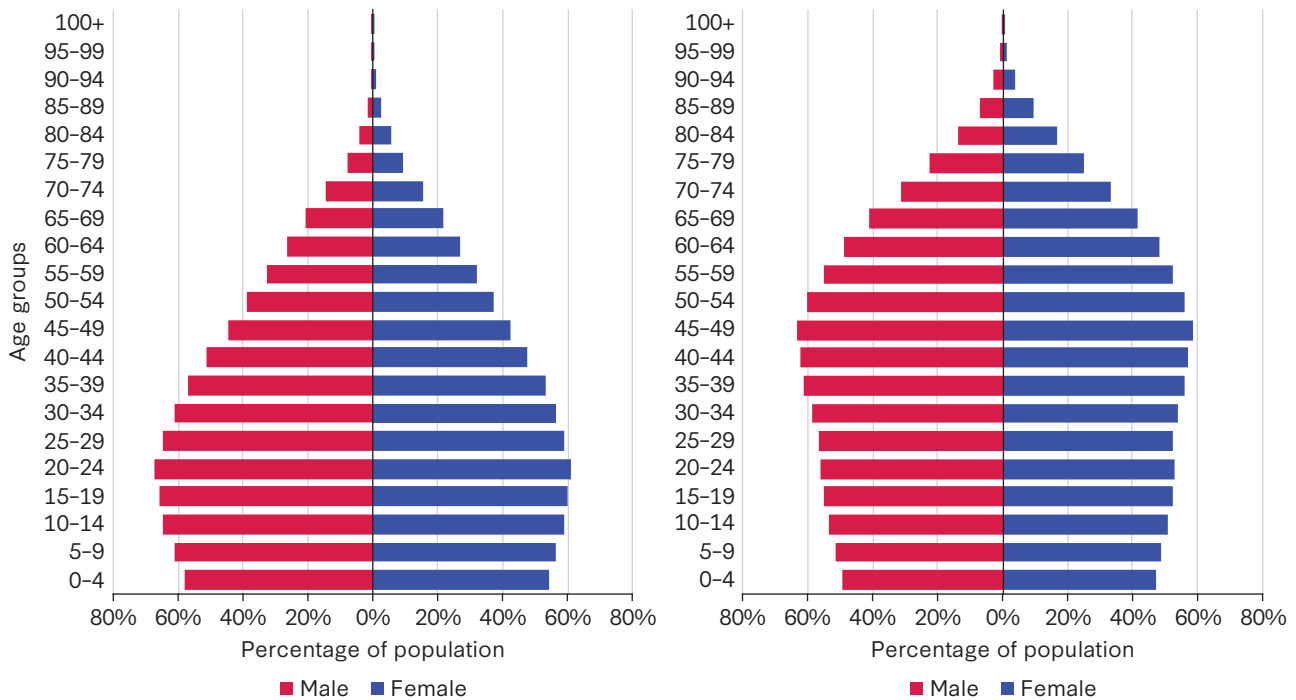
Source: United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects*, various years

for India, as the UN projection is for total population to reach no more than 1.697 billion in 2064 after which total population will slowly decline to 1.53 billion by the end of the century.

Much more important is what is happening to India's population in terms of age structure and regional variations. First, India is now enjoying a period of prime age structure for economic development. That is, a majority of the population is neither too young (because of recent low fertility) nor too old (because life expectancy has only recently risen above 60) for productive work. If we look at India's population pyramid for 2024, we can see that the largest age cohorts are those from age 10 to 44, with smaller cohorts under age 10 and over age 45. Over the next fifteen years these larger cohorts will remain in their prime working years; if they are in the workforce and productive—especially if they are more productive than the cohorts that preceded them—India will enjoy rapid growth.

However, that window is limited. By 2050, these larger cohorts will have begun to retire, and the cohorts following them into the workforce will be substantially smaller (see fig. 2.2).

Thus today, India's 15–24-age population group—the age group that is critical for expanding the labor force and covering military service—is 254 million. It will never be that large again. According to the United Nations' medium variant projection (which may be conservative, as fertility in India may well follow trends in the rest of Asia and fall more rapidly than expected), that age group will be down to 246 million in 2030, 225 million in 2040, and 217 million in 2050, 15 percent smaller than today. If we look at the larger prime working-age group, those age 15–49, they number 790 million today and will increase to 830 million in 2035. But then this entire group will also decline, falling back to just 798 million by 2050. That is, India in 2050 *will have only eight million more prime working-age*

FIGURE 2.3 Fertility rates in India's states

Average births per woman

<1.5 2.0 2.5 >3.0
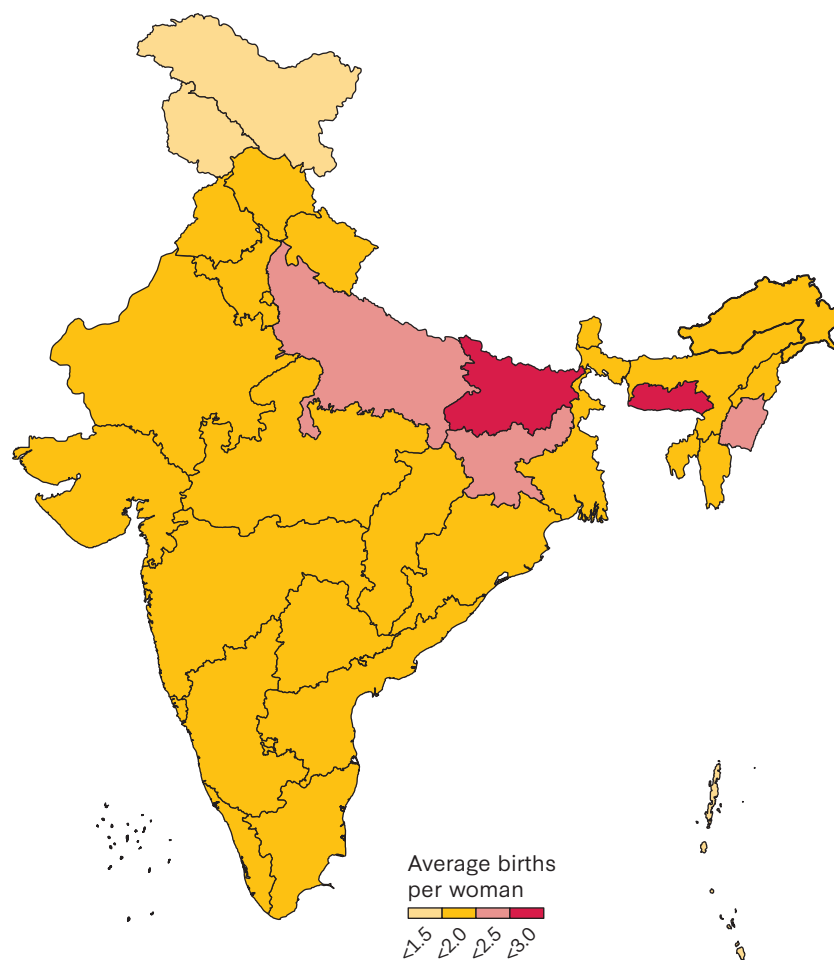
Source: PRS Legislative Research, National Family Health Survey 5 (2019–20)

people—1 percent more—than it has today. In other words, India's future economic growth will depend entirely on improving its labor force participation and the productivity of its workforce, as it will simply not have more workers.

What India will have is many more seniors. Today, India's retirement age is among the lowest in the world, at 58 to 60 years. While many countries are planning to increase their retirement age, that will not be easy in India, where much work is demanding blue-collar and agricultural labor. Today, India's population age 60 and over is 159 million; by 2050, that is almost certain to be more than double, to 348 million (all these people have already been

born, so they are readily counted). That increase of 189 million in the 60-plus population is virtually all of the anticipated increase in India's population: that is, of India's anticipated 228 million total population increase to 2050, more than 80 percent will be in the population over 60 years old.

In addition to most of India's population growth being driven by seniors, it will likely come from India's poorest and least educated states. As shown in figure 2.3, the only states in India with fertility rates still above replacement are Bihar, Uttar Pradesh, Jharkhand, Manipur, and Meghalaya. In the last census, these states were thus among the fastest growing, increasing

from 2001 to 2011 by 25.4, 20.3, 22.4, 24.5, and 27.9 percent, respectively. They were also among the poorest: the two largest, the northern states of Bihar (population 236 million in 2023) and Uttar Pradesh (127 million), had GDP/capita in 2022–23 of 54,111 Indian rupees (INR) and 83,565 INR, respectively.[4] By contrast, India's more prosperous southern states of Telangana, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala, and Maharashtra all have GDP/capita from 200,000 to 300,000 INR per year, many times higher. Unless India can increase incomes in the roughly 30 percent of its population that still has above-replacement fertility, it will have difficulty growing its economy in the coming decades.

Fortunately, there is plenty of room for progress. Bihar and Uttar Pradesh had literacy rates in 2011 of 62 percent and 67 percent, respectively, compared with the 80 to 90 percent literacy achieved in the leading southern states. In regard to higher secondary school enrollment (grades 11–12), Bihar and Uttar Pradesh had rates of 36 percent and 51 percent in 2021–22, in contrast to Kerala (85 percent), Tamil Nadu (65 percent), Maharashtra (72 percent), and Telangana (6 percent). One might suggest that the large states of Bihar and Uttar Pradesh have high fertility *because* they have low education. But that is not what India's data show. In fact, the states of Gujarat (higher secondary school enrollment of 48.2 percent), Assam (40.1 percent), Nagaland (35.8 percent), and Odisha (43.6 percent) are also exceptionally low in secondary school completion but have fertility rates of 1.9, 1.9, 1.7, and 1.8, respectively. The higher fertility in the north is more a matter of a much larger rural, agricultural population and less funding and emphasis for family planning.[5]

India's states also vary tremendously in regard to urbanization, even setting aside the states or territories that are essentially city-states (e.g., Delhi, Goa, Puducherry). Thus, in the 2011 census, Bihar and Uttar Pradesh had urban populations of 11 percent and 22 percent, respectively, while the prosperous southern states had urbanization rates ranging from 39 percent in Karnataka and Telangana to 48 percent in Kerala and Tamil Nadu. At an overall urbanization rate of 35 percent in 2020, India has ample scope for improving productivity by following other Asian countries in moving population from rural to urban employment.[6]

In short, in the next twenty-five years, India cannot hope to grow simply through increased numbers of workers; there will not be any. Rather, India's economic prospects will depend on improving the education and urbanization of its existing workforce, while at the same time coping with the needs of a much larger elderly population. Given the massive variation among India's states, especially between the poorer, less educated, more rural, and higher-fertility north and the richer and more urban south, policies will need to target the large northern states to help them catch up with the rest of the nation.

There is yet another area where India has room for improvement regarding its population: the challenges faced by women.

GENDER ISSUES: WORK AND MARRIAGE

Traditionally, India was a painfully patriarchic society. This was most brutally shown in the Hindu practice of *sati*, which, before it was stamped out by the British, encouraged widows to join their husbands in death by throwing themselves on the funeral pyre, being cremated (alive) with them. Patriarchy also survives in the practice of paying dowry, in which a bride's family pays cash or provides clothes and jewelry to the family of the groom. Though made illegal in 1961, a survey of India's rural villages found that dowries were paid in 95 percent of marriages through 2008. Interestingly, dowries are paid by Christian, Sikh, and Muslim families, not just Hindus. Some states

have seen inflation in reported dowries, notably Haryana, Punjab, Gujarat, and Kerala, while others have seen decreases, such as Odisha, West Bengal, Tamil Nadu, and Maharashtra.[7]

However, gender differences are *not* stark where one might expect them, in education and sex ratio. According to the Reserve Bank of India, elementary and upper secondary school enrollments in each state are virtually identical for boys and girls. Thus, the enrollment rate in elementary school for boys and girls in Bihar is 95.1 percent and 97.4 percent, respectively; in Uttar Pradesh for boys and girls, it is 96.5 percent and 99.9 percent—in both states slightly *higher* for girls. If we look at upper secondary enrollments, even in poor rural Bihar, enrollments are slightly higher for girls: 36.2 percent versus 35.6 percent. In Uttar Pradesh, boys have an advantage, but it is slight: 52.8 percent for boys versus 48.3 percent for girls. In Delhi, that is reversed; there, higher secondary school enrollment is 99.5 percent for girls and 91.2 percent for boys. For India as a whole, upper secondary enrollments are 58.2 percent for eligible girls and 57 percent for eligible boys. It is not sex discrimination in education that is responsible for poor education in India; it is the overall poor school enrollment in northern rural states compared with that in richer states, and the low enrollment in higher secondary school overall (under 60 percent nationally).

Also, despite the availability of ultrasound to guide sex-selective abortions, the sex ratio in India never grew as extreme as in India's neighbors. Thus in 1950, the ratio of males to females in India's population stood at 106; it never rose higher than 107.4 in the early 1980s and then returned to 106 today. By contrast, in Bhutan the male/female ratio rose to 114 in 2005 and remains above 112 today. In Pakistan, sex-selective infanticide produced a male/female ratio of 119 in the 1950s, falling to 110 in 1981, but then fading to just 102 today.

Where we do see a stark difference between men and women in India is in regard to formal employment. India, though predominantly Hindu in religion, is part of a group of nations extending from India west through the Middle East and North Africa that have the lowest rates of female labor force participation in the world. In India, only 29.9 percent of women age 15–64 are in the labor force, compared with 71.1 percent in China, over 70 percent in most of the developed world, and 50–65 percent even in sub-Saharan Africa, reaching over 75 percent in Ethiopia, Tanzania, Madagascar, and Mozambique.[8] Getting this huge potential labor force—70 percent of women age 15–64—into more productive roles is critical to provide a boost to economic growth in the absence of any increase in the prime working-age population. According to studies carried out in India, some of the factors responsible for the low participation of women in the workplace are the "motherhood penalty," where women who have children are expected to devote themselves fully to their domestic responsibilities, and the custom that in the presence of an adult male with higher levels of education and income, the spouse should be discouraged from working.[9]

INDIA'S MIGRATION PATTERNS: INTERNAL AND EXTERNAL

As might be expected for a very populous and still relatively young country, India is a major net exporter of labor. In fact, India is the single largest source of global migrants and the largest recipient of remittances. A total of 17.9 million people born in India are living abroad, often forming large émigré communities in their destination countries. The US$125 billion received in remittances in 2023 was nearly 16 percent of all global transfers to low- and middle-income countries.[10] India sends unskilled migrants abroad mainly from the large northern states of Bihar and Uttar Pradesh and sends highly skilled migrants abroad mainly from the richer southern states of Kerala and

Tamil Nadu. Many of the latter acquired high-level entrepreneurial and business skills abroad and returned to use those skills building information technology and service industry firms around Hyderabad and Bangalore.[11]

In 2018 and 2019, a total of just over one million Indians (net) migrated to other nations. This of course plummeted during COVID but has recovered to over 300,000 in 2021. The UN projects outmigration from India to continue at a steady rate of half a million per year through the entire twenty-first century. This may be a high estimate, both because India's main age group for migration (age 15–24) is steadily diminishing and because India's own economy should grow and offer more opportunities locally.

Historically, under the British Empire hundreds of thousands of Indian laborers were sent to the Caribbean (especially Trinidad and British Guyana), Fiji, Mauritius, and South Africa. Today, however, migrants more commonly move to the Middle East, Europe, and North America. Slightly over one-half of Indians living abroad today are in Persian Gulf countries; 3.5 million are in the United Arab Emirates and 2.5 million are in Saudi Arabia. However, the second-largest group of Indian-born migrants living abroad is in the United States (2.7 million), where net migration from India now far outpaces that from Mexico. Other large expat communities from India are found in the United Kingdom (835,000), Canada (720,000), and Australia (579,000).[12]

Internal migration, however, is several times greater than international migration, with an estimated five to six million Indians moving to another state from their state of birth every year in the first decade of the twenty-first century, producing an interstate migrant population of about sixty million. This is largely a flow from the poorer north to the richer, faster-growing economies in the southern states, but it is also a movement from rural areas to India's growing cities.[13]

From 2010 to 2020, India's fastest-growing cities increased by 3 to 6 percent per year, with even Delhi and Bangalore growing at over 3 percent per annum. The United Nations projects that India's urban population will increase from its current 38 percent of the total to 53 percent by 2050. Today, five of the world's thirty largest cities are in India (Delhi, Mumbai, Kolkata, Bangalore, and Chennai), and Delhi is expected to displace Tokyo as the world's largest urban agglomeration by 2030. By 2035, greater Delhi is expected to have forty-three million inhabitants and Mumbai twenty-seven million, while Kolkata (twenty million) will be larger than Osaka, and Hyderabad, Bangalore, and Chennai will each be larger than Los Angeles.[14]

The key question, however, is not how large India's cities will be, but how prosperous India will be as they grow.

INDIA'S FUTURE ECONOMIC GROWTH: CAN THE DEMOGRAPHIC DIVIDEND BE ACHIEVED?

India today has an age structure nearly optimal for economic growth, with 64 percent of the entire population of working age (15–59). However, as we have noted earlier, India's literacy and female labor force participation are quite low; these reduce India's *effective* working-age population. Thus China, at the beginning of its remarkable economic ascent in 1980, had only 57 percent of its population in that age group. However, China had other advantages. First, China's population was still growing fast, so that age group grew in numbers by 65 percent over the next thirty years. By contrast, in slower-growing India, in the next thirty years (2024–54), India's 15–59 age population will grow by only 8.6 percent. Second, even in 1980 China had higher literacy (91 percent) than India has today (78 percent)—a legacy of the Chinese Communist

Party's emphasis on peasant schooling. Third, China had higher labor force participation in 1980 for both men (87 percent) and women (71 percent) than India has today (76 percent for men, just 33 percent for women).

Thus, if we ask what fraction of China's population was literate and participating in the workforce in 1980, it was 40 percent. But for India today, that fraction is just 27 percent. And for China, that larger effective workforce grew by two-thirds in the next thirty years; in India, it will grow just an eighth as much.

Moreover, China had an edge in its trajectory of urbanization as well. From 1980 to 2010, China's urban population—which generally is three or four times more productive than the rural population—increased from 192 to 669 million, an increase of 477 million, or 248 percent. India, though undergoing urbanization as well, has much slower urbanization; the United Nations projects its urban population will grow from 483 million in 2020 to 877 million by 2050, an increase of only 394 million, and a much smaller percentage gain of just 82 percent.

Furthermore, while the most severe discrimination in India's workplace falls upon women, resulting in the exceptionally low female labor participation rate, India also still retains significant caste-based discrimination against the Scheduled Castes (Dalits) and Scheduled Tribes, whose position outside the established primary castes leads them to be treated with suspicion (or worse) by many Indians. Particularly in rural areas, where caste roles are more rigorously enforced, the scheduled castes and tribes face severe discrimination in access to professional positions, higher education, self-employment, and credit.[15] Although India's Constitution demands equality, in practice informal discrimination based on caste, though diminishing, still persists (much like that of the United States in regard to different races). Inasmuch as the Scheduled Castes

and Scheduled Tribes form about 25 percent of India's total population, the limits on their full and equal participation in the labor force is a further constraint on India's full economic utilization of its population. Given that the 14 percent of India's population that is Muslim also faces discrimination in regard to employment, this means that 40 percent of India's population is subject to significant restrictions on their economic role. This also reduces the effective impact of India's vast population.

Finally, India is already heading into life as an aging country. In 1980, China's over age 65 population was just 43 million, a tiny 4.4 percent of total population. By 2010, that had increased to 116 million, still just 8.6 percent of the total. In India in 2020, the over age 65 population was already 93 million, or 6.7 percent of the total. More important, in the thirty years to 2050, that will increase to 250 million, or 15 percent of the population. So India will be dealing with a senior population roughly twice as large, in terms of population percentage, as China did during its boom years.

In sum, while India has an opportunity to collect a "demographic dividend" on its favorable age structure over the next twenty-five years, it will almost certainly not be able to duplicate China's level of growth. Compared with China, it is handicapped by being in a phase of much slower population growth, by starting with much lower levels of literacy and labor force participation, and by having a more rapidly aging population. What growth can then be reasonably expected?

The biggest factor will clearly be whether India can induce more of its female population to enter the labor force. Doubling their labor force participation to a level common in other Asian countries, at about 66 percent, could raise national output by one-third, even if those women are no more productive than working women are today. However, if they could enter factory work, rather than agriculture, the gains would be even greater.

In 2022, 43 percent of Indians who are employed worked in agriculture. That fraction rises to 59 percent for women. Most concerning, the percentage of women working in agriculture had fallen sharply from 74 percent in 2000 to 54 percent in 2019, but then rose in the last two years. No doubt part of that is due to COVID, which forced people to return home and seek work in their villages. But part may be due to the more rapid growth of population in rural areas than in urban ones. In any event, enabling both men and women to move out of agriculture into other sectors of the economy will be crucial. For comparison, in China by 2010 the fraction of employed women who worked in agriculture had fallen to 32 percent.[16]

Also alarming is that India's large youth cohorts—the country's main comparative advantage relative to East Asian nations—are facing relatively high rates of unemployment. The data are uncertain on this: according to a recent report by the International Labour Organization (ILO), "the problem of unemployment in India has become increasingly concentrated among the youth, especially educated youths and women in urban areas."[17] However, this report estimates the unemployment rate for youth to be only 12.4 percent for all youth and 18.4 percent for those with secondary education or higher. Yet the report also notes that from 2010 to 2022 almost "one in three young people was not in employment, education or training in India, which was almost equal in rural and urban areas and increased over the years. In 2022, the proportion of youths with such status remained high, at 28.5 percent, with almost equal proportions in rural (28.7 percent) and urban areas (29.7 percent)."[18] Just recently, a report from the independent Centre for Monitoring Indian Economy in Mumbai claimed that youth unemployment in India was 45.8 percent in December 2022.[19] Part of the disparity is because of uncertainty over what is a "job." Even the ILO report notes that the majority of reported youth employment is self-employment or irregular work. Legions of youth

are "gig workers" doing sporadic service and delivery work in India's burgeoning cities, uncertain of work from day to day. All reports agree that youth unemployment is much higher for youth who have completed secondary education and still higher for college graduates. This is because despite its rapid overall growth, India's economy still provides too few full-time white-collar positions for its educated youth. This mismatch of jobs and skills is hampering the transition into full-time work of precisely India's potentially most valuable workers.

A final consideration that is hard to quantify is the impact of future climate change on India's growth. India is already suffering punishing heat waves, and Pakistan next door suffered tens of billions of dollars' worth of damage from massive floods in 2022. A single cyclone (Amphan) did US$13 billion of damage to India in 2020, and rising sea levels will affect the one-third of Indians who live along the coast. Kolkata and Mumbai are particularly vulnerable. More irregular monsoons and higher temperatures may reduce agricultural productivity and limit outdoor labor. In May of 2024, New Delhi recorded its highest-ever temperature—126 degrees Fahrenheit—and temperatures in several states remained above 110 degrees for weeks.[20] Moreover, where China was able to fuel its economy with cheap coal without regard for climate consequences, India will likely face both internal and international pressure to shift to greener sources of energy. That may make India's development more costly; but it is also possible that it may position India to be a low-cost supplier of solar, wind, and storage equipment and green hydrogen, or even an exporter of green energy, providing economic benefits.[21]

Although India's low levels of education and female workforce participation along with high youth unemployment are handicaps, they are also opportunities if they can be overcome. India is hoping to achieve sustained 7 percent per year GDP growth, but we believe that is wholly

unreasonable given these handicaps and the slow growth in the prime labor force. A more realistic (but perhaps still optimistic) guess at India's future GDP growth, assuming no major catastrophes and sound policy, might be for 6 percent per year average growth to 2034, when the prime working-age (15–49) population peaks in size, and 4.5 percent per year from 2034 to 2050, when the labor force starts declining and population aging becomes even more significant. That would take India's GDP from US$3.94 trillion today to US$7.1 trillion in 2034, making it likely the third-largest economy in the world behind the United States and China. GDP per capita would rise from US$2,733 today to US$4,529. By 2050, India's GDP would double again to $14.3 trillion, or nearly where China is today, while GDP/capita would reach US$8,544, a solidly upper-middle-income level, about equal to that of Armenia or Georgia today.[22] That may fall short of Prime Minister Modi's aspiration for India to be a high-income country by 2050, but it would still be a stunning accomplishment and cement India's position as by far the largest economy in the world after the United States and China.

CAN A GROWING BUT AGING INDIA BE A WORLD POWER?

In five to ten years, India will be by far the world's largest country by population, pulling ahead of a shrinking China, likely reaching 1.6 billion by 2035 compared with China's 1.4 billion. More important, India will also have the world's third-largest economy, provided it can improve the productivity and labor force participation of its billion working-age people, especially in the larger, northern rural states. India will demand, and deserve, a seat at the table in the world's chief security and financial organizations, from the UN Security Council to the World Bank and International Monetary Fund.

India is already seeking both to cooperate with China through membership in the BRICS (Brazil, Russia, India, China, South Africa) international

summits and to compete with China for economic growth and even leadership in certain sectors (e.g., steel, green hydrogen). Even though up through 2050 India's economy will remain considerably smaller than China's, likely somewhere between one-third and one-half its size, India is already seeking to be the major power in the Indian Ocean and to compete with China for influence in Southeast Asia and the Middle East. India's diaspora, already tens of millions strong, will be a potent element of India's ability to project influence.

The next ten years will be crucial for India's ascension to world power status. If it is able to utilize the potential of its working-age population and rapidly raise their productivity, India will be poised to be one of the leading powers of the twenty-first century. However, if that opportunity is lost, if India's poorest states grow larger and remain overwhelmingly rural while its southern states see further declines in fertility, India will enter the middle third of the twenty-first century starting serious aging while not yet solidly a middle-income country. Between 2035 and 2050, the over-60 population will increase by 120 million while the prime working-age (15–49) population will decline by 34 million, a situation that will make it difficult to sustain rapid economic growth.

Though exceeding China in population, India will not rival China in total economic output or in income per head. However, its combination of population and economic size will make it a significant world power compared with much less populous states like Germany, Japan, and Russia; or compared with large states with much smaller economies like those of Nigeria, Pakistan, or Indonesia. Still, whether or not India arrives at this point having overcome the headwinds noted in the previous section, or whether it continues to struggle with them, will determine whether India arrives as a confident, increasingly powerful and influential state, or as a large but staggering state distracted by the need to cope with numerous internal issues.

IS AN AGING INDIA MORE OR LESS PRONE TO DEMOCRACY?

Richard Cincotta and his collaborators have shown there is a strong relationship between a country's median age and its regime type.[23] Young countries (median age under 25) are overwhelmingly autocracies; mature countries (median age over 35) are overwhelmingly democracies; and countries that are maturing (median age 25 to 35) are often transitioning from autocracy to democracy but are not always successful. India, at median age 28.6 today, and likely to be 35 by 2041, would be a country where democracy is likely to emerge but not become stable until well after 2041. Yet India, paradoxically, emerged as a democracy in 1950 despite a median age of 19.9 and is only now, with median age approaching 30, showing signs of drifting into autocracy. In 2021, Freedom House demoted India to "partly free" in its ranking of civil and political liberties, as evidence grows that Prime Minister Narendra Modi is curbing critics, jailing opponents, and clamping down on the Indian press.[24] Does India's demography hold any clues as to the trajectory of its regime? Despite India's long history of democracy, there are in fact no firm bulwarks against sliding into illiberal democracy or even electoral autocracy. If Prime Minister Modi can acquire overwhelming support in India's parliament through a combination of electoral pressure and spreading a Hindu nationalist narrative playing on fears of neighboring Pakistan and China and internal conflict with Muslims, while continuing to show strong economic results, he will likely be able to justify the need for him as the "strong man" necessary to defend India and build it into a regional and world power. This would put him on a trajectory not too different from Viktor Orbán's acquisition of centralized power in Hungary, or even Vladimir Putin's rise to power in the Russian Federation.[25]

Yet there are reasons to believe that Modi will not be able to go that far down the path to one-man rule. First, India may not be able to continue its strong economic growth. Doing so will require more than just deals to support India's oligarchs. As noted earlier, it will require changing India's female workforce participation and a massive effort to raise education and formal employment in rural India. Those changes may be difficult to achieve by decree and will require enlisting local popular support for major reforms. If Modi continues to rely mainly on state backing for oligarchs and infrastructure investment to fuel growth, that path will likely stall out in the absence of broad-based growth, robbing Modi of one of his major selling points.

Second is India's enormous regional and ethnic diversity. So far, Modi has framed his Hindu nationalist policies mainly in opposition to India's Muslim minority. Yet Hindu/Muslim is just one of India's many divisions. Another is that between the Indo-European-language regions (mainly speaking Hindi and its offshoots) of northern India and the Dravidian-language regions of southern India. The latter include the states of Andhra Pradesh, Telangana, Karnataka, Kerala, and Tamil Nadu. These are all among the most economically prosperous states in India; collectively they produce more than a quarter of India's total GDP and include the tech centers of Bangalore and Hyderabad.[26] These regions are not strongly attracted to Modi's Hindu nationalist program, and none of these states have voted for the BJP in the most recent state elections. The south is a region that Modi cannot afford to alienate, and its opposition will likely remain a check on Hindu extremism and a limiting factor on BJP power.

The 2024 national elections for India's parliament (the Lok Sabha) have suggested that there are limits to how far Modi and the BJP are able to exert control over India. A weak showing in the southern states demonstrated little appeal there for Modi's centralizing of power and use of the BJP as a vehicle for rolling back Indian democracy. Modi's party also had a weak showing in parts of the north, which are economically

lagging. If that does not change, enthusiasm for Modi may decline. Just as the next ten years will be crucial in determining whether India is able to overcome its economic hurdles and become a high-middle-income state, so these years will also be crucial in determining whether the south will remain in opposition and a force to limit the surge to illiberalism, or whether the region will jump on the Modi bandwagon and enable him to make India into a more autocratic one-party state.

CONCLUSION: INDIA AT A TURNING POINT

India's economy and political system are at a turning point. The economy has great potential to reap a "demographic dividend" from its current favorable population structure and continue its strong growth. Yet there are also daunting obstacles that need to be overcome for that potential to be achieved. The next ten years are critical, as India's prime-age labor force will only grow until 2035, at which point that trend will reverse and aging will start to become a more significant drag on future growth. Whether or not India can implement reforms that will effectively utilize and increase the productivity of its labor force will shape its economic trajectory for the next half century. The political system is also facing a critical juncture. Drawing on India's increasing global stature and strong current growth, Prime Minister Narendra Modi is building a more centralized, less liberal regime promoting Hindu nationalism. If Modi can overcome the obstacles noted above and keep India powerful and growing strongly, he may continue to shift India in the direction of becoming a more autocratic, one-party state. Yet given all the obstacles India faces, and Modi's pattern of relying on oligarchs and infrastructure investment to drive growth—which is not compatible with sustained broad-based and inclusive growth—India may falter, and Modi's aspirations may be met with greater opposition. Either way, the coming ten years will be crucial to

determining India's economic and political patterns for the next half century.

NOTES

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3. India's Economy

An Assessment

Nirvikar Singh

As one of the first colonies to achieve independence in the twentieth century, India was a pioneer among non-Western nations in trying to forge an explicit strategy for economic growth and development. The centerpiece of its strategy for the economy was modernization through industrialization. The private sector was viewed as inadequate for this task, so India's leaders embarked on a program of government occupation of the "commanding heights" of the economy, including the creation of public enterprises in key sectors of the economy, regulation of existing private businesses, and some nationalization.

Some of the inspiration for this approach came from the example of the Soviet Union, at that time still considered a successful alternative model to capitalism. However, India's leaders did not completely jettison private property and enterprise, and "big business" continued to matter in the economy.[1] Furthermore, India adopted a federal, democratic system, with regular elections at the national and state levels. These political structures have played an important role in shaping the evolution of the Indian economy. Although India's constitutional democracy has retained its basic structure since it was formalized in 1950, the thinking about the roles of government and market has changed considerably. This evolution

provides a typical narrative framing for the manner in which India's economy has progressed over this period.

This chapter is structured as follows. In the next section, we review the broad contours of India's economic progress from Independence in 1947 to the election of Narendra Modi as prime minister in 2014.[2] The third section focuses on the last decade, which has witnessed many ups and downs in the economy, often driven by non-economic factors. The fourth section drills down to recent economic policies under the current regime, evaluating their rationale and coherence. The fifth section then considers prospects for the Indian economy over the next few years, with some more speculative remarks on the longer run. The last section is a summary conclusion.

FROM INDEPENDENCE TO MODI

In the 1950s, analytical arguments for the government having a central role in promoting economic growth were combined with concerns about inequalities that are inherent in capitalism, and even sociologically or philosophically based concerns about the role of business in society. The strategy for economic growth through

FIGURE 3.1   Real per capita GDP
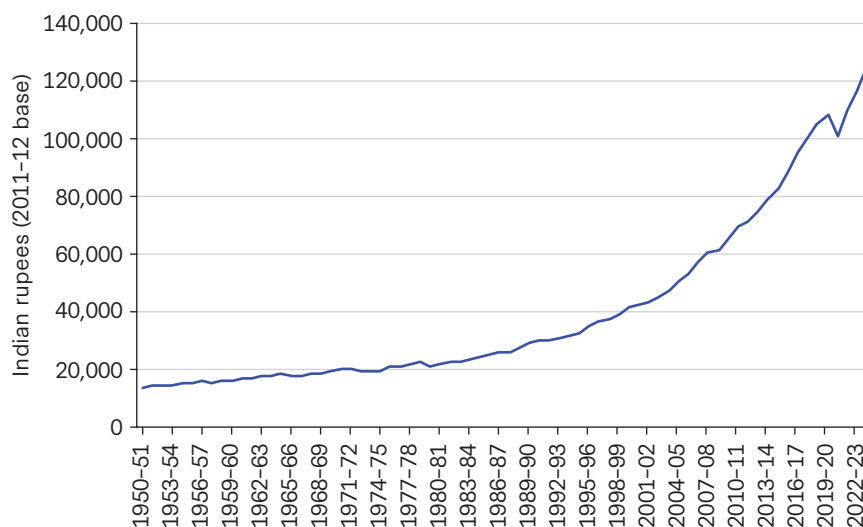
Source: Author calculations based on data from the National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India

government-led industrialization also included protecting nascent industries from foreign competition, so high barriers to trade were also part of the policy mix. Private industries that were not nationalized or dominated by government enterprises were controlled in various ways, including where and how much they could invest and expand and in their access to external credit. These policies were driven by the twin motives of promoting economic growth and managing economic inequalities. Agriculture was not neglected, but attempts at land reform were mostly ineffective. New universities that focused on science and technology education were also created, to support industrialization.

In the initial decades after Independence, India's growth rate went up considerably from the pre-Independence period, health and education indicators improved steadily, modern industries were created, agricultural productivity increased, and greater self-reliance was achieved in many ways, while inequalities were held in check. Infrastructure and institutions for delivering public goods also improved substantially, as compared with those in the colonial era.[3] On the other hand, poverty

came down very slowly, the improvement in human development indicators was also limited, and democracy came under increasing strain, as competition for rents within the system became fiercer due to the limits on the redistributive options of government placed by slow growth. Figure 3.1 and table 3.1 summarize the basics of India's economic growth performance after Independence.

Attempts to reduce the extent of government control of the market, aiming to accelerate slow economic growth, began in the 1980s, but the major shift in policy was triggered by a balance of payments crisis in 1991, leading to a decades-long period of "economic reform." Key initial steps of reform were liberalization of international trade, a greater role for the market in determining the exchange rate, and removal of many controls on private domestic industrial investment and operations. The tax system also began to be reformed, and direct tax rates were reduced substantially. Financial markets, particularly the stock market, were also reformed, with respect to trading technologies and regulatory institutions. Numerous other institutional reforms have followed, including the conduct of monetary policy and other spheres

TABLE 3.1 AGGREGATE AND SECTORAL GROWTH RATES

Period	GDP	Agriculture, forestry, and fishing	Industry	Manufacturing	Services
1951–52 to 1965–66	3.86	1.99	6.42	6.25	4.59
1965–66 to 1981–82	3.36	2.28	4.26	4.11	4.11
1981–82 to 1988–89	5.53	3.75	5.91	6.08	6.39
1988–89 to 2006–07	6.18	3.45	6.84	7.00	7.41
2006–07 to 2014–15	6.63	3.26	6.63	7.73	7.58
2014–15 to 2022–23	5.69	3.74	5.47	6.02	6.22

Sources: Arvid Panagariya, *India: The Emerging Giant,* Table 1.2 (Oxford University Press, 2008), and author calculations based on data from the National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India

of regulation, such as telecommunications and industry competition in general. Over time, foreign investment was also gradually liberalized. But reforms in industrial labor markets and agricultural land markets have been politically more difficult to achieve. Nevertheless, India's economy began to grow faster after the reform period began (see table 3.1 and fig. 3.1). Despite differences among various empirical analyses, the best evidence suggests that productivity growth accelerated in the 1980s and thereafter, potentially representing a "structural" shift in the growth trajectory.[4] In the 1990s and subsequently, India has been one of the fastest-growing economies in the world.

Digging deeper, India's improved economic growth performance has had some unusual features. Growth has not necessarily come through the conventional route of producing and exporting labor-intensive manufacturing goods, with quality and variety increasing over time. That pattern of development has empirical backing and seems to fit the case of many East and Southeast Asian economic successes.[5] Instead, India's growth path has been characterized by capital and skill intensities that are out of line with other countries at similar per capita income levels.[6] Aggregate

capital intensity in India's economy had long been identified as relatively high, a consequence of policies that pushed heavy industrialization, as well as restrictive laws on hiring and firing labor. High capital intensity was also arguably caused by inefficient use of capital associated with the control regime, including domestic licensing and prohibitive trade restrictions. After economic reforms, India's incremental capital-output ratio (ICOR) did decline, even as investment rates increased, suggesting more efficient use of capital.[7]

Despite improvements in capital use, India's employment generation in labor-intensive manufacturing remains low. There has been limited absorption of the rural labor force into manufacturing, which remains unusually skilled-labor-intensive.[8] The services sector has been relatively more important, contributing over half of GDP growth since the 1990s.[9] But services have also been skill-intensive in areas such as information technology (IT)—specifically software development—and IT-enabled services (ITES, e.g., business process outsourcing). Even seemingly low-skilled areas such as call centers require levels of education and English-language proficiency that are possessed by less than 10 percent

FIGURE 3.2   Ratio of investment to GDP
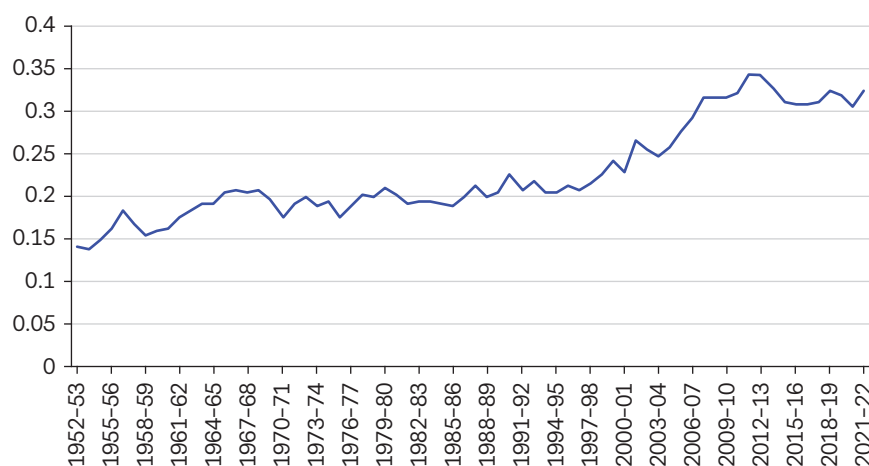
of India's population. Overall, therefore, India's accelerated economic growth in the reform period has not been accompanied by commensurate employment generation.[10]

The acceleration of India's economic growth beginning in the late 1980s had a positive feedback effect, increasing domestic demand for consumer goods and attracting foreign investment. Rising incomes and demographic changes also spurred domestic savings. There were some changes in financial intermediation, including the entry of new private firms, organizational reform of public-sector financial firms, and overall regulatory reform in the financial sector. Growth accelerated even more in the 2000s, approaching double digits for the first time in India's history, supported by rising investment rates (see fig. 3.2). This acceleration took place during a global financial boom, which ended in a financial crisis and a major recession. India was less directly affected by this crisis, but the global slowdown exposed some weaknesses in financial intermediation during the boom. Specifically, many private-sector investment projects stalled. Their viability might have been questionable to begin with, but the slowdown quickly exposed

the problems. The result was a rapid deterioration of borrowing firms' balance sheets, as well as a steep increase in nonperforming assets (NPAs) on banks' balance sheets, especially those in the public sector.

The accumulation of NPAs and of stalled or failed private-sector investment projects acted as a brake on economic growth after the financial crisis. Although India did not suffer from a severe slowdown, economic growth fell from the boom years before the crisis and was very slow to recover. Reforms in the bankruptcy laws, designed to speed up resolution of the NPA problem, helped somewhat, but the impact was still limited and slow. The global slowdown affected exports, adding another damper to the growth rate. Another factor at work in this period was heightened government corruption, or at least concerns about such corruption, associated with uncertainty about the future of leadership in the ruling party. In these years, the focus of economic policy also tended to be on welfare programs such as rural employment and food security, rather than on continuing to seek rapid economic growth. Conceptually, growth was supposed to be more inclusive: human capabilities and

human development were important goals, not just per capita GDP growth. Slow rates of poverty reduction, rising inequality, and lack of employment generation were also justifying factors in these policy choices. At the same time, policies to stimulate industrial employment growth were not prominent, and a slowdown in employment growth that had started during the boom became worse.[11]

THE LAST DECADE

The year 2014 witnessed a major change in India's national political leadership, when the Bharatiya Janata Party (BJP) led by Narendra Modi won the general election. On the economic front, this change manifested itself in a more explicitly "pro-business" approach to economic policy. Ever since Independence, there had been a strong strand of accommodation of business interests, but in a less overt manner.[12] The BJP had been in power earlier (1998–2004), and it pursued a similar economic strategy but from a more politically constrained position. However, whereas economic conditions at that time had been relatively favorable, with strong global economic growth, the situation in 2014 was more fragile. As compared with the earlier period, India's capital account was more open, and capital flows were sometimes volatile, as when the US Federal Reserve announced plans to reverse its massive postcrisis monetary easing in 2013. Such events reinforced long-standing concerns about economic openness across the political spectrum. In the BJP's case, other forms of nationalism aligned with these concerns and shaped economic policy.

An example of a nationalistic approach was the 2014 launch of a Make in India initiative, designed to increase the growth rate of domestic manufacturing, in a manner somewhat reminiscent of the import-substituting era after Independence. Another strand of thinking, that of modernization,

was illustrated by another initiative, Digital India, also proposed in 2014 and formally launched in 2015. In a sense, information technology had replaced steel mills as a symbol of a modern economy. Both these conceptual policy strands were consistent with a "pro-business" orientation. A greater focus on improving India's global ranking in the World Bank's Ease of Doing Business Index illustrated this orientation. A move from 142nd rank in 2014 to 63rd in 2019 was prominently featured by the government, and the tracking of such measures for Indian states has continued, even after the World Bank's own effort was stopped in light of some data issues.

A third and differently motivated strand of policymaking adapted the continual political need to address the welfare of the least-well-off Indians. Although the massive employment guarantee scheme that was deployed under the previous government remained in place, it was de-emphasized, and better targeting of in-kind subsidies was promoted, as well as specific infrastructure. For example, rural sanitation became a major government mission, in the form of building toilets in each village. A Total Sanitation Campaign (TSC) had been in place since 2001, but by 2011, evidence was being presented that open defecation contributed to malnutrition, childhood stunting, and cognitive deficits.[13] Narendra Modi, while campaigning in 2013, sought to signal his focus on inclusive development, as opposed to religious themes or favoring big business, stating, "First toilets, then temples."

Another major aspect of reform, completed in 2017, also represented a continuity across governments. The sales tax structure that had developed out of the Constitution of 1950 was inefficient, in terms of overlapping jurisdictions, cascading taxes, and creating internal trade barriers. Value-added tax (VAT) systems at the state and central levels had begun to be implemented in the late 1980s, and a unified, comprehensive VAT, the Goods and Services Tax (GST), was formally proposed in 1999. After

multiple attempts across different governments, the GST came into effect through a constitutional amendment in 2017, but its implementation raised multiple challenges for the central and state governments.

Raising adequate revenue has been a perennial problem for the central government in India. Although fiscal deficits in the range of 3 to 5 percent of GDP seem relatively small, they are larger when viewed as a percentage of expenditure: government revenue is typically only about 70 percent of expenditure. Increasing political pressures for welfare expenditure and the reduction of revenue from customs duties after the 1991 liberalization have been recent factors in this arena, as have recommendations for increasing the share of state governments in overall tax revenue, which is constitutionally mandated.[14] To increase revenue, the previous government had attempted to impose retroactive taxes on a few foreign corporations in areas such as telecommunications.

In December 2016, halfway through its first term, the Modi government resorted to demonetizing all notes with denominations of 500 Indian rupees and above, with the claimed goal of reducing tax evasion and corruption in general. Another justification was also tax related—that the demonetization would force smaller firms to use digital payments and therefore ease their transition into the forthcoming GST system. Perhaps the most plausible explanation of the motive for demonetization has to do with crippling the financial resources of opposition parties in the Uttar Pradesh legislative assembly election of February–March 2017. From an economic perspective, the policy had a severe negative impact, with no clear economic rationale. One estimate is that output fell by 2 percent in the quarter in which the demonetization occurred and took months after that to return to its previous levels.[15] There is no evidence that long-run or trend growth was affected, but the temporary loss in welfare was significant.

During this period, India appeared to still be growing rapidly, especially after a revision of the national income accounts in 2015, to update the base year from 2004–05 to 2011–12. Several analysts questioned the methodology of the new GDP accounts, and it was pointed out that data from other sources, such as the Index of Industrial Production or export statistics, suggested that the economy was growing more slowly than what the official GDP statistics reported. Other aspects of the data and methodology were also explored, but there does not seem to be any consensus on the validity of concerns, and there was no subsequent change in the methodology or the data.[16] Even with the new series, there was evidence of an economic slowdown in 2018–19 along with other negative factors for growth: a continued nonperforming asset (NPA) problem in the banking system, compounded by the 2018 failure of a major nonbank finance company, Infrastructure Leasing & Financial Services (IL&FS), which required a government takeover and had ripple effects through the whole financial system and economy.

Some of the backdrop for the IL&FS crisis was the continued boom in the real-estate sector, even after other investment projects had run into trouble following the global financial crisis. Because global interest rates were low, but the investment climate was uncertain, real estate became relatively more attractive, as a traditionally safe investment. The demonetization also disrupted this boom, since some real estate transactions also involved off-the-books transfers to reduce taxes on property and property transfers. All these disruptions caught up with IL&FS in 2018, after it had failed to adjust its strategy.

The Indian economy's bumpy path in the last decade can be understood in terms of global events (a major boom followed by a historic bust), the evolution of an uneven economic reform process, which created new sources of economic rents, and attempts to capture those rents. Real estate, construction, and telecommunications

were all areas where the kinds of rents that had marked the old "license-permit-quota raj" were available for contestation.[17] IT and ITES best represented the new economy, shaped by global competition and global standards.

The COVID-19 pandemic of 2020 came at a difficult time for the economy, and the government response was suboptimal in a couple of ways. The initial lockdown was implemented suddenly and without adequate planning. Subsequent policy responses and relaxations of controls were also suboptimal.[18] In both cases, there were negative human and economic consequences beyond what was necessary. The government was relatively conservative in providing economic support during the lockdown, partly because of its own fiscal situation. In some ways, it squeezed the states' finances, affecting their capacity to respond. Possibly because of underlying characteristics such as demographics, technological progress in software and biotech, or shifts in geopolitics as China's importance in global value chains became a source of concern, India had a sharp, if uneven, recovery after the pandemic.

A view from within the government offers a more positive summary of the last decade's economic trajectory.[19] After a review of the entire 1950–2014 period, problems of the post–financial crisis period are highlighted, including high inflation, ill-targeted subsidies, and dysfunctional government decision making. In contrast, the last decade is described as one of transformative growth. One example to support this claim includes a 3.3X nominal increase in annual public-sector capital investment from 2015 to 2024 (a doubling in real terms), resulting in an "unprecedented" build-out of infrastructure. Other areas where economic progress over the last decade is highlighted include greater financial and monetary stability, financial inclusion (including free bank accounts for the poor and low-cost digital payments), rural sanitation through a massive toilet-building program, and improvements in the reach and targeting of various welfare programs.

Underlying many of these areas of progress is the development of digital infrastructure, particularly within government, and also through increased smartphone penetration.[20]

It is difficult to disentangle what changes are the result of government policies versus what is driven by exogenous factors. Nor can one easily estimate counterfactuals based on different policy regimes. Over the past decade, India's growth averaged 6 percent per year, slightly lower than the previous decade's average of 6.8 percent. If one adjusts for the COVID lockdown effect, the two numbers are statistically indistinguishable. On the other hand, it can be argued that the global growth environment has been much less favorable in the past decade. Assessing India's economic performance requires a more detailed analysis of recent economic policies and their impacts, and one can use that to offer some thoughts on the Indian economy's prospects.

RECENT POLICIES AND IMPACTS

A persistent problem for the Indian economy has been the failure of manufacturing to grow rapidly enough to create enough "good" jobs, ones where wages and working conditions are better than those in traditional agriculture or services. Labor market rigidities have been identified as one constraint in the Indian context, but access to credit and markets may be even more important. Labor law reforms have always met with resistance, partly from concerns about worker protections in areas such as occupational safety and arbitrary dismissal, but also to defend economic rents. The Modi government passed a new labor code in 2020, simplifying and streamlining labor laws, but it has still to be implemented, although some states have already pursued more flexibility in this area.

The financial aspect of business operations has seen some progress. Bank balance sheets have improved in the last few years, as resolution of NPAs has slowly progressed. However, there is

little progress in improving the institutional quality of public-sector banks, although there has been some consolidation. Arguments for privatization of most public-sector banks, to improve efficiency in the sector, have not made any headway in policy circles.[21] Considerable global funding for start-ups has become available, from venture capital and private equity firms, as regulations have been liberalized and India's prospects in some sectors are viewed very favorably. Private equity capital has roughly quadrupled in the last decade, with an annual investment volume of about US$40 billion. As a result, the number of high-value start-ups has increased dramatically. On the other hand, the total number of firms listed on the stock exchange has not increased appreciably, although the number of investor accounts has gone up by a factor of five, along with an increase in market capitalization.[22] Since late 2021, retail investors can also invest directly in government securities, through a new online portal.

The most severe financing constraints have been felt by smaller firms. They have limited access to short-term bank credit for working capital, and they are often squeezed by delayed payments when they supply larger firms or the government. Although the GST system still disadvantages small firms because of such delayed payments, in the case of trade receivables, an electronic platform for discounted trading of such receivables, introduced in 2018, is finally taking off, with volumes doubling in 2023. Although this still accounts for only about 10 percent of trade receivables, network effects may lead to more accelerated adoption.

The most significant change in government policy to support industry has been a new program of subsidies for targeted sectors, called the Production-Linked Incentive (PLI) scheme. The scheme was introduced in 2020, and fourteen sectors are covered. A few of these sectors are narrow (e.g., drones and drone components, advanced chemistry cell batteries), but most of them are quite broad (e.g., automobiles and automotive components, white goods, food products). The sectors span a range of technologies and labor intensities. Subsidies are for investments designed to reward growth and scaling up of firms. Even so-called formal-sector firms in India are small by international standards and lack economies of scale. Although such initiatives do not address the problem of the large number of informal-sector firms with low productivities, they do include smaller firms. The scheme appears to be having an impact, being credited for a significant increase in electronics goods exports, a decrease in telecom-sector imports, and new domestic manufacturing of a number of active pharmaceutical ingredients. Overall, the PLI scheme is credited with stimulating increased foreign direct investment (FDI) in several manufacturing sectors.[23]

The relative importance of services in India's economic growth has continued and even increased in recent years. Services are very heterogeneous in terms of labor intensity and productivity, but those based on high levels of human capital seem to be particularly significant for growth. In addition to domestic information technology firms, centers set up by multinational firms have become increasingly common, as an alternative to outsourcing. Such centers can include customer service, operations management, internal corporate services, consulting, and research and development (R&D), and are not restricted to software services: for example, some of these centers specialize in semiconductor design. These centers are credited with a sharp increase in the share of services exports in GDP. The COVID pandemic accelerated the creation of these centers, when remote work became more common and more sophisticated in nature.[24] Importantly, these high-end services exports are also credited with providing India with stability in its balance of payments.

At the other end of the economic spectrum, the government has been less successful with agricultural reforms, although it has made some

efforts to provide income support and risk reduction for farmers with various schemes. Much of Indian agriculture is dominated by a national food procurement system, which has provided food security through subsidized food grains. This infrastructure was especially important during the COVID pandemic, when emergency food supplies could be distributed. However, the guarantee of purchases of wheat and rice at minimum support prices (MSPs) has led to procurement beyond storage capabilities and distribution needs and to diminishing returns in production, distortions in cropping decisions and input prices, and environmental degradation. A 2020 attempt at agricultural reform focused on liberalizing agricultural output markets and land markets, with the aim of encouraging corporate investment in agriculture. In theory, such measures could give farmers more choice and higher incomes, but there were concerns about unequal bargaining power in these markets and shifting of risks to farmers. Some of these concerns were related to the detailed design of the reforms and the nature of the political process used, rather than to the principle of reform. After massive protests, the new laws were withdrawn in 2021, putting agricultural reform back to square one. An independent effort, announced in 2024, is a program to buy unlimited maize and pulses at MSPs from farmers who switch from wheat and rice. If this works, it could begin to correct some major distortions in Indian agriculture.[25]

The relatively slow growth of manufacturing, especially labor-intensive, formal-sector manufacturing, has limited rural-urban migration. India therefore still has a high proportion of its population in rural areas. The proportion of the population that is urban has increased by less than two percentage points every five years. This threshold was crossed in 2015–20, but the COVID pandemic reversed that process. More recently, the urbanization rate has picked up again. It is argued that the "gig economy" is now creating over seven million jobs in smaller cities and providing entry-level

and part-time options for students and first-time job seekers.[26] Even with slow urbanization, India's cities and towns have struggled to keep up with the development of infrastructure. One reason is that city governments are underfunded and have relatively little autonomy. State governments typically do not have enough funds to transfer, and the central government has been stepping in. One "urban renewal mission" ran from 2005 to 2014 and was replaced by a Smart Cities mission in 2015, which is also nearing its end. A formal evaluation emphasized that lack of local organizational capacity hindered the design and implementation of many projects. It noted that more projects to improve core infrastructure weaknesses, including waste, water, and traffic, should have been planned.[27] One significant change from the past has been a program for construction of low-cost and subsidized housing in urban as well as rural areas, which is reported to have built over thirty million dwellings in the last decade.[28]

Two of the major changes that resulted from the balance of payments crisis of 1991 were significant reductions in trade barriers and abandonment of a fixed exchange rate. Exchange rate policy since then has been what might be termed a "managed float," and this has continued in various forms over the past three decades, with a gradual depreciation of the rupee over time. Although prohibitive tariffs and quotas were removed, India's import tariff barriers have remained relatively high, and some firms find that their input costs are high as a result. On the other hand, sometimes consumer goods are imported very cheaply, especially from China. Although India has a diversified basket of merchandise exports, it has not been globally competitive in large-scale, labor-intensive manufacturing. The outcome has been regular merchandise trade deficits.

The export-GDP ratio did increase steadily until the financial crisis (see fig. 3.3), but then that growth stalled and even reversed. COVID disruptions made matters worse, but recently, there has been

FIGURE 3.3   Ratio of exports to GDP
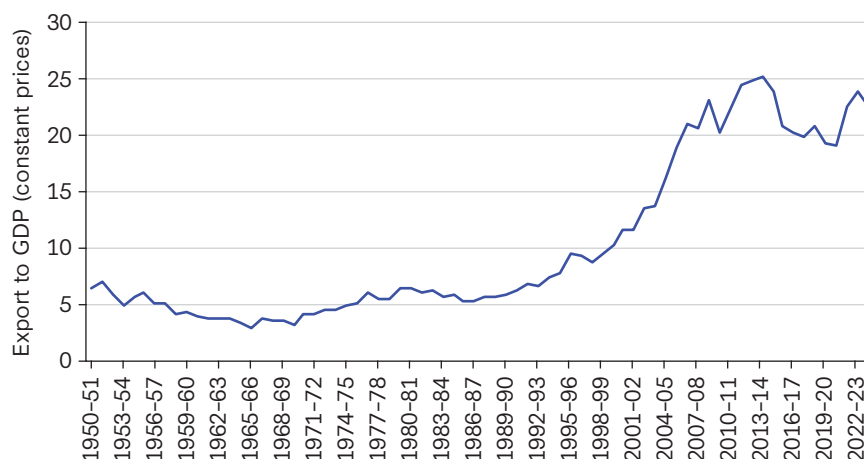
Source: Author calculations based on data from the National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India

a resumption of export growth, possibly because of more favorable conditions within India, though global factors may also play a role. As noted earlier, services exports based on the digital/knowledge economy have been particularly strong. Overall, India's current account balance has rarely been a source of concern, and strong foreign capital inflows, both portfolio flows and direct investment, have resulted in one of the strongest external positions in the history of India's economy since Independence. India has been slow to enter into trade agreements that would increase its access to some markets, fearing that new imports would threaten its attempt to build domestic manufacturing. This issue is discussed in the next section.

PROSPECTS

The Indian government's chief economic advisor (CEA) emphasizes four economy-related challenges for the country going forward.[29] Paraphrasing his articulation, these challenges are

1. Uncertainty and change in the organization of global production, and opportunities for international trade,

2. A possible trade-off between energy security and economic growth, versus making a transition to a greener economy,

3. The impacts of artificial intelligence (AI) on the demand for labor, displacing labor in some cases, creating new types of demand in others, and

4. Ensuring a healthy, educated, and appropriately skilled population.

The list of challenges is immediately followed by examples of how India has overcome other challenges, such as the COVID pandemic, and a description of the economy's resilience. Resilience is attributed to macroeconomic stability, financial recovery, consumer confidence, and various types of public expenditure, including investments in infrastructure and in people. There is no reason to think that these positive characteristics will not continue to hold for India's economy.

With respect to the possibilities for international trade, the CEA's report is cautious, giving lower growth rates for global trade and geopolitical uncertainties. On the other hand, there are several

other developments that might be a basis for optimism. One is the lower cost of internal logistics, which has started to be apparent and is driven by investments in transport infrastructure and by the simplification of indirect taxes through the GST. Another is the likelihood of further acceleration in the growth of services exports, as multinationals make India a major Global Capability Center (GCC) hub. Indeed, the GCC concept offers some suggestions for integrating Indian manufacturing into global and regional production networks. A third positive factor is the scope for new production networks, especially when multinationals want to avoid overcommitting to a single source country. Therefore, dealing with this first challenge will likely require a combination of domestic and external policy decisions, including general tariff policies and trade agreements, as well as more robust versions of special economic zones.[30]

With respect to the second challenge, that of implementing a green transition without sacrificing economic growth or energy security, although the complexity of the transition is indeed significant, there are several areas that can lead the way. India is already building solar power generation capacity quite rapidly and has brought down the cost of solar power to be cost competitive with coal. The National Electricity Policy of 2023 included a decision to postpone new coal power plants and invest that money in storage technology to make renewable sources more efficient.[31] There is an opportunity to make solar panels domestically, and rapid scaling up can reduce costs—China dominates the global market, but future demand will be many times greater than current Chinese production. India has been slow to make the switch to electric vehicles and to invest in the associated transport and charging infrastructure, and that is another opportunity to compete in new global production networks. Designing and building new electric power grids also represents an opportunity where India can move quickly. There are issues of transition costs for coal-producing localities and of securing

access to the materials that will be the basis of this green economy, such as lithium and rare earth elements, but these are not any more difficult than other kinds of adjustments to industrialization. Arguably, therefore, if Indian policy continues to move decisively in the direction of a green economy, its ultimate transition costs will be lower. In this case, being a late mover can be an advantage, since there is less need to replace legacy technologies and infrastructure.

The third challenge, that of AI and employment, represents a different situation. Many manufacturing and service jobs will be immune to AI, because they require physical activity. AI may play a greater role in identifying where there are problems in a building's electrical or water systems, or in a power grid, but physical repairs will typically still be required. In other cases, such as knowledge services, for example interpreting medical X-rays, AI may indeed replace human beings. But one can conjecture that the GCCs that use Indian talent to handle many kinds of services will adapt, and this talent will provide complementary services rather than be replaced in any substantial way. In some ways, the issue of AI and employment misses the real challenge that the Indian economy faces. As noted earlier, not enough jobs that offer reasonable income and the opportunity to be productive—good jobs—are being created. This is a basic problem of underdevelopment, and three decades of economic reform have not solved it.

One view is that efforts at skilling, along with technological change that creates new services jobs in the "gig economy," are making inroads into the employment challenge. A rising female labor force participation ratio (FLFPR), particularly in rural areas, is argued to be a consequence of new job opportunities for men and skilling programs for men and women.[32] However, the situation may be more complicated, since the FLFPR is returning to levels of two decades ago but with recent changes in measurement. Furthermore, it is not clear that the rural jobs being taken by women, whether

agricultural or nonagricultural, are good jobs in any sense: they remain low-productivity jobs outside the formal or organized sector of the economy.[33]

Even if one takes the increase in FLFPR at face value, it does not represent a major increase in employment numbers. The Indian labor force is almost 600 million people. Even though unemployment rates are low, they provide little information about the actual number of good jobs. There are only about 17 million jobs in organized manufacturing. The GCCs employ fewer than 2 million people. Hence, the scale of the challenge that India faces is an order of magnitude greater than any of the areas for optimism and two orders of magnitude greater than the challenge of AI. Only a rapid, massive push to increase large-scale manufacturing of products will begin to make a dent in the jobs challenge, and much of this production will have to be for export to richer countries.[34] In that sense, tackling the first two challenges will be the key to addressing the true employment challenge in India.

The final challenge listed in the CEA's review of the Indian economy is also the core issue for the country's development. Health indicators in India have continued to improve, though balanced nutrition escapes many children and adults. Access to sanitation remains far from universal. The quality of education and access to education are far short of what propelled China's growth. India is currently rethinking the goals of its education system, moving away from rote learning, but it is known to still be hampered by poor incentives and inadequate training of teachers. There is a case for optimism, if recent policies and initiatives increase their impact, but the evidence is not conclusive.[35] In particular, it is not clear whether national skilling efforts are producing workers who are employable. The task is enormous—over 70 percent of the workforce has not received any kind of skilling or vocational training. To some extent, training and skilling also takes place on the job, and employers are often best placed to know what skills are required. Even in the case

of software development, Indian firms developed their own training programs after hiring, as well as used software industry certifications. Skilling and training may be one area where greater industry involvement is needed, rather than new government-run programs. Even in science and technology, it is not clear that India is making sufficient educational investments or investing adequately in research institutions, where on-the-job learning continues and fosters innovation.[36] As yet, much of the policymaking in these areas is aspirational rather than at the level of having significant tangible impacts.

The joint challenges of employment and education also suggest yet another challenge for India's economic trajectory, that of inequality. There are several aspects of inequality that have been increasing over time, and collectively they constitute a distinct problem for the economy's prospects. Most obviously, wealth and income inequality among households have increased, plausibly as a consequence of unequal access to education, skill acquisition, and job opportunities. One manifestation of this inequality is an extreme concentration of wealth at the top of the distribution.[37] A second related manifestation of inequality is increased industrial concentration. After the 1991 reforms, concentration initially went down, then slowly crept up, but resumed its decline until 2015, when another reversal took place. This recent trend has been particularly centered on the five largest Indian conglomerates and may portend a less dynamic economy going forward.[38] A third aspect of increasing inequality is the regional dimension. Regional inequality, typically measured at the level of India's states, has been increasing since the 1990s, and there is no sign that this trend will change.[39] States that got a head start after liberalization have tended to pull away further, becoming preferred sites for further investment in GCCs or other higher-productivity economic activity.[40] In different ways, all these aspects of increasing inequality also present political challenges that can have negative feedbacks to economic growth.

CONCLUSION

India's economy has been growing at an average of 6 or 7 percent a year for over two decades. This has resulted in significant improvements in the standard of living for many of its residents. These growth rates have been achieved through periods of global crisis, which India has weathered quite well, also maintaining macroeconomic stability during those times. However, India's growth has been quite unevenly distributed, and economic inequality has been growing. Governments in India pay a great deal of attention to welfare and social protection programs, and these provide safety nets, but improvements in human development indicators have not been spectacular and poverty reduction has been somewhat slow. At one stage, during the global boom of the early 2000s, the growth rate approached double digits, and savings and investment rates reached new highs, almost comparable to those of the East Asian miracle economies.

The economy has been growing strongly after the recovery from the disruptions of the pandemic, although disparities in who benefits from growth may have increased. The country's biggest challenge has been the failure to increase the number of good jobs quickly enough. Good jobs are created when high-productivity, labor-intensive economic activities expand. Indian economic policies have not pursued that objective aggressively enough. Doing so would require greater openness to inflows of goods, capital, and ideas, more attention to serving global markets, and more domestic competition. The process also requires control of rent-seeking or corruption, so that the economic gains from growth are not captured by a few or dissipated unproductively.

Taking a different perspective than the CEA's review of the Indian economy, changes in global production networks, the need to make the economy green, and technological changes such as AI are all opportunities as much as they are challenges. The real challenges are implementing policies to quickly achieve large increases in the quality and quantity of education and in the creation and expansion of all kinds of new businesses. Savings and investment rates have not recovered to previous boom levels and are not enough at the present to make double-digit growth rates possible. Slowing population growth adds a percentage point to per capita growth rates, but the current demographic dividend risks being wasted. Nevertheless, economic growth rates that would once have been thought of as unrealistic are now a realistic floor if economic policies can be strategically conceived and implemented effectively.

NOTES

1. In particular, see Vivek Chibber, *Locked in Place: State Building and Late Industrialization in India* (Princeton University Press, 2003).

2. This telescoping of a long stretch of post-Independence Indian economic progress is in the interest of brevity and glosses over many intermediate differences in economic policy. For example, as University of Maryland sociologist and demographer Sonalde Desai reminded me, Indira Gandhi's initial period of leadership saw increased emphasis on government control and action, and, at least in stated intention, more focus on poverty reduction and economic equality. Two opposite perspectives on the early post-Independence period are provided by Baldev Raj Nayar, *The Modernization Imperative and Indian Planning* (Vikas Publications, 1972) and Jagdish N. Bhagwati and Padma Desai, *India: Planning for Industrialization* (Oxford University Press, 1970).

3. India also managed relatively low inflation rates, preventing the kind of tax on the poor that has been characteristic of Latin American economies, several of which have experienced hyperinflation.

4. Barry Bosworth, Susan M. Collins, and Arvind Virmani, "Sources of Growth in the Indian Economy," in *India Policy Forum 2006–07*, ed. Suman Bery, Barry Bosworth, and Arvind Panagariya (Sage Publications, 2007); Barry Bosworth and Susan M. Collins, "Accounting for Growth: Comparing China and India," *Journal of Economic Perspectives* 22, no. 1 (2017).

5. Ricardo Hausmann, Jason Hwang, and Dani Rodrik, "What You Export Matters," *Journal of Economic Growth* 12 (2007): 1–25.

6. Kalpana Kochhar, Utsav Kumar, Raghuram Rajan, Arvind Subramanian, and Ioannis Tokatlidis, "India's Pattern of Development: What Happened, What Follows?" *Journal of Monetary Economics* 53, no. 5 (2006): 981–1019.

7. Rakesh Mohan, "The Growth Record of the Indian Economy, 1950–2008: A Story of Sustained Savings and Investment," Stanford Center for International Development, Working Paper No. 365 (2008), table 1. Private equipment investment has been specifically identified as the key driver of growth in India: Kunal Sen, "Why Did the Elephant Start to Trot? India's Growth Acceleration Re-examined," *Economic and Political Weekly* (2007): 37–47.

8. In addition to Kochhar et al., "India's Pattern of Development," an analysis of the patterns and causes of slow employment growth in the first decade of reform can be found in Ashok Kotwal, Bharat Ramaswami, and Wilima Wadhwa, "Economic Liberalization and Indian Economic Growth: What's the Evidence?" *Journal of Economic Literature* 49, no. 4 (2011): 1152–99.

9. Nirvikar Singh, "Services-Led Industrialization in India: Assessment and Lessons," in *Industrial Development for the 21st Century: Sustainable Development Perspectives*, ed. David O'Connor (UN-DESA, 2006), 235–91.

10. The success of India's IT and ITES industries owes something to the post-Independence strategy of focusing on modernization and higher education. But telecommunications growth was stifled by being viewed as a luxury. Software development was not subject to the most restrictive industrial policy controls and flew under the radar, as described in Narayana Murthy, "The Impact of Economic Reforms on Industry in India: A Case Study of the Software Industry," in *India's Emerging Economy: Performance and Prospects in the 1990s and Beyond*, ed. Kaushik Basu (MIT Press, 2004), 217–22. Arguably, the software sector in India has had important spillovers. The success of the software development sector involved building direct relationships with business customers, and development of management expertise. Both these factors led to spillovers that generated the ITES sector in India, and thereafter contributed to successful new manufacturing efforts in areas such as automotive components and to IT-based development in financial services.

11. See, for example, Balakrushna Padhi, D. Tripati Rao, and T. Triveni, "Discerning the Long-Term Pace and Patterns of Employment in India," *Indian Journal of Labour Economics* (2023): 1–30. This trend began to reverse after 2017–18, but the COVID pandemic disrupted that reversal.

12. Chibber, *Locked in Place*. The "pro-business" label, contrasted with "pro-market," is due to Atul Kohli, "Politics of Economic Growth in India, 1980–2005, Part I: The 1980s," *Economic and Political Weekly* 41, no. 13 (2006): 1251–59.

13. Early examples are Dean Spears and Sneha Lamba, "Effects of Early-Life Exposure to Rural Sanitation on Childhood Cognitive Skills: Evidence from India's Total Sanitation Campaign" (2011), https://scholar.google.com/citations?user=NQo9onkAAAAJ&hl=en&oi=sra; and Diane Coffey, Angus Deaton, Jean Drèze, Dean Spears, and Alessandro Tarozzi, "Stunting among Children: Facts and Implications," *Economic and Political Weekly* 48, no. 34 (2013): 68–70.

14. Recommendations are made every five years by a Finance Commission, appointed for that purpose. The commission determines the share of the states in general government revenue, which supplements their own source revenues, as well as the division of the states' share among the states.

15. Gabriel Chodorow-Reich, Gita Gopinath, Prachi Mishra, and Abhinav Narayanan, "Cash and the Economy: Evidence from India's Demonetization," *Quarterly Journal of Economics* 135, no. 1 (2020): 57–103.

16. One among many analyses is that of Arvind Subramanian, who was chief economic advisor to the Ministry of Finance during this period. See Arvind Subramanian, "Validating India's GDP Growth Estimates," CID Working Paper Series Number 357 (July 2019).

17. This term is an extension of "Permit/License Raj," coined by Chakravarti Rajagopalachari, in an article in the pro-market magazine, *Swarajya*, which was established in 1956. Rajagopalachari was unhappy with the industrial licensing policy introduced in 1955 and formed a new pro-market political party in 1959.

18. See, for example, Šumit Ganguly and Dinsha Mistree, eds., *The COVID-19 Crisis in South Asia: Coping with the Pandemic* (Routledge, 2022), and Nirvikar Singh, "Federal Dimensions of India's Response to the Covid Pandemic: Challenging the Idea of the 'Flailing State,'" *Indian Public Policy Review* 4 no. 1 (2023): 27–48.

19. V. Anantha Nageswaran and the Office of the Chief Economic Advisor, *The Indian Economy: A Review*, Office of the Chief Economic Advisor, Department of Economic Affairs, Ministry of Finance, Government of India (January 2024).

20. It can be difficult to determine this number reliably, since individuals may have multiple phones and phone lines, but penetration has probably increased by a factor of 5 or 6 in the last decade.

21. A detailed case for privatization is made in Poonam Gupta and Arvind Panagariya, "Privatization of Public Sector Banks in India: Why, How and How Far?" *India Policy Forum*, 19 (2022), 55–105. The corporate bond market has grown rapidly in this decade, providing some alternative to bank financing for larger firms, so one can avoid the organizational weaknesses in the banking sector: Nageswaran et al., *The Indian Economy*, 36. In addition, the largest firms are being required to raise a minimum proportion of their debt from the bond market.

22. The capitalization of the Indian stock market has tripled in the last decade, which is somewhat greater than the increase in US stock market indexes over the same period. It is likely that there is some churn in the set of listed companies, since it is reported that over a thousand companies had IPOs in the last decade. Nageswaran et al., *The Indian Economy*, 35. Smaller companies have had a separate platform for stock exchange listing since 2012.

23. See EAC International Consulting, "Product Linked Incentives (PLI) of India: Reviewing the Impact," https://eac-consulting.de/production-linked-incentives-pli-of-india-reviewing-the-impact/. Although a large amount has been allocated in total, annual allocations are still relatively small, so the true impact may take some time to be accurately measurable.

24. These centers are called Global Capability Centers (GCCs), although the term does not come with a formal definition. India has over 1,600 GCCs, which is about 30 percent of the worldwide total. Employment in India's GCCs is estimated at 1.66 million. See Nageswaran et al., *The Indian Economy*, 31, and the references therein.

25. Growing rice is particularly water-intensive, and it is environmentally ill-suited for many of its current locations. Procuring pulses makes sense from the perspective of nutritional needs of poorer Indians. The impacts of increasing maize production, which is envisaged as an input for ethanol production, are less clear.

26. Nageswaran et al., *The Indian Economy*, 49, and the references therein.

27. PRS Legislative Research, "Standing Committee Report Summary: Smart Cities Mission—An Evaluation," Institute for Policy Research Studies, New Delhi.

28. Nageswaran et al., *The Indian Economy*, 44.

29. Nageswaran et al., 9.

30. In the Indian implementation of that idea, these zones have been relatively small and still somewhat constrained in their activities and resources.

31. More speculative technological solutions, such as green hydrogen and plant-level capture, are already part of India's green transition portfolio.

32. Nageswaran et al., *The Indian Economy*, 50–52.

33. Cledwyn Fernandez and Havishaye Puri, "A Statistical Portrait of the Indian Female Labor Force," ADBI Policy Brief, 2023-17; and Ashwini Deshpande, "Illusory or Real? Unpacking the Recent Increase in Women's Labour Force Participation in India," Centre for Economic Data and Analysis, Ashoka University.

34. These arguments are developed in Kunal Sen and Nirvikar Singh, eds., "Introduction to e-Symposium: The Good Jobs Challenge in India," *Ideas for India*, September 12, 2022, https://www.ideasforindia.in/topics /productivity-innovation/introduction-to-e-symposium -the-good-jobs-challenge-in-india1.html. As Sen and Singh note, "The ostensible reason for the violence was to do with the results of a Railways Recruitment Board exam, where 12.5 million persons applied for 35,000 jobs. The deeper reason for the frustrations expressed in street protests was the dearth of good jobs, in both the public and the private sectors, for India's increasingly educated youth." The scarcity of good jobs repeatedly manifests itself in excess competition and occasional violence: see, for example, Kunal Mangal, "The Indian Labour Market through the Lens of Public Sector Recruitment," Centre for Sustainable Employment, Azim Premji University (2023); Sumit Ganguly, "Has India's Military Recruitment Plan Backfired?" *Foreign Policy* (June 28, 2022), https://foreignpolicy.com/2022/06/28/india-agnipath-protests -military-recruitment-plan-modi/. The slow pace of pulling workers out of the informal sector, more so than the rate of shifting of workers out of agriculture, is identified as a key factor in slow employment growth by Amit Basole, "Structural Transformation and Employment Generation in India: Past Performance and the Way Forward," *Indian Journal of Labour Economics* 65, no. 2 (2022): 295–320. This is also connected to the slow pace of structural transformation of the Indian economy.

35. Nageswaran et al., *The Indian Economy*, 50–52.

36. Tarun Khanna, "Science-Based Entrepreneurship in India: A Policy Glass (As Yet) Quarter-Full," *India Policy Forum* 19 (2022): 1–44.

37. These increases and the concentration at the top are documented comprehensively in a couple of recent studies: Maitreesh Ghatak, Ramya Raghavan, and Linchuan Xu, "Trends in Economic Inequality in India," *The India Forum* (2022), https://www.theindiaforum.in/economy /trends-economic-inequality-india; and Nitin Kumar Bharti, Lucas Chancel, Thomas Piketty, and Anmol Somanchi, "Income and Wealth Inequality in India, 1922–2023: The Rise of the Billionaire Raj," Working Paper No. 2024/09, World Inequality Lab, Paris.

38. See Viral V. Acharya, "India at 75: Replete with Contradictions, Brimming with Opportunities, Saddled with Challenges," Brookings Papers on Economic Activity (Spring 2023), 185–288.

39. See, for example, Biswa Swarup Misra, Saban Nazlioglu, and Ilhan Kucukkaplan, "Sources of Divergence in Income in Indian States, 2001–2015," *Development Policy Review* 40, no. 4 (2022): e12594; and Biswa Swarup Misra, *Development and Economic Growth in India: Drivers for Indian States* (Routledge, 2022).

40. Renjith Ramachandran, Subash Sasidharan, and Nadia Doytch, "Foreign Direct Investment and Industrial Agglomeration: Evidence from India," *Economic Systems* 44, no. 4 (2020): 100777.

4. A Focused and Dynamic Foreign Policy for India

Chris Ogden

In the last decades, India's foreign policy has come to rest at the very fulcrum of the country's wider modernization and development goals across all spheres. As a means by which New Delhi can enhance its economic, military, diplomatic, and—now arguably cultural—strength, success in global affairs has the potential to augment its domestic affairs. Particularly since the gradual embrace of economic liberalization began in the early 1990s, and certainly across the last decade of governance under the Bharatiya Janata Party (BJP), such sources of strength have all significantly expanded in scale and scope. Underscoring this progression has been a belief since the foundation of India in 1947 that the country was destined to be a major force in global affairs. As its first prime minister, and the architect of its foreign policy inclinations, Jawaharlal Nehru noted that "a free India, with her vast resources, can be a great service to the world and to humanity. India will always make a difference to the world; fate has marked us for big things." This belief has persisted across all leaders to this very day.[1]

Negative experiences of colonialism under the British Raj had debased India's regional and international significance over many centuries, while undercutting its prior status as a great power. From this basis, India's leaders after 1947 had a foreign policy approach based on positive neutralism and *purna swaraj* (complete independence) from great-power politics. During the Cold War, Indian diplomacy encompassed complementary policies of nonalignment, self-reliance, *ahimsa* (nonviolence), and nuclear disarmament. Furthermore, India's global conduct was based on the idealistic internationalism of a Nehruvian world order that strove for peace, harmony, cooperation, and development, whereby all countries were treated equally regardless of status or position. Other core characteristics included equilibrating balances within an Indian society that was multicultural and multiethnic in nature—namely, tolerance, equality, and general detachment.

Colonial legacies (especially the violence of Partition that led to the formation of Muslim-dominated Pakistan and secular India) played into these logics by instilling an inherent distrust of outside forces. The colonial period also gave birth to a range of border issues, mainly with Pakistan and China, which would persist for the next seventy-five years and beyond. These would also test principles of nonviolence with India engaging in wars with Pakistan (1947–48, 1965, and 1971) and China (1962). Such a Nehruvian approach to security represented a "strategy of balance

of power for a militarily weak but large and self-confident nation in a bipolar world."[2]

As the Cold War ended in the early 1990s, India was forced to reassess the conduct of its foreign policy. Although Nehruvianism had enabled New Delhi's regional preeminence in South Asia and had given it a well-recognized international voice (via the Non-Aligned Movement [NAM] created in 1961), its socialist and inward-looking economic policy had nearly bankrupted the country. The resultant balance of payments crisis of 1991 made India's leaders appreciate the advantages of economic liberalization in terms of status acquisition, providing a strategy to engage with the international system's great powers. Such understandings recognized the realities of a post–Cold War world, which had depleted Indo-USSR links, increasingly made the NAM irrelevant, and demanded new foreign policy dimensions—especially if great-power status was to be achieved. A stronger economy also meant more resources to protect India's borders and was a way to attract—and, to a degree, bind—other countries to New Delhi in a win-win dynamic.

The post–Cold War period further saw the advent of the Hindu nationalist BJP, as India's domestic politics shifted away from the control of Nehru's Indian National Congress (INC). In 1998, a BJP-led coalition gained power, breaking decades of INC rule. With a stress on regaining India's glorious (Hindu) past, the BJP sought to reverse the apparent inability of India to fruitfully assert itself regionally and globally. The party revitalized calls for India to recover its rightful place in the world and "a role in world affairs commensurate with its size and capability."[3] This assertion included a strategic tilt toward the United States (US), enhancing ties with all the great powers, broadening India's security horizons out across all parts of Asia, embracing economic liberalization, and taking an overt pro–nuclear weapons stance (via the 1998 nuclear tests). For the BJP, these changes indicated how India should now be led

only by its own—not other—great-power interests. More pragmatism, assertiveness, and proactive engagement underpinned these policies, producing a "structural shift in New Delhi's worldview."[4] These fundamental recalibrations persisted when the BJP left office in 2004 and were generally retained by two successive INC-led governments until 2014.

THE IMPACT OF THE BJP AND NARENDRA MODI

Since the BJP's election victory of 2014 under the leadership of Prime Minister Narendra Modi, the conduct of Indian foreign policy became more focused and dynamic. Although still concerned with achieving the same set of "key goals, including the national economic transformation, ensuring national security, sovereignty, and territorial integrity," and addressing "our key regional and global concerns," the overriding style of Indian diplomacy changed.[5] Self-confident, shrewdly assertive, and more calculated in its delivery, India's leaders and diplomats now sought "a paradigm of confident engagement with simultaneous pursuit of different interests with various partners while maintaining a cohesive unity in our overall strategic vision."[6] In many ways, this emphasis is more sophisticated and determined than that of previous Indian governments.

The language used in the annual reports of the Ministry of External Affairs (MEA) from 2014 onward reflects this change. As such, they successively speak of "a more pro-active and pragmatic approach," "renewed energy, vigour, and planning in India's engagement with the rest of the world," and the need for "active diplomacy . . . creating new directions for the growth and expansion of India's foreign policy."[7] As the years progress, they also note the desire for an "outcome-orientated foreign policy" that has "strategic autonomy at its core," and the "purposeful pursuit of national interest."[8] The pursuit of national interests through "non-interference, flexibility, (and) pragmatism" is

also of importance, as is having a wide "policy of neutral approach, focusing on development."[9]

There is also a continuation of a phenomenon first emphasized by the BJP during the 1998–2004 National Democratic Alliance government of foreign policy becoming critical to electoral politics.[10] Thus, the MEA annual reports speak of an "increased emphasis placed by government in establishing close linkages between our foreign policy and our domestic developmental aspirations, . . . to create the most propitious climate for domestic growth."[11] India's ongoing privileging of its great-power diplomacy above all other relations is pivotal here, whereby through "the continued engagement with the major powers of the world, . . . India leverage(s) all these important relationships to increase the flow of trade, investment, and technologies into the Indian economy."[12] Such goals buttress the current government's Make in India, Skill India, Digital India, and Startup India programs, all of which are geared to fulfill the BJP's commitment "to build [developed India] by 2047" and to establish "a futuristic, prosperous, inclusive and developed society."[13]

These narratives are underpinned by a self-awareness concerning India and its place in the world. Recognizing India's position as a rising, would-be great power and as a major actor in the Asian twenty-first century, reports note how "the continuing geo-political shift towards Asia imparted new momentum and positive trajectory to our partnerships."[14] The rise of China and the West's activist diplomacy to try to bring New Delhi into an anti-Beijing axis have also added weight—and opportunities for India—to this shift. As part of this change, India is seen to be occupying "a new role in the world, as a confident, articulate, rising power, willing to claim its place on the global high table and able to discharge its responsibilities."[15] This new positioning further includes "India's emerging role as 'force for the good' in contributing global solutions to global problems."[16] Such a realization embraces a mutual recognition of how "the world

visibly acknowledge[s] India's potential to act as a leading power, under a determined and decisive leadership with a regional and global vision."[17]

A central part of these discourses is the BJP's ongoing desire "to fundamentally reboot and reorient . . . foreign policy goals, content and process."[18] The key factor within such an aim has been not only to instill a difference in style, tone, and approach but also the fundamental Hindu edge that the BJP is doggedly injecting into Indian politics. Prime Minister Modi's status as a senior member of the Rashtriya Swayamsevak Sangh (RSS), a hard-line Hindu nationalist organization that propagates a Hindu-dominated worldview, underpins this assertion.[19] The BJP is the RSS's political wing, and RSS is the BJP's umbilical cord to more severe ideological leanings.[20]

Modi's widespread image as a powerful, strong, and messianic orator further plays to Hindu nationalist ideals of a resurgent India.[21] He has also been central to the BJP's electoral success since 2014. Talismanic, if divisive in some quarters, he maintained exceptionally high approval ratings in his two periods in office up until 2024. These ratings did not drop below 64 percent and peaked at 93.5 percent.[22] In August 2023, 79 percent had a favorable view of Modi, including 55 percent who had a *very* favorable view.[23] This popularity has been instrumental in the BJP's electoral majorities in 2014 (282 seats and 31 percent of the total vote) and in 2019 (303 seats and 37 percent of the total vote).[24] Even though the BJP did not gain a majority in the 2024 elections and won only 240 seats, it still maintained its voter base at 37 percent.[25] Such results have, to a degree, defied the incumbency effect, whereby most leaders in Indian elections lose voters after gaining power. Such success was thought to be nearly impossible for a Hindu-dominated party to achieve in an ethnically diverse and political complex country such as India.

As a result of his electoral success, Modi has come to completely dominate the BJP as a political

brand, both domestically and internationally. A pro-capitalist, pro-market embrace, backed up by large donations from big business, is also a vital pillar of this political succor.[26] Moreover, this synergy between the foreign and domestic spheres—in terms of policy overlap and his leadership—firmly locates Modi at the fulcrum of India's contemporary fortunes. Reflective of this dominance, the BJP's *2024 Election Manifesto* had the title *Modi Ki Guarantee*, which could be found another seventy-five times throughout the document. In this way, Modi has come to equal not only the BJP's success but the general international standing of India itself.

Especially in the BJP's first term in office from 2014, Modi cast himself as a prominent global leader striding across the world from summit to summit.[27] He also centralized all foreign policy decision making in the Prime Minister's Office. Such pro-active diplomacy made sure that Modi—and by extension India and Indian interests—became a highly prominent and well-established part of the strategic calculi of all other states.[28] It also helped define him as a world leader whose longevity and gravitas now arguably put him in the same bracket as a generation of ruling figures such as Xi Jinping and Vladimir Putin. Moreover, observers note how Modi "wants to be seen as the biggest and most popular globally accepted political leader from India ever. He wants to have iconic status globally."[29] Winning the 2024 elections have also put him on a par with India's founding father—and global statesman—Jawaharlal Nehru with three victories. If Modi were to win again in 2029, he would be India's most successful election winner and would become India's longest-serving prime minister. Such success would only heighten his global presence and personal prestige.

Reflective of the BJP's foundations and linkages, the MEA annual reports now frequently assert that "India's foreign policy has civilizational roots and heritage and is based on the principled pursuit of our national interests."[30] As such, the reports note "the growing impact of India's civilizational values

on international cooperation, underpinned by the enduring conceptual framework of Vasudhaiva Kutumbakam" (the world is one family), as well as "traditions of peaceful co-existence, pluralism and peace."[31] Since 2014, the MEA has had "a dual objective of propagation and promotion of Hindi abroad and the implementation of its use in day-to-day official work."[32] The Indian Council of World Affairs and the Indian Council for Cultural Relations are also used as organizations to promote Hindi as an international language.

This use of Hindi has been more prominent than under previous non-BJP governments, and since 2014 there has been a consistent emphasis on major development mantras, such as *sabka saath, sabka vikas, sabka vishwa, sabka prayaas* (together, for everyone's growth, with everyone's trust, with everyone's effort).[33] It is also highly notable that the term "India" is largely absent from the BJP's *2024 Election Manifesto*, with a clear preference for "Bharat," which is the Hindi designation for India. Although both Bharat and India are in the Indian Constitution, this is a newer emphasis and is the more open assertion that the use of "India" is now an unwanted colonial name.[34] Its greater usage also mirrors the replacement of colonial-era city names across the country. Bharat further speaks to BJP national self-conceptions of a state whose borders, interests, and strategic footprint are larger than those of modern India, which thus informs major BJP foreign policies like the "extended strategic neighbourhood," Act East, and Think West. These conceptions also link to BJP aims to build a Hindu Rashtra (Hindu country) and historical notions of Akhand Bharat (undivided India) when Indian territory extended into Afghanistan, Central Asia, Persia, and the Indian Ocean.[35]

MAJOR CONTOURS OF CONTEMPORARY FOREIGN POLICY

Indicative of the pragmatic core running through India's strategic outlook, a high degree of strategic

flexibility is central to New Delhi's contemporary foreign policy. Although always evident through Cold War policies such as nonalignment, the general tilt toward the Soviet Union during the Cold War, and the post-1998 strategic convergence with the US, in recent years has become a highly noticeable trait within Indian diplomacy. The defining moment—at least from the perspective of the international community—was in the aftermath of Russia's 2022 invasion of Ukraine. New Delhi's refusal to condemn Moscow's military action challenged Western strategic expectations that India was a natural part of a pro-democracy bloc. Instead, India has consistently shown itself to be an astute chameleon on the world stage that is able to nurture positive relations with a range of states that are frequently in (very direct) competition with each other.[36]

This positioning underscores how New Delhi does not wish to be compelled by long-lasting alliances but instead pursues multiple cooperative partnerships *simultaneously*, even if they are counterintuitive in terms of strategic alignment. Fundamentally, this approach allows India to maintain a path of maximum strategic flexibility and autonomy in global affairs. New Delhi can use this elasticity to actively position itself as a diplomatic bridge between the West and its major antagonists, be they Russia, China, Iran, or others, which is of increasing strategic value as India's multilateral engagement expands. It is also so deeply embedded within India's historical experience to now become a core foreign policy prerogative. As Modi noted in his 2020 Independence Day speech, "India faced centuries of foreign rule. All efforts were made to destroy our nation, our culture, our traditions, but they underestimated our self-belief and determination."[37]

Within this context, the BJP's foreign policy proclivities rest on the "5S approach of *Samman*, *Samvad*, *Sahyog*, *Shanti* and *Samriddhi* (respect, dialogue, cooperation, peace and prosperity)," which in earlier versions also had references to

suraksha (regional/global security) and *sanskriti evam sabhyata* (cultural/civilizational links).[38] Central to the BJP's policy approach are a predominant focus on three core dimensions: self-reliance, great-power diplomacy, and multilateralism. Each area straddles the foreign and domestic spheres, and they thus effectively feed and build off each other. Overarching all these dimensions and spheres has also been the BJP's active reference to Hindutva (Hinduness) as an ideological, political, and synergistic touchstone for the crafting of contemporary Indian—or even proto-*Bharatiya*—strategic thought and foreign policy.

ENSURING SELF-RELIANCE

Ever since Independence in 1947, India has pursued its quest for influence and status in international relations by preserving and enhancing its autonomy and self-sufficiency. Under the BJP, Modi has recast this fundamental strategic aim, calling it Atmanirbhar Bharat Abhiyaan (self-reliant India mission). This understanding centers on the five pillars of "economy, infrastructure, technology-driven system, vibrant demography and demand" and is designed to avoid any over-reliance on external actors.[39] Predominantly economic in focus, it seeks to help establish India as a center for global manufacturing that is not wholly dependent on external supply chains. It places a greater emphasis on attracting ever-higher amounts of foreign direct investment (FDI) and signing more bilateral free trade agreements (FTAs), in order to make India a major exporter rather than an importer. The vision also translates into a wider sense of enhanced strategic autonomy, particularly by modernizing India's military power base.

In the last decade, India has become one of the international system's largest economic powers. In 2022, it had the world's fourth-largest economy in terms of GDP purchasing power parity, which was worth US$11.9 trillion, behind the US ($25.4 trillion), the European Union

(EU) ($25.6 trillion), and China ($30.3 trillion).[40] Significantly from 2014 to 2022, India's economic size expanded at an overall faster rate than both the US and the EU, growing by 77.5 percent versus 44.9 percent and 55.9 percent, respectively, and was only just behind China's economy, which increased by 77 percent during the same period. Moreover, at 7.2 percent, India's annual GDP growth in 2022 outstripped all these entities (the EU, 3.4 percent; the US, 1.9 percent; and China, 3 percent) and virtually all other major economies.[41] In these regards, India's position as a top-tier economic power is indisputable in global affairs and appears to be on a trajectory to even be the largest economy by 2050. India's now world-leading (and very young) population of over 1.43 billion will be a valuable resource in this regard, although high youth unemployment due to the insufficient creation of jobs has recently been a major domestic issue.[42]

The Indian government's launching of the Make in India plan to encourage manufacturing and create jobs, as well as the Digital India drive to expand digital infrastructure and access to technology, have aided economic success. Underpinned by Modi's personal diplomacy, the relative maturing and slowdown of the Chinese economy, and India's large middle-class population of some 450 million people, India has become a major destination for FDI. From 2014 to 2022, FDI into India rose by 108 percent from $24 billion to $49.9 billion.[43] In turn, in 2022 India was the world's tenth-largest exporter (from fifteenth in 2014) and the world's seventh-largest importer (from thirteenth in 2014).[44] Together these factors enhance New Delhi's overall increasing self-reliance and self-sufficiency in economic terms. They also indicate an increasing interdependence and interreliance between the international system and India, augmenting its strategic necessity in the calculi of other global actors.

Further underlining these greater levels of interconnection, India has signed a series of FTAs with other countries during the Modi premiership. From 2014, these have included agreements with Thailand, Australia, and New Zealand, a related Comprehensive Economic Partner Agreement with the United Arab Emirates (UAE), and the ongoing upgrading of all its major trade partnerships. To the year ending February 2024, India's ten largest trading partners in descending order were the US, the UAE, the Netherlands, China, Saudi Arabia, Bangladesh, Singapore, the United Kingdom (UK), Saudi Arabia, and Germany.[45] Moreover, as India's economy continues to grow it is accounting for greater levels of energy consumption. In 2022, India's economy was the world's third-largest oil consumer and the world's third-largest energy consumer (including electricity, transport, and heating).[46] In 2023, India's biggest oil imports came from Russia, Iraq, Saudi Arabia, and the UAE.[47] Given India's economic trajectory, such energy needs will only increase as it modernizes, thus creating more interdependencies. That stated, India has also seen dramatic investment in renewable energy, with its solar capacity increasing elevenfold from 2016 to 2023, which in the longer term will aid New Delhi's energy security self-reliance.[48]

The translatability of economic power means that it can be converted into other resources that can further enhance India's autonomy in its foreign policy. This conversion is most evident concerning military spending, which can be used to enhance the ability to protect India's borders and vital trade routes but also to project prestige and national modernization. In this regard, India spent $83.64 billion in 2023, which ranked third behind the US ($916.01 billion) and China ($296.44 billion).[49] In turn, in 2023, India spent 2.44 percent of its GDP on its military versus 3.36 percent by the US and 1.67 percent by China.[50] A key element of this military spending is India's being the world's largest arms importer from 1950 to 2023, spending $134.47 billion, or 6.5 percent of the global total.[51] Such figures point to a persistent need for new weaponry that we can expect to endure in

the future and that also creates further synergies with major arms exporters. The major military suppliers to India in 2023 were, in descending order, Israel, Russia, France, Spain, Germany, Italy, and the US.[52] India is seeking to increase the "indigenisation of defence production" as part of Atmanirbhar Bharat Abhiyaan but with limited results, and it cannot be considered a major arms exporter.

Where India has enhanced its military capabilities is through continued and expanding military exercises with a range of countries, which is increasing interoperability and knowledge-sharing (including about counterterrorism and border security). According to various MEA annual reports since 2014, at the very least, India has conducted military exercises with Mongolia, China, Singapore, the Maldives, Russia, Vietnam, the Seychelles, France, Nepal, the US, Uzbekistan, Kazakhstan, Sri Lanka, BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation, which includes Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand), IBSAMAR (India, Brazil, and South Africa Maritime), SCO (Shanghai Cooperation Organisation, which includes China, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, and Uzbekistan), and Malabar (India, Japan, Australia, and the US). India has also assisted with military training in Uzbekistan, ASEAN (Association of Southeast Asian Nations), Tanzania, Uganda, Kenya, Sri Lanka, Mozambique, Myanmar, Bangladesh, and South Korea. Further ties are apparent with Australia, Brazil, Belarus, Brunei, Kyrgyzstan, Oman, and Fiji. Other regular dialogues and exchanges increase such ties, which strengthen India's overall self-sufficiency. All such linkages have significantly widened the scope of India's military engagement over the last decade under the BJP.

Having enhanced military capabilities has also had a practical application for India since 2014. This usage has included deploying surgical strikes in Pakistan in September 2016 and February 2019 and in Myanmar in June 2015, all of which targeted militants. Indian military personnel also participated in the June–August 2017 Doklam standoff with China, as well as the deadly skirmishes with China across their shared border in the latter half of 2020. Via Operation Ganga, Indian Armed Forces also evacuated twenty-five thousand of its nationals from Ukraine in 2022 after Russia's invasion. More broadly, developing better naval capabilities has improved the protection of vital energy and trade security routes in the Indian Ocean Region (IOR) and boosted India's much vaunted dominance of that region. Modi's policy of SAGAR (Security and Growth for All in the Region), articulated in 2015, continues to guide India's policy for the Indo-Pacific, as does India's Vision for the Indo-Pacific that desires "a free, open, inclusive and rules-based Indo-Pacific."[53] Both also inform India's participation in the Quadrilateral Security Dialogue (known as the Quad) together with the US, Japan, and Australia, which is designed to contain China.

Taking these economic and military developments together, they are providing ever-expanding foundations for the broadening of India's global strategic footprint. Not only increasing New Delhi's international influence and relevance making, they also make India more attractive to potential strategic partners. As such, having more economic and military power is emboldening India's Neighbourhood First Policy in South Asia, as well as bolstering its "extended strategic neighbourhood" policy via the enhanced Look East Policy, with its new Act East dimension.[54] More widely, India is diplomatically active in regions hitherto largely untouched before 2014. These include regions in Latin America, the Caribbean, and the Pacific (the first Forum for India–Pacific Islands Cooperation met in 2014), as well as ongoing India-Africa Forum Summits. The MEA established a new Division for the Indo-Pacific in April 2019 and continued to enlarge the size and mandate of its Policy Planning & Research Division. Via the

Vaccine Maitri (vaccine friendship) initiative, which supplied more than 110 million vaccine doses to ninety-seven countries, India also boosted its global soft power credentials, thus stressing its desired "position as a responsible and reliable stakeholder."[55]

GREAT-POWER DIPLOMACY

Reflective of the cross-generation desires of all India's leaders, the aspiration to be a great power in global politics is the lynchpin of Indian foreign policy.[56] Boosted by the BJP's proactive policy plans, Modi's global diplomatic presence, and New Delhi's ever-increasing economic and military clout, such an aspiration is becoming a reality in international affairs. Apart from seeing the global system as innately hierarchical, with India looking to position itself in the very top tier of international actors, there is now also a deep-seated strategic belief that positively engaging with the current, future, and nascent great powers should be the major focus for Indian diplomacy. Such an approach is not only about socialization—that is, being among the group of powers that India aspires to be part of—but is also about the relative diplomatic gains to be made from such engagement that are proportionally far higher than boosting ties with much smaller entities. India's ties with the US, Russia, China, and Japan are its most fruitful major relationships.

Great powers are also the international system's gatekeepers who can provide entry to their great-power "club" and are able to provide exceptions if it meets their strategic needs. India's 1998 nuclear tests are the prima facie case here. The US eventually allowed New Delhi to sidestep major parts of the nuclear nonproliferation architecture because Washington needed a stable strategic partner in the region, especially after the 9/11 terrorist attacks. India's democratic basis and large economic potential all aided such a calculus and have continued to gain weight in the last two decades as the US and its Western partners seek to use India to balance out against a rapidly rising China. In turn, inculcating good relations with the great powers also opens up their own sets of relations with particular partners. Thus, and again with the US example, once Washington was seen to accept India as a legitimate diplomatic actor after 1998, then so did key allies such as Japan, Israel, Australia, and others. For India, this ongoing creation and expansion of a "web of partners," via a hierarchical and omnidirectional diplomatic strategy, also pays increasing dividends in multilateral settings. In such spheres, New Delhi can now attract wide-ranging support from across a growing bank of great, middle, and small powers.

As the system's foremost power, over the last decade New Delhi has inculcated "a qualitative reinvigoration" across its relations with Washington, typified by a "shift away from nonalignment and the pursuit of strategic autonomy."[57] US president Barack Obama was the chief guest at India's Republic Day celebrations in January 2015, and since then senior Indian and US leaders have made regular visits to each other, culminating in Modi's first state visit to the US in June 2023. Underpinning relations has been burgeoning economic ties: bilateral trade rose from $141.55 in 2018 to $191.43 in 2022.[58] In 2022, the US was also the third-largest source of FDI in India and has invested "in high-quality infrastructure projects and development of economic corridors through the India Middle East Europe Economic Connectivity Corridor and the Partnership for Global Infrastructure and Investment."[59] In April 2021, the India-US Climate and Clean Energy Agenda 2030 Partnership was launched, joining a range of dialogues and exchanges concerning science and technology, space cooperation, education, culture, and health.

With shared regional security concerns, the India-US defense relationship has also been deepened. As such, in 2015 the New Framework for Defence Cooperation was formally renewed for ten years, while defense procurements from the US amounted to almost $20 billion in 2022.[60]

According to an MEA Bilateral Brief, "India has the largest number of military exercises with USA," which involve India's army, special forces, navy, air force, and tri-services, as well as a range of multilateral exercises.[61] Now regular 2+2 Ministerial Dialogues, cochaired by the minister of external affairs and the minister of defence and the US secretary of state and the secretary of defense, aid this cooperation, as do ongoing meetings of the Defence Policy Group to review all defense dialogues and mechanisms. These are now complemented by new joint working groups on counterterrorism and counternarcotics and by a cyber dialogue. Exemplifying all these linkages, the India-US relationship was elevated to a Comprehensive Global Strategic Partnership in 2020. US threat perceptions concerning an ever-more powerful, assertive, and ambitious China push Washington to actively court New Delhi to counterbalance Beijing. Reflecting this view, a senior US official noted that "it is no secret that India is one of the most sought-after players on the global stage" and that India-US ties are "the most important relationship on the planet."[62]

Despite these assertions, India's relationship with Russia continues to indicate New Delhi's preference for a pathway of maximum strategic flexibility in its diplomacy.[63] Seen as a "special and privileged strategic partner" (the highest such designation by India in this regard), Russia is "a time tested and reliable friend."[64] Annual summits between the Russian president and the Indian prime minister also heighten ties, as do the India-Russia Strategic Economic Dialogue and cooperation on nuclear energy, space, science and technology, and culture issues. Highly regular SCO, BRICS (Brazil, Russia, India, China, South Africa), RIC (Russia-India-China), and UN meetings are also of significance. Underscoring their deep relations, in 2021 the India-Russia Partnership for Peace, Progress and Prosperity Joint Statement was adopted. Russia also continues to support India's quest to be a permanent member of a reformed UN Security Council,

as well as to advocate on behalf of India's Kashmir claims.

Defense—rather than economic—cooperation is the mainstay of their relations and "has evolved from a buyer-seller framework to one involving joint research, development and production of advanced defence technologies and systems."[65] These links are aided by the ongoing India-Russia Inter-Governmental Commission on Military & Military-Technical Cooperation and, from 2021, the first-ever 2+2 Format meeting between India and Russia with the participation of foreign and defense ministers of both countries. As a result of all these linkages, which build on those formed during the Cold War, and despite Russia's pariah status in the West, New Delhi refused to abandon its long-standing strategic partner following Moscow's 2022 invasion of Ukraine. As such, it abstained in UN resolutions concerning Ukraine and also significantly increased its gas and oil exports from Russia (by 700 percent) since early 2022.[66]

Within Asia, India-China relations can also be regarded as historically close, even despite their deadly military clashes over their disputed border in 2020. Indeed, both countries want many of the same things: to be developed and modernized, to be recognized and respected as returning and influential great powers in international affairs, and to recast the world order as being multipolar—rather than unipolar and US dominated—in nature.[67] This strategic outlook has the potential to deeply bind Beijing and New Delhi together. Thus, although they have major differences, concerning, say, ever-closer China-Pakistan ties and the Belt and Road Initiative on one side versus concerns on the other about a growing India-US strategic convergence and the Quad, this common long-term view of global order is of significance.[68]

The complexity of India-China relations is shown through the "more than thirty dialogue mechanisms in place at various levels, across bilateral political, economic, cultural, people-to-people

and consular matters, along with dialogues on regional and global issues."[69] Through these groupings, "both countries continue to cooperate and coordinate on important global issues such as climate change, food security and energy security, and maintain closer dialogue on important regional issues."[70] Regular high-level participation by leaders from both sides at the BRICS, the SCO, and the RIC add to this engagement, as do the ongoing Special Representatives mechanism on the India-China Boundary Question, which has continued to meet despite the 2020 clashes. Through an Expert-Level Mechanism, there are also steady exchanges on cooperation about water resources. In 2014, the two sides established a Strategic Economic Dialogue and redefined their bilateral engagement as a Closer Developmental Partnership. Over the last decade, trade between New Delhi and Beijing has risen 93 percent from $70.59 billion in 2014 to $136.20 billion in 2023.[71]

Seen to share a Special Strategic and Global Partnership from 2014, the last decade has also witnessed a "qualitative shift" and a "transformation of relations" between India and Japan.[72] Regular annual summits and regular exchanges including at the foreign minister, defense minister, and national security advisor levels are central to this shift. So too are their ongoing Strategic Dialogue, the India-Japan Act East Forum established in 2017, and the inaugural India-Japan Forum in 2021, while Japanese prime minister Shinzo Abe was Chief Guest at India's 2014 Republic Day celebrations. There are also exchanges concerning the environment, space cooperation, education, tourism, and culture. Despite relatively low bilateral trade—rising from $15.51 billion in 2014–15 to $21.96 billion in 2022–23—there have been high amounts of public and private investment and financing from Japan to India.[73] From 2022 to 2027, this will amount to $42 billion, including but not limited to the Mumbai-Ahmedabad High Speed Railway project and six Metro Rail projects.[74] Military-to-military

cooperation has also significantly deepened since 2014 to include agreements on Defence Cooperation and Exchanges (2014) and Transfer of Defence Equipment & Technology Cooperation (2015) among many others.[75] Common US ties, the Quad, a mutual fear of China, and a harmonized agreement on India's SAGAR vision for the Indo-Pacific have also reinforced the two sides' strategic partnership.

EXPANDING MULTILATERALISM

The growing confidence of its leaders mixed with having more material power is allowing India to articulate herself as a *vishwaguru* (world guru); "a 'leading power' . . . equipped with a clear vision of how international affairs ought to be organized, not merely a power that accepts the system as it is."[76] At the heart of this outlook is a desire to reorder the current international order and to build a multipolar system with New Delhi as a major pole of unquestioned influence. Relatedly, India remains "committed to seeking permanent membership in the UN Security Council to elevate Bharat's position in global decision making."[77] In unison with working with the great powers, being more prominent in multilateral settings highly amplifies its status and thus its great-power ambitions. As an emergent and relatively immature major power, there are, though, questions concerning India's actual status. However, such an apparent "status inconsistency" as to whether New Delhi is a great power or not—and which perhaps prevents, say, an all-weather alliance with the US—makes it attractive to a much wider range of potential partners. Such a positioning thus enhances India's diplomatic allure, especially in multilateral settings, and serves to amplify New Delhi's strategic flexibility and autonomy in global relations.

In the last decade, India has shown an accumulating degree of visibility, relevance, and innovation in terms of its multilateral diplomacy. From such a basis, MEA annual reports talk of "India's emergence as a global forum for deliberations

on international relations and globalization, . . . through the holding of international conferences covering the three pillars of geopolitics, geoeconomics, and geotechnology."[78] One notable early grouping was the International Solar Alliance (ISA) that was first proposed by Modi in late 2015. Focused on endorsing clean energy, sustainable environment, public transport, and climate, the alliance seeks to boost the global use of solar power over fossil fuels. It now has over 120 members, mainly bringing together so-called sunshine countries, Suryaputra (sons of the sun), between the Tropics of Cancer and Capricorn.

Apart from the first Forum for India–Pacific Islands Cooperation in 2014, as well as ongoing India-Africa Forum Summits, New Delhi has also sought to set up or advance other groupings. Thus, March 2017 saw the first Indian Ocean Rim Association (IORA) Summit, while Modi hosted the first India-Central Asia Summit in January 2022, with the participation of the presidents of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Also under Modi's initiative, the International Day of Yoga was introduced through the UN and was first celebrated on June 21, 2015, and every year since. Courtesy of its growing economic weight, India's role across all other fora also continued to increase, including at the G20 and others. India has also become more prominent within climate change negotiations, especially ongoing UN Climate Change Conferences, and at COP26 in 2021 presented a Five-Point Agenda, or Panchamrit, which committed India to achieving "net-zero" carbon emissions by 2070.[79] India also remained one of the largest troop contributors to UN peacekeeping operations.

Since 2014, New Delhi's standout—even watershed—diplomatic moment on the world stage was taking on the G20 Presidency from 2022 to 2023, culminating in the 2023 G20 New Delhi Summit. With a main element of the G20's remit relating to the construction and maintenance of global financial architectures

and governance mechanisms, the presidency enhanced India's ability to crucially influence such debates as its own economic authority increases on the global stage. With India's great-power rise centering on core goals relating to development, modernization, status, leadership, importance, prestige, and pride, assuming the G20 Presidency gained an ever-greater significance. Modi's hosting also aided India's purposeful production of "a self-confident image, a sense of destiny and restored stature, which are as important for internal audiences as they are for external ones."[80] Overarching this policy was the personality of Modi as a skilled and energetic global statesman seen to be able to broker global diplomacy.

New Delhi's increasing status was also apparent in a number of regional organizations. In June 2017, India officially became a member of the SCO. Joining at the same time as Pakistan, this was the first time the SCO had welcomed new members since 2001. A Eurasian security organization that aims to combat the regional threats of terrorism, secessionism, and extremism, the SCO is the world's largest regional organization, representing over 41 percent of the global population and around a third of its GDP. Along with core members Russia and China, its affiliates coordinate joint military operations, energy security concerns, and—most important from India's standpoint—a belief in a future pluralistic multipolar world order. New Delhi's membership furthers these strategic aims, demonstrating India's diplomatic flexibility.

Elsewhere, the beginning of 2024 saw the BRICS grouping double its number of members. Adding Argentina, Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE, this expansion signified a major new phase for what is arguably the developing world's foremost multilateral organization. It will also add greater credence to the group's demands for a more equitable and representative world, as well as indicating "wide-ranging global south support for a recalibration of the global order."[81]

Representing over two-fifths of global GDP and over a quarter of its territory, the BRICS helps to amplify India's diplomatic and economic prowess. The BRICS's New Development Bank bolsters these aims; from 2013 to 2023 the bank had lent around $33 billion to ninety-six development projects compared with some $67 billion lent by the World Bank.[82] BRICS plans to develop its own currency—potentially called the R5 or the R5+—are also important in this regard.[83] The currency would not be controlled by a single country or a nation-based central bank or limited to a specific geographic locale. As such, it would hugely reduce BRICS's trade dependence on the US dollar, euro, or yen and would reduce any economic shock waves emanating from the Global North and the West in the event of recessions or depressions.

BUILDING A HINDUTVA INDIA

The final core factor concerning contemporary Indian foreign policy is the increasing role of Hindutva as the guiding ideology of the BJP. This presence is emblematic of the gestation of a "new India" under the aegis of Modi and the BJP and of a "fresh era" for Indian foreign policy. Such an influence is wide-ranging, including using anti-Muslim sentiments to aid the "othering" of Pakistan as a danger to Hindus and by extension Bharat/India. Increasing claims of Hinduphobia or of Hindus being under threat globally amplify such prejudiced narratives. These perspectives are bolstered by internal political developments, such as the removal in 2019 of Article 370 from the Constitution that revoked the special status of Kashmir or Modi's personal dedication of the Bhavya Ram Mandir at Ayodhya in 2024, which replaced a mosque of the site. Both actions were long-standing manifesto promises, with the BJP claiming that the latter "has rejuvenated our society, . . . [leading to] a new interest in our history and heritage."[84] They also serve to directly inform such nationalist discourses of a resurgent India under the BJP.

This process is climaxing in what can be denoted as the "Hinduization of foreign policy."[85] A feeling of threat infuses these predilections, be it against an India-centric hierarchy in South Asia, the potential loss of territory vis-à-vis China, or any factor or actor that jeopardizes India's overall status and wider influence among New Delhi's great-power peer group. Threat thus acts as a clear—and highly useful—emotional criterion for Indian diplomacy under the guidance of Narendra Modi. The specter of China further drives the ever-greater focus of successive Modi governments on their Hindutva foundations, in order to express, project, and ultimately protect India's national identity.[86] Further away from the Asian context, Hindutva is feeding into a "global India brand" such as within the Indian diaspora in the US.[87] This exportation also sustains ideas of Indian exceptionalism, pointing to the BJP's reach outside India's borders, and serves to pointedly augment its overall influence and status.

The growing influence of Hindutva within India is also of significance concerning its global image. This outlook is pertinent concerning the gradual deterioration of domestic human rights that not only undercuts BJP claims of "Bharat's rich democratic traditions going back millennia as the Mother of Democracy" but also signifies an antidemocratic shift, whereby "the authoritarian impulses evident before are more pronounced today."[88] These developments are of significance concerning Indian foreign policy on universal human rights but where India lies on any democratic-autocratic spectrum in international affairs. They will hence be a major factor that affects the various strategic outlooks of other countries.

In these ways, in the last decade Prime Minister Modi has openly abused journalists as "presstitutes," "dalals" (pimps), or "bazaru" (for sale).[89] Defamation laws have also been used to silence journalists and news outlets critical of the BJP government, while scores of journalists have been

arrested, detained, or interrogated.[90] Relatedly, the Unlawful Activities (Prevention) Act of 2019 is "being used to harass, intimidate, and imprison political opponents . . . [and] silence dissent in academia."[91] Revamped laws on defamation aid this repression, and since 2014 over seven thousand people have been charged with sedition under the wide-ranging Section 124A of the Indian Penal Code of 1870.[92] Over the same period, violence and discrimination against India's 200 million Muslims have also increased. In this way, the National Register of Citizens and the Citizenship Amendment Act of 2019 excluded Muslims from the same rights of the Hindu majority. Other policies include building vast camps for undocumented Muslim migrants in Assam, regarded as "the stage just before genocide," as well as legislation to prevent marriages between Muslim men and Hindu women (to prevent so-called love jihad).[93]

For these reasons, according to *The Economist*'s 2021 Democracy Index, India was a "flawed democracy."[94] This reality poses difficulties for Western leaders keen to highlight how an authoritarian China and Russia threaten the democratic liberal international order, which ostensibly includes India. Moreover, the very real possibility of a Hindutva India becoming more entrenched became an existential issue for the BJP's electoral opponents in the 2024 elections. So great was the scale of this threat that in 2023 a formal political bloc was formed across all main opposition parties, called the Indian National Developmental Inclusive Alliance, or INDIA. In line with their fears of BJP authoritarianism, INDIA protested the suspension of 146 members of the Indian Parliament (a hundred from the Lower House and forty-six from the Upper House) in late 2023. Many members had their bank accounts frozen, limiting their 2024 election campaigns, which was denounced as the "murder of democracy."[95] In turn, Modi was accused of "trying match-fixing in this election."[96] Final results showed that INDIA was unable to fully counteract the electorate's ongoing attraction to the BJP and Modi's evident political popularity

and dominance, as well as "Modi's Guarantee that we [the BJP] will work 24 by 7 for 2047."[97]

LOOKING BEYOND THE 2024 ELECTION

Surveying the BJP's *2024 Election Manifesto*, in conjunction with the party's dominant media narratives, we can judge the core policy approaches embraced since 2014 to both continue and accelerate. In this way, we can expect Indian diplomacy to seek to augment India's national power in any way it can—and with any country or multilateral grouping—so long as it positively aids its development, modernization, and status ambitions. As part of these continuities, the *2024 Election Manifesto* notes "following the Neighbourhood First policy," "strengthening maritime vision (SAGAR)," "expanding Bharat's diplomatic network," "elevating Bharat as a global soft power," "pioneering international alliances," "bringing back Bharatiya artefacts," "protecting Bharat's Security Interests in the Indian Ocean Region," and "develop[ing] Bharat as a global manufacturing hub."[98] The strategic aims to achieve enhanced self-reliance via a focus on great-power diplomacy and global leadership will therefore be increasingly evident. We can also expect this latter dimension to become more prominent domestically, including the potential introduction of a Uniform Civil Code into the Indian Constitution that could pointedly curtail religious freedoms across India.[99]

Within its foreign policy, India is seen as a friend to the world (*vishwa bandhu bharat*).[100] Overarching Modi's outlook concerning foreign policy is a sense of India's destiny coming of age, of *Yahi Samay Hai, Sahi Samay Hai* (this is the time, the right time).[101] This perception is not only the BJP's but is claimed to be that of the international system, whereby "today, many respected voices across the globe are also saying that this is India's time. In fact, today, India is being seen

as an important player in the global efforts to create a better future."[102] India's status as major economic, military, and diplomatic actor will be used to bolster this positioning. Underpinning these viewpoints is a self-conception of the BJP having "established Bharat as a reliable, trusted and dependable voice globally . . . [and] we have demonstrated Bharat's independence of thought and action."[103] Furthermore, and as per the BJP's Hindutva foundations, there are assertions that "our civilizational values, thoughts, wisdom and traditional knowledge have found a place of pride at the world stage."[104]

From a wider perspective, India's necessity to the strategic aims of other major actors has never been more apparent. As such, and in the same way that Washington engaged with China in the 1970s to balance against the Soviet Union (which was then the US's primary competitor), enhanced ties with New Delhi are now used by the West to counterbalance the challenge posed by China. Within this compulsion, the West often discounts the new political—and authoritarian realities gripping India, as they are trumped by the higher desire of preventing Beijing from gaining global preeminence. Such inertia can be argued to be emboldening Indian foreign policy, whose intelligence services have been accused of targeting Sikh separatists in Canada, the UK, and the US. The West's China-myopia thus makes criticizing New Delhi more difficult, while allowing other transgressions—be they domestic (the BJP's attitude toward India's minorities) or regional (surgical strikes against its neighbors)—to perhaps worsen.

Overall, India's strategic necessity to the great powers of all ilks will embolden the Modi government to unashamedly pursue its foreign policy goals and New Delhi to increasingly flex its growing diplomatic muscles. Within this context, we can expect India to maintain and heighten its diplomatic flexibility and to not enter into long-standing alliances with any actors, no matter the potential benefits that such ties would bring.

While the post-2024 BJP government may see the appointment of a new foreign secretary and a new national security advisor, with potentially the same external affairs minister, the style and core fundamentals of Indian foreign policy will not change. Such an "India First" mind-set will prevail with a proactive and vocal Modi at the helm of a nascent proto–great power, which is now carving an undisputable place for itself in an emergent multipolar world order. What the last decade shows is that the BJP is firmly focused on achieving its foreign (and domestic) policy goals. Noting in an extremely rare media interview in April 2024 that "I am always in the moment . . . when I am doing something, I am 100 percent involved and engrossed in that task," Modi has been at the center of these triumphs and will remain so for a long time to come.[105]

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5. Health and Education Outcomes in India

A Half Century of Progress and Shortcomings

Andrea Malji

India has made remarkable progress in the twenty-first century as it works toward advancing its education and health outcomes. Since Indian Independence in 1947, life expectancy has more than doubled, going from less than forty years in 1947 to over seventy in 2024.[1] Fewer children are dying before their fifth birthday; women are having fewer children, and when they do, they are more likely to survive childbirth; vaccines are more widely available; and death rates from communicable diseases continue to decline. India's healthcare infrastructure and access to modern medicine have vastly expanded. Diseases that once debilitated much of the population, like polio, have all but been eradicated. The life of an Indian citizen in the twenty-first century is remarkably better than even twenty years prior.

India's literacy and education rates have also seen substantial improvements since Independence. At that time, only 12 to 18 percent of the population was literate, and it closely coincided with socioeconomic status. Since then, the state and national governments have undertaken several initiatives to expand educational access. As of the 2011 census, the literacy rate had increased to 74.04 percent, and the latest estimates indicate that the literacy rate was near 77 percent in 2023.[2] Although this is a clear improvement, India's literacy rate remains below the global average of 87 percent.[3] China, for example, had a similar literacy rate in 1947 but now has a literacy near 100 percent.[4] There are also notable gaps along lines of gender, caste, urban-rural residency, and socioeconomic status. Estimates in 2018 found that 84.7 percent of men in India are literate compared with only 70.3 percent for women.[5] A rural woman in India has a literacy rate of around 65 percent compared with an urban woman at 83 percent. These divides are also regionally concentrated. For example, more than 90 percent of women in rural areas of Kerala are literate compared with 49 percent of rural women in Bihar.[6]

Despite significant overall progress, discrepancies and inequalities remain obvious, as marginalized groups continue to have among the worst health and educational outcomes. The negative impacts of caste continue to shape access, opportunities, and outcomes especially in rural areas. The quality of life also varies significantly based on region. Residents of states like Uttar Pradesh and Bihar live shorter lives with fewer opportunities whereas citizens of states

A Chapter from The Hoover Institution's Survey of India

like Kerala have life expectancy and literacy rates similar to those of developed countries.

Critics have also raised concerns about the potentially growing influence of Hindu nationalist ideology, or "saffronization," in health and education policies. Changes in the curriculum that removed or modified historical texts and narratives about India's history, an increased focus on Sanskrit and Hindi, and the appointment of Bharatiya Janata Party (BJP) supporters to high-ranking university administrative positions are among some examples of changes that have furthered these concerns. Ultimately, saffronization of these previously neutral fields could further marginalize religious minority groups and heighten communal tension.

This chapter examines the current state of health and education in India. Focus is given to the progress that has been made since Independence and particularly in the last twenty-five years. Subsequent sections will examine new policies and priorities undertaken by the Modi government since 2014 and the success and continuing challenges facing India in these sectors.

BACKGROUND

At the turn of the twenty-first century, India sought to establish itself as a major economic and political power. Following major economic liberalization policies in the 1990s, India began experiencing rapid economic growth; GDP growth averaged between 7 and 9 percent in the early 2000s and 6 and 7 percent in the 2010s.[7] The liberalization measures introduced in 1991 aimed to open the Indian economy, reduce trade barriers, and integrate India into the global economy. As India's economy opened to global trade and investment, the government saw this as an opportunity for economic growth to drive social development. Although the primary objectives were economic in nature, such as boosting growth, attracting foreign investment, and improving

competitiveness, the government also recognized the potential social benefits of trade liberalization through job creation, access to goods and services, and technological innovation. Economic growth through expanding employment opportunities was expected to contribute to poverty alleviation and improved quality of life.

India's trade liberalization policies coincided with the United Nations Millennium Development Goals (MDGs). The MDGs were established in 2000 and highlighted eight development goals for member states to achieve by 2015. The goals aimed to address various global challenges and improve the living conditions of people around the world. India expressed strong support for the MDGs and actively participated in the global efforts to achieve these targets. The government identified areas such as education, healthcare, sanitation, and gender equality as critical for achieving the MDGs. India made significant progress in areas such as reducing poverty, improving access to education, and combating diseases like HIV/AIDS and malaria. However, it also faced obstacles such as regional disparities and gaps in healthcare and sanitation provisions.

THE STATE OF HEALTHCARE

India has made significant strides in improving public health since Independence. Infant mortality rates dropped from over 160 per 1,000 births in 1960 to 26 per 1,000 births in 2022.[8] Likewise, maternal mortality dropped from 680 per 100,000 live births in 1980 to nearly 100 per 100,000 in 2020.[9] Other important indicators also saw significant improvement. Mortality and frequency rates of communicable diseases like tuberculosis and HIV/AIDS have also been significantly reduced.[10] Smallpox was eradicated in 1977 and polio in 2014.[11] These were significant milestones that helped improve the quality and duration of life for many Indian citizens. These improvements are a result of decades of cumulative efforts to improve

FIGURE 5.1 Life expectancy
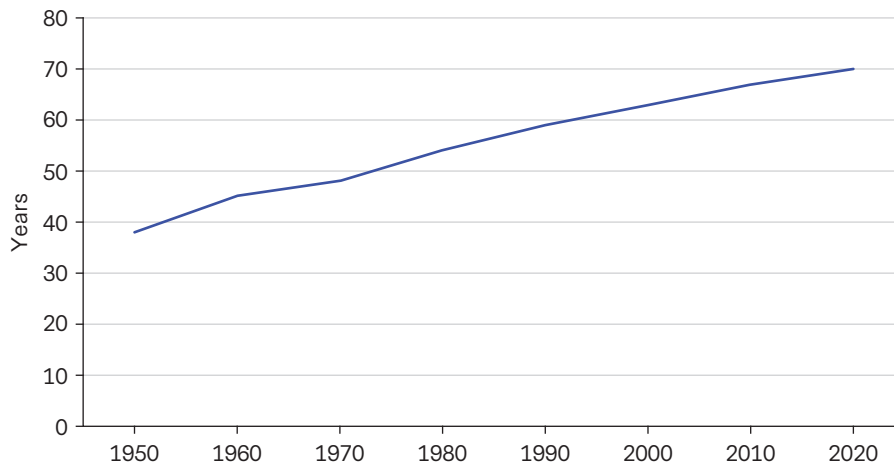
Source: World Bank's World Development Indicators

FIGURE 5.2 Infant mortality
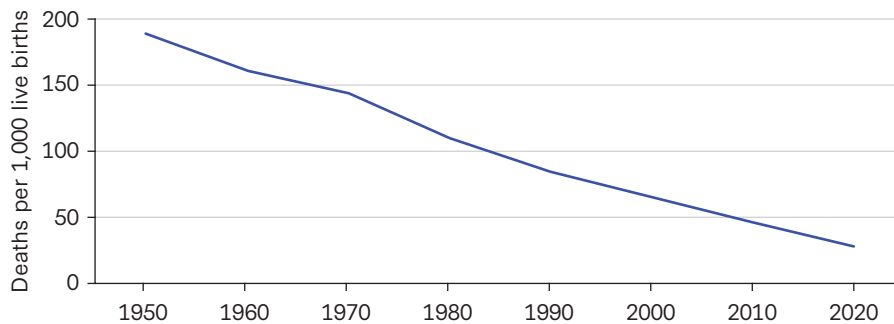
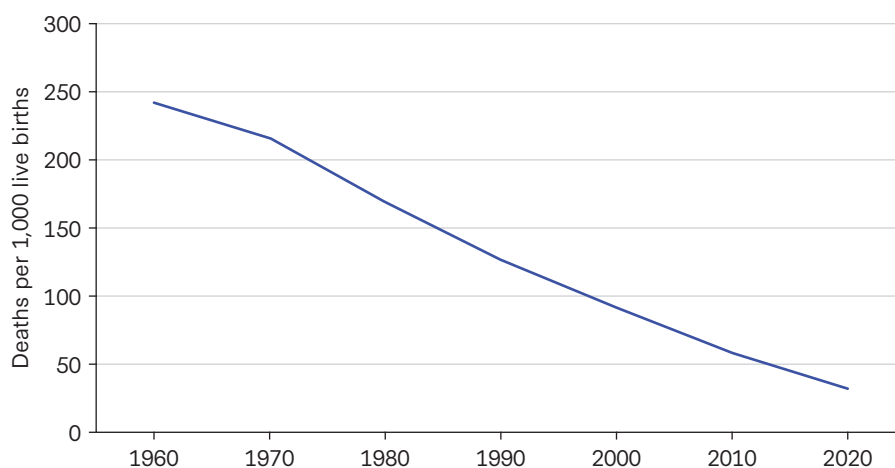**Source:** World Bank's World Development Indicators

the life expectancy of Indians, which has gone from thirty-five years in 1950 to seventy-plus years in 2024 (see fig. 5.1).[12]

Several factors are responsible for this notable increase in India's life expectancy. Not only are people living longer lives in general, fewer infants, children, and mothers are dying (see figs. 5.2, 5.3, and 5.4). Lowering infant and child mortality has been done through a multipronged approach over several decades. In the 1970s, programs like the Integrated Child Development Services (ICDS) focused on improving nutritional status for children under six by providing access to food, healthcare, and education to the mother and children.[13] Although infant and child mortality rates

were reduced, they still remained high. By 2000, the infant mortality rate in India was 66 deaths per 1,000 live births, lower but still comparatively high.[14] For example, China's infant mortality rate was 30 deaths per 1,000 and Sri Lanka's was 14.8 at the same time.[15] India still had many factors that urgently needed to be addressed to reduce infant mortality.

The government of India launched a series of programs focused on improving maternal and infant health in the twenty-first century. In 2005, the government launched two new programs, the National Rural Health Mission/National Urban Health Mission (NRHM/NUHM) and Janani Suraksha Yojana (JSY).[16] These programs focused

FIGURE 5.3 Mortality rate, children under 5

Deaths per 1,000 live births

FIGURE 5.4 Maternal mortality rate

Deaths per 100,000 live births
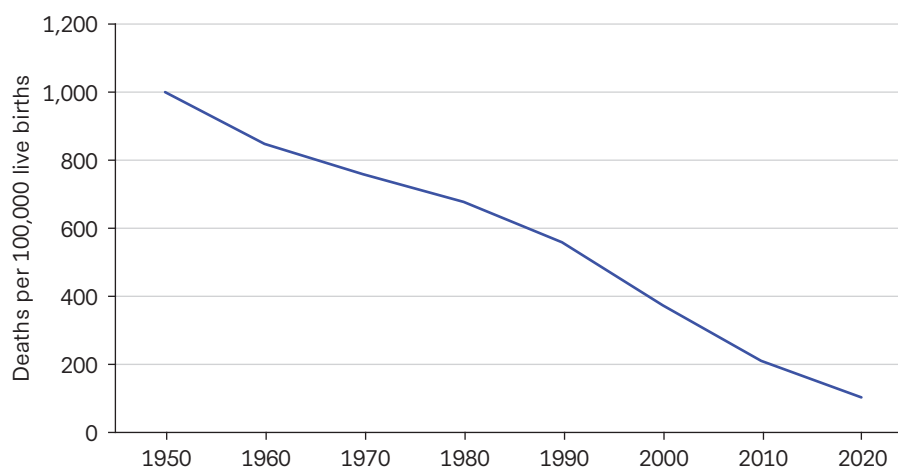
on increasing the number of attended births taking place in healthcare facilities. Such access would reduce the risk of birth-related complications that require immediate attention, such as hemorrhage, sepsis, neonatal infections, and birth asphyxia. Having access to a facility that can provide emergency C-sections can drastically improve the outcomes for both mother and baby. Following the introduction of these two programs, institutional deliveries increased by 42.6 percent, bringing specific improvement to

rural communities and those of the lower socio-economic strata.[17] The programs also helped expand access to contraception and provide breast-feeding assistance.

Both mother and baby are at increased risk of complications when births are less than eighteen months apart. Thus, access to contraception was critical to reducing the frequency of pregnancy and increasing the duration between pregnancies, improving overall health outcomes. These initiatives

helped reduce India's infant mortality to fewer than 30 per 1,000 live births in 2020 (see fig. 5.2).[18]

At the heart of addressing high maternal and infant mortality was reducing the fertility rate. A reduced fertility rate leads to better health outcomes for the mother and her children by reducing pregnancy and childbirth complications, allowing extended time for breast-feeding, reducing the amount of money and food a family needs to survive, and improving the quality of education and healthcare available to children.

India became the world's most populous country in April 2023 with 1.4 billion citizens.[19] Despite this new placement, India's fertility rate has continued to decline. At Independence, India's fertility rate was 6.0, meaning the average woman had six children in her lifetime.[20] Because such a high birthrate was unsustainable, the Indian government initiated several initiatives early on, beginning with the National Family Planning Program (NFP) in 1952.[21] The program sought to make birth control widely available to the population by free distribution of contraceptives in addition to education campaigns related to family planning. Sterilization was also promoted as a popular and permanent fix for women who no longer wished to have children.

By 2000, the fertility rate had been cut nearly in half, and the average woman was delivering 3.35 children in her lifetime.[22] Several programs expanded on the original NFP to help reduce pregnancies, including the Reproductive and Child Health (RCH) Program in 1997 and the National Population Policy in 2000, which sought to stabilize India's population by 2045 by achieving a replacement-level fertility rate (two children per woman).[23] This was addressed by promoting delayed marriage and childbearing, increasing access to contraception, and highlighting the long-term benefits of increased spacing between births.[24] These programs helped reduce the fertility rate even further; however, there was still a regional and urban/rural divide. To help address

the high birthrates in certain districts, Mission Parivar Vikas was launched in 2016. The program sought to make contraception more widely available, including insertion of IUDs during postpartum care.[25] Overall, these programs have been quite successful and have significantly contributed to the reduction in fertility rates. As of 2021, the fertility rate is at two children per woman and thus close to stabilizing population growth.[26]

CHILDHOOD VACCINES AND NUTRITION

Vaccine access expansion programs were another key factor in reducing infant and child mortality rates. The Universal Immunization Program introduced in 1985 increased vaccine coverage in children, especially for polio, but the overall vaccination rates remained low. Less than half of children were being fully immunized by 2000.[27] To be considered fully immunized, a child should receive four doses of the tuberculosis vaccine (BCG), three doses of the diphtheria, tetanus, and pertussis vaccine (DTP), three doses of the polio vaccine, and one dose of the measles vaccine by twelve months. In 1993, only 44 percent of children were fully immunized, and by 2015 that number was higher but still too low at 62 percent.[28]

To address poor vaccine coverage, in 2014 the Union Health minister introduced Mission Indradhanush, which sought to achieve 90 percent of full immunization coverage by 2022.[29] The government was specifically focused on six hundred districts with low vaccination rates. Although vaccine coverage was improving, it was not on the trajectory to meet the 2022 goal of 90 percent. Thus in 2017 the Intensified Mission Indradhanush (IMI) was introduced under the Modi government.[30] However, full vaccination coverage still fell below 90 percent, and four hundred thousand Indian children were dying yearly from vaccine-preventable diseases. The coronavirus pandemic further impacted these rates and led to a 6 percent drop in childhood vaccines in 2020.[31]

This led to the introduction of the Intensified Mission Indradhanush 4.0 in 2022.[32] A World Health Organization report found that 90 percent of children under two had received DPT3 coverage (diphtheria, tetanus, pertussis), but full vaccination coverage was lower. According to the National Family Health Survey 5 (NFHS-5) conducted in 2019–21, approximately 76 percent of children are fully immunized compared to 62 percent in 2015–16. A notable improvement but still much lower than the goal of 90 percent.[33]

However, vaccinations alone are not enough to drastically improve infant, child, and maternal health outcomes. In addition to addressing vaccination rates and attended birth, improvement in nutrition rates has been key. Much of the population suffers from poor health outcomes related to anemia, malnutrition, and undernutrition. These conditions not only stunt growth but make pregnancy, childbirth, and infancy much riskier. In 2023, the Global Hunger Index (GHI) found that India ranks 111th out of 125, with a designation of "serious" levels of hunger.[34] This is an improvement from previous designations by the GHI of "alarming" rates of hunger in 2000 and 2008; however, such a poor ranking is obviously concerning. Nearly all countries with scores worse than India's were active war zones, highlighting India's major challenges when it comes to adequate nutrition.

India has undertaken several programs to address chronic hunger and malnutrition. At the forefront of this was ensuring access to safe, nutritious, and healthy foods. The Food Safety and Standards Authority of India (FSSAI), established in 2008, was at the forefront of addressing food and nutrition safety and concerns.[35] The FSSAI was specifically focused on fortification of food staples. In 2016, the FSSAI launched the Food Fortification Resource Centre (FFRC) to promote and support food fortification initiatives across the country.[36] In 2019, the Ministry of Consumer Affairs, Food and Public Distribution collaborated with the FSSAI and scaled up efforts to distribute fortified rice

through the public delivery system, particularly targeting states with high malnutrition rates.[37] The midday meal scheme also sought to address malnutrition/undernutrition by providing hot meals during school.

In 2018, the government launched a National Nutrition Mission (NNM or POSHAN Abhiyaan) focused on improving the nutritional status of those most at risk for anemia, children under six, adolescent girls, and pregnant/lactating women.[38] The government invested 54 million Indian rupees (INR) into the scheme; however, outcomes were poorer than expected. Rates of wasting only reduced from 21 to 19.3 percent, undernutrition rates only slightly fell from 35.7 to 32.1 percent, and stunting reduced from 38.4 to 35.5 percent.[39] In 2023, it was announced that the NNM would be realigned as part of Mission Saksham Anganwadi and POSHAN 2.0. The program seeks to expand diet diversity and food fortification, increase use of millets and ultimately reduce anemia and malnutrition/undernutrition, and improve nutrition.[40]

The Pradhan Mantri Matru Vandana Yojana (PMMVY) was a program launched by the Modi government in 2017 to give cash incentives to pregnant and lactating women to improve their health status. Women in the program received 5,000 INR (~US$60) in three installments when they registered their pregnancy with a birth facility, received antenatal checkups, and registered their childbirth.[41] Likewise, the 2018 Anaemia Mukt Bharat (Anemia-Free India) program sought to address high anemia rates in children and pregnant or lactating women. Since anemic women are at higher risk of pregnancy and delivery complications, addressing anemia in pregnant women was key to achieving improved health outcomes.[42] As part of the program, the government intensified year-round iron and folic acid supplementation and anemia testing and treatment. These efforts coincided with the previously mentioned iron and vitamin fortification of staple foods like oil, milk, rice, and wheat.

FIGURE 5.5 Percentage of population with access to clean water
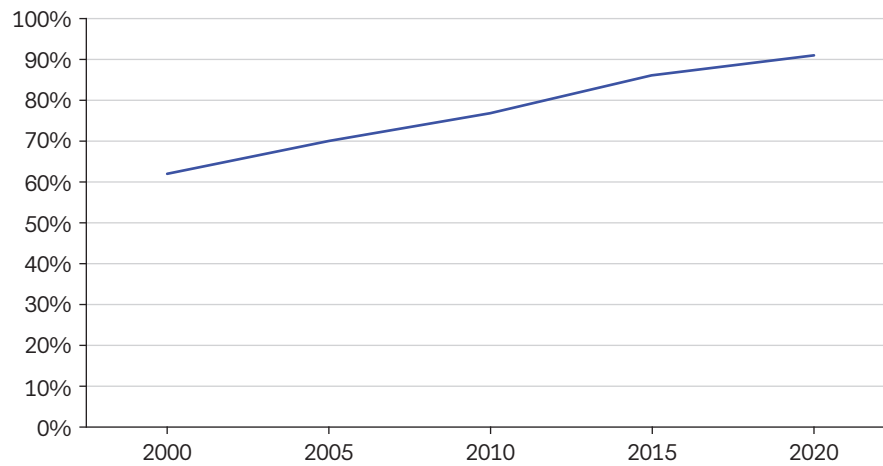
Source: UNICEF, "Drinking Water," data for India

FIGURE 5.6 Percentage of population using at least basic sanitation services
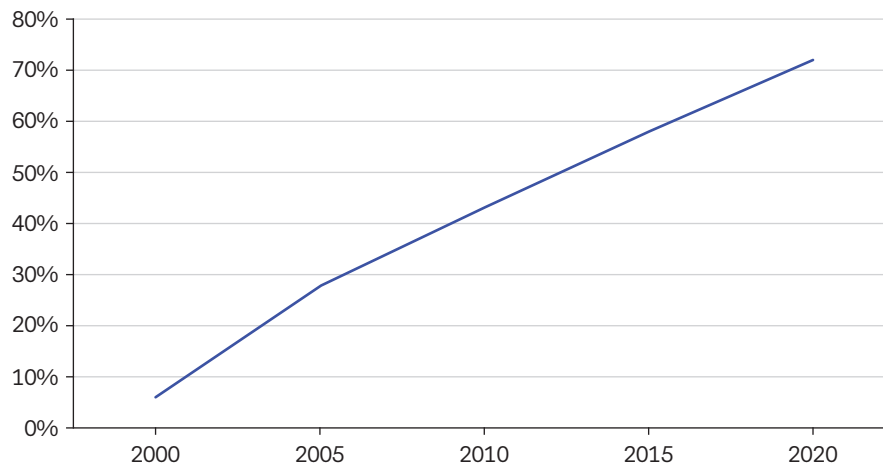
Source: UNICEF, "India: Sanitation"

SANITATION AND CLEAN WATER

Many diseases and inadequate nutrition are intricately linked to limited access to modern sanitation or clean water. There has been slow and steady improvement with the population's access to clean water (see fig. 5.5). However, certain practices such as open defecation continued to stall progress. Open defecation greatly increases the likelihood of diarrheal diseases, which are responsible for one in nine child deaths worldwide.[43] At the turn of the century, approximately 75 percent of India's population still practiced open defecation, and rates of bacterial, viral, and parasitic worms were high among the most vulnerable populations, specifically children.[44] Consequently, improving access to sanitation and reducing open defecation was a key policy initiative by the Indian government. In 1999, the government launched the Total Sanitation Campaign to improve sanitation coverage throughout the country, especially in rural areas; however, progress remained slow (see fig. 5.6).[45]

Swachh Bharat Abhiyan (Clean India Now), introduced in 2014, sought to eliminate open defecation and make India "Open Defecation Free" by 2019.[46] The key features of the program were toilet construction, eradicating manual scavenging, and public awareness campaigns around sanitation practices. Providing privacy and access to menstrual products for women was also a key concern. Phase one of Swachh Bharat Abhiyan, which focused on expanding access to toilets, was mostly successful. According to the Indian government, 98 percent of rural areas had toilet coverage by 2019, and 92 million toilets were constructed under the program initiatives.[47] However, a survey conducted by the National Statistical Office (NSO) found that only 71 percent of rural houses had access to toilets. The toilets were also often inadequate as most relied on single-pit or septic systems, many of which became unusable during floods.[48] A lack of adequate monitoring of open defecation by the health ministries meant it was difficult to obtain accurate numbers, meaning the government may have overestimated success rates.[49]

Access to toilets and improved sanitation also has broader social impacts, such as reducing the risk of sexual assaults toward women and improving school retention by keeping girls in school when they begin menstruation. Because many schools lack adequate facilities, many girls leave school upon menstruation owing to privacy and sanitation concerns.[50] Alongside expansion of access to improved sanitation, access to clean drinking water was another key factor negatively impacting India's population. Fetching water also has dramatic negative effects on women and girls; many girls may leave school, especially in rural areas, to help fetch water for their families. According to UN Women, in 80 percent of water-deprived households, women and girls are the ones responsible for collecting water.[51] Consequently, many girls in India are removed from school to help meet a family's water needs. As of 2023, 93 percent of Indians in rural areas now have access to safe and clean drinking water, a dramatic improvement from only 25 percent with access at Independence and 70 percent in 2000.[52]

HEALTHCARE INFRASTRUCTURE AND ACCESS

The World Health Organization recommends countries allocate approximately 5 percent of their GDP to health expenditure. India has never met this threshold and has struggled to provide adequate healthcare coverage for a large portion of its population. Estimates vary based on sources and classifications; however, according to the World Bank, India came near the WHO recommendation in 2000 by allocating 4 percent of overall GDP toward healthcare. However, this allotment continued to steadily decline between 2005 and 2010, going from 3.79 to 3.27 percent, respectively (see fig. 5.7). However, investments began further declining in the first years of the Modi administration. By 2018, budget allocations toward healthcare dropped to 2.86 percent, the lowest of the twenty-first century. The healthcare-spending budget increased during and amid the COVID-19 pandemic, when 3.28 percent GDP was spent on healthcare. However, a 2024 *Lancet* report asserts that India spends just 1.2 percent of GDP on healthcare, the lowest of any G20 countries.[53] In response, India claims that spending on healthcare is at an "all-time high" and "out-of-pocket expenditure has decreased."

Despite these criticisms, the government of India emphasizes its expanded access to healthcare over the past decade, specifically for underserved areas and peoples. In 2017, the government launched the Ayushman Bharat (AB) scheme, which aims to achieve Universal Health Coverage (UHC). This was done through two key initiatives. The first initiative sought to establish 150,000 Health and Wellness Centers (HWCs) across the country by transforming 150,000 subcenters, primary health centers, and urban primary health centers into AB-HWCs by the end of 2022. The

FIGURE 5.7   Healthcare spending
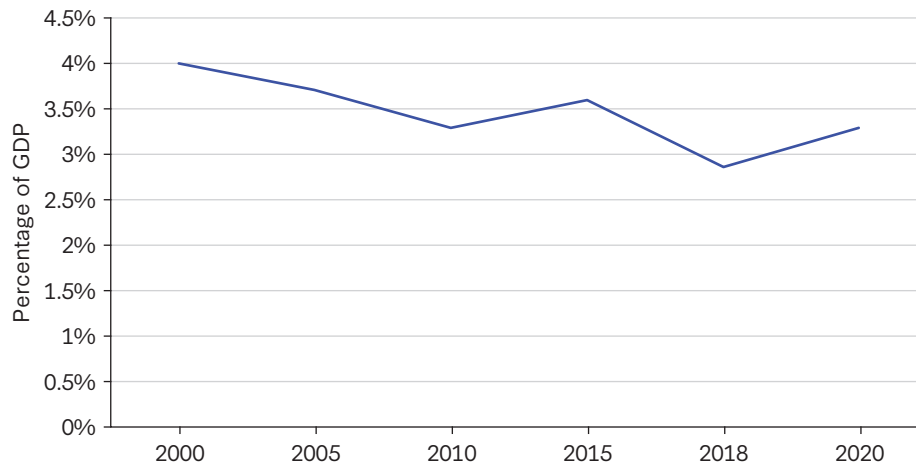
purpose of the HWC is to provide comprehensive healthcare and emergency medical services in addition to pharmaceutical access and diagnostic services. According to the government, 154,000 AB-HWCs were established by 2024. However, critics argue that this number is an overestimate and that the actual functionality and quality of services provided at these centers falls short of intended standards.[54] There are also concerns about the sustainability of the centers owing to funding challenges and lack of trained professionals.[55]

The Ayushman Bharat scheme also introduced the Pradhan Mantri Jan Arogya Yojana (PM-JAY) health insurance scheme, which provides healthcare funding to the bottom 40 percent of the Indian population, around 500 million people. The insurance covers healthcare costs of up to $6,000 per family per year and partnered with both public and private facilities to provide comprehensive care. PM-JAY has significantly expanded access to healthcare for the underprivileged; however, like the AB-HWCs, considerable challenges remain including high out-of-pocket expenses, inconsistent or poor quality of care, and low levels of awareness regarding the program's benefits and availability.[56]

The changes driven by the Ayushman Bharat scheme coincided with a rapidly changing healthcare landscape in India. Since Independence, India's healthcare system has evolved from a primarily public driven model to a mixed system with significant private-sector involvement. India's healthcare system at Independence was rudimentary to nonexistent in many places. Establishing basic primary health centers and community health centers was a top priority for the early government. The government sought to provide universal healthcare as established in the National Health Policy of 1983.[57] Around this time, private healthcare facilities also started to emerge to address the shortcomings of government health facilities and programs. The private facilities primarily catered to wealthier families who could afford the costs and sought quicker and more specialized care.

By the 2000s, the government sought to establish new hospitals, medical colleges, and health facilities throughout the country. At the same time, the government increasingly relied on public-private partnerships to achieve these goals. By the 2010s, private healthcare facilities dominated the healthcare scene in India, as 70 percent of urban households and 63 percent of rural households

relied on private facilities, especially for inpatient care. Corporate hospitals became increasingly popular during this time, and large hospital chains became increasingly dominant. Apollo Hospitals, Fortis Healthcare Ltd, and Manipal hospitals have multiple sites throughout the country and now account for the largest hospitals across India. In 2023, Apollo Hospitals had more than 73 hospitals, 5,000 pharmacies, and 1,100 diagnostic centers.[58] Their domination of the private healthcare industry in India led to a yearly revenue of US$2.20 billion.[59]

Despite increased access to healthcare facilities, both public and private, India still faces significant challenges in accessibility, quality, and infrastructure. The COVID pandemic exposed and exacerbated these vulnerabilities, overwhelming healthcare facilities and straining resources. Like most of the world, India struggled to respond and adapt to the challenges of a global pandemic.

THE IMPACT OF THE COVID PANDEMIC ON INDIA'S HEALTHCARE SYSTEM

The 2020 COVID pandemic challenged even the most resilient and developed countries and likewise proved devastating for India. India's initial response to its first case of COVID in the state of Kerala was swift. The state government quickly established isolation wards, converted hundreds of hostels, schools, and unoccupied buildings into COVID care centers, and carried out extensive contact tracing for those potentially exposed to the virus.[60] However, new cases continued to rise across the country, causing alarm and leading India to declare a nationwide lockdown on March 24, 2020.

The efforts to contain the virus and manage the health crisis came at a severe economic cost. India attempted to ease this impact through several economic relief packages with a focus on direct cash transfers, food distribution, and credit support for small businesses. The Atmanirbhar

Bharat Abhiyaan (self-reliant India) campaign was launched to boost the economy, with a focus on local manufacturing and self-sufficiency.[61] However, this program experienced catastrophic failures and could not effectively deliver aid and relief to those suffering the most.

To lessen the global and local impact of COVID, India immediately began focusing on creating an effective vaccine. Covaxin by Bharat Biotech and Covishield by the Serum Institute of India were approved for emergency use in January 2021.[62] India also focused on promoting vaccine diplomacy, known as Vaccine Maitri (vaccine friendship) by sharing its vaccine to various countries around the world.[63] The initiative sought to display India's role as a major pharmaceutical hub. However, the devastating impact of India's second wave of COVID in April 2021 put a halt to that initiative and demonstrated how India's focus on vaccine diplomacy had perhaps left many Indians still vulnerable, as much of the population was still unvaccinated.[64]

The severity of the COVID crisis in India escalated dramatically during the second wave in April and May 2021. The new wave, caused by the Delta variant, was characterized by a massive surge in cases and deaths, overwhelming the healthcare system. There were shortages of hospital beds, oxygen, and essential medicines. Critical shortages of medical oxygen led to widespread scenes of patients dying in the streets and outside hospitals due to lack of oxygen. During the peak, daily new cases exceeded four hundred thousand, and daily deaths reached over four thousand.[65] India's infrastructure was unprepared to carry out so many cremations and burials, leading to horrific images of makeshift morgues.

A study by the Brookings Institution found that India's response to COVID was poor due to low levels of testing, implementation failures in containing the spread during lockdown, and serious impacts on other health services.[66] Furthermore,

an accurate number of deaths in most states is unknown owing to the lack of formal death registrations and unreliable data, meaning the country's death toll is likely much higher than reported. Later analyses of excess deaths from civil registration data found that India's deaths were likely eight to ten times higher than reported, with an estimated range of 2.8 to 5.2 million deaths.[67]

Beyond the health and economic toll the pandemic had on India broadly, it also took a great social and humanitarian toll on the informal sector, migrant workers, and daily wage earners. The abrupt March 2020 lockdown resulted in the closure of factories, construction sites, and other businesses, leading to a sudden and massive loss of employment for migrant workers. The lockdown triggered a large-scale reverse migration, as millions of workers attempted to return to their native villages, often on foot because of the suspension of public transport.[68] Many migrant workers were stranded in cities without adequate food, shelter, or money and faced heightened health risks caused by crowded living conditions, lack of access to healthcare, and poor sanitation facilities. Many migrant workers died from exhaustion and lack of medical care during the pandemic-induced mass migration.[69] The government attempted to provide some expanded relief to migrant workers through programs such as Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY).[70] However, the implementation and reach of these measures were widely inconsistent; migrants in some states revealed that nearly no food or aid was available.[71]

Following the devastating impact of the second wave of COVID, India amplified its vaccine campaign and achieved widespread coverage, including significant coverage among high-risk groups. Seventy-five percent of all Indians received at least one dose of the COVID vaccine.[72] The vaccination rates appeared to help reduce the number of severe COVID cases, hospitalizations, and deaths. However, like most countries in the world, vaccine hesitancy remained a challenge, particularly in rural areas.[73] Despite these challenges, the intensified vaccination efforts marked a crucial step toward controlling the pandemic and mitigating its impact on India's health system and economy.

Overall, the pandemic revealed significant gaps in India's social security and healthcare system. COVID also had a detrimental effect on India's advances in health and education.[74] School closures and the shift to online learning further marginalized the most vulnerable communities, especially those with limited access to the internet. Not only did this lead to learning loss, but it also led to an increased dropout rate; girls were particularly at risk of dropping out because of increased household responsibilities and early marriages. The shift to focus healthcare on COVID also meant that non-COVID-related health services were disrupted. The delivery of regular health services, including maternal and child health, immunization programs, and treatment of chronic diseases, became secondary. School closures disrupted midday meal schemes, which are crucial for the nutrition of many economically insecure children. This disruption led to increased food insecurity among many families, especially migrant workers who no longer had employment. Although the challenges COVID brought to India are not unique, the pandemic harshly highlighted India's vulnerabilities.

SHORTCOMINGS OF INDIA'S HEALTHCARE SYSTEM

Like most developing countries, India faces significant challenges when it comes to public health. India's diversity, poverty, and large population exacerbate multiple underlying concerns. India has seen significant improvements in several key indicators, as highlighted in this chapter. However, several monumental challenges and criticisms remain. For one, there is an overreliance on private-sector healthcare to address

the shortcomings of the government-led health programs. As with everything else in India, there remains significant disparities and disadvantages based on region, urban/rural setting, and socio-economic status. States like Uttar Pradesh have a life expectancy of sixty-three years compared with seventy-three years in Goa and Kerala.[75] Some states like Karnataka, Kerala, Tamil Nadu, and Goa have more than 1 doctor per 1,000 people (the WHO recommendation) whereas other states like Jharkhand have only 1 doctor per 8,000 people.[76] The quality of care across states also varies significantly. Concerns about poor training, patient safety, corruption, and overall quality of care are widespread in the most underserved areas.

The Modi administration has attempted to address these shortcomings, but there have been several specific critiques toward these initiatives. Many families continue to struggle to get healthcare access and coverage because of bureaucratic difficulties and coverage gaps even since the introduction of the Ayushman Bharat program. This poor coverage often intersects with limited access to healthcare facilities and usually impacts the most vulnerable communities. Critics also say the PM-JAY program is overly reliant on private providers, which have higher and hidden costs that still leave patients with bills they are unable to pay.

Allopathic doctors have also expressed concern about the increased expansion and emphasis on ayurvedic medicine by the Modi government. The new ministry of AYUSH (an acronym that stands for Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy) was established in 2014. Previous governments had always integrated traditional medicine, specifically Ayurveda, into the healthcare system, such as the Department of Indian Systems of Medicine and Homeopathy established in 1995.[77] The creation of the stand-alone AYUSH ministry, however, elevated the status of natural medicine and yoga within India's healthcare system. This increased emphasis was also accompanied with nearly $500 million a year

in support from the government.[78] The government also began heavily promoting Ayurveda and ayurvedic products through its diplomatic and trade partners.

Although many were happy to see the elevation of India's traditional medicine and practices, others raised several concerns. For one, skepticism remains about the scientific rigor surrounding each of these practices and remedies, especially ayurvedic medicines.[79] There is a lack of peer-reviewed studies showing effectiveness of ayurvedic medicines in addition to doubts about the lack of regulations. One study found that 20 percent of ayurvedic products in the United States and India contain high levels of toxic metals, including lead, mercury, and arsenic.[80]

The lack of scientific rigor and regulations led to Supreme Court involvement with one ayurvedic company. In 2023, the Indian Supreme Court found the multibillion-dollar ayurvedic company Patanjali had deceived the Indian public by claiming that its products could cure multiple diseases and conditions, including COVID. The Supreme Court temporarily banned Patanjali from advertising. Although many companies have been guilty of false advertising, what makes Patanjali unique is its close connections to the BJP. Since the Ministry of AYUSH came into existence, the government has placed higher priority on ayurvedic medicines and facilities, providing new economic opportunities for those in the field. In 2017, Prime Minister Modi inaugurated Patanjali's research facility in 2017 and received nearly US$50 million in land discounts in states controlled by the BJP.[81]

The promotion of Ayurveda by the government also led to additional concerns such as potential exclusion of medical traditions not rooted in Hinduism. Moreover, there is concern that promotion of Ayurveda may come at the expense of more effective allopathic medicine.[82] Some patients may choose to forgo lifesaving medications and procedures in favor of unproven naturopathic

remedies.[83] This is especially worrisome given all the other concerns outlined in this chapter regarding poor healthcare funding and infrastructure.

The increased reliance on private-sector healthcare and the promotion of traditional medicine, such as Ayurveda, have been met with mixed reactions as India works toward healthcare expansion. Moreover, just as there are concerns about the potential saffronization of education, there are similar concerns about the healthcare system. Despite these criticisms, however, India's rapid advances in the healthcare industry are noteworthy.

As India works to improve its healthcare sector, parallel efforts are also being made to address critical issues in the education system. At the turn of the twenty-first century, nearly 40 percent of India's population was still living in poverty and many residents lived in dire circumstances.[84] Broad access to education was considered a key foundation in helping alleviate poverty and provide opportunities for growth. As a result, the government introduced several education programs in the early 2000s that aimed to expand access to quality education.

THE STATE OF EDUCATION

PRIMARY EDUCATION

Article 21A of the Indian Constitution, added by the 86th Amendment Act of 2002, enshrines the right to a free education as a fundamental right for children ages six to fourteen. To help fulfill the massive set of educational goals set forth by Article 21A, several new programs and initiatives have been established. The Sarva Shiksha Abhiyan (SSA) was one key program launched in 2002 that created a partnership among the central, state, and local governments.[85] The SSA had four key objectives, including universal access to primary education, increasing retention rates, bridging the gender and social gaps in education, and improving the quality of education.[86] The SSA sought to
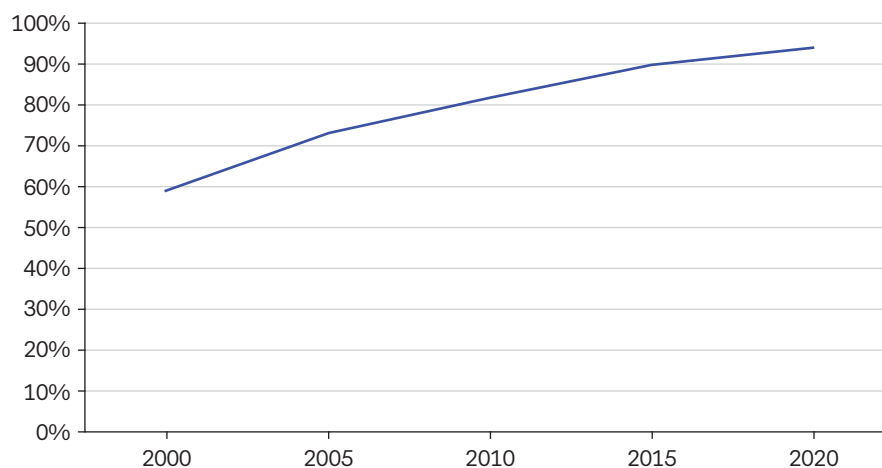
meet these goals by rapidly building new schools and updated classrooms, recruiting and incentivizing new teachers, supplying texts and classroom tools, and providing accessible options for students with disabilities. Providing these resources in underserved areas was a key priority.

To expand on the efforts of the SSA, the Indian government passed the Right of Children to Free and Compulsory Education Act in 2009, commonly known as the Right to Education (RTE) Act. The RTE focused on improving the quality of education while also increasing investments in it. The central government invested US$38.2 billion into the RTE over five years and provided 65 percent of overall funding while states contributed 35 percent.[87] In addition to a focus on broad access to education, the government sought to ensure the quality of the teachers and infrastructure. The RTE required schools to have proper lighting, ventilation, safe drinking water, functional toilets, a library, and a kitchen to prepare midday meals. Teachers were also expected to have professional training from the National Council for Teacher Education (NCTE) and not have a student-teacher ratio higher than 30:1. The act also banned any sort of physical punishment to be used on students. The RTE new requirements also extended to private schools as well and required them to reserve 25 percent of seats to children based on economic status or caste.

The RTE and the SSA, alongside additional programs, helped make significant strides in increasing access to primary education. By 2015 primary enrollment rates rose to over 90 percent (see fig. 5.8).[88] Although there were still gaps in access, there was a significant improvement among women and marginalized communities. This initiative was further motivated by India's desire to meet the second MDG of achieving universal access to primary education.

The substantial increase in primary education access signifies remarkable improvement over a period of two decades. There are still notable

FIGURE 5.8 Primary school completion rates

concerns though, particularly about the quality of the education and facilities. Many students still did not achieve age-appropriate readiness for reading and math. The Annual Status of Education Report (ASER) found that only half of students in the fifth grade could read at the second-grade level and only 28 percent of them could solve a simple division problem. Learning outcomes were the worst in Bihar, Uttar Pradesh, and Jharkhand and best in Kerala, Himachal Pradesh, and Punjab.[89]

Dropout rates were significantly reduced but remained higher than the goal of universal primary completion. About 3 percent of students drop out before completing the eighth grade and 12.6 percent before completing tenth grade, with dropout rates higher for girls.[90] Social factors such as early marriage and household responsibilities often lead to higher dropout rates among girls. Some sources have also expressed concerns that these numbers underestimate dropout rates.[91]

It also remained difficult to obtain and retain well-trained teachers, especially in underserved areas. Chronic teacher absenteeism remained a problem throughout the country. One World Bank study found that teacher absenteeism in India is around 25 percent. States like Uttar Pradesh, Bihar, and

Rajasthan had the highest rates of absenteeism in the country.[92] Reasons for teacher absenteeism vary but reflect broader socioeconomic issues such as poor working conditions, health concerns, poor infrastructure, and a lack of accountability.

SECONDARY EDUCATION

While the SSA focused on access to primary education, the Rashtriya Madhyamik Shiksha Abhiyan (RMSA) program was introduced in 2009 to help improve the quality and access to secondary education. The RMSA sought to provide universal access to secondary-level education by 2017 and universal retention by 2020.[93] Like the SSA, the RMSA also sought to improve the quality of education by recruiting and training new teachers, improving the educational infrastructure, and closing the gender, caste, and socioeconomic gaps. The RMSA took similar steps to the SSA by constructing new schools, adding libraries and sanitation facilities, providing free textbooks, and improving the quality and training of teachers.[94]

Although India did not meet its goal of universal access to secondary education by 2017, overall secondary education rates drastically improved (see fig. 5.9). The gross enrollment ratio (GER)

FIGURE 5.9 Secondary school enrollment rates by gender
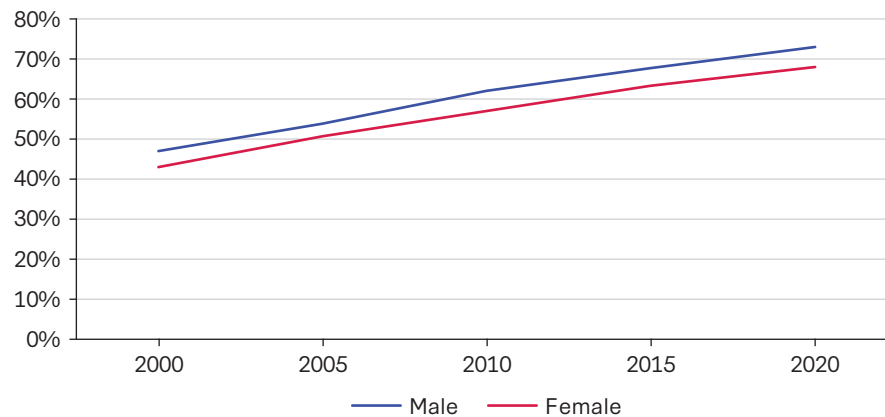
for secondary education (grades 9 and 10) went from 45 percent in 2000 to 76 percent by 2020.[95] Higher secondary education (grades 11 and 12) enrollment increased from about 28 percent in 2000 to 51 percent in 2020. Access to secondary education also dramatically improved along gender-based lines. A 2019 study even found that a slightly higher percentage of girls are enrolled in secondary education (62 percent) compared with boys (61 percent).[96] As with other indicators there remains an urban-rural gap and variation among different states. The secondary enrollment in rural areas was approximately 70 percent, compared with 85 percent in urban areas. States like Kerala, Tamil Nadu, and Himachal Pradesh had the highest state-level enrollments compared with the lowest performing states of Bihar, Uttar Pradesh, and Jharkhand.[97]

The RTE and the SSA/RMSA were accompanied by several additional programs to improve overall attendance and completion rates, such as the midday meal scheme. The midday meal scheme was originally introduced in 1995 but expanded in 2001.[98] The program required the provision of free hot lunches for children in government and government-aided schools. The midday meal scheme was an important part of conquering two key issues at once, access to education and

nutritional food. According to data from the World Bank, in 2000, nearly 45 percent of children under the age of five were underweight and around 52 percent of children had stunted growth, indicating chronic malnutrition.[99] The midday meal scheme sought to ensure that students were receiving at least one hot and nutritious meal a day since malnourishment and undernourishment have significant impacts on physical and mental development. By 2020, the rates of undernourishment and malnourishment had reduced but still remained high. According to the National Family Health Survey (NFHS-5), 35.5 percent of children under the age of five were stunted and 32.1 percent were underweight.[100]

Although the RTE and other programs made substantial progress, India was still falling short on meeting several of its educational goals, particularly in secondary and tertiary education. The Modi government, which came into power in 2014, implemented several new programs aimed at accelerating educational advancements by increasing the education budget at the federal and state levels. One of the largest suggested educational overhauls occurred in 2020 with the proposal of the National Education Policy (NEP). The proposal seeks to replace the National Policy on Education from 1986 and increase the budget

allocation toward education from 3 to 6 percent to meet several goals and transform the nature of India's education system.[101] The NEP has various foundational components focused on primary, secondary, higher education, and beyond. Since the goal of universal primary education access had mostly been achieved, the new focus is on access to early childhood care and education, which sought to expand education to children ages three to six. This included providing high-quality educational access at rural childhood care centers (known as *anganwadis*), preschools, and preprimary schools.[102] This focus coincided with the creation of the National Early Childhood Care and Education (NECCE), whose purpose is to monitor and assess educational outcomes and curriculum at the early childhood phase and help prepare children for primary school.[103]

The NEP also proposes changing the curricular structure of the education program. India traditionally follows a 10+2 system, whereby students receive ten years of general education plus two years of specialized education after year ten. The 10+2 system is being phased out to transition to a 5+3+3+4 system, which more closely resembles many Western education systems: five years of foundational school from preprimary to grades 1 and 2, three years at the preparatory stage from grades 3 to 5, three years at the middle stage from grades 6 to 8, and four years at the secondary stage from grades 9 to 12. The change in the educational structure coincides with the goal of creating a more interdisciplinary and integrated curriculum that focuses on developing both creative and analytical skills.[104]

The NEP also suggests reducing standardized testing and "exam coaching culture," stating that students were spending too much time with exam preparation instead of focusing on holistic educational development.[105] Assessment reform is supposed to shift from "summative" to "formative" and more greatly emphasize analysis, critical thinking, and conceptual clarity. There

were also key proposed changes to the board exams. Students generally take exams at the end of Class 10 and Class 12. These exams are crucial as they play a significant role in determining students' future academic and career paths. The content of the board exams was changed to focus on core capacities like analytical skills instead of memorization and expanded offerings on subjects, content, and timings to reduce the high-pressure surrounding exams. The NEP 2020 also sought to expand the curriculum to be more multidisciplinary, including more classes in the arts, sciences, sports, and vocational subjects so that students can explore and develop their interests.[106]

The NEP 2020 also made several proposed changes that received significant attention and criticism. One policy that led to criticism among many was the proposed establishment of the centralized Higher Education Commission of India (HECI).[107] The purpose of this reform is to act as a single regulatory body for higher education rather than leaving it to the state level. Many state leaders expressed concerns about excessive centralization and potential centralized bureaucratic control over educational institutions.[108] Another major criticism of NEP 2020 was the three-language formula, which emphasized teaching in the regional language instead of English, especially in the foundational years.[109] Many non-Hindi-speaking states were especially critical of this approach, which requires all Indian students to learn at least two native Indian languages and one regional language through fifth but ideally eighth grade.[110] English will be taught as a third and essential language. This policy was criticized for potentially disadvantaging students in an increasingly globalized world where English proficiency is considered a critical skill. Critics argue that this may also lead to the imposition of Hindi on non-Hindi-speaking regions, which has long been a concern in the southern part of India, whose Dravidian language families are completely different from Northern Indian languages.[111] Many

states have not yet implemented the NEP owing to regional language concerns, and there is speculation that many states will use the NEP as a bargaining chip following the BJP's failure to secure a parliamentary majority in the 2024 election.[112]

There have also been allegations about the potential saffronization of education. In addition to many of the structural changes in the education system discussed above, there have been allegations about significant changes to the content of the curriculum. Critics claim that the shift in curriculum increasingly saffronizes educational content in a variety of ways. For one, there is concern about a shift in the focus of some of the content taught to students. Several reports have highlighted how textbooks and classroom lessons increasingly emphasize Hindu culture and history, often at the expense of other religious and cultural contributions. For example, there have been reports of history textbooks diminishing, or even demonizing, the role of Mughal emperors and other non-Hindu figures in Indian history. Specific chapters related to the Mughal period and events like the assassination of Mahatma Gandhi by a Hindu nationalist have been removed from textbooks.[113] In Karnataka, chapters on social reformers like Periyar and Bhagat Singh were removed, while speeches by RSS founder K. H. Hedgewar were added.[114] Additionally, dubious claims such as ancient Indians knowing about atomic theory and plastic surgery have been included in the curriculum.[115] The inclusion of texts like the Bhagavad Gita in the curriculum of several states and the removal of content related to secular and pluralistic values are also seen as efforts to push a Hindu nationalist agenda.[116]

The increased emphasis on Sanskrit and "traditional Indian knowledge systems" is also viewed by some as part of the saffronization agenda. While proponents argue that promoting Sanskrit helps preserve India's heritage, critics see it as prioritizing Hindu cultural elements.[117] Finally, there have been numerous instances of individuals with strong RSS or BJP affiliations being appointed to key educational positions, including vice-chancellors and heads of educational bodies like the University Grants Commission (UGC) and the National Council of Educational Research and Training (NCERT).[118] This has raised concerns about appointments being based on ideological alignment rather than academic merit.

Supporters of these changes argue that they are necessary corrections to a previously distorted and Eurocentric curriculum that neglected India's indigenous cultures and histories, where Hinduism is central. They claim that emphasizing India's Hindu heritage is a way to restore national pride and cultural identity. However, critics contend that these changes point to a larger problem of an increasing saffronization in India across multiple domains.

HIGHER EDUCATION

India's higher education sector has grown tremendously in terms of the number of institutions, student enrollment, and academic diversity. At Independence, India's higher education infrastructure was limited, with approximately twenty universities and five hundred colleges.[119] However, rapid expansion began shortly after. Of key importance was the establishment of the Indian Institute of Technology (IIT) in 1951. The IITs, which would grow to multiple locations throughout India, are held in high regard for their commitment to a high-level technical education. India's colleges continued to grow in the 1970s and 1980s, which led to the expansion of universities and an increased focus on establishing regional engineering colleges. The liberalization era of the 1990s was the kick start to rapid expansion of India's higher education environment, specifically the growth of private institutions, mostly focused on engineering and management.[120]

As of 2023, India has over a thousand universities, including central universities, state universities, deemed (government-recognized) universities, and private universities.

FIGURE 5.10   Number of universities in India
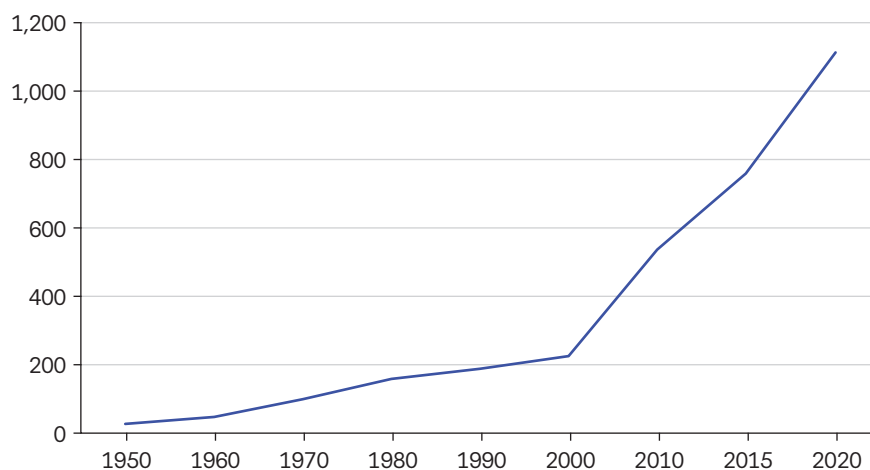
Source: All India Council for Technical Education

Additionally, there are over forty-two thousand colleges affiliated with these universities.[121] The GER in higher education has increased significantly, reaching around 27.1 percent in 2019–20, indicating that more than a quarter of the eligible population is pursuing higher education.[122] The available content of higher education has also expanded with increased programs offering social sciences and humanities. Beyond the IITs, institutions like the IIMs (Indian Institutes of Management), AIIMS (All India Institutes of Medical Sciences), and NITs (National Institutes of Technology) gained increasing recognition for their quality of education.[123]

One of the most noticeable changes in the higher education environment is the growth of private universities and colleges. As of 2024, private institutions constituted approximately 78.6 percent of all colleges in India, catering to about one-third of total college enrollment.[124] This coincides with the goals of the NEP, which emphasizes the importance of private institutions in achieving educational goals. The NEP specifically seeks to improve the quality of higher education, increase multidisciplinary learning, and increase the GER from 27 percent in 2020 to 50 percent by 2035.[125] The number of universities has grown

exponentially since 2000, with the largest growth among private institutions (see fig. 5.10).

Despite quantitative growth, challenges remain in terms of quality, faculty shortages, research output, and employability of graduates. Many states have limited access to quality programs. Many private institutions have also been criticized for poor teaching standards, weak governance, and inadequate infrastructure. The uneven quality has prompted regulatory bodies like the All India Council for Technical Education (AICTE) to impose moratoriums on new engineering colleges owing to low attendance and quality concerns.[126] The NEP hopes to address this by consolidating smaller institutions and ensuring a minimum enrollment to improve resource utilization and education quality.[127] However, implementation and oversight has remained challenging.

RESERVATIONS IN HIGHER EDUCATION

The reservations system in India's higher education has been enshrined in the Constitution since 1950 and is aimed at addressing social inequities by reserving a specific number of college admission seats for specific groups, specifically Scheduled Castes (SC), Scheduled Tribes (ST), and Other

Backward Classes (OBC). Reservations apply to public institutions including central and state universities and government-funded higher education institutions.[128] Approximately 15 percent of seats are reserved for Scheduled Castes, 7.5 percent for Scheduled Tribes, and 27 percent for OBCs. Persons with disabilities receive another 5 percent of seats. In 2019, there were additional provisions added to reserve 10 percent of seats for "Economically Weaker Sections (EWS)," who are not SC/ST or OBC.[129]

The expansion of the EWS quota in India's reservation system represents a significant shift toward addressing economic disparities alongside traditional caste-based inequities. However, many still criticize the reservations system in higher education saying that it undermines meritocracy and reinforces caste-based divisions. The term "creamy layer" is also a widely used term to classify those more affluent and better-educated members of OBC who benefit from the policies compared with those who are more disadvantaged.[130] The introduction of the EWS quota was framed as an attempt to address this concern. However, many still express concerns about how well the reservations system addresses the issues of deep-seated inequality throughout the country.[131]

CONCLUSIONS ON EDUCATION IN INDIA

India's education sector has experienced substantial growth and transformation in recent decades. Literacy, education rates, and higher education enrollment have skyrocketed and the number of educational institutions at all levels has greatly expanded. This growth has been driven by economic liberalization and government initiatives like the RTE and SSA. Despite improvements, challenges such as high dropout rates, teacher absenteeism, and regional disparities persist. The National Education Policy aims to further overhaul the system with increased budgets, curriculum reforms, and a focus on early childhood education and digital infrastructure. However, many

elements of the education reforms face significant criticism, especially from non-BJP-led states. Many question how effective the reforms will be at transforming India's education system.

CONCLUSION

India's journey toward improving health and education outcomes since Independence is marked by significant progress and persistent challenges. Life expectancy and literacy rates have improved dramatically, but disparities based on gender, caste, and socioeconomic status persist. India has emphasized that addressing these shortcomings and coverage gaps will be a priority of the government moving forward.

India's public health landscape has seen substantial improvements since Independence, with notable advancements in eradicating diseases and increasing life expectancy. Programs targeting infant, child, and maternal health, vaccination coverage, and nutrition have contributed to these achievements. The Swachh Bharat Abhiyan campaign successfully increased access to toilets and improved sanitation across the country, particularly in rural areas. The Ayushman Bharat scheme helped expand health insurance coverage for poor families, and Mission Indradhanush achieved significant increases in childhood vaccination coverage. However, significant challenges remain, including regional disparities, poor nutritional outcomes, infrastructure gaps, and access to quality and affordable care. The COVID pandemic further underscored these challenges.

Education outcomes across all measures have also improved drastically since 2000. More children are attending school, the gender gap in educational access is lessening, and higher education has expanded rapidly. Educational reforms, including the RTE and NEP 2020, have worked on increasing access and changing curricular structures. However, some implementation issues

and allegations of ideological influence persist. Further, the increased centralization of education through the establishment of the HECI has faced criticism for potentially undermining state autonomy.

In 2021, Prime Minister Narendra Modi unveiled the vision of Viksit Bharat (Developed India), aiming for India to become a developed country by 2047. The healthcare and education reforms outlined in this chapter are key elements of this vision. Continued reforms and investments in both are essential to creating a foundation for broader economic and social development and a more equitable and sustainable future for all Indians.

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6. From Development to Innovation

Policy for Science and Technology in India

Jahnavi Phalkey

India, in 1939, was among the eight most industrial countries in the world and hosted one of the largest scientific communities outside Europe and North America.[1] It is no surprise then that a National Planning Committee (NPC) was established in 1938 by the leadership of the Indian National Congress Party (INC) following the elections under the Government of India Act (1935) to form government in provinces under British India.[2] The NPC took charge of the first concerted efforts to shape the regulation of science and engineering research and education in relation to public life in India. Earlier, at the start of the decade, Chandrashekhara Venkata Raman was awarded the Nobel Prize in Physics in 1930, and he remains, to date, the only Indian citizen to earn a Nobel Prize in the sciences. It made perfect sense for the first elected provincial government to establish a National Planning Committee because, by Independence, science had come "to assume a public importance, a social impact and a cultural resonance inconceivable at the start of the colonial era."[3]

The National Planning Committee, in its journey via the Planning Commission of India, established in 1950, was modeled on the success of the Soviet five-year plans to transform a largely agrarian economy into a modern industrial economy for economic growth and development.[4] It is

the precursor to today's National Institution for Transforming India, or Niti Aayog, established in 2014 to signal the changed perception of the Indian economy both at home and, to some extent, abroad. The two institutions firmly establish the intent behind policy for science and technology (S&T) in the country: the development, industrialization, and economic growth of India. These objectives did not go uncontested, and in the early years of independence, an interesting debate ensued between those interested in the ideas of Mohandas Gandhi and, broadly speaking, those interested in ideas fronted by the country's first prime minister, Jawaharlal Nehru.[5]

At Independence, a "Nehruvian model" began to take shape. Science- and engineering-led industrialization became central to the nation's planned economic development.[6] Nehru himself played a significant role in supporting the establishment of a number of scientific institutions and organizations. Starting already in the 1940s, independent India's first government worked closely with scientists to create state-funded research and educational institutions such as the Council of Scientific and Industrial Research (CSIR), the Tata Institute of Fundamental Research (TIFR), and the Saha Institute of Nuclear Physics (SINP), laying the groundwork for the autonomy of scientific

A Chapter from The Hoover Institution's Survey of India

research in India, many a times at a distance also from the universities. The 1950s saw the expansion of scientific agencies like the Department of Atomic Energy (DAE) and the Indian Council of Medical Research (ICMR).

A SCIENCE POLICY RESOLUTION: 1958

Nehru's regime held fast that a welfare state could succeed only through investment in science and technology. Creating jobs, alleviating poverty, and industrializing India were deeply connected to rapid expansion of education, skills, and human capital, particularly through higher education institutions. This vision culminated in the first document in science policy for India: the Scientific Policy Resolution (SPR) of 1958. The SPR, a concise two-page document, laid the foundation for integrating science into national development. Increasingly aligned with India's Five-Year Plans over time, the SPR was foundational to future science policies. It stated:

> The Government of India have decided to pursue and accomplish these aims by offering good conditions of service to scientists and according them an honored position, by associating scientists with the formulation of policies, and by taking such other measures as may be deemed necessary from time to time.[7]

In 1960, during his inaugural address to the Indian Science Congress, Nehru stated how his own interest in science had arisen from "the social consequences of science rather than the science itself."[8] The SPR highlighted the position of scientists as key advisors toward the making of public policy. Commissions and other centralized regulatory agencies of the state headed by scientists—and not by bureaucrats—were created in the early years of independence. The Atomic Energy Commission (AEC), first headed by the physicist

Homi Jehangir Bhabha, became the model for how to organize government for science and continues to do so today. The SPR could be seen as a document of aspiration that called for the cultivation of a "culture and mechanism where creative talents of citizens are recognized and opportunities are found in scientific activity, acquisition, dissemination, and discovery of new knowledge," setting the stage for the next two decades.[9] The resolution invited global attention for demonstrating the country's commitment to "science and technology in the service of development"; one might say it became foundational for the discourse on both scientific temper and scientific enterprise.

The two decades between the 1950s and the 1970s can be considered the era of "policy for science" in India.[10] This included determined efforts at gathering robust data by the Research Survey and Planning Organisation led by Abdur Rahman, an information scientist and science policy analyst, for the Council of Scientific and Industrial Research. The focus was on consolidating existing strengths and prioritizing policy implementation, which could establish basic infrastructure and human resources for the growth of science and industry in the country. New and specialized state agencies emerged in India, like elsewhere, such as the Department of Atomic Energy (DAE), Indian Council of Medical Research (ICMR), Council of Scientific and Industrial Research (CSIR), the Defence Research and Development Organisation (DRDO), and Indian Space Research Organisation (ISRO) all of which expanded significantly and increasingly shaped science policy away from the universities.

Itty Abraham, a political scientist, has argued that Homi Bhabha's successful creation of the AEC, which led to the formation of similar specialized and dedicated state agencies, was largely because of

> close personal ties between Nehru and Bhabha, with the former seeing in the latter

the one person who could translate his vision for the technological transformation of the country into reality. Bhabha also had intimate ties to the largest private Indian business conglomerate, the Tata group, which not only was funding his Bombay-based research institute but also was connected to him through kin networks. Tata support for Bhabha reinforced his standing by adding financial backing and a professional managerial element to his acknowledged scientific abilities.[11]

The structures governing science and engineering education and research that emerged in the first two decades of independence are attributed to the close relationships between scientists and political leadership at the time, including personal relationships that Nehru shared with many of the institution builders of the time. Homi Jehangir Bhabha (of the Tata Institute of Fundamental Research and the Atomic Energy Establishment, Trombay), Shanti Swarup Bhatnagar (of the CSIR), Prasanta Chandra Mahalanobis (of the Indian Statistical Institute, the National Sample Survey Organisation, and the Planning Commission of India), and Daulat Singh Kothari (of the DRDO) led the establishment of structures and the mechanisms of both governance and institution building, which remain prevalent today. As a result of prioritizing "reasons of state," it is worth noting that rural technologies, agriculture, medical research, and, most critically, research and education in Indian universities have only seen marginal growth.[12]

Aspirations articulated in the Scientific Policy Resolution of 1958 under Nehru's leadership continued to inform the governance of science and the kinds of projects that the Indian state invested in between 1970 and 1980 under Prime Minister Indira Gandhi. In the middle decades of the twentieth century, comprehensive planning for science and technology adapting both the American New Deal and the Soviet models were abundant across

the globe, especially in the newly independent countries, including China and India. The Chinese twelve-year science and technology plan (1956–67) and the first dedicated Indian five-year plan for science and technology (1974–79) were remarkable.[13]

Cold War geopolitics of technical assistance and development aid characterized the global oversight on science and technology policy. Organizations like UNESCO took the lead in documenting policies across countries and, in the process, also shaped the vocabulary for science policy studies, especially in the developing world. The Cold War indelibly embedded science and technology policy for defense and development in India: warfare and diplomacy determined the projects that would get invested in. If nuclear research, followed closely by aerospace research, was already on the tray at the end of World War II, the Green Revolution was added to it at the height of the Cold War to address the precarity of food aid. At home, India participated in three wars in the neighborhood between 1962 and 1971: the Sino-Indian War of 1962, the Indo-Pakistani War of 1965, and the Bangladesh Liberation War of 1971. Wanting to fortify defense capabilities and not wanting to be left behind in the global nuclear and space race, the country saw more than a fourfold increase in its budget for defense and nuclear research. This was a wartime economy that expected science for warfare.

In 1974, India conducted a Peaceful Nuclear Explosion declaring in no uncertain terms its aspiration to nuclear capability; a year later, in 1975, the Indian Space Research Organisation launched its first satellite, *Aryabhata*, followed by the launch of its second satellite five years later, in 1980. Key departments dedicated to dual-use technologies such as the Department of Electronics, the Electronics Commission, and the National Centre for Software Development and Computing Techniques (NCSDCT) were also established in this decade. The Indian Patent Act of 1971, which limited patent protection to seven years, brought support for the pharmaceutical

industry and paved the way for India's global trade in generics. This was the policy that enabled CSIR laboratories to develop processes that allowed Indian pharmaceutical companies to commercialize essential drugs by exploiting existing patents. Indian pharma firms, in collaboration with CSIR's five drug research labs, attained high technological capabilities in reverse engineering, facilitating the introduction of generic drugs into the market.[14]

India's science and engineering capability was on the ascent in the 1970s and 1980s, which contributed to a return of the Gandhian argument on the secondary place of rural India in processes of industrialization. Scholars across the human, social, and natural sciences as well as bureaucrats noticed the disparity between the urban rich and the rural poor following the implementation of large engineering projects.[15] Could science and engineering deliver equitable development and alleviation from poverty to the taxpayer? A strong critique of science and technology–led development policy emerged in civil society with the People's Science Movement and the Alternative Science Movement, and in academically eminent institutions like, among others, Application of Science and Technology to Rural Areas (ASTRA) led by Amulya Reddy at the Indian Institute of Science, Bangalore.[16]

An aspirational resolution on science policy was inadequate by the early 1980s, and the strength of the critique of large engineering projects called for a more directly articulated policy on technology. In 1983, only a year before her assassination, Indira Gandhi's government introduced a Technology Policy Statement, one that her son and the next prime minister Rajiv Gandhi would implement infused with his own vision and that of his advisors, prominent among them being Sam Pitroda. As we begin to trace the next turn in science policy, it is perhaps helpful here to pin the argument that science and technology policy well into the early 1980s was essentially development

policy that assumed a linear model of science-backed industrialization, at times folded into innovation.[17]

A TECHNOLOGY POLICY STATEMENT: 1983

The Technology Policy Statement (TPS) was introduced in 1983.[18] The statement was a declaration of confidence in what preceded: "Our science has shown its capacity to solve problems." Therefore, the statement was a guiding document to achieve one goal: self-reliance. India was not alone to firmly establish the need for self-reliance in the context of international conflict, competition, and capacity for collaboration.[19]

> We have regarded science and technology as the basis of economic progress. As a result of three decades of planning, and the Scientific Policy Resolution of 1958, we now have a strong agricultural and industrial base and a scientific manpower impressive in quality, numbers and range of skills. Given clear-cut objectives and the necessary support, *our science has shown its capacity to solve problems. . . . In a country of India's size and endowments, self-reliance is inescapable and must be at the very heart of technological development*. We must aim at major technological break-throughs in the shortest possible time for the development of indigenous technology appropriate to national priorities and resources. For this, the role of different agencies will be identified, responsibilities assigned and the necessary linkages established.[20]

Key technologies of the 1980s—biotechnology, information technology, and microelectronics—posed a new concern for India: the challenges of absorption and diffusion. But even before that, the most significant challenge came from export

controls and technology denial implemented by the United States, particularly in the areas of supercomputing, space technologies, and critical high-tech components.[21] A primary motivation, therefore, for the TPS was to institutionalize processes to "reduce dependence on foreign technologies, support for infant industry protections for indigenously developed products and recommendation to back-engineer imported capital goods."[22] This was back-ended by an explicit policy directive for technology assessment studies. The CSIR agencies producing robust data on India's science and engineering capacity in the first two decades after Independence had been reconstituted, and systematic policy-relevant insights through comprehensive surveys were tenuous at best.

An important objective for the TPS was the consolidation of an Indian technology base in the up-and-coming sectors of the time—information, electronics, and biotechnology—by identifying obsolete technologies and replacing them with technologies that would improve "productivity, efficiency, quality and reliability of products using minimum capital and energy utilization."[23]

TPS eventually managed to address, at least in directives, some of the concerns that were brought up by civil society and scholars demonstrating, first and foremost, awareness of notable environmental concerns.[24] The previous decade had already seen two oil crises. The first occurred in 1973, with a total oil embargo by the Organization of Arab Petroleum Exporting Countries (OAPEC) of countries that had supported Israel during the Yom Kippur War. Barely six years later, in 1979, following the Islamic Revolution in Iran and the overthrow of the Pahlavi dynasty, a drop in oil production led to a second global energy crisis. In India, this prompted policy directives for reduced energy consumption. The TPS acknowledged an uneven development of the Indian economy and identified key sectors for investment in science and technology, specifically

in health, food, housing, energy, and industry. Indira Gandhi's regime may be equally remembered for conservation policies that gave impetus to scientific research in ecology, which remains a patchily studied field.[25]

Only a year after the TPS was introduced, Indira Gandhi was assassinated and her son, Rajiv Gandhi, became the new prime minister. His regime inherited the vision embodied in the Technology Policy Statement to which he soon added his own. In 1987, Rajiv Gandhi appointed Sam Pitroda, an Indian telecommunications engineer and entrepreneur, as an advisor on National Technology Missions. Pitroda and Gandhi began with five critical missions: drinking water, immunization, literacy, oil seeds, and telecommunications, to which they soon added a sixth: dairy production. To achieve these objectives, a Department of Biotechnology (DBT) and a Technology Information Forecasting and Assessment Council (TIFAC) were established in 1986 and 1988, respectively.

INTERLUDE

In many ways the National Technology Missions, most critically the one on telecommunications, prepared the country to meet the sweeping global transformation taking place at the end of the Cold War. The New Industrial Policy of 1991 aimed at providing facilities and infrastructure, including a workforce, this time not primarily aimed at state-led development but at efficiencies connected with globally open or liberalized market forces.

Economic policy in India wrestled with the idea of import substitution especially in the first few decades after Independence given its success in East Asian economies like South Korea and Taiwan. However, given the skepticism of senior economic advisors on import substitution, it was not adopted as an overarching policy; economist Amiya Bagchi as late as 1990 argued that "the distinction between import-substitution and export-led growth strategies is too mechanical to serve

as a policy guide in any real economy."[26] This thinking, in the context of low foreign exchange holdings of the Indian government, had interesting consequences on the acquisition of research and training apparatus from outside India that played out differently for dual-use science and engineering like nuclear research, space research, and electronics when compared with many other areas.

Economic reforms were introduced in India in the early 1990s. Industrial and political leadership in India that was aligned with the changing global geopolitical landscape came to the fore in shaping a private sector to lead economic growth and expect the free operation of markets.[27] With globalization (and liberalization and privatization, vocabulary articulated in the policy), increasing market competition, and the country opening up its economy, the principles of TPS 1983—technological self-reliance and the adoption of home-grown technologies—had to nest within a new paradigm. The inflow of external capital but more so of shifting priorities in market-driven technology projects sometimes conflicted with the TPS's goals. Some socioeconomic sectors became reliant on foreign technology and investment in the domains of information technology, entertainment, and aviation, among others, challenging the earlier vision of self-reliance. Science and engineering research and education as well as their real and imagined contributions to the economy became increasingly imbricated in foreign equipment, grants, and investments.

The global landscape of science and engineering saw extraordinarily rapid and substantial transformation during the 1990s and early 2000s. This period marked a transition toward a more multidisciplinary approach, fostering international collaboration that has shifted scientific practices even as they have become ever more deeply implicated in industry, the financialization of the economy, and technologically enabled governance. If earlier policies treated science and technology as not entirely but somewhat separate strands for regulation, it is

evident that this approach is no longer possible in a knowledge economy.

A SCIENCE AND TECHNOLOGY POLICY: 2003

The Science and Technology Policy (STP) of 2003 came two decades after TPS (1983) to address the globally shifting language of knowledge, commerce, and fierce international competition. The principles of TPS paved the way for a new liberal approach that was consolidated in the STP. The state took on the role of encouraging and supporting all kinds of private enterprise but especially knowledge-based private enterprise through public-private partnerships. This shift marked a departure from the federal and nationalistic ideals of the past, when the state was the main patron of research and development (R&D), to align with a so-called universalizing impulse that looked for a global power status for India and one within which the discourse on science and engineering was well placed to nestle into.[28]

Perhaps the most significant aspect of this policy was the official recognition of a need for a substantial increase in R&D investments: the policy recommended the goal to increase investment to 2 percent of GDP.[29] Although this target was not met, the policy did bring about an increase in both public and private R&D investments, reaching a globally recognized figure of 0.7 percent of GDP by the end of the decade.[30]

Another significant aspect of STP 2003 was the perceived need for developing mechanisms within ministries and state agencies to solicit ideas from scientists and technologists for planning and policymaking. Toward this end, STP 2003 articulated the necessity to modernize infrastructures within academic institutions and introduced, to some extent, new funding mechanisms for basic research. In keeping with the global collaborative efforts of the early 2000s, the policy called

for incentive systems to bring scientists and engineers, particularly those of Indian origin from abroad, to contribute to India's science, technology, and innovation (STI) ecosystem. STP 2003 also placed heavy importance on the protection of intellectual property by establishing an intellectual property rights regime to protect and further incentivize scientists and researchers. With international collaboration taking center stage, STP 2003 encouraged science diplomacy, especially among countries in the Global South.[31]

STP 2003 was an expression of the changed topography of education, research, and manufacturing and of international relations, including scientific collaborations and trade. The language that was developing around this change was one of "knowledge economy" and the word "innovation" was causing forest fires across the landscape. A National Knowledge Commission was created in 2005 with a tenure of three years during which it was to advise the prime minister on policy and reforms in education, science and technology, e-governance, and so on. Technology and engineering-led thinking was getting deeply embedded in the mechanisms of governance. In five years, a National Innovation Council was established (2010) with Sam Pitroda as its chairperson; its mandate was to draw up a Roadmap for Innovation in India for the next decade.

A SCIENCE, TECHNOLOGY, AND INNOVATION POLICY: 2013

As the country caught its breath following the rapid and sweeping changes in the organization of markets and social life around consumption that rolled off decisively in the early 1990s, the newest policy document identified the decade between 2010 and 2020 as a "Decade of Innovation."[32] Increased globalization accompanied by an exponential growth of engineering and information technology in everyday life made it imperative for India to find its own version of a knowledge-based economy. A

decade after STP 2003, the Science, Technology, and Innovation Policy (STIP 2013) normalized the intention to support "innovation" through government with a continued older emphasis on finding pathways to show how "innovation converts knowledge into wealth and/or value."[33]

Among the first initiatives facilitated under STIP 2013 was India's increased involvement in (expensive) global mega-science projects, including the Laser Interferometer Gravitational-Wave Observatory (LIGO), the Large Hadron Collider (LHC) at CERN (Conseil Européen pour la Recherche Nucléaire/European Organization for Nuclear Research), the International Thermonuclear Experimental Reactor (ITER), and the Square Kilometer Array (SKA).[34] The policy embodied a faith in international scientific collaborations and diplomacy as new opportunities to harness global knowledge for domestic advancement. Innovation, the world agreed, was to be driven by skilled scientists and engineers and the knowledge they help produce.

This policy document speaks of ambition with a new language of confidence: the aim is to position India among the top five countries in research and innovation and to boost R&D personnel by a staggering 66 percent over five years. This would be achieved by stimulating innovation through the encouragement of private-sector investment in research and development. The policy also made a point of remembering other ambitions from bygone days: directing scientific discovering and technological advancements toward developmental priorities such as manufacturing, water, health, agriculture, infrastructure, and environment.

In 2014, only a year later, a new government led by the Bhartiya Janata Party came into power led by Prime Minister Narendra Modi. It continues to date through two subsequent general elections. Seen from changes perceived in the culture around science and technology policy, the

new administration is seen to exert significant political-bureaucratic influence and control over the conduct of research and education, also in science and engineering.[35] The new government has shaped several national flagship programs and missions that involve science and technology, research and development, and technological inputs and resources, including financial and human expertise such as Make in India, Skill India, Digital India, and Startup India. The Technology Development Fund (TDF, 2023), a flagship program of the Ministry of Defence and executed by the DRDO under the Make in India initiative, has been established, offering financial assistance to industries.[36] Several policy reforms and regulatory changes like simplifying patent processes, providing tax incentives for R&D activities, and establishing clearer guidelines for intellectual property rights are also on the anvil. Following the implementation of STIP 2013, there has been a noticeable increase in private-sector participation in R&D activities and a great deal of energy in parts of the country toward innovation-driven start-ups.

STIP 2013 set fairly ambitious goals and there is a clear disparity, as has been the case over time, between the policy formulation and implementation. The period since has witnessed an increase in the publication rankings, a higher number of PhD graduates, increase in patent filings, and the birth of new start-ups. In 2020, 0.64 percent of the GDP was invested in R&D.[37] Scholars continue to observe that bureaucratic hurdles, lack of coordination among stakeholders, and inadequate infrastructure have hampered the effective execution of policy initiatives.

A DRAFT SCIENCE, TECHNOLOGY, AND INNOVATION POLICY: 2020

Only seven years after STIP 2013, a policy draft was introduced in 2020 with the aim to bring "profound changes through short-term, medium-term,

and long-term mission mode projects by building a nurtured ecosystem that promotes research and innovation on the part of both individuals and organizations."[38] Given the spacing between the earlier policy documents, this one has been introduced early, marking, perhaps, not only the unprecedented rapid changes in science and engineering and geopolitics, but also the first full articulation of the ambitions for a science and technology of a new regime.

The draft STIP 2020 was floated to establish a more comprehensive framework for the growth and development of science, technology, and innovation in the country than seen earlier. The policy introduced an open science framework, addressing the importance of open access to scientific knowledge, data, and infrastructure. This framework of openness aims to create wider dissemination of existing knowledge that would lead researchers to benefit from scientific advancements and perhaps, as a consequence, to contribute to them. More so, the policy also focuses on enhancing the R&D ecosystem, placing importance on translational research and innovation-driven enterprises. STIP 2020 wants to address issues of gender disparity in the path to developing a strong workforce.

STIP 2020 outlines a framework of decentralization by delegating more responsibilities to state-level and local bodies. It also calls for the establishment of a National Science Technology and Innovation (STI) Observatory that would function as a central platform for continuous monitoring and evaluation of the STI landscape. Perhaps this might bring back, to some extent, data and evaluation of outputs and impact.

In a move away from hitherto predominantly state-funded research in India, STIP 2020 introduces funding mechanisms, such as public-private partnerships, venture capital, and other financial instruments, to support research and innovation. The last two decades have already seen a gradual increase in funding for scientific research, from

both the government and the private sector. This thinking is embodied in the suggestion to establish a National Research Foundation (NRF), modeled on a combination of the National Science Foundation (United States) and the research councils of Europe, to fund and support high-impact research projects.[39] The need for an arm's-length funding body for cutting-edge research in science and engineering has been argued for by scientists in India for many decades starting with the Archibald Vivian Hill report of 1944. Intended to take stock of Indian research capability to meet the flaring Eastern Frontier during World War II, the report eventually became a guiding document for the organization of science in postwar India.[40]

The NRF is proposed as a replacement for the Science and Engineering Research Board of India (SERB). It aims to radically transform the R&D ecosystem in India by substantially increasing investment from the government, private sector, and international collaborations. This research funding is expected to flow into Indian universities, colleges, institutes, and national laboratories. The Anusandhan National Research Foundation Bill 2023 (which led to the establishment of the NRF) wants to push 500 billion Indian rupees (US$6 billion) into the STI ecosystem over the next five years (2023–28). About 70 percent of this funding is expected to come from industry and philanthropists.[41]

At least one reason behind establishing the NRF stems from the understanding that high-quality knowledge creation materializes in well-funded higher education institutions (HEIs) around the world. The Economic Survey of India (2016–17) notes that the number of researchers in India is a rather dismal 25 for every 100,000 citizens when compared with the 111 in China, 423 in the United States, and 825 in Israel.[42] In India's own assessment of its achievements, despite substantial progress in fields like pharmacology, molecular biology, chemistry, computer science, and telecommunications, India's science

ecosystem, by and large, lags behind what many Indians consider "the great and the good." Indian researchers produce the world's third-highest number of journal articles in science and engineering (6.2 percent in 2022), but Indian political, industrial, and academic leadership compare this number with those of the United States (13.7 percent) and China (26.9 percent).[43] In the current international rankings of universities based in India, which the Government of India would like to see improve, the top three that appear in the US News and World Report of Best Global Universities are the Indian Institute of Science ranked at 612 and the Indian Institute of Technology, Bombay, and the Indian Institute of Technology, Madras, both ranked at 635.[44]

The NRF is offered as a panacea for the many concerns that plague the science and engineering ecosystem, including translational research that is seen to be critical to a knowledge-driven economy. The foundation is registered as a not-for-profit society before it will be converted to an autonomous body of the Government of India, through parliamentary legislation. The founding members of this society include the Prime Minister's Science, Technology and Innovation Advisory Council. Overseen by the Prime Minister's Office, the NRF will host ten major directorates dedicated to specific domains including science, arts, humanities, innovation, and entrepreneurship. An eighteen-member board comprising eminent Indian and international scientists, senior government officials, and industry leaders will advise the work of the NRF.

To begin with, the NRF was envisioned as an arm's-length funding body offering a path away from the bureaucratization of the conduct of research as a streamlined funding mechanism. The NRF was also to be run by a governing board of leading researchers and philanthropists.[45] As it stands now, the NRF is to be led by government officials, with the prime minister as the president of the foundation, and union minister of the Department of Science and Technology

and the union minister of the Department of Education as its ex officio vice presidents.[46] In this deviation from the initial plan, the proposed structure of governance brings back the concerns around bureaucratic protocol and renders the organization at less than an arm's-length funding body for independent research. How this will eventually unfold, of course, remains to be seen.

In the meanwhile, there is an increase, when compared with the previous six and a half decades after Independence, in the attention to Indian Knowledge Systems, something that became highlighted in the National Education Policy (2020). Dedicated centers, including those for the study of Indian languages, have been established at universities and institutes across the country.[47] The vision statement backing state funding for such centers is to "rejuvenate and mainstream Indian Knowledge Systems for the contemporary world." While these efforts are focused on epistemic legitimacy for knowledge systems historically developed on the Indian subcontinent, the offer appears to be one of supplementing the world of science. There is no direct and explicit effort to discredit the conduct of modern science in Indian laboratories. A few scholars find this effort discomfited with the practice of modern science.[48] Historians of science such as Mark Walker have made sense of the "science and ideology" question historically to show that the freedom to conduct science on questions considered important by practitioners or "scientific freedom" under any regime, including science during and for the Cold War in the United States and the Soviet Union, is not necessarily affected in the same manner as political freedoms.[49] Again, how this will eventually unfold remains to be seen.

CODA

In the journey from science and technology policy for development to now science and technology for accelerated economic growth and wealth generation, three weak links are apparent:

research, education, and translational research [R&D] spending is inadequate; data for robustly informed policy is insufficient and, when available, not reliable; and most of India's universities are not ready to meet the moment—they do not have the funds for research, the structures to institute contracts, or the standing to recruit the most motivated students globally, or for that matter from India, Africa, or West Asia, which have been historically the major sources for student enrollment.

It is difficult to imagine an effective policy that can address problems at scale with inadequate funding allocation. Science in India is still predominantly state funded, and yet only 0.65 percent of India's GDP goes toward research and development; it is the lowest among major scientific powers in the world.[50] The bulk of government spending on science moves to atomic energy, defense, and the space program—about 55 percent of gross domestic expenditure on R&D (GERD).[51] Venni Venkata Krishna, a policy studies scholar, argues that the "two decades of relative stagnation in the national R&D and S&T investments, particularly in universities, have drastically aborted their ability to compete at the international level in the World Class University rankings."[52] The private sector's contribution to GERD has, in the meanwhile, marginally increased from 25 percent (2004) to approximately 36 percent (2020).[53] It also appears to be the case that firms claim tax benefits for R&D but engage in activities like quality control or calibrations that are not about research or development. Furthermore, a significant portion of the R&D conducted—especially by or for multinational firms in India—is not meant for India nor does it get used in India.

Given the state of the majority of Indian universities (and the astonishingly low number of institutions for advanced research otherwise), the private sector appears to be hesitant to pump funding into the system. Many in the private sector chose to establish their own educational institutions

instead, and in the bargain, research capacity, which takes time to develop, suffers in places where it could grow, although it may well grow in time in the new institutions. The inadequate funding for universities also leads to another problem: poor quality of higher education. Teaching faculty at most universities cannot do their own research or attend conferences that would keep them informed about the frontiers of their fields or disciplines. Perhaps it is time for some borderline radical measures: India's education policy could purposefully meet India's science and technology policy. In 2023, India became the largest source of overseas graduate students in America, surpassing China.[54] India is a young country. In the absence of an adequate number of institutions to train and retain its talent, those who can will continue to leave, but those who cannot will remain underserved and unable to develop their best capacities.

A second set of concerns arises from the bureaucratization of scientific practice in India. Itty Abraham analyzed five strategic technological sectors in postcolonial India: atomic energy, space, electronics, biotechnology, and telecommunications. In his findings, there is no single factor that explains the successes and failures of these technological initiatives; however, there is one common factor that poses a significant challenge to all:

> The common feature of both the Commission and the Mission models is a discourse that proposed the need for organizational autonomy from established state institutions and norms in order to let allegedly exemplary techno-scientists "get on with the job." From this standpoint, regulatory bodies are only seen as hindrances to the achievement of strategically vital technology projects.[55]

On the one hand, agencies responsible for the government of science are headed by scientists drawn from the community of practitioners.

On the other hand, their staff—while recruited for their basic training in science—function as bureaucrats to run the state machinery. Given that most science in India is funded by the state, this group is quite large and holds considerable power over the scientific community because of their ability to decide and eventually conduct research. Science is run by protocol where officers are held accountable for compliance with procedures but not for the outcomes of those procedures.[56] Astonishingly, this exact concern was diagnosed already in the late 1960s by a visiting American scholar, Ward Morehouse.[57] Bureaucratized mechanisms of control lead to an excess of procedure that is not inherent to the matter at hand—research or education—thus delaying if not stifling science and engineering initiatives.

One manifestation of "science by protocol" is the significantly delayed release of funds for scholarships and research, which halts ongoing projects and discourages other planned projects.[58] Protocol also encourages risk-averse interpretations of policy directives—as a result, investment in new areas of research at the frontier, which may well sink funds, is rendered excruciatingly difficult. All of this is legible to policymakers and to the community: in 2017, around twelve thousand researchers in around forty cities in India participated in a "march for science" and in 2019 more than a hundred economists wrote to the prime minister asking for a better-defined policy on data collection for official statistics.[59]

From the foundational efforts of the Nehruvian regime and the leading scientists of the time to more recent attempts aimed at strengthening innovation and addressing contemporary problems, India's STI policy landscape is a mixed bag. If we line up key science policy documents and leave aside education and industrial policies, which are also closely linked into the ecosystem, we find that from SPR 1958 to STIP 2020 all reflect, in time, the aspirations of India's scientific and political leadership to respond to the

changing global politics, furthering self-reliance and ensuring that science and engineering play a key role in organizing social life.

All policy statements and resolutions are interesting exercises in visioning and the sociopolitical imaginaries they propose: what is missing in India, at least from the public domain, is any insight into the strategic thinking behind these policies and thinking toward any action plan that can operationalize these vision statements. In 1968, Abdur Rahman, the policy analyst mentioned earlier in this chapter, hooked science policy to seven other elements his colleagues and he considered necessary to close the loop on policymaking and implementation. We are missing that kind of insight today from policymakers and policy studies scholars on how policy moves from vision to strategy to, finally, an action plan:

> Seven elements of science policy: (1) surveys and studies for evolving science policy, (2) the planning of science and technology, (3) national science policy, (4) national budgeting of science, (5) implementing agencies, (6) co-ordination and evaluation of research, and (7) international collaboration.[60]

Early policies like SPR 1958 and TPS 1983 outlined the requirements for a well-equipped science and engineering infrastructure that could deliver technological self-reliance and help grow the science in India. State-formation and science policy usually go hand in hand, and in a new country, this was especially true in the early years. Resource scarcity meant that priorities of a new state took precedence and atomic energy, space, and defense grew relatively strong when compared with other areas like technologies for rural areas and medical research. Early policies played a pivotal role in the establishment and growth of scientific institutions such as the Council of Scientific and Industrial Research, the Department of Atomic Energy, and the Indian Space Research Organisation.

Subsequent decades saw a different approach, policies that could rely on gradually stabilizing institutions and on experts trained both in India and abroad through aid and technical assistance programs who were now leaders of the new institutions. Like in the rest of the world, India's science policy began to be driven by a strong commitment to a somewhat fuzzy idea called innovation; science policy also, at least marginally, responded to concerns of the environment and ecology. STP 2003 and STIP 2013 called for an integration of innovation with the broader sociopolitical context, increasing international collaboration, private-sector participation, and the protection of intellectual property.

The draft STIP 2020 is the latest chapter in India's STI policies with the expansive ambition to introduce a comprehensive framework for the growth of science and technology, laying specific stress on open access to scientific knowledge, enhancing R&D capacity, and—a first for science policy in India—explicitly addressing gender disparity in the scientific community. Nesting within this dream is the long-drawn establishment of the NRF to "revolutionize India's research landscape" by increasing philanthropic and industry support for research, establishing a space for interdisciplinary research, and promoting international collaboration.

When we look back at India's science policy journey, whether it's through examining the earlier commission model or today's mission model, we see that success, when apparent and judged so by peers in India and abroad, has hinged on three key factors: first, intellectual autonomy of the institution that has allowed scientists and researchers to operate independently and efficiently as seen in the success especially of institutions considered to be of "national importance" like the Indian Institutes of Technology and those dedicated to research enveloped within the Department of Atomic Energy budget; second, a well-trained talented pool of researchers and scientists

collaborating with peers in India and abroad; and, third, adequate funding, again, as seen in the success of institutions of national importance and also, today, in the mushrooming start-up world where state and private funding has allowed a new set of smaller initiatives to thrive.

Much more may be accomplished with effective policymaking in India, as elsewhere, and this is a rather critical juncture. Science policy studies in India, which is finally beginning to take off, may want to systematically explain learnings from the past for decision makers and the taxpayers both. We need to know more about successful as well as failed initiatives in order to understand where India stands today and at what cost.[61] What have we learned from previous policy articulations and their implementation? What are India's best preferred techno-social imaginaries?[62]

Equally, this might be a good moment to examine the assumptions that propel science and technology policy in India. When and how does research meet economic growth and wealth generation? Can that process be orchestrated under circumstances where there is no immediate existential pressure, like war or a pandemic? What are the relationships to foster between the human, social, and natural sciences as they interface with engineering, art, and design? Why and how might we consider continuing funding for fundamental research? What is our collective relationship to fundamental research?

A public debate, even as a demonstration, might be useful to generate a discussion on what the newest science policy may be expected to accomplish. What is the place and the role for an informed and invested citizen in shaping science and technology policy? We are dealing with rapidly shifting frontiers in artificial intelligence, new genetic technologies, climate change, and pandemics, to name but a few. What are the policy frameworks and appropriately corresponding institutional structures required to regulate and govern research and technology at these and other emerging frontiers?

Science and engineering have been at the core of India's identity after Independence. A range of policies have converged to shape how science and engineering have come to be organized in India across education, research, and industry. In a world where new technology is ubiquitous, extractive, and all encompassing, science and technology policy in India and elsewhere may benefit from keeping planetary interests at the center of decision making. India stands at yet another critical juncture: there is more wealth and potential in India today than there has been in the last decades. The temptation, therefore, to mobilize science and engineering along the known path to wealth and growth is strong. Is it, however, in India's own best interests to accelerate or might it be worthwhile to take stock and share global responsibility in an inequitably organized world?

Is it time, perhaps, to get cautiously comfortable with the idea that, apart from key areas of excellence and of strategic importance, India is largely an R&D recipient rather than producer? Is transfer, adaptation, economizing, and distribution the more rewarding policy objective over the ambition to achieve an end-to-end chain across areas?[63] Nehruvian science, as the historian of science David Arnold has argued, "presented science as a program of delivery, committed to redressing such basic social problems as ill health and poverty, an endeavor answerable to the state and the public it aspired to represent."[64] Early on, then, a distinction was drawn between "science as authority" on the one hand—as articulated in the first SPR and informed by ideas like "scientific temper"—and "science as delivery" on the other. Has the Indian state delivered on the promise of science and technology for development? Are science and society coproduced in India?

There is precedent in India for thoughtful engagement: scientists, bureaucrats, and industry leaders

collectively took several years in the 1940s to take stock and draw up the National Planning Committee Reports; and yet again, they took eighteen full months in the early 1970s to draw up the first Science and Technology Plan for India.[65] Might this be the moment for the political, administrative, and scientific leadership to consider a more determined pause before finalizing a new science policy document?

NOTES

The author would like to thank Sahil Borse for research assistance and Roland Wittje, Rohit Chandra, and Šumit Ganguly for their close reading of this chapter.

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7. Evolution of India's Energy System Post-Independence

A Brief History and Synthesis

Varun Rai

India's energy system is described in many ways: "growing rapidly," "catching up," "government controlled," "coal backbone," "oil dependent," "fully electrified," "low emissions intensity," and "renewables future." Although each of these descriptions is relevant, none comes close to describing the deeper nature and drivers of India's complex energy system, which is best described as an "all-the-above" approach to energy.

All the above, not just in terms of the sources of supply—which is the normal sense in which this phrase is used to describe energy—but rather across all dimensions that are relevant to understanding the energy system of a major world economy: public and private sectors, federal (center) and state governments, urban and rural, fossil and renewable, domestic and international, closed and open, monopolistic and competitive, and (technologically) catching up and advanced.

Several good sectoral studies already provide a solid overview of India's energy system.[1] The purpose of this chapter is not to rehash or simply synthesize these studies. Instead, this chapter proceeds by presenting a current snapshot of India's energy system (or just "system"

henceforth) before delving into a consideration of the longer-term trends reflected in India's energy system since India's Independence in 1947. Next, through a synthesis of these long-term trends, this chapter identifies various core and persistent drivers of energy policy—what I call the "dynamic imbalances" in the energy system—that undergird these long-term trends. These dynamic imbalances include (1) issues having to do with the federal tensions in energy policy; (2) India's geographic distribution of resources; (3) the deployment of technological capabilities amid rapid advancements; (4) urban versus rural trade-offs; and (5) energy security issues. These dynamic imbalances are continuous themes that are likely to affect India's energy system in the years and decades to come.

ENERGY SNAPSHOT: CURRENT STATUS OF ENERGY IN INDIA

ENERGY SUPPLY AND SOURCES

India's primary energy needs are currently supplied through a combination of coal, oil, biomass, renewables, and some hydroelectric, nuclear, and natural gas sources.

A Chapter from The Hoover Institution's Survey of India

India's transportation sector is split between rail and road. The former is largely supplied through a combination of coal and electricity and the latter through oil (petrol/gasoline and diesel). Indian Railways—the government-owned rail public-sector undertaking (PSU)—is the primary mode of moving coal around India (48 percent), mostly from eastern India to other parts. A little appreciated fact is that in recent years, owing to rail bottlenecks, about a third of coal has been moved around India through road transportation (trucks), highlighting the interdependence between oil (i.e., diesel for commercial road transportation) and coal.[2] India produces over 80 percent of its coal needs domestically; coal imports, typically of higher-quality coal, mostly from Indonesia, South Africa, and Australia, help meet coking coal needs in steelmaking.

On the oil side, India consumes about five million barrels per day (mbpd), producing only about 0.6 mbpd of that at home.[3] In FY 2021–22, oil imports were mainly from Iraq (25 percent) and Saudi Arabia (17 percent), followed by the United Arab Emirates (UAE) and the United States (US) at roughly 10 percent each. However, following Russia's invasion of Ukraine, Indian oil imports from Russia increased dramatically, reaching ~40 percent of imports in FY 2022–23.[4] The increase is attributed to Russia selling oil to India at significantly discounted prices compared with open market global prices in the face of the G7 price cap of $60 per barrel on Russian oil since December 2022.[5] India's refining capacity stands at 5 mbpd, of which about half is government owned and a third owned by the private sector, with the rest in public-private joint ventures. About a third (i.e., 1.7 mbpd) of petroleum products refined in India are exported, most of which are in the form of petrol and diesel (with some amounts of naphtha—a fuel that can be used to dilute crude oil—and jet fuel). Given that both crude oil consumption and refining capacity are about 5 mbpd, the same amount of petroleum production is imported (as liquified petroleum gas,

fuel oil, and petroleum coke).[6] The private-sector refineries, mostly located on India's west coast, are world-class facilities and are export oriented. About 1 mbpd new refining capacity is under construction or development, most of it by various government-owned entities. Diesel (for both commercial and passenger transport) and petrol (for passenger transport) are the primary petroleum products. Interestingly, oil forms about 30 percent of India's primary energy demand, similar to that in the US (36 percent). However, coal and natural gas constitute 57 percent and 7.5 percent of primary energy demand in India, respectively, compared with 10 percent and 33 percent in the US. Thus, the main difference is the amount of natural gas, which in India is primarily used for fertilizer manufacturing and some electricity generation (<2 percent), but in the US about 33 percent of electricity generation is from natural gas. As discussed further below, constraints on gas supply mean India relies heavily on coal for electricity generation (~75 percent).

Diversification and decarbonization efforts are underway in both rail and road transportation. Indian Railways has already been electrified up to 95 percent and is the largest consumer of electricity in India.[7] It has set a very ambitious target to become a net-zero carbon emitter by 2030, through a combination of efficiency, renewable energy (RE) installation and procurement, and integration of intermittent renewable electricity with electricity storage across its locomotives, stations, and buildings. Similarly, the Indian government has set aggressive targets for electric vehicles (EVs) through its EV30@30 campaign that envisions 30 percent of new vehicles sales will be EVs by 2030.[8]

A little appreciated fact is that ~10 percent of India's oil imports (or about 8 percent of total oil demand) are supplied by the US, the latest significant addition to the list of suppliers to India. Another recent feature of India's oil industry is the addition of strategic petroleum reserves (SPRs).

First added in 2018, currently India's SPRs stand at 39 million barrels (i.e., ~8 days of India's oil demand), with an additional capacity of 48 million barrels under development. In 2021, India released 5 million barrels from its SPR as part of coordinated global efforts to increase oil supply to check high prices.[9]

Natural gas comprises 7.5 percent of India's primary energy demand. Most natural gas is used in the fertilizer industry (33 percent), followed by city and local gas distribution (20.5 percent) and power production (14 percent). Of the nearly 60 billion cubic meters (BCM) of gas India consumes annually, India produces about 60 percent of its natural gas needs at home, while importing the rest in the form of liquefied natural gas (LNG). Qatar (45 percent) is the largest and most consistent shipper of LNG to India, followed by the US and the UAE, each supplying 10 to 15 percent of LNG imports in the last couple of years (2022 and 2023). The US has recently emerged as a significant LNG supplier to India, starting from nearly zero in 2016. LNG imports are price sensitive and have been reduced by 20 percent in 2023 compared with 2021, during which the aggregate price secured for India's LNG imports nearly tripled.[10]

Electricity generation capacity in India is diversified, a trend that is further accelerating owing to rapid deployment of renewable energy sources, especially solar. As of May 2024, only about half of the total installed electricity generation capacity (444 gigawatts [GW]) is coal (218 GW) and over a quarter is nonhydro renewables (solar: 85 GW, wind: 45 GW). Hydro (large and small, 52 GW, but declining), natural gas (~25 GW and flat or declining), and nuclear (8 GW and slowly increasing) make up the remainder of the electricity generation capacity. In terms of electricity generation (as against installed capacity), the picture is more skewed toward coal, which currently accounts for ~70 to 75 percent of electricity generation, the remaining coming from hydro (~8 percent), solar (~7 percent), wind (~5 percent), and nuclear

(2.5 percent). It is noteworthy that a little less than 60 percent of coal-based electricity generation is lost because of thermal losses at power plants, an important reminder that on a primary energy basis about 2.5–3 times the energy is needed as input (i.e., primary energy stored in coal) to supply one unit of useful energy (i.e., consumption in an end-use sector). Interestingly, coal, solar, and nuclear have a relatively flat (aggregate) generation profile on an annual basis, while wind and hydro have a more seasonal characteristic, as the best wind and hydro production come in the summer months from May to September.[11] As dominant as coal-based electricity generation mostly supplied through domestic coal production is in India, international energy markets still have a noticeable bearing on actual deployment on an annual basis: for example, during part of 2023 about half of the 25 GW natural gas generation capacity was not operational due to high LNG prices.[12]

Overall, ownership of generation capacity is spread almost evenly across the government (state: 24 percent, national: 24 percent) and the private sector (52 percent). However, ownership levels vary based on fuel type. Two-thirds of coal generation are government owned (roughly a third each in state and central [national] government ownership), while the remaining third is owned by the private sector. All nuclear generation capacity is owned by the central (national) government, while hydroelectric plants are mostly government owned (57 percent state and 34 percent central). In contrast, nearly all the installed solar and wind capacity (~130 GW) is in the hands of the private sector.

As of May 2024, India has twenty-four operating nuclear reactors across seven nuclear power stations with a combined capacity of 8,180 megawatts (MW), which accounted for 2.5 percent of total electricity generation in 2023. Most of India's operating nuclear reactors are pressurized heavy-water reactors (twenty reactors, 71.5 percent installed capacity). The latest ones to go into commission are at Kakrapar (2021 and 2024), each with

a reference power capacity of 630 MW; two pressurized water reactors make up about 24.5 percent of nuclear installed capacity (1,000 MW each). The earliest nuclear power reactors in India involved boiling water reactors (BWRs) in Tarapur (1969), which now account for less than 4 percent of installed nuclear capacity. Another seven reactors, with a combined capacity of 6,000 MW, are at various stages of construction. Based on current plans, India expects to nearly triple its nuclear generation fleet to about 22.5 GW by 2031–32.[13]

ENERGY DEMAND

In terms of total primary energy, industrial demand (~40 percent) is followed by demand in the building (13 percent: 11 percent residential and 2 percent commercial) and transportation sectors (8 percent).[14] In the residential sector, the main sources of demand are during the summer months for cooling and throughout the year for lighting and cooking purposes; unlike much of the Western world, heating load is not a big piece of residential electricity consumption in India. Residential demand, especially in urban areas, has been fueled by the rapid adoption of home appliances and especially air-conditioning. An estimated 40 percent of India's population still depends on biomass (firewood and cow dung), mostly for cooking purposes.[15]

On electricity consumption, industrial (~31 percent) and residential (i.e., domestic, ~31 percent) sectors dominate, trailed by agriculture (21 percent) and commercial (10 percent) sectors.[16] Indian Railways, which has an aggressive publicly stated goal of going net-zero by 2030, accounted for about 1 percent of electricity sales in 2023. The states of Gujarat, Maharashtra, and Uttar Pradesh (UP) are the largest consumers of electricity, both on an annual basis and on a peak demand basis: Maharashtra due to both a large population and industrial base, Gujarat due to its industrial base, and UP as India's most populous state (~240 million, or 17 percent).

Buyers of electricity at the wholesale level mostly include state-level distribution companies (DISCOMs) and, increasingly, but still to a lesser degree, large industrial users. Since electricity generation is unbundled from transmission and distribution (T&D) and competitive (see more on this below), wholesale buyers must contract for new electricity capacity through long-term (typically twenty-five years) power purchase agreements (PPAs) based on reverse auctions (a competitive bidding process) or buy electricity in the day-ahead market (DAM) on the national power exchange trading system.[17] Over 85 percent of electricity purchase in India is through long-term PPAs and less than 10 percent happens over the power exchange. Although the volumes traded over the power exchange are not insignificant, recent analysis suggests that these volumes are on the lower side of expectations in a market that "opened up" two decades ago, and thus might be symptomatic of structural inefficiencies that have been built into the current electricity system market mechanism.[18] Those inefficiencies reflect some fundamental imbalances that continue to exist—the prime of them being center and state governments' uneven yet influential grip on the electricity system value chain—but which market reforms had to accept (rather than overcome) to lay foundational change in the electricity sector.

GREENHOUSE GAS (GHG) EMISSIONS

India is the third-largest annual emitter of CO_2, behind China and the US. However, on an intensity basis, at 2 tonnes per person per year India's CO_2 emissions are still relatively low, roughly one-seventh and one-fourth that of the US (15 tonnes) and China (8 tonnes), respectively.[19] India's energy intensity (energy used/GDP) has decreased by 30 percent in 2022 since its peak around 1990, while its carbon intensity (CO_2 emissions/energy produced) has increased by about 10 percent over the same period.[20] Rising industrial and residential demand over the next couple of decades is expected to strain India's energy supply and, unless

that supply is cleaned up, to contribute to worsening local and global pollution. To that end, at the UN Climate Change Conference in Glasgow in 2021 (COP26), India presented a five-pronged approach (Panchamrit, or five nectars) for its climate action:

1. Reach 500 GW nonfossil energy capacity by 2030.

2. Fifty percent of its energy requirements from renewable energy by 2030.

3. Reduction of total projected carbon emissions by one billion tonnes from now to 2030.

4. Reduction of the carbon intensity of the economy by 45 percent by 2030, over 2005 levels.

5. Achieving the target of net-zero emissions by 2070.[21]

MAJOR LONG-TERM TRENDS

OIL: INCREASED CONSUMPTION, STAGNANT PRODUCTION

As noted earlier, India consumes ~5 mbpd and produces about 0.6 mbpd.[22] The crude oil consumption-production gap (i.e., required imports) has grown from 190 million metric tons (MMT) in 2013–14 to 233 MMT in 2022–23 at a compounded annual growth rate (CAGR) of 2.32 percent, while production declined from 38 MMT to 29 MMT over the same period at a –2.83 percent CAGR; the concomitant increase in India's import bill has been 8.65 trillion Indian rupees to 12.6 trillion Indian rupees, a 45 percent increase over a decade.

In some ways, India's oil story is a nightmare come true, one that India had both anticipated and worked to avoid. The current situation of very high import dependence (90 percent) in oil is a combination of three factors: (1) population and economic growth driven oil demand growth; (2) relatively poor natural resource endowment;

and (3) uneven regulation and management of resources that did exist at home.[23] Although, what "nightmare" entails for India in the case of oil has changed over the last couple of decades. Until the mid-2000s, the main apprehension was balance of trade, that is, the foreign exchange needed to pay for oil imports. In fact, earlier in the 1990s, a high oil import bill was a contributor to precipitating a financial crisis that eventually led to economy-wide reforms. However, as India's service economy took off in the mid-2000s, foreign exchange to pay for imported oil was less of a problem. Instead, the problem became the widening gap between domestic production and consumption: India's oil import dependency went from 75 percent in 2005–06 to 90 percent in 2022–23, while oil consumption nearly doubled during the same period.

NATURAL GAS: STAGNANT PRODUCTION, INCREASED LNG IMPORTS

Natural gas (or just "gas") has had the most stable consumption level among fossil fuels in India in recent years: both domestic production and imports have hovered around 30 billion cubic meters (BCM) each and consumption around 60 BCM annually in the last five years.[24] But that is not because of a lack of interest or effort in gas on India's part. On the surface, it might appear that natural gas consumption has stagnated while domestic production has declined over the last decade. But that hides a much more dynamic set of factors at play.

In fact, one of the early major payoffs that resulted from India's opening of its oil and gas (O&G) sector to private investments since the 1990s was major gas discoveries in the eastern offshore Krishna-Godavari (KG) basin. Those discoveries— first of them by Reliance in 2002—significantly changed expectations of gas's future in India.[25] The initial excitement pulled in infrastructure investments (e.g., gas pipelines, gas power plants, and fertilizer manufacturing) and spurred visions of a national gas grid that would culminate

in urban gas supply networks across India.[26] However, production in the KG basin proved more difficult and expensive than first imagined and the early discoveries weren't replicated at hoped-for scale and speed, resulting in production declines over the last decade. This also explains the slow but continued rise of liquefied natural gas (LNG) imports in India. But given their exposure to spot markets, Indian LNG imports are quite price sensitive. Since 2022, global LNG trade has picked up in the wake of the Russia-Ukraine war, kicking LNG prices up, which has hurt LNG volumes coming into India.

COAL: FROM KING TO EMPEROR

India's energy system is most closely associated with coal. With all its downsides aside, it is the fuel India is most naturally endowed with. And largely for that reason, starting with the global oil crises in the 1970s, Indian policymakers and system operators have turned again and again to coal to serve as the backbone of the electricity generation sector. That homegrown confidence, not just in terms of resource availability, but also in technological capabilities (e.g., boilers, turbines, grid management, etc.), has firmly established coal as the most "reliable" source of supply in India.

But coal's story in India runs much deeper than that. As discussed later, coal is connected to one of the five fundamental imbalances that have driven and shaped India's energy system since 1947, namely the imbalance in the geography of resource distribution across India. Most of India's coal reserves—plentiful for the next couple of centuries or longer at current rates of production—are in the eastern states in a region aptly known as the "coal belt." Decades of upstream and downstream integration of local economies to coal production have created deep skills- and earnings-related dependence on the coal economy. Furthermore, the enmeshment of government-owned companies—such as the Coal India Limited (CIL), the largest coal producer in India and for Indian Railways, the predominant transporter of coal across India—in the socioeconomic fabric of the region through the provision of a near-full range of nonenergy services (schools, roads, hospitals, etc.) further deepens the lock-in, fueling a mutual codependence that is hard to piece apart.[27]

ELECTRICITY: ONGOING FULL-SCALE TRANSFORMATION

Of all parts of India's energy system, the electricity sector is arguably the most complex but also has changed the most in the last twenty-five years. The reforms set in motion in the late 1990s and early 2000s have transformed the face of India's electricity system. Among other changes, those reforms have resulted in (1) central and state-level regulatory bodies covering generation, transmission, and distribution systems; (2) significant private-sector participation; (3) more supply flexibility and contracting options for large customers; (4) increased transparency regarding power dispatch and pricing; and (5) international funding.[28]

One of the main and first things that the electricity reforms initiated over two decades ago was to unbundle electricity generation from transmission and distribution (T&D) and inject competition in the generation sector. Fast-forward two decades, and generation is now competitive (i.e., generators must bid competitively through a reverse auction process) and ownership of assets is spread across private and public sectors (center and state governments), further complicating incentives for transparent system operations. The main national power exchange—the Indian Electricity Exchange (IEX)—still sees less than 10 percent of power being traded on the day-ahead market (DAM), a measure of the depth of competitiveness and price transparency of electricity markets. However, a new set of rules is expected to push higher DAM volumes through open access to transmission, while also enabling new contractual arrangements whereby producers and users of electricity are directly (and more freely) able to contract for electricity supply.[29]

CLIMATE: ENGAGING PROACTIVELY AND PROMINENTLY AT THE INTERNATIONAL STAGE

India has been actively involved with global climate discussions and goals since the early days, but its position and role have evolved markedly over the last three decades. In the 1990s, India championed the "common but differentiated responsibility" approach, which focused on per capita GHG emissions and essentially argued that developed countries should be responsible for most of GHG emissions cuts and should also help developing countries like India both financially and technologically meet emissions reductions.[30] Internally, during the 1990s India was busy reforming its economy more broadly and the energy sector as part of that. Major reforms in both the O&G and electricity sectors were formulated in the late 1990s. Solar and wind were still very expensive energies during this period. So, besides engaging in some research and development (R&D) at home and abroad, the only real interest India had in low-carbon energy (i.e., RE) during the 1990s through mid-2000s was for energy access in rural and remote parts, which are typically more expensive to connect to the grid.

But with the core pieces of energy sector reform (Electricity Act 2003, National Electricity Policy 2005, and National Tariff Policy 2006) set by the mid-2000s, prices of RE in impressive decline, and global climate negotiations heating up, by the late 2000s India started a deeper and more serious evaluation of its energy future amid climate change. The National Action Plan on Climate Change (NAPCC) was issued in 2008 laying out the core principles of India's action vis-à-vis climate change:

> [The NAPCC] outlines a national strategy that aims to enable the country to adapt to climate change and enhance the ecological sustainability of India's development path. It stresses that maintaining a high growth rate is essential for increasing living standards of the vast majority of people of India and reducing their vulnerability to the impacts of climate change.[31]

The National Solar Mission was initiated as part of this along with seven other national missions focusing on energy efficiency and sustainability.

The intensity and visibility of India's engagement in the global climate process significantly increased, though, after Narendra Modi became India's prime minister in 2014. Starting with COP21 in 2015 (Paris), Modi's approach to climate negotiations and India's positioning have generally been viewed as proactive and positive but not without controversy. At COP26 in 2021 (Glasgow), PM Modi announced the "five nectar elements" (Panchamrit) of India's climate action plan, the prime of which was the declaration that India will go to net-zero carbon emissions by 2070.[32]

Three main drivers have shaped India's climate goals and action over the last decade. First, private-sector appetite for building more coal in India has waned since its heyday in the late 2000s. After coal and electricity sector reforms in the 2000s, many Indian conglomerates (e.g., Adani, Reliance, and Tata) went on a coal-mining and plant-building spree. But financial operation of these long-lived assets within a complex web of electricity-market rules and actors have proved more challenging than originally anticipated. Besides, many of these conglomerates are global players with diversified assets and investments. As such, there is increasing reputational and investment pressure on them from the investment community.[33] Relatedly, tightening international credit in recent years for thermal power generation has made it harder to finance privately owned coal plants.[34] Second, RE prices have been in free fall over the last decade. That combined with preferential interconnection and scheduling policies (as part of India's climate push) make RE investments financially viable and attractive for the private sector, which, since the mid-2010s, has predominantly led RE deployment in India while also almost

entirely backing down from building new coal plants. This plays into the strong electricity-demand growth and generation-capacity needs anticipated in India over the next few decades.

And third, as India is the fifth-largest economy and the most populous country in the world that is still in the early phases of its economic ascension, its global position and aspirations are very different from two decades ago. India's growth and security needs necessitate a broader set of engagement with other major economies on trade, energy, and advanced technology, and climate action is part of that broader set of issues that needs to be tackled together. In particular, the US under the Biden administration since 2021 has increasingly combined climate action as part of broader bilateral trade and technology deals with India.[35]

IMPORTS: DIVERSIFICATION OF SOURCES

India imports about 90 percent of its oil, 50 percent of its gas, and 10 to 20 percent of its coal needs. Although coal imports have ticked up in recent years, generally India has kept domestic production up with its needs and there is still much room for improvement in the productivity of domestic coal production. Thus, while meaningful in its scale, coal imports are generally not viewed in the Indian business and policymaking circles as being a long-term source of concern. It is the continued uptick in the imports of oil and gas, even in the face of their increasing global prices, that has surprised India and upended some of the hopeful visions of dramatically increasing domestic production of these commodities following the reforms and the opening (to private investment) of the O&G sector starting in the late 1990s.

At this point, India's predominant planning approach to managing its O&G appears to have shifted from one being dominated by visions of vastly expanded domestic production to one of navigating a long-term, deep-import dependence. As in most other major countries, O&G has always

been viewed through the "energy security" lens in India. But through decades of practical experience, India is closer than ever in accepting its role as a major long-term importer of both oil and gas.

And that shift directly influences India's strategy in securing the O&G supply it needs. As a result, EVs have become a lot more attractive in this situation. Thus, unsurprisingly, India has set a target for EVs to be 30 percent of new vehicle sales by 2030. Furthermore, India is now more interested in the robustness and reliability of the global O&G supply chain than ever. To be sure, India has always been a neutral, if not a positive, actor in terms of global energy supply chains. But given its outsized demand and internally acknowledged expectations of deep import dependence, the intent is much more serious. There's a lot more at stake now.

One immediate offshoot of India's positioning vis-à-vis O&G supplies is India's willingness to engage with available supplies anywhere in the world. Two instances exemplify this approach the best. First, following Russia's invasion of Ukraine in 2022, India's oil imports from Russia significantly increased owing to the discounted price of Russian oil in the face of international sanctions.[36] Second, in parallel, and more cross-cutting, in recent years India has increased imports of oil, gas, and coal from the US. In 2022–23, the US supplied nearly a tenth each of India's oil, gas (LNG), and coal imports.

ENERGY EFFICIENCY

Growing import dependence and pains at home to produce energy resources apace with energy-demand growth had another lasting effect on India's energy landscape: a well-resourced and institutionalized focus on energy conservation pushed by the Energy Conservation Act of 2001. This was initiated through the creation of the Bureau of Energy Efficiency (BEE) under the Ministry of Power. Since its formation in 2002, BEE has focused on building codes, lighting efficiency,

and appliance efficiency. Much of BEE's early efforts involved coordination of actors across the energy value chain, development of energy labels, and voluntary energy-efficiency goals.[37] Over time, many of these programs became more formalized and some even turned into national initiatives and rules, such as the Energy Conservation Building Code (ECBC) for commercial buildings established in 2007.[38]

Buildings efficiency has also been a target through the development and coordination of building codes. India's building stock is expected to double by 2040, and 70 percent of new construction is likely to be in urban areas.[39] Unlike the electricity sector, most emissions in the building sector will come from the construction and operations of new buildings, making the building sector critically important from a climate change and health perspective. However, multiple guidelines, voluntary ratings, and codes have emerged and coordination, adoption, and enforcement by local administrative bodies have been slow.[40]

Within buildings, air-conditioning (AC) systems have been the central plank of energy-efficiency efforts. Adoption of AC systems has skyrocketed over the last decade, with the future expected to hold more of the same.[41] A particular difficulty is that cooling load makes summer early evenings the peak hours, which is not aligned with solar generation. This has increasingly necessitated—and is starting to attract—the incorporation of more short-duration battery storage on the grid. This need is expected to explode over the next decade.

PRIVATE PLAYERS: UNSHACKLED (ONCE MORE)

Structurally, the substantial increase in private ownership of and investment in energy infrastructure and services delivery represents the biggest shift in India's energy system since 1947 and especially in the last two decades. In some ways, this is going back to where it all started in 1947

post-Independence, albeit through a circuitous, tumultuous, perspiring, and at times scandalous route.

At the time of India's Independence much of the oil sector, mostly refining, was under private operation (there was little gas-based operation then). The same was true for coal production and electricity generation, which, at 1.36 GW, was a tiny fraction of generation capacity today (444 GW).[42] There was no gas, nuclear, or even hydropower to speak of.

India's fundamental aspirations of modernization and economic growth, to which energy was a critical input, did not always square with the profit-focused, often exploitative, operations of the private operators at the time.[43] The frustration to steer the energy-ship in desired socio-economic directions combined with a broader socialist-leaning, centrally planned approach to India's future led to the increasing nationalization of India's energy system—a transformation that was nearly complete by the mid-1970s, a time when the world was rocked by two back-to-back oil crises and India in particular was going through the most tumultuous period politically post-Independence.

Aspiring to drive India's economic engine through nationalization of energy production and infrastructure was one thing. But delivering on that promise pivoted around frontier technological capabilities, which India was just beginning to develop systematically through a national system of higher-education and R&D institutions. So, India desperately needed help. Following, India's first nuclear explosion test in 1974, the US slowed down and eventually stopped fuel supplies for India's first nuclear reactors in the Tarapur Atomic Power Station (TAPS), pushing India closer to the Soviet bloc.[44] In the years following, India would develop close collaborative relationships with Soviet-bloc countries—the effects of which are salient even to this day. As a result, India's most major oil discoveries on the west coast in the

offshore "Bombay High" field were made in 1974 with Russian help.[45] Similarly, Russian and Czechoslovakian assistance was instrumental in helping India build thermal power generation manufacturing capabilities.[46]

As fruitful and promising as those relationships were at the time, over the next two decades India was strapped for foreign exchange to pay for ballooning oil import bills in the face of flat oil production and increasing demand. The national oil company, Oil and Natural Gas Corporation (ONGC), struggled to succeed in exploration and mismanaged producing assets. To address such shortcomings across the energy sector in India, regulatory reforms and injection of competition (by opening to private investment) were among the central pillars of the economic reforms in India initiated in the early and mid-1990s at the requirement of foreign institutions, notably the World Bank.[47]

THE FIVE DYNAMIC IMBALANCES IN THE INDIAN ENERGY SYSTEM

1. CENTER VERSUS STATE POLITICS AND AUTHORITY

A fundamental source of complexity arises from electricity being on the "concurrent" list of both the center and state governments to work through jointly. That coordination is difficult and shape-shifting, given the ever-changing political winds at local and national levels.

More important, while the central government sets policies and regulations in national and inter-state matters (e.g., power trading, transmission access, etc.), state governments have jurisdiction over electricity distribution, a function delivered through DISCOMs. Decades of politics-driven meddling to artificially keep electricity rates low for electoral gains have left the DISCOMs in dire financial states. Yet DISCOMs are responsible for contracting for all power to meet statewide electricity demand now and in the future.

Some DISCOMs, especially those in some of the largest metros like Ahmedabad (Gujarat), Delhi, Mumbai (Maharashtra), Noida (UP), and Kolkata (West Bengal), have been privatized, a change that is generally regarded as having improved reliability and quality of service in these areas.[48] Since 2020 efforts have been underway to possibly privatize DISCOMs in the eight union territories of India, areas that are under the central government's administrative purview. But progress has been slow and checkered.[49] Regardless of that, it still leaves most of India's electricity demand under state-owned DISCOMs. This is the mother of all the problems that Indian policymakers and investors face vis-à-vis the electricity system and is one of the root causes of the complex web of regulations, infrastructure, pricing, and finances. The Ujwal Discom Assurance Yojana (UDAY) was launched in 2015 to push states to assume 70 percent of the DISCOM debt, aiming to improve their operational efficiency and financial health. But results have been mixed.[50] An updated plan with 2027 targets—the Revamped Distribution Sector Scheme (RDSS)—was introduced in 2022 to continue the progress made.

2. GEOGRAPHY OF RESOURCES: THE EAST BASKS IN COAL GLORY WHILE THE SUN RISES IN THE WEST

Past and current landscapes of India's electricity system are deeply imprinted by coal and hydro resources in the east. But the energy transition in India is not just one from fossil-based to increasingly more renewable sources; it is also a transition from the east of India to its west (and the south), where most of India's solar and wind resources are located. If the concentration of massive coal reserves along India's coal belt (the region mostly in the eastern states) has deeply intertwined India's current energy system with broader socioeconomic-political dimensions, the concentration of solar and wind resources combined with private enterprise and progressive regulation in the west and the south has spawned

a spectacular growth of RE in India that was unimaginable even a decade ago. If one considers that coal is the past, then this view would suggest that the sun might be setting in the east and rising in the west for the energy system in India.

But that view is misplaced, at least for the time being. Private-sector investments might have been replaced to some extent by the meteoric increase in private-led RE deployment, but coal's central position as the backbone of India's electricity system has only *strengthened* post-COVID-19. Integrating intermittent RE at low levels—as has generally been the case so far (~10 percent or less of RE-based generation on an annual basis)—may be largely handled through operational changes and low-lift grid enhancements. But at much higher levels, RE integration requires a much tighter market design, lots of grid-scale storage, and deeper investments in the grid infrastructure, both in transmission and distribution. A multilayered market design whereby layers and layers of incremental dispatch and pricing rules bind atop each other to serve the financially and regulatorily fragmented state-level distribution systems is not conducive to such integration.[51]

Two important issues arise in the face of this dual-faceted energy geography in India. First, ever since Prime Minister Modi's COP26 (2021) declaration of net-zero India by 2070, coal's future in India has become an intense matter of debate.[52] That debate is less about the immediate future, over which coal will continue to remain a big part of India's energy supply. But the debate certainly has some overtones of large parts of the coal ecosystem—from mining to transport to power generation—eventually coming to a grind and possibly even phasing out in the next four or five decades. If not planned carefully, such a transition, even at less than full scale (i.e., "phase down" instead of "phase out"), could mean profound disruptions to the social and economic life in the coal belt and even political upheaval more broadly. This is not something India has ever planned for. In fact, this is not

something even the scholarly and analyst communities have focused much on until very recently.[53]

Second, as part of progressive rules and incentives for supporting large-scale RE deployment, Renewable Purchase Obligations (RPOs) have been imposed on DISCOMs.[54] Currently, RPOs require DISCOMs to buy a minimum of about 25 percent of their electricity through power purchase agreements (PPAs) with RE-generators; and this requirement is slated to go up to 43 percent by 2029–30. Given that much of RE generation is happening in the west and the south, this amounts to a flow of monetary resources from the east to the west, further exacerbating the divide.[55]

3. TECHNOLOGICAL CAPABILITIES: CATCHING UP AMID WAVES OF GLOBAL CHANGE

Over the last seventy-five years—as the global energy system focused in waves first on coal, oil, nuclear, hydro, and natural gas, back on coal, and, most recently, on wind and solar—India has been trying to ride each of those waves, with varying degrees of success. A common position India has found itself in all these waves is a lack of world-class technological capability to not just ride these waves but rather power them indigenously, inside out. This has led India to work on all channels of acquiring such capabilities—bilateral national partnerships, government-owned production and funded R&D, and opening to foreign direct investment (FDI).[56]

Except for coal-based thermal generation, most of these efforts haven't really panned out as hoped. Self-sufficiency in coal technologies was built over decades through the National Thermal Power Corporation (NTPC), a PSU under the Ministry of Power, and Bharat Heavy Electrical Limited (BHEL), a PSU under the Ministry of Heavy Industries. NTPC builds and operates the power plants, while BHEL manufactures the key components (e.g., boilers and turbines). Soviet assistance was

instrumental in helping India's budding thermal-generation industry build technological capabilities over time and eventually becoming self-sufficient. That coal-based power generation is one of the few energy areas where India is fully self-sufficient further adds to the techno-institutional lock-in and contributes critically to the "coal means energy security" paradigm. This technological history and the international relationships that enabled India to count coal in its corner from a resource and technological security perspective continue to shape India's worldview on technological capabilities.

Throughout the past seventy-five years India has chased energy infrastructure and technologies one after another as the global picture of resources, economics, and innovation has shifted. And in all these instances, including in the current wave of RE and storage technologies, India has tried to play catch-up. As discussed above, some of the causes for this outcome have entailed intricate and often corrupt bureaucracy, inefficient government-owned production systems, low-intensity government and private R&D spending, poor integration of R&D and commercialization, and so on.[57]

Given the importance of coal, cleaning up coal-based generation is a top priority. Yet after years of fits and starts in coal gasification and carbon capture and storage (CCS) R&D, India doesn't really have deployable commercial scale technologies. To change that, India is planning more significant investments in coal gasification.[58] India has had better luck with wind technologies, and some Indian companies have produced world-class wind components for both domestic usage and exports.[59] However, growth of wind has slowed down in recent years, while solar has already taken over wind in India by a big margin (85 GW to 46 GW). Moving forward, solar is widely expected to be the RE mainstay in India. In the solar space too, India finds itself in a similar position all over again. As with the rest of the world, most solar cells and modules in India are imported from China. To help grow an indigenous solar-manufacturing industry, India has levied import duties on solar technologies and instituted production-linked incentives to support Indian companies as they get a foothold amid a brutally competitive global solar industry with China in the front seat. Success is anything but guaranteed and India will need to tread very carefully.

4. URBAN VERSUS RURAL

Although most of the Indian population is still rural (65 percent), the urban population in India has grown fast. The vote bank of a large rural population has meant that politicians have pandered for decades to improve connectivity and quality of services for rural energy, including lighting, sustenance electricity for basic appliances, and clean cookstoves.[60] But progress has been much slower to materialize until the last decade. At present about 98 percent of India has some level of grid connectivity, although the quality of services remains variable.[61] Recent studies show that both electricity connectivity and quality of electricity supply to rural public health centers (PHCs) are strongly correlated to health services and gender outcomes in rural areas across India.[62]

However, the perennial problem with rural energy services is the ability of the low-income and poor households to pay for them routinely. That is, even though on paper electricity services enhance health and educational outcomes for poor and rural households, thus potentially aiding upward economic mobility, those linkages are not uniform and fully developed. A positive development in this area is the rise of decentralized renewable energy–assisted machines, for example, solar+battery-powered sewing, roti-making, and milking machines. By directly coupling a *reliable and flexible* source of electricity with increased income, such distributed, small-scale machines offer a promising avenue to activate social and economic mobility in rural India.[63]

On the emissions front, the carbon intensity of energy consumption of urban residents is roughly double that of rural residents, to the extent that sometimes this has been referred to as "two Indias" and "the rich hiding behind the poor" (i.e., India's per capita emissions are lower because of the large poor population, which consumes only a small part of India's overall energy demand).[64] A 2022 study, though, paints a more nuanced picture:

> The richest 10% of Indians only emitted 20% more emissions from direct primary energy use than the poorest 10% in 2012 (excluding direct emissions from transport). . . . Results suggest that addressing pressing welfare issues connected to energy use in India, such as indoor air pollution from solid fuels, can be aided by a transition to modern energy carriers, with little consequential increase in CO_2 emissions.[65]

Relatedly, pollution in urban areas from coal-based power generation and diesel-dominated road transportation, especially in high-population-density areas across vast swaths of northern/central India, is a major health issue. Not surprisingly, NGO-based environmental action and activism is well supported in urban areas, especially by the urban middle class.[66]

5. ENERGY SECURITY

Energy security has been a constant factor in India's energy decision making. But the specific form that energy security considerations have taken has evolved through the decades. Right after independence, energy security was about *affordability* of supply to the masses and India's budding industrial base. If prices were considered unaffordable for the people or economically high for the industry, they were subsidized.[67] During the oil crises of the 1970s, energy security took the face of (self-reliant, i.e., inward-looking)

security of supply, leading India to take a decisive and deep turn toward coal, just as the US did in those years. In the 1980s and 1990s, energy security was about *financial sustainability*. High oil import bills amid dwindling foreign exchange reserves abroad combined with poor operational performance of O&G and electricity PSUs at home to help precipitate economy-wide policy, regulatory, and institutional reforms. If the 1990s were about laying the foundations of economic liberalization, in the 2000s energy security took the form of robust *market design* (arm's length regulation, competition, price transparency) as the bedrock for all other parts of the energy security equation—affordability, supply security, and reliability (of service quality)—to build off from. In this sense, the 2000s entailed some of the most detailed and painstaking work by Indian policymakers and institutions in energy. Finally, in the 2010s energy security became synonymous with *diversification* of fuels in the energy system and their supply sources. This has entailed in electricity the rapid growth of RE alongside coal and in O&G the diversification of originating countries from which India sources its supplies.

It was also during the early 2000s that the "clean" part of energy security got some initial attention in India, particularly in the metro area in Delhi, through the court-directed use of compressed natural gas (CNG) in commercial vehicles.[68] But the focus was still on local health effects. Only by the late 2000s did the clean part of energy security start to truly reflect national and international considerations.[69]

These five cycles of energy security foci that India has gone through in the last seventy-five years—namely, affordability, self-reliant supply security, financial sustainability, robust market design, and diversification of supply with clean supply now layered on top—are an important reminder of the immense thoughtfulness, hard work, perseverance, collaboration, innovation, and resilience that India has exhibited regarding its energy journey

postindependence. India truly has had an "all the above" energy journey post-Independence.

CONCLUSION

Almost eight decades ago India started with relatively small energy production and consumption, near-zero technical capacity in the sector, no energy markets to speak of, and little financial wherewithal to write its energy story. At present, India is one of the largest consumers and producers of primary energy, with a diversified supply base and no runaway energy prices. It has one of the highest installed RE capacities globally and nearly complete electrification.

As highlighted in this chapter, there have been many challenges and missed opportunities as well during these decades that have taught valuable lessons. The challenges and opportunities of tomorrow, however, are quite different from those of the past. Moving forward, it is going to be about efficiency, electrification of transportation, large-scale RE integration, reimagining of urban growth and transportation, cleaning up and ramping down coal generation, development of functioning carbon markets, and integration of the demand side in the energy equation. As India embarks on this new journey over the next few decades it will increasingly look to leverage international cooperation and collaboration to meet its technological and fuel-supply needs. Primary among them will be the opportunity to redefine and grow the US-India energy relationship, which currently is at an all-time high as the US has emerged as a significant supplier of oil, LNG, and even coal to India. The hard part is that India must corral all domestic and international resources, cooperation, and collaboration in real time given its fast-paced economic growth. But, on the flip side, that is also the promising part: high growth also means that India has room for trial-error-and-learn in real time by experimenting in parallel. To materialize that opportunity, the key for India will be to refine its

all-the-above approach into a more coordinated energy strategy and pursue it with intention and persistence through building reliable and stable coalitions domestically and internationally.

NOTES

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8. Embracing Reform

India's Defense Policy under Modi

Manoj Joshi

India has one of the largest military establishments in the world. Yet, by all accounts, it remains archaic in its organization, equipment, and doctrine. In its last major overhaul in the 1980s, India had depended on the erstwhile Soviet Union to equip its forces. "Friendship prices" as well as the Soviet desire to find friends in the wake of the Soviet Union's ill-fated invasion of Afghanistan enabled the Indian military to stand tall, prompting *Time* magazine to do a cover story on "Super India: The Next Military Power" in April 1989.

Such talk receded in the ensuing decade as the Indian Army got embroiled for decades in dealing with insurgencies in Punjab, the northeast, and Jammu and Kashmir, even while maintaining a deterrent posture against Pakistan in the west and China in the north. The Soviet collapse created its own set of difficulties for India in maintaining its own forces and defense research, development, and production capacities never quite matured. India has long held the dubious distinction of being a major importer of defense equipment. However, because its governments have always maintained a tight control over its defense expenditure, modernization of its forces never quite caught up with their needs.

Today, as in the past, nuclear-armed China and Pakistan loom large as India's primary adversaries, even as its military continues to grapple with a Pakistan-supported insurgency in Jammu and Kashmir. The difference is that it is a China whose own military has grown by giant strides in the last two decades, even as the relationship between Pakistan and China has deepened. Given India's geography, its defense has both continental and oceanic responsibilities. In the west, north, and northeast, it confronts China, but its oceanic location enables it to play the pivot of the United States (US)–led Indo-Pacific strategy, which too is directed at China.

In the Modi era, India is making a concerted effort to modernize its military organization and industry and restructure its higher command system to bring it to world standards. Even though it is still overwhelmingly equipped with ex-Soviet or Russian systems, it is making a concerted effort to develop its own industry. This time, the US has emerged as an ally and preferred source of technology.

BACKGROUND

One of the first moves of the government headed by Prime Minister Jawaharlal Nehru at the time of independence was to assert civilian supremacy within the government. As part of this effort, he excluded the British-era commander-in-chief

A Chapter from The Hoover Institution's Survey of India

(C-in-C) from the Cabinet and insisted that all communications and decisions be routed through civilian officials of the Ministry of Defense.

The next item on the government's agenda was to insulate it from the possibility of intervention by the man on horseback. This was a time when many newly independent countries like Egypt, Iran, Burma, and Pakistan had coups that overthrew their civilian governments.

In his outstanding study on the Indian military and the state, Steven I. Wilkinson has shown that beginning in the 1950s, higher defense management in the country was deliberately structured "to minimise the risk of military intervention in politics." Lamentably, he observed at the time his study was published in 2015 that there had been no major change, even though such strategies were seen "as an increasing drag on the country's military efficiency and antiterrorist strategies."[1] The structures of the 1950s and 1960s included keeping the military out of defense planning, a lack of integrated civil-military structures for command and control and integrated intelligence gathering, and a Chief of Defence Staff (CDS) to promote integrated military solutions.

Reforms were carried out in the organization of the Indian Army, the Indian Navy, and the Indian Air Force, also known as the "Services," in the wake of the disastrous war with China in 1962.[2] New geographical and functional commands were set up through the 1960s and 1970s. Geographical commands defined an area of responsibility, the northern, eastern, or southern part of the country, while functional commands dealt with some specialized area, say, logistics or training.

However, in essence the army has until today largely retained its organizational structure of battalions (750–1,000 soldiers), brigades (3,000–5,000), divisions (9,000–15,000), and corps (40,000–60,000), which are distributed to five geographical commands (the eastern, western, northern, southern, and central), a later southwestern command, and a training command.

In the 1970s and 1980s, there was considerable thinking on the need to modernize the Indian Army's organization and doctrine. Many of these ideas eventually gave rise to what is called the Army Plan 2000. This envisaged a massive mechanization effort that would see the entire army being reorganized into strike formations, the Reorganised Army Plains Infantry Divisions (RAPIDS) and the Reorganised Army Mountain Infantry Divisions (RAMIDS). But India's economic travails and the collapse of the Soviet Union, which would have provided the equipment, led to a failure of this effort.[3]

The poor experience of the military mobilization against Pakistan, in the 2001–02 Operation code-named Parakram (strength), following the December 2001 terrorist attack on Parliament, convinced the army to come up with a new offensive doctrine called the Cold Start. Developed in 2004, it aimed at smaller-scale, swift, and decisive conventional operations against Pakistan.[4] The army also began to speak of reorganization into Integrated Battle Groups (IBGs), somewhere between a division and a brigade in size, to execute its plans. But the idea really bore fruit only by 2018.[5]

Over time, the Indian military has divided its responsibilities into fourteen geographical and three functional commands, in addition to the Tri-Service Andaman and Nicobar Command and the Strategic Forces Command responsible for the command and control of the country's nuclear arsenal. This has made operational planning difficult. For example, the eastern army command is headquartered in Kolkata, some 900 kilometers away by road from the eastern naval command in Visakhapatnam and over 1,000 kilometers from the eastern air force command at Shillong.

But along with restructuring its organizational attributes and command boundaries, India needed to simultaneously reform its higher command system, which was also archaic and unwieldy, encouraging commanders to work along service-specific silos.

REFORMING HIGHER COMMAND

The notion of appointing a Chief of Defence Staff, to enhance what the Indian military called "jointness" in its organization, had been discussed for quite some time as other militaries pushed ahead with integration of their command structures.

India's most serious reform effort—the Group of Ministers (GOM) report of 2001—recommended the appointment of a CDS but postponed the implementation of the measure. Another report in 2012 by the Naresh Chandra Committee also approved the idea of a CDS by another name— the permanent chairman of the Chiefs of Staff Committee—but little came of this.

A major recommendation of the GOM in 2001 was to create a Tri-Service Andaman and Nicobar Command to deal with the security of these eastern islands of India that lie at the head of the strategic Malacca Straits. This command was created in 2002 and was meant to serve as a model that could be applied elsewhere. The GOM also created a new Integrated Defence Staff (IDS) organization to serve under the CDS. Along with this it also created the tri-service Defense Intelligence Agency (DIA) aimed at centralizing the electronic intelligence assets of the three services. Another tri-service command came up in early 2003 when the government revealed its nuclear weapons policy through a press release that also announced the creation of a Strategic Forces Command (SFC).[6] All these new entities needed the leading role of the CDS, who was yet to be appointed. The GOM saw the CDS as the natural leader of the reformed higher command

system, one who could have the authority to coordinate the different Services and commands.

It was only in 2019 that Prime Minister Narendra Modi cut the Gordian knot and declared that he would appoint a Chief of Defence Staff for the Indian military. This was accompanied by the creation of a Department of Military Affairs (DMA) and an alteration of the government's allocation of business rules to bring the military into the Department of Defence instead of viewing it as an "attached office." The CDS would concurrently also be the secretary of the DMA.

QUEST OF TECHNOLOGICAL INDEPENDENCE

Along with the issues of command and control, change was also needed in the technological capacity of the Indian military. In its own way, it was as archaic as the higher command system. Being technologically autonomous was an important aspiration for the newly independent India.

As a British colony, India was technologically dependent on the United Kingdom for almost all defense supplies. For immediate military requirements, the British had established a number of ordnance factories in India to produce gunpowder and some military hardware like ammunition and rifles, fuses, and detonators. World War II lent some impetus to their upgrade to produce more sophisticated explosives and products, but in the main their output related to small arms, field guns, ammunition, explosives, and clothing. And associated with them were various kinds of steels and castings and containers.

THE DEFENCE RESEARCH AND DEVELOPMENT ORGANIZATION (DRDO)

The DRDO, the premier official defense research and development agency, was formed in 1958

by amalgamating existing technical institutions that had a nucleus of some ten laboratories and functioned as the research arm of the Ministry of Defence (MOD). But over time it grew into a network of forty-one laboratories that work in a range of areas like aeronautics, armaments, electronics, combat vehicles, special materials, advanced computing, naval systems, and missiles.

In the 1960s, as India sought to modernize its military to meet the Chinese challenge, it took recourse by making a number of products through licensed manufacture of vehicles (Japan and West Germany), tanks and warships (United Kingdom), and assault rifles (Belgium).

India began to develop the HF-24 Marut, a fighter, in the mid-1950s at the Hindustan Aeronautics Ltd. (HAL) with the help of a German designer, Dr. Kurt Tank, and it first flew in 1961, the first supersonic fighter in Asia outside the Soviet Union. But the project ran out of steam for the want of an effective engine. In 1961, India purchased the MiG-21 fighter from the Soviet Union and soon began its license manufacture.[7]

In the case of the navy, India acquired the British Leander-class frigates, which were built beginning in 1966 onward by Mazgaon Dockyards, Mumbai, the first major warship to be built in India after a long time. Based on the Leander experience, the Mazgaon Dockyards indigenously developed the Godavari class frigates from the late 1970s onward, and ships of this class served the navy until 2022.[8]

THE DRDO FINDS ITS FEET: 1980s–2000s

By the 1980s, the Defence Research and Development (DRDO) laboratories had gained confidence and initiated a number of ambitious schemes. Political turbulence in the 1970s had delayed decisions, but things got underway in the early 1980s with three ambitious projects—a Main Battle Tank (MBT) project, a Light Combat Aircraft (LCA) project, and an Integrated Guided

Missile Development Programme (IGMDP). India self-consciously sought to develop these as indigenous projects, though it did seek consultancy and technical assistance from abroad. The IGMDP had within it four key elements, a surface-to-surface missile named Prithvi (earth), an intermediate range ballistic missile Agni (fire), an antitank missile Nag (cobra), and a surface-to-air missile Akash (sky). The first two of these were linked to its then clandestine nuclear weapons program.

On the naval side, after inducting a number of warships and submarines from the Soviet Union, India initiated a project in 1980 for the licensed manufacture of a conventional submarine of German design. India also began work on a nuclear-propelled submarine and a submarine-launched ballistic missile Sagarika (born in the seas) for which the government sought Soviet assistance.

In all these instances there were important technological gaps that India hoped to fill gradually. Primarily, the gaps were related to weapons systems, missiles, and sensors. But the biggest weakness was India's inability to design and develop effective engines, for either the tank or the LCA despite considerable expenditure of both time and money.

All these developments were taking place in the context of a larger effort that India was making in trying to develop technology in a range of strategic areas like nuclear power and space. However, with its nuclear test of 1974, it came under Western sanctions and found that many doors to technology that were heretofore open had begun to shut. As the US tightened technology restrictions against the erstwhile Soviet Union, a new category of restrictions on dual-use technologies also kicked in, making India's task harder.

But by the mid-1980s, after another bout of Soviet acquisitions, the course of India's defense industrial policy had been set and has lasted to this day. This involved the use of foreign technology

wherever needed, even while encouraging steady import substitution and indigenization. This was a slow-motion project, and the MBT was inducted into service in 2011, along with the LCA (renamed as Tejas [brilliance]), the Akash surface-to-air missile in 2015, and the Nag antitank missile only in 2020. More successful were the ballistic missiles some of which had come into service in the 1990s. An ambitious effort to build an indigenous jet engine to power the LCA failed, and India took advantage of the opening to the US during the Rajiv Gandhi–Ronald Reagan years to get an American commitment for the supply of the General Electric GE-404 engine, which powers the aircraft today.

The length of time taken ensured that the products were less than state of the art, and the military were not particularly impressed by them. The DRDO had not, for example, been able to deliver a single unmanned aerial vehicle that had been inducted into service. Even the assault rifle it had made proved to be less than satisfactory and was abandoned.

Though India continued to import its weapons systems from Russia, it looked to the West, and especially the US, Germany, France, the UK, and Israel, to enhance its domestic technology capacity. Improved relations with the US in the 2000s resulted in the progressive removal of sanctions on India in both the conventional and nuclear areas.

The result of the long endeavor was that India built up a significant arms industry through the efforts and investments it had made since the 1950s. It had developed its own design and development capacity in major areas like combat jets, helicopters, warships, and armored vehicles.

MODI'S DEFENCE CHALLENGE

THE CRISIS

Yet by the time Modi came to power in 2014, the defense sector was in a multidimensional

crisis of sorts, which is best brought out by the Parliament's Standing Committee's report on the Demands for Grants for the 2018–19 budget. Its basic thrust was that the money being provided by the government for defense was inadequate.[9]

As it is, the Indian Air Force (IAF) strength was down to thirty-one squadrons, versus the forty-two it had been sanctioned. As for the army, the Standing Committee noted that over the years, it had accumulated substantial deficiencies "because adequate attention has been lacking both in terms of policy and budget for modernizing the ageing armoury." As for the navy, its share of the budget was witnessing a steady decline over the years resulting in a decline of its force levels.[10]

Perhaps the most telling was Indian Army Vice Chief, Lieutenant General Sarath Chand's comment to the committee with regard to the army: "Typically, any modern Armed Forces should have one-third of forces, one-third of its equipment in the vintage category, one-third in the current category and one-third in the state of the art category. As far as we are concerned, the state today is 68 percent of our equipment is in the vintage category, with just about 24 percent in the current, and eight percent in the state of the art category."[11]

The defense industry, working through public-sector units, essentially government-owned-and-directed industries, continued to churn out tanks, helicopters, and fighter aircraft, but a lot of this was license production and there was a tendency to overstate the levels of indigenization that had been achieved.

The DRDO had designed and developed a range of products such as missiles, a fighter aircraft, and a main battle tank, yet the weakness of Indian defense research and development (R&D) was manifest. The products were less than state of the art, and the military was not particularly happy

about them and used imports to provide the cutting edge of their arsenal.

THE RESOURCE CRUNCH

The bottom-line issue was the lack of adequate resources to finance a military as large as India's and make it a modern technically proficient fighting force. If one looks at the 2024–25 budget presented by the government in July 2024, matters looked promising, but the underlying reality has been more complex. The total allocation for defense stands at 621 billion Indian rupees (INR) (US$74.8 billion), which is slightly lower than the figure of the Interim Budget presented in February. Compared with the budgets of other ministries, the allocation to the defense ministry is the highest, and its budget grew 4.79 percent from the previous year. The budget allots 27.7 percent of defense spending for capital; 14.8 percent is earmarked for sustenance and operational preparedness; 30.7 percent for pay and allowances; 22.7 percent for pensions; and 4.2 percent for civil organizations under the Ministry of Defence.[12] A special innovation was the provision of Rs 518 crore to the iDEX (Innovations for Defence Excellence) scheme to support technological efforts of private-sector start-ups, small-scale enterprises, and innovators.

Although this budget shows a steady increase in defense outlays, a more detailed analysis reveals a continuing problem. A Parliamentary Research Service (PRS) analysis of the annual demand for grants for 2023–24 revealed that the share of defense expenditure in the budget has been steadily declining. Between 2013–14 and 2023–24, Union government expenditure has increased at an annual rate of 11 percent while spending on defense had increased at only at 9 percent. Likewise, the defense spending as a percentage of GDP has been going down, and in 2023–24 it was 1.97 percent. Figures show that the allocation made to the defense ministry is lower than what the military has sought. In 2022–23, it was 28 percent lower than what the armed forces had wanted for their needs.[13]

One of the problems that India confronted was on account of defense pensions. Since 1976, India's terms of engagement of personnel, both military and civilian, lengthened the tenure of service, requiring the state to pay out pensions to the personnel. The pension bill started rising and in the mid-1980s India stopped counting pensions as part of the defense expenditure, though most analyses continue to do so.

The PRS analysis also brought out the fact that since 2014–15 and 2023–24, spending on defense pensions had been consistently higher than 20 percent of the total defense budget. In fact, in 2019–20 and 2022–23, 26 percent of the defense budgets were paid out as pensions.

This had, in turn, constrained the expenditure that was needed as capital outlay for buying new equipment and systems. This figure was 32 percent of the budget in 2014–15 but had gone down to 29 percent in 2023–24. In the 2024–25 interim budget, it is 27.67 percent. This persuaded the government to undertake a sweeping reform of its recruitment system through what is known as the Agnipath (path of fire) scheme in 2022, which we will discuss below.

The Modi government was conscious of the tasks it had at hand. These related to modernizing the military's equipment, its organization, and its higher command-and-control structure. An important adjunct of this was to deal with the pension system, which was consuming an unconscionable amount of resources that could have been employed for the forces' modernization. There were interlocked issues here. Modernizing the military's equipment merely by imports was simply not possible; India was already importing a substantial amount of its requirement at great cost. So the government needed to urgently reform India's defense industrial sector

to promote greater indigenization of production as well.

The government adopted a draconian approach in all these areas, by appointing a CDS in 2019, overhauling the defense acquisition procedure in 2020, resorting to banning a large number of products from import, even while encouraging domestic production and R&D, and drastically altering the recruitment system of the military in 2022 to stem the outflow on the pension head in the budget. Simultaneously, it reached out to the United States and Western countries to enhance the technological quality of its forces.

THE MODI REFORMS

APPOINTING A CHIEF OF DEFENCE STAFF

Prime Minister Modi took the country by surprise when he announced in his Independence Day speech of 2019 that in the interests of doing away with the fragmented command system, the country would have a Chief of Defence Staff to provide the three forces with "effective leadership at the top level."[14]

This decision was given effect through a meeting of the Cabinet Committee on Security (CCS) on December 24, 2019, when simultaneously it was announced that the CDS would also wear a bureaucratic hat as the head of a DMA within the MOD.[15]

As the chief of the DMA, he would be the secretary of the fifth department of the MOD. His primary task would be to supervise and regulate the functioning of the three Services and their headquarters and procurement for the military, barring big-ticket items that fall under the category of capital acquisitions. Until that point, the MOD had four departments: the Department of Defence, the Department of Defence Production, the Department of Research and Development, and the Department of Ex-Servicemen's Welfare. The DMA was added as the fifth entity in the MOD.

The DMA's second major task that was linked to the tasks laid out for the CDS was to promote "jointness" in procurement, training, and staffing of the three Services, facilitate the restructuring of the military commands to effect integration, and promote the use of indigenous equipment by the military.

Though the rank of the CDS would be the same as that of the existing Service chiefs, he would be primus inter pares as the permanent chairman of the Chiefs of Staff Committee and be the "Principal Military Advisor" to the defence minister on all tri-service matters.[16]

The creation of the DMA was aimed at meeting the long-standing demand of the Services that they be integrated into the MOD system instead of being treated as "Attached Offices." This was a major step in conveying that the armed forces could be trusted to manage themselves. A day earlier, on December 30, 2019, the government had announced that General Bipin Rawat, who was the current army chief, had been appointed as the first CDS.

At the same time, the government also modified its Allocation of Business Rules (AOBR) to list the subjects that would be handled by the new DMA. What was interesting was what the DMA would not do. It would not make "defense policy" and would not be involved in capital acquisitions.

At the Department of Defence, the administrative head was the defence secretary, who would remain the person responsible for the "Defence of India and every part thereof, including defence policy and preparation for defence and all such acts as may be conducive in times of war to its prosecution and after its termination to effective demobilization."[17]

The new CDS, General Rawat, saw his principal task as that of promoting jointness through the

creation of theater commands. However, he faced considerable resistance, in part because of the way he handled the issue. He mooted the notion of reducing the seventeen commands to five integrated theater commands by 2023. A major problem was that there was resistance from within the Services themselves. One of the issues was the status of the three-star commanders whose commands would be crunched into unified commands. No one wanted to lose the authority and prestige of being a commander-in-chief of a command.

The second problem was the IAF, which by its very nature can deploy its assets at great speed across the country and which realized that given its depleting numbers, it would end up thinly spread out among the emerging new theater commands, lowering its authority vis-à-vis other services. General Rawat compounded the IAF's worries by declaring that the air force was nothing but a support arm for the army, akin to the engineers and artillery.[18] Unfortunately, Rawat died in a tragic accident on December 8, 2021, having completed just two years of his tenure.

The issue of theaterization—replacing existing and geographical commands with theater commands—was allowed to drift and a new CDS was only appointed nine months after Rawat's passing in September 2022 when Lieutenant General Anil Chauhan, an officer who had already retired, was promoted to the rank of general and appointed to the office.

REFORMING RECRUITMENT: THE AGNIPATH (PATH OF FIRE) SCHEME

No one is clear as to who is the real author of the Agnipath recruitment scheme under which the old system of recruitment of personnel was done away with. The scheme was announced in June 2022, six months after death of the first CDS, Bipin Rawat, and three months before the appointment of the second, Lieutenant General Chauhan.

Under this scheme, an Agniveer (fire warrior) would be recruited between the ages of seventeen and twenty-one (now modified to twenty-three), and she or he would serve for four years and thereafter leave with a severance package. Twenty-five percent of these "retirees" would be offered reenlistment for a further period of fifteen years and more and presumably be entitled to a pension. The bulk of the Agniveers, 75 percent of them, would be offered various government jobs where they would be entitled to preferential recruitment.

The ostensible aim was to provide the armed forces with a young and tech-savvy profile, but it was clear that it was mooted with a view of tackling the pension "problem" dogging Indian defense spending.[19]

The government has denied by anything else other than the need for a younger and more technology-oriented profile of the military. In retrospect, the government needed to be up front about the fact that it was indeed motivated by the public finance aspects of the scheme.

Pranay Kotasthane of the think tank Takshashila Institution has noted that the pension issue is such that even if defense expenditure were increased to 3 percent of the GDP, it would not make a dent on the resource crunch. However, he says, "over the long term" the Agnipath scheme "has the potential to reduce the pension burden substantially. But it will not make much of an impact in the short term, and benefits will only accrue after 15 years or so."[20]

However, there are other issues beyond savings that raise questions about the utility of the scheme. Given the levels of education and the problems in employment, it is unlikely that an Agniveer would acquire any salable skills. A respected former chairman of the Chiefs of Staff Committee Admiral Arun Prakash has noted that while it may have been useful for the army where infantry personnel are not too much into technology, it would be a major problem for the air

force and the navy where "at least 5–6 years are required before a new entrant can acquire enough hands-on experience to be entrusted with the operation or maintenance of lethal weapons systems and complex machinery and electronics."[21]

THE AGNIVEER EXPERIENCE

Meanwhile, the Agniveer recruitment process has gotten underway. Reports suggest that in the first intake the army has taken 80,000 personnel, the navy around 3,000, and the air force around 2,700. The overall intake is capped at 175,000 personnel until 2026. In the first four years, intake of recruits will be 46,000 per year, in the fifth year it will be 90,000, and in the sixth year 125,000.[22]

Typically, some 60,000 personnel retire from the army every year and there was no recruitment for three years during the COVID-19 period. The Agniveer intake will not be able to make up for the reduction in numbers until 2026. The army does not provide details of its manpower holdings, but back-of-the-envelope calculations would suggest that the army may reduce its numbers by 300,000 by then.[23]

Some controversy arose over the scheme when, in late 2023, former army chief general M. M. Naravane said in his yet-to-be-published memoir that the scheme was a "bolt out of the blue for the Navy and the IAF," that he had proposed a four-year term only for the army, and that too with retaining 75 percent personnel and letting go 25 percent. But the MOD reversed this, releasing 75 percent and retaining only 25 percent.[24]

Just how the scheme will work remains to be seen. In the general elections of 2024, the opposition parties criticized it and said they would reverse it if they came to power. They were seeking to take advantage of the resentment against the scheme in the traditional recruitment areas of the country where people felt cheated by the offer of a mere four-year term of duty and that, too, minus a pension. As a result of this, the armed forces have carried out an internal review of the scheme and suggested modifications, which have not been disclosed as of now.[25]

NEW IMPETUS TO DEFENSE INDUSTRIAL PRODUCTION

In May 2020, as a result of the global impact of COVID, Prime Minister Modi announced a stimulus package to promote Atmanirbhar Bharat Abhiyaan, or Self-Reliant India. This was, in a way, an extension for Modi's first initiative for Make in India that had been announced soon after he came to power in 2014. Both were taken up by the MOD, which initiated a major program for indigenization of defense production.

These have included institutional changes like corporatizing the ordnance factories and policy measures to promote indigenization and import substitution. The Defence Acquisition Procedure (DAP) was tweaked to prioritize domestic industry over foreign sources. New entities such as the iDEX (Innovations for Defence Excellence) have been created to encourage start-ups and micro, small, and medium enterprises (MSMEs).

As part of this strategy of promoting self-reliance, in August 2020, the MOD developed an indigenization portal, srijandefence.gov.in, that listed items for indigenization that could be taken up by the private sector. The initial list included some 6,590 items and currently some 32,000-plus are listed.

At the heart of the defense reforms was the revised Defence Acquisition Procedure (DAP) 2020 released in September 2020 whose main thrust was to simplify the process of acquisition and promote indigenous arms manufacturing.[26]

In May 2021, the defense industries that had been reserved for the public sector, were thrown open to Indian private-sector participation up to 100 percent. Indian companies could involve

foreign direct investment (FDI) up to 26 percent in this process. Later the FDI limit was raised to 49 percent. The private sector was now seen as not merely a supplier of raw material, components, and subsystems, but as a partner in the manufacture of complete systems. To this end, the government also finalized a security manual that provided the rules and procedures relating to access, use, and transmission of classified information for private players.[27] This was an important lacuna preventing private individuals from being involved in classified projects.

Indian industry, both public and private, was encouraged to design, develop, and manufacture defense products under the Make in India procedure; provisions to provide financial assistance for prototype development were also incorporated. The DAP has been designed to encourage foreign manufacturers to set up shop in India to make products, assemblies, or subassemblies. It also seeks to encourage foreign companies to set up maintenance, repair, and overhaul (MRO) facilities in India to be operated by their Indian subsidiaries.

The DAP was also linked to a 2018 initiative for Innovations for Defence Excellence (iDEX), which was created to encourage innovation and technology development in the Indian industry, particularly smaller industries, start-ups, individual innovators, R&D institutes, and academia. iDEX is funded by the Defence Innovation Organisation (DIO), which was created by two premier defense public-sector units, Hindustan Aeronautics Ltd. and Bharat Electronics Ltd.[28]

With a view of attracting the attention of start-ups and innovators and medium- and small-scale industries, the iDEX started a system of Defence India Startup Challenges (DISC) for which they offered small grants to those selected by them. Some twenty-eight challengers were accepted from a list of five hundred applications for the first challenge. They dealt with a range of problem

issues from secure communications, networks, and artificial intelligence (AI) in logistics.[29] The DISC is now on its eleventh iteration, and in the meantime, its success has led to an increase of the grant amount to 100 million INR.

FORCED INDIGENIZATION

The government has also doubled down on a policy of forced indigenization that was initiated by the DAP 2020. A series of lists have been announced laying out timelines within which the military will exclusively source the listed items from domestic manufacturers. The first Positive Indigenization List (PILs) was issued by the new DMA in August 2020. It banned the import of 101 items ranging from artillery guns, corvettes, transport aircraft, and light-combat helicopters.[30]

The DMA thereafter had promulgated four PILs comprising 411 military items. Separately the Department of Defence Production (DDP) had notified four PILs comprising 4,666 major subsystems, spares, assemblies, and components produced by Defence Public Sector Units (DPSUs).[31] It needs to be pointed out that the MOD policy accepts platforms as an Atmanirbhar Bharat Abhiyaan project, even if it is built under Transfer of Technology and if it has 50 percent indigenous content. Thereby, many systems with significant foreign content like light helicopters, next-generation corvettes, antitank guided missiles, and medium-range surface-to-air missiles are classed as indigenous.

Many of the products in the lists such as warships, Offshore Patrol Vessels, towed artillery guns, bulletproof jackets, and helmets were already being made in India. Take warships: out of forty-one warships and submarines under construction, thirty-nine are being made in India. The fifth PIL was launched in October 2023 and included complex systems, sensors, weapons, and ammunition.

INDUSTRIAL CORRIDORS

Another reform initiative was the creation of Defence Industrial Corridors, one in the state of Uttar Pradesh and the other in Tamil Nadu. The target of the corridors was to develop the aerospace and defense sector, and their aim is to reduce dependence on imports.

The Tamil Nadu corridor was inaugurated in January 2019. Tamil Nadu has a strong industrial base and was an obvious choice for such a corridor. In Tamil Nadu, the effort will be to create new defense production facilities and promote clusters that can enhance defense exports. The Uttar Pradesh corridor has been described as an "aspirational" project by the Society of Defence Manufacturers because the state is not too well developed from the point of view of industry. The corridor links the cities of Aligarh, Agra, Lucknow, Kanpur, Chitrakoot, and Jhansi and is linked to a larger project of the economic development of the politically important state.[32]

The launch of the Make in India initiative has seen a "remarkable" growth of the private sector and, according to Laxman Behera, as of 2022–23 it had captured about 20 percent of India's total defense production from the dominant DPSUs and the Ordnance Factories (which have now been corporatized).[33]

The big problem remains the bureaucratic approach to acquisitions. Take the case of the K-9 self-propelled howitzers. The army received the first tranche of one hundred K-9s from South Korea and assembled by the firm Larsen and Toubro in February 2021. They came with 80 percent indigenous work packages and above 50 percent indigenization by value. The army needs a total of three hundred. However, since then, no additional orders have been placed and the assembly line is idle. Any new order will come with enhanced costs. And of course, the impact on security is another matter.[34] As of mid-2024, there is no news on additional orders.

DEFENSE R&D

In a move to encourage domestic industry to take up design and development, the 2022–23 defense budget had within it a provision that would allocate 25 percent of the R&D budget to industry. Subsequently, the MOD identified eighteen areas for industry-led design and development. Among them were hypersonic glide vehicles, directed energy weapons, lightweight tanks, electric propulsion for naval application, unmanned autonomous AI-based land robots, and so on.[35]

In terms of plans and procedures, the Indian MOD has created a formidable structure providing a significant array of products for its military. What remains to be seen is whether it can meet India's ambition to emerge as a self-sufficient country in the area of designing and developing its own defense products, and also become a significant exporter of the same.

The real challenge here is to develop domestic capabilities for design and manufacturing and not just to assemble components from elsewhere. As of now, license manufacturing accounts for 58 percent of Indian defense procurement.[36]

The annual reports of Stockholm International Peace Research Institute (SIPRI) show that despite a significant defense R&D and industrial base, India remained a huge arms-importing country. Its share of global arms imports was 9.1 percent in the 2014–18 period and it actually went up to 9.8 percent in the 2020–23.[37]

The fact that the reform measures have as yet made little difference is evident from the fact that the share of domestic production in capital acquisition by the armed forces was 63 percent in 2014–15 and it was 64 percent in 2022–23, meaning that there was little change.[38]

The Indian defense industry has a large and varied production base, but it lacks the capacity of designing and manufacturing major systems, as well as critical materials, assemblies, and subassemblies. A major reason for this is the lack of a larger industrial ecosystem that can service the defense segment. Despite its size, Indian acquisitions are in numbers that do not always make it worthwhile to invest in production facilities. There are areas where imports are a cheaper and quicker option. Instead of blanket "positive indigenization lists," it may be a better idea to determine in which areas India can depend on reliable supply chains and where it needs to set up its own facilities.

However, there can be little doubt that significant problems lie within the realm of the DRDO, India's principal defense research organization, a network of forty-one laboratories that deals with everything from missiles to bulletproof jackets. Its weaknesses relate to the overall problems of Indian R&D, as well as inadequate budgets and focus and an inability to take along the armed forces in its planning and processes.

In August 2023, the government of India constituted a nine-member committee headed by Professor Vijay Raghavan, the former principal scientific advisor to redefine the role of Defence R&D and the DRDO. The committee report was submitted in January 2024, and it has reportedly recommended the creation of a Defence Technology Council under the Prime Minister's Office with the defence minister and the national security advisor as its members, along with two members from academia and industry, to identify suitable paths for specific technologies and also supervise the DRDO.[39]

A separate organization under the MOD—the Department of Defence Science, Technology, and Innovation (DDSTI)—would be created to promote defense research and development in academic and start-up ecosystems. It would also serve

as the secretariat of the Defence Technology Council. The DRDO's role would be limited to research and development; they would not develop prototypes or technologies themselves, which would be done by the public- and private-sector industry.[40]

Not surprisingly, the committee report has met with strong resistance within the DRDO, and its senior scientists have submitted a dissent note to the government. The MOD will now examine the various options and submit them to the Prime Minister's Office for the final decision.[41]

ADDRESSING THE NEW DOMAINS

Despite the resource crunch and other preoccupations and priorities, the government ensured that the military remained familiar with new domains. In 2018, the Cabinet Committee on Security approved the formation of three new tri-service entities—the Defence Cyber Agency (DCA), the Defence Space Agency (DSA), and the Special Operations Division (SOD). The military had wanted these as full-fledged commands, but the government decided that that would be a step too far at this stage.[42]

In 2019, a few months after the DSA was established, the government created a Defence Space Research Organisation (DSRO) as an offshoot of the parent Defence Research and Development Organisation (DRDO). The DSRO's role was to find and implement defense applications for India's spectrum of space technologies.[43]

In October 2022, "Mission DefSpace" was launched by Prime Minister Modi with seventy-five space challenges (i.e., incentivized competitions) in the areas of launch, satellite, communications, payload, ground, and software systems. These are aimed at the private sector, especially small industries and start-ups, and in this way the defense space sector was opened to private industry.[44]

Another development of the period was the incipient steps taken to address the issue of AI and its uses for defense. In February 2018, the Department of Defence Production in the MOD constituted a task force for Strategic Implementation of AI for National Security and Defence, headed by the chairman of the vast Indian conglomerate Tata Sons, N. Chandrasekaran. Based on the task force's recommendations, the MOD created a Defence AI Council, with the defence minister as its chairman in 2019 as well as an Defence AI Project Agency with a specific annual budget.[45]

In 2022, the Department of Defence Production published a list of seventy-five priority projects related to using AI for defense. This was seen as a joint effort of the public and private sectors, as well as research organizations and academic institutions that had "helped create many unique technological products based on AI in the areas of data, logistics, surveillance, weapons and many more."[46]

REORGANIZATION 2022–23

Meanwhile, beyond the exotic high-tech domains, the military still needed to respond to the shifts and changes in relation to the basic military challenges it needs to deal with.

In May 2020, Chinese forces violated existing agreements to mass themselves on the Indian border in eastern Ladakh. They blocked Indian access to certain areas of overlapping claims that had hitherto been patrolled by both sides. This led to a clash at Galwan, in the northwestern region of Ladakh, resulting in the deaths of twenty Indians and an unknown number of Chinese, the first casualties in the border since 1975. This has resulted in a major standoff between the two countries that is still ongoing.[47]

India ordered its I Strike Corps headquartered in Mathura, south of New Delhi, to pivot away from

Pakistan toward China. This was the first significant reorientation of the Indian Army's defense posture that had hitherto focused on Pakistan. In 2022, it also took steps that had been initiated following the failure of Operation Parakram in 2002, to break its traditional "battalion-brigade-division-corps" army organization. The idea was to create agile and combined arms IBGs, larger than a brigade (3,000 personnel), but smaller than a division (12,000–15,000 personnel).[48]

Chauhan, the new Chief of Defence Staff, has taken a different approach to his primary task of restructuring and reorganizing the Indian military as such. He has made few public statements but has worked in the background to move ahead while building consensus. By mid-2024, he had held some two dozen meetings with the three Service chiefs and the chief of the Integrated Defence Staff (IDS) to work out the parameters, and now there is general agreement on the issue of creating theater commands. Chauhan will now seek approval from the new government later this year and thereafter hopes to have a theater command framework in place in two or three years.

Reports suggest that the model, on which there is "99 percent agreement," will see the emergence of a western, a northern, and a maritime theater command to be headed by four-star officers. The current Services' chiefs, who are also four-star, will henceforth be responsible for the provisioning and training of their respective arms. There will also be some other integrated functional commands relating to logistics, training, cyber and space, and intelligence, but they will be headed by three-star officers.[49]

Even before the creation of theater commands, a great deal of work is being undertaken in the background to integrate a number of areas—logistics, communications, systems, training facilities, and so on. The approach taken by General Chauhan was visible in a brainstorming conference held

in April 2024, where the heads of the two existing tri-service Commands interacted with various defense educational institutions like the National Defence Academy, the Defence Services Staff College, the College of Defence Management, and the Military Institute of Technology, as well as the heads of the armed forces Special Operations Division, the Defence Space Agency, and the Defence Cyber Agency. The aim was to promote the joint operational culture, even while making it clear that the uniqueness of each Service will not be affected by the changes.[50]

The government has passed an Inter-Services Organization (Command, Control, and Discipline) Bill in 2023 to standardize the legal mechanism for command, control, and discipline across the three Services, which is aimed at enabling the theaterization process. Among the trickier issues that still need to be dealt with is the process through which there can be equalization of promotion rates among the three Services, which vary hugely in terms of their size. Finally, there will be a need to establish a joint command structure in place of the separate operations directorates of the three Services.

There are likely to be no internal boundaries for the theater commands whose operational roles would be outside the country's borders. Aerospace assets will be spread across the country and dealt with through the existing theater commands, and it is likely that the first three theater commanders will belong to the army, navy, and air force.[51]

Given all this, it is clear that at some stage, the CDS would have to be introduced into the operational command structure from which he is currently excluded. In the structure outlined above, there is need for someone to lead national operational planning and coordinate the inter-theater command and control, and this can only be done by whosoever is in command of the joint command system. Logically, this will have to be the CDS, who is currently the head of the Chiefs of Staff Committee.

This would, of course, affect his job as secretary of the DMA since it would be too much of a burden on a single person. The way out could be the appointment of a vice-chief of Defence Staff as the head of the DMA. Perhaps more structural changes lie ahead.

THE FOREIGN CONNECTION

THE RUSSIA PROBLEM

Despite Herculean efforts toward creating a domestic defense industry, India remains dependent on foreign connections for some arms, spare parts, and components. Another dependence is in the geopolitical sphere where India confronts the challenge of dealing with the currently vastly superior Chinese People's Liberation Army across its land borders in the north and the Indian Ocean to the south.

The 2023 SIPRI analysis of global arms transfers reveals that while Russia remained India's main supplier, its share of Indian arms imports shrank from 76 percent in 2009–13 to 58 percent in 2014–18 and finally to 36 percent in 2019–23.[52]

The last major order of a Russian system was that of the S-400 missile system for which India has braved the 2017 Countering America's Adversaries Through Sanctions Act (CAATSA). It has so far received two systems and expects the balance by 2026. The Russians have also failed to deliver on a plan to manufacture 600,000 Kalashnikov AK-203 assault rifles at a dedicated factory in the UP industrial corridor at Korwa. Two other Russian projects are also facing delay—the construction of two Project 1135.6 Admiral Grigorovich frigates, which originally had Ukrainian engines, and the follow-on lease of a nuclear propelled submarine worth some US$3 billion.[53]

Some of these delays are the outcome of the war in Ukraine, and some are the result of the

comprehensive sanctions imposed on Russia by the West that have complicated the issue of payments between the two countries. Earlier payments were in US dollars and the sanctions have blocked them. On the other hand, India is buying a vast quantity of Russian oil against Indian rupees, and the two sides have not been able to work out some way in which this can be transferred to another hard currency. India has turned down a proposal to settle its bills in Chinese yuan.

In a 2021 paper, the Indian American analyst Sameer Lalwani and colleagues showed that the India-Russia relationship is much deeper and durable than is commonly assumed. It has been based on a congruence of interests between the two countries that goes back to the Soviet era. Arms transfer ties are one important component. The other is a mutual understanding on how the international system ought to be organized and how each country must defer to the other in terms of spheres of interest.[54]

As for arms, as we have indicated, India has sought to design, develop, and manufacture its own weaponry. Over the years, India has been seeking to diversify its source of technology and know-how, and in recent decades, as its relations with the US have improved, it has sought to source important deals from America. Nevertheless, as Sameer Lalwani et al. point out, Indian dependence is very high and enduring. They have suggested that Russian-origin platforms "composes 85 percent of major Indian weapons systems rather than the 60 percent figure often cited."[55]

In essence, this means that even if India were not to acquire complete systems from Russia hereafter, in the coming decades it will still be dependent on Moscow for spares, consumables, assemblies, and components for a range of equipment that it fields and in some cases manufactures under license, such as tanks, helicopters, field guns, infantry combat vehicles, and fighter aircraft.

THE US IN INDIA'S DEFENSE INDUSTRIALIZATION PLANS

By 2020, India had signed all four of the foundational agreements needed to operationalize India-US defense cooperation. These were the General Security of Military Information Agreement (GSOMIA) in 2002, the Logistics Exchange Memorandum of Agreement (LEMOA) in 2016, the Communications Compatibility and Security Agreement (COMCASA) in 2018, and the Basic Exchange Cooperation Agreement (BECA), which involves information sharing in the space and undersea domains, in October 2020.

The two sides had been working under an agreed framework of military cooperation since 2005, and in 2012 they sought to kick off design and development cooperation under the Defence Trade and Technology Initiative (DTTI). In 2016, the US designated India a Major Defense Partner, a designation unique to India.

In August 2018, India was granted the Strategic Trade Authorization Tier 1 (STA-1) status available only to close US allies. Through this, US companies were enabled to export a greater range of dual-use technologies to India. By now it was clear that the DTTI was not delivering the expected results, and the US was seeking to link up to Indian initiatives like the Innovations for Defence Excellence (iDEX), aiming to obtain results in the defense and aerospace sector. As part of this, the two sides signed an Industrial Security Agreement (ISA) in 2019 to deepen Indo-US collaboration by enabling exchange of classified military information.

The year 2023 was pathbreaking in the India-US defense ties, particularly in relation to efforts to enhance their industrial collaboration. It has seen the entry of the United States into the Indian defense industrialization process in a significant way.

There have been several reasons for this. First has been the learning from ongoing processes of the previous decade. Second is the Indian estrangement with China following the latter's coercive actions in eastern Ladakh in 2020. Third was the growing friction in US-China relations. And fourth was the US decision to evolve a new industrial framework based on semiconductor manufacturing and green energy, even while emphasizing a shift away from Chinese supply chains.

A year earlier, in May 2022, when Modi and US president Joe Biden met in Tokyo, they announced an Initiative for Critical and Emerging Technologies (iCET). This was given final shape by the national security advisors of both countries during their meeting in Washington, DC, in January 2023. At an inaugural meeting thereafter, senior science and technology officials from both sides met to discuss opportunities for greater cooperation focusing on codevelopment and coproduction and developing links between their respective ecosystems. Among the subjects that the two sides pledged to boost their cooperation was AI.[56]

THE MODI VISIT TO WASHINGTON, DC, 2023

There was a flurry of activity in the period leading up to the state visit of Prime Minister Modi to Washington, DC, on June 21–23, 2023. In May, the two sides held their first Advanced Domains Defense Dialogue (AD3) led by sub-cabinet officials where the two sides discussed collaboration in the areas of space and emerging technologies, especially AI.[57]

The two sides had begun working on a road map for US-India Defense Industrial Cooperation based on the 2015 Framework for US-India Defense Relationship. On June 5, they updated the road map during the visit of US secretary of defense Lloyd Austin to New Delhi.

The updated road map was aimed at "fast-tracking" technology cooperation and coproduction between the US and India, as well as at especially addressing India's needs to certain cutting-edge technologies. Priority projects under this framework included systems for intelligence, surveillance, and reconnaissance (ISR), undersea domain awareness, and air combat and support, as well as aeroengines, munitions, and mobility systems. The US made clear that it intended to make India "a logistic hub" for the US and its other partners in the Indo-Pacific as well as "support the integration of Indian defense industry into global supply chains of US defense and aerospace companies."[58]

On June 6, in Washington, DC, Indian foreign secretary V. M. Kwatra participated in the inaugural meeting of the India-US Strategic Trade Dialogue with Alan Estevez, undersecretary for Industry and Security in the US Department of Commerce. The aim was to facilitate Indian access to US semiconductor, space, telecom, quantum, and other cutting-edge technologies through the thicket of US regulations.[59]

Capping all this, as it were, was the announcement that General Electric Company had agreed with HAL to jointly produce the company's GE-414 jet engine to power the yet-to-be-developed LCA Tejas Mk2, the advanced medium combat aircraft (AMCA), as well as collaborate with India on the AMCA Mk2 engine program. The deal would see an 80 percent technology transfer to the HAL, including critical technologies; a previous agreement of 2012 had a 58 percent technology transfer component.[60]

During the Modi visit on June 21, 2023, India's defense ministry and its US counterpart launched a bilateral Defense Acceleration Ecosystem (INDUS-X) program to expand strategic technology and defense industrial cooperation. India's iDEX organization and the office of the US

secretary of defense would provide the leadership to connect industry and academic institutions in public-private partnerships.

Almost immediately, the INDUS-X began to receive applications for various projects. By November 2023, two INDUS-X "challenges" were accepted under the INDUS-X Mutual Promotion of Advanced Collaborative Technologies (IMPACT), jointly finalized by iDEX and the US Defense Innovation Unit (DIU). These relate to underwater communications and oil spills detection, as well as technologies relating to the Indian Navy and Coast Guard.[61]

There are still some outstanding issues in the relationship, such as the need for India to sign the Security of Supplies Arrangement (SoSA) and the Reciprocal Defense Procurement (RDP) agreement, both of which are being negotiated. Further, the "road map" document was viewed as a short-term measure since the 2015 Framework is up for renewal in 2024–25.

In May 2024, amid India's general elections, the officials of the two sides met for their second Advanced Domains Defense Dialogue (AD3) at the Pentagon. According to a readout, the dialogue featured their first discussion on ways to enhance cooperation in the space domain. The Indian delegation met with the US Space Command and AI experts in the US Department of Defense as well.[62]

THE YEAR AHEAD

This chapter has focused on policy issues that have played a significant role in the effort to reform and reorganize the Indian military in the recent years. There have been two important factors at play here. One is the ongoing standoff between India and China along the Line of Actual Control (LAC), and the other is the significant uptick in the India-US relationship.

Let us now examine how some of these issues are playing out on the ground currently. The Indian Army is continuing to focus on technology. In his annual Army Day press conference in January 2024, the Army Chief General Manoj Pande said that 2024 would be "The Year of Technology Absorption," noting that the army wanted leverage technology for "transformative change." This would be done, he insisted, through in-house expertise as well as collaboration with industry.[63]

At another event a few months later in April 2024, General Pande observed that warfare had transcended into new domains such as space, cyber, electromagnetic spectrum, and information. Besides listing terrain-specific electronic warfare (EW) systems, drones and anti-drone systems, light tanks, and light utility helicopters, he said that the army was pursuing forty-five niche technologies, while another 120 projects were underway to develop and absorb these technologies.[64]

The process of integration between the Services has also moved ahead. The Interim Budget 2024 for the first time consolidated the capital head of all three services in the demand for grants. These deal with land, aircraft, aeroengines, heavy and medium vehicles, and so on. The CDS would now prioritize their allocations with the help of the Integrated Defense Staff (IDS) and send them to the Defence Acquisitions Council for approval.[65]

Another development was the approval from the Cabinet Committee on Security (CCS) in February 2024 for two hundred BrahMos missiles worth 190 billion INR (US$2.3 billion). According to the Indian Navy Chief R. Hari Kumar, this would now emerge as the primary weapon for the Indian Navy, replacing all those imported hitherto. He noted that in all likelihood it would also emerge as the main air-to-surface missile for the Indian Air Force (IAF) as well.[66]

In February, the US approved the sale of thirty-one SeaGuardian MQ-9B armed drones to India at an estimated cost of $3.99 billion. The deal to acquire the drones, fifteen of which would be for the navy, would enhance India's maritime surveillance and control capabilities. The deal was announced during the Modi visit in June 2023. The army and air force each would get eight of its land version, called SkyGuardian.[67]

Meanwhile, the Indian Air Force is likely to get the delivery of the first of sixteen Tejas LCA Mk1A fighters from the HAL in July 2024. This is an advanced variant of the Tejas that is already serving with the IAF. The air force ordered eighty-three of the fighters in 2021 and is likely to order nearly one hundred more of the aircraft, which uses the GE-404 engine made by General Electric.

Another significant development has been the government's approval in March 2024 of the advanced medium combat aircraft (AMCA) fifth-generation fighter aircraft program. The approval is for the design and development of five prototypes of the aircraft to fly by 2028–29. The design work will be done by the Aeronautical Development Agency (ADA) of the Defence Research and Development Organisation (DRDO), which developed the Tejas fighter aircraft. The prototypes will be made by the public-sector HAL.[68]

In 2024, the Indian Army reorganization plans continued apace with another major shift—this time a reinforcement of its deployments in its central sector that stretches from Himachal Pradesh in the west to Sikkim in the east. Since a large portion of this comprises the Indian border with Nepal, Indian deployments there had not been very significant in what is known as the Central Sector.

However, now it was felt that there was a need to reinforce this sector as well, primarily in the Indian state of Uttarakhand, which borders on China. Plans are afoot to create a new corps here in what

is being called the "Uttar Bharat Area" (North India Area), headquartered in Bareilly.[69]

Meanwhile, the army expressed satisfaction with the first phase of its plans to create IBGs, which had been instituted in a pilot project in the IX Corps headquartered in Yol, Himachal Pradesh, and the XVII Mountain Strike Corps in Panagarh, West Bengal. The first phase IX Corps, which deals with Pakistan, had two IBGs, and in Phase II the Panagarh Corps had five.[70] The army now seeks sanction of the new government that came to power in June 2024 to go ahead with Phase III of the project, which will make IBGs the basic combat organization of the army.

The Indian Navy, too, is making an important shift in reinforcing its posture in its western Lakshadweep islands in the Indian Ocean. In February, it was revealed that India was to establish naval bases in Agatti and Minicoy islands, which sit on the nine-degree channel through which there is a major commercial shipping route from the Persian Gulf to Southeast Asia. The base at Minicoy, which is just 524 kilometers from the Maldives, was inaugurated in March. This seems to be a fallout of a pro-Chinese government taking office in the Maldives last year. Plans also call for the building of a new airstrip there.[71]

A significant development was the growth of Indian ties with the Philippines. In December 2023 and again in May 2024, Indian naval vessels visited the island country. Manila has recently received the first tranche of Indian-made BrahMos supersonic antiship missiles.[72] The Philippines plans to establish three coastal batteries of the missiles under a $375 million project.

Reports say that India is also upgrading its military infrastructure in the Andaman and Nicobar islands, which are adjacent to the Malacca Straits. Airfields there are getting longer runways and upgraded jetties, and new roads are being built in the islands. The aim is to facilitate greater

deployment of warships, aircraft, missile batteries, and troops there.[73]

Another significant development in 2024 is that India and France have begun contract negotiations on a deal to procure twenty-six Rafale Marine fighter aircraft for the navy. These will replace the current Russian origin MiG-29K fighters. Last year the government chose the aircraft over the American F/A-18 Super Hornets, and they will be used in its indigenous aircraft carrier the INS *Vikrant*.[74]

Another hallmark of India's more outgoing military stance is manifesting itself with the appointment of military attachés to more than a dozen new nations. These include countries like Poland, Armenia, Tanzania, Mozambique, Djibouti, Ethiopia, Ivory Coast, and the Philippines.[75]

In February, India's senior most defense official, Defence Secretary Giridhar Aramane, provided a glimpse as to how Indo-US cooperation is working on the Line of Actual Control with China. Speaking at the second edition of the INDUS-X summit, he said that "one thing that aided us [during the LAC standoff] was the intelligence, [and] the situational awareness which the US equipment and the US government helped us with." He noted that such assistance would be absolutely critical in the future as well.[76]

Aramane was also obliquely referring to the India-China clash at Yangtse on the LAC near the monastery town of Tawang in Arunachal Pradesh in December 2022, where the Chinese sought to overwhelm an Indian post using spiked clubs and improvised spears. Forewarned, reportedly by the Americans, however, the Indians had reinforced the position and were able to repel the Chinese.[77]

An important aspect of the Indo-US space cooperation was visible when the TSAT-1A was launched on April 7, 2024, from the SpaceX Falcon 9 rocket from the Kennedy Space Center. This is

a military-grade earth observation satellite with submeter resolution and has been developed following an agreement between the US company Satellogic and the Tata Advanced Systems Ltd. (TASL).[78]

On June 17–18, US national security advisor Jake Sullivan visited India along with Deputy Secretary of State Kurt Campbell. The visit, which was postponed twice, was connected to a review of the functioning of the iCET program initiated in 2023 by Sullivan and his Indian counterpart, Ajit Doval.[79]

Subsequently, Campbell gave an online briefing to journalists around the world and India and provided details of the state of play with regard to a number of Indo-US programs arising from iCET, which Campbell said was "at the heart of our partnership between the United States and India." He said that since the launch of iCET in January 2023, the two sides had deepened strategic cooperation. He noted that "the area that has sparked the greatest set of ambitions" related to India playing a key role in both supply chains, development, and design relating to semiconductors.[80]

In relation to defense, Campbell announced a number of new initiatives and partnerships such as the one between the US Space Force and the Indian start-ups 114AI and 3rd ITECH on advancing space situational awareness, data fusion technologies, and infrared sensor semiconductor manufacturing; another between General Atomics and 3rd ITECH "to co-develop semiconductor design and manufacturing for precision guided munition and other national security focused electronics platforms"; and third, an AI multi-domain situational awareness product jointly developed by General Atomics and 114AI to support all-domain command and control.[81]

He also provided details on the ongoing process for India to acquire the MQ-9B SeaGuardian drones, which had been approved by the US, and said that there had also been some early-stage

discussions on the possibility of the coproduction of the Stryker infantry combat vehicle and the Javelin antitank missiles.[82]

CONCLUSION

It is clear from this discussion that India is in the midst of a massive military transformation. Efforts are underway in multiple directions to make the Indian military more agile, technology oriented, and capable of deterring or winning wars in a multi-domain operational environment. These efforts also cater to an important aspect of India's aspiration and self-image to be seen as a global power and an industrial and exporting powerhouse. The United States is already committed to play a significant role in this, even though there are caveats on the extent to which US technology will be available for India to make the difference. American companies are jealous of their intellectual property rights, and the US itself has tough limits on the technology it is willing to export.[83]

Even so, as is evident, the tasks before India are huge, ranging from restructuring and modernizing its military and R&D systems, getting a modern defense industry going, overhauling its human resource management by overcoming the challenges to its Agnipath scheme, and promoting jointness and integration of forces even while putting in place a new higher command-and-control system.

India hopes that this process will ride on increased resources for defense as a result of its economic growth and reforms that have been instituted. This would, hopefully, aid the emergence of a new Indian defense industrial capacity that will service its military and also be a major exporter of defense equipment. However, as of now a great deal of this remains a work in progress and requires considerable effort and additional resources to succeed.

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