



INDIA@ 100

*Realizing the potential of
a US\$26 trillion economy*



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F O R E W O R D

N. Chandrasekaran, Executive Chairman, Tata Sons




India's progress over the past decade has been quite remarkable. The economy's position has gone from the tenth largest ten years ago to the fifth largest today. India has been the fastest growing major economy for the third year in a row—a bright spot in a global economy facing strong

recessionary impulses, multi-decade high inflation, record levels of public debt and the squeezing of real household incomes.

Looking over the next few decades, the country presents a major growth opportunity. **India@100: Realizing the potential of a US\$26 trillion economy** details the path ahead, from demographics to domestic consumption to reform. The following pages explain how India is most likely to overtake Germany and Japan and will become the third largest economy after China and the US by 2030. In 25 years, at a size of US\$26 trillion, our per capita GDP would be over US\$15,000, six times its current level.

I have full faith in our ability to achieve this Amrit Kaal vision because of several unique factors today. First of all, today's geo-political realignment contains numerous opportunities. We have a real India-plus opportunity in nearly every sector on the precipice of dramatic disruption—from energy and automobiles to pharmaceuticals





and medical devices. New manufacturing methods combined with new supply routes are a chance to claim a more central position in the new economy.

Second, there is massive potential of technology to address many of our most persistent development challenges, both in the private and public sectors. Whether it is generating jobs, improving access to healthcare and education, increasing the degree of formalization in the economy, public services delivery or getting more women into the workforce—technology will play a crucial role in solving these fundamental challenges.

Our technology strength means that we are well placed to continue reimagining our national blueprint using digital. If we use technology in the right way – and put our people first – it can fix structural problems that have held us back for decades.

But this is not just about domestic development. It is about becoming a global

hub for technology that will drive exports, fuel growth and raise incomes even faster. India has already led the world in reimagining ways of work once before, during the transition from hardware to software. As traditional ways of doing things continue to be transformed by the accelerating digital revolution, we can lead again.

This is a crucial decade for India to shape its own future, and even beyond, to chart a path for other developing countries in a global context that has been transformed by the pandemic, conflict and the generational fight against climate change.

The big question is, how do we spread the future to everyone, from workers in the informal sector to agricultural workers and to women who want to participate in the workforce.

It is our responsibility to shape the best path that will ensure a future India, that is one with massive opportunities for all.



EXECUTIVE SUMMARY

As per EY projections:

India's GDP
will be
**US\$26
TRILLION**
in market exchange
rate terms
by 2047-48

India's per capita
income would exceed
US\$15,000,
by 2047-48, putting
it among the ranks of
developed economies

In the medium term,
India would remain
**THE FASTEST
GROWING LARGE
ECONOMY**

India celebrated its 75th anniversary of independence in 2022. Milestones like these not only give an opportunity to celebrate the achievements of the past but are also an occasion to envisage a vision for the country. The Government of India has set for itself the goal of becoming a “developed” economy by 2047.

The next 25 years have been deemed as the ‘Amrit Kaal’ by Prime Minister Narendra Modi, a term drawn from Vedic inspiration, which means a uniquely auspicious period and represents India’s opportunity to herald a new world era.

India’s success is important for the world economy as it is home to approximately 1/6th of the global population. In 2023, India is slated to become the largest country in terms of population, enabling it to become the largest contributor to the global workforce for the next several decades.

The enthusiasm for India’s growth prospects is palpable given the slowing global growth buffeted by recent headwinds of unprecedentedly high levels of global debt to GDP, inflation, decelerating global population growth and plateauing global trade to GDP. These trends have been further exacerbated by rising protectionism amidst rising geopolitical tensions.

India has attained critical mass as the fifth largest economy in the world, realized primarily on account of its policies of economic liberalization, which made it more market-oriented, allowed for a greater role for private capital and in the process increased its global competitiveness. The growth projections for the Indian economy are the highest for any large economy over the coming decades.

This report demonstrates that even while maintaining a stable yet modest growth rate averaging about 6% per annum, India would become a US\$26 trillion economy (in

market exchange rate terms) by 2047-48 (in nominal terms), with a per capita income exceeding US\$15,000 (nearly six times the current value).

The recent accelerated pace of economic reforms of the last few years in the domains of fiscal, digital, physical infrastructure and social inclusion, has positioned India for higher and sustainable growth. This, together with the largest, broadest and deepest labor pool, with a relatively inelastic labor market, provides a long runway for improving productivity at a pace faster than growth in wages. This enhances the global competitiveness of enterprises doing business in India.

In this context, there are a few key enablers of growth that uniquely strengthen India's position in the global economy over the next decade and beyond, which are summarized ahead.

WORLD'S INFORMATION TECHNOLOGY AND SERVICES HUB >

India's strong services exports have grown by 14% over the last two decades and stood at US\$254.5b in 2021-22. A large part of services exports is from the Information

Technology (IT) Services and Business Process Outsourcing (BPO) services with US\$157b in 2021-22.

This growth has been driven by both Indian headquartered and global IT companies. Besides, other global corporations are leveraging Indian talent through their capability centers in India, which employ over 5 million people¹. What began as a cost arbitrage has now become a key source of high-quality talent and leading-edge innovation. The 1,500 Global Capability Centers (GCCs) in India representing 45% of global GCCs are an acknowledgement that these centers are scalable with access to manpower skilled in new technologies, while adhering to business processes of the highest quality and efficiency. All of these have converged to give

India an opportunity to become “office of the world” for corporations as they look to adopt technology at a global scale.

India is well-positioned to leverage this success and cater to more skill-intensive and increasingly digitized services. Indian and global IT services players will leverage India for higher value services such as consulting, experience design, full stack digital engineering, product development for Industry 4.0 and incubate and industrialize new business process management use cases and processes often considered core

to businesses today. Most Indian and global IT services players will have their centers of excellence for Cloud, analytics and AI and other new age technology in India. Besides, great strides are being made in IP-based platform and product businesses, which are more scalable, sticky and differentiated, creating a potent ecosystem for India Hyperscalers to emerge over the next two decades.

Similarly, in non-IT services segments, India has a unique opportunity to fill in the talent gap as developed economies face a shortage of skilled talent due to demographic changes. This would be in areas such as education and healthcare, where services are increasingly being delivered over digital channels.

DIGITALIZATION: A FORCE MULTIPLIER >

A large telecom subscriber base of 1.2b and 837m internet users combined with government's focus on building digital platforms have laid foundations for a digital economy, enabled the development of a robust digital payment ecosystem and strengthened governance. A special focus and consistent backing of the GoI over the last decade in creating India's uniquely scalable Digital Public Infrastructure has borne fruit, yielding economic benefits and growth of innovation and entrepreneurship. Over the period 2014-19, in absolute US

1 <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1847841>

dollar terms, the digital economy grew by 15.6%, which was 2.4 times faster than the growth of the Indian economy.

Several service delivery platforms such as Cowin (COVID vaccinations), Ayushman Bharat (healthcare), DIKSHA (education and teacher training), GSTN (Tax), GeM (public procurement), UMANG (e-Gov services) have been implemented successfully and several other platforms such as AgriTech Stack, DESH for skilling and LiveStock are being planned.

The India Stack pioneered in India is now the global benchmark for most countries and provides a competitive advantage for growing businesses while addressing some of the complexities of the Indian economy. The uniqueness of the India Stack lies in its population scale, open architecture facilitating transactions, catering to very high volumes and designed to be low cost, based on 1.3b digital identities (Aadhaar).

Riding on the Stack and the wide-scale adoption of Unified Payments Interface (UPI) by 260m unique users, India today accounts for the highest volume of real-time digital payments among businesses globally, with a share of over 40% of all such transactions². This has enabled formalization of the economy with greater financial inclusion and created a market opportunity for entrepreneurship, which is reflected in the growing start-up ecosystem with over 84,000 recognized³ start-ups.

Going forward, platforms like Open Credit Enablement Network (OCEN) are expected to democratize credit at scale by enabling credit penetration at a low cost and making credit decisions/disbursals cash-flow based. Open Network of Digital Commerce (ONDC) is another platform which can be transformative as it will onboard micro, small and medium enterprises and small traders on a single platform, thereby giving more choice and access to a variety of products to customers and open e-commerce to buyers and sellers of all sizes.

The digital public infrastructure and its adoption by people, provides India a unique competitive advantage of not only reducing the cost of doing business, but also formalizes the economy and supports financial inclusion and creates new business opportunities.

2 <https://www.livemint.com/news/india/40-of-global-real-time-payments-originated-in-india-in-2021-report-11650973119569.html>

3 Recognised by Department for Promotion of Industry and Internal Trade (DPIIT)



FILLING THE CREDIT GAP TO FUEL GROWTH >

India's debt to GDP at 55% remains amongst the lowest among large economies globally. The Indian banking sector had a high level of non-performing assets (NPAs) in the past, which have significantly reduced and there has been a progressive deleveraging of stressed balance sheets. Despite the pandemic, gross NPAs as of September 2022 have reached a seven-year low of 5%⁴.

The Micro Small and Medium Enterprises (MSMEs), which contribute 30% to the GDP, face a shortfall in supply of credit estimated at US\$250-US\$300b.

While there has been a slow but steady progress of the corporate bond market to 16% of GDP, the ratio is significantly lower than other large economies.

At the same time, digitization of the economy and availability of data provides a more objective and comprehensive basis for credit assessment and thereby enhanced lending to both individuals and businesses. This is a significant opportunity for the financial services sector, while addressing the credit needs of the Indian diaspora and businesses.

Accelerated credit growth and development of the corporate bond market would drive consumption through higher levels of personal credit and provide capital for investments in manufacturing and infrastructure.




THRIVING ENTREPRENEURSHIP SPURRED BY PRIVATE CAPITAL >

India's entrepreneurial spirit has always been its distinct advantage. Over the last few years, this entrepreneurship culture has got further bolstered backed by digitalization and supportive policy environment, giving a new and unprecedented scale to Indian enterprises.

Start-ups have grown remarkably over the last six years, with India emerging as the third largest ecosystem for start-ups globally. Over the past four years (since FY 2017-18), there has been 66% year-on-year growth in the number of additional unicorns being added every year. As of August 2022, India had 107 unicorns⁵ with a total valuation of US\$341b⁶.

PE/VC investments in India have been at record levels touching US\$82b⁷ in FY 21-22. There have been a significant number of successful exits for these funds to the tune of US\$42.5b in FY21-22, further demonstrating rising confidence in investments flowing into India. Though there would be short-term volatility owing to changes in financial conditions globally, the long-term trajectory for investments in India is clearly positive.

The spurt of new-age companies across technology and other sectors on the back of rapid digitalization and strong capital availability would be instrumental in delivering differential growth to the Indian economy.



REAPING THE DEMOGRAPHIC DIVIDEND >

India is projected to become the most populous country in the world in 2023. Currently, about 67%⁸ of India's population lies in the working age group. Approximately 25% of the incremental global workforce over the next decade will come from India. By 2030, India's working-age population will exceed 1b. On the other hand, the population is rapidly ageing in the developed world.

5 Why Indian economy is steady even as world faces turbulence - Times of India (indiatimes.com)

6 <https://www.investindia.gov.in/indian-unicorn-landscape>

7 RBI, EY analysis

8 <https://data.oecd.org/pop/working-age-population.htm>

With nearly 49% of the total enrolment in higher education consisting of female students⁹, India should expect a much larger proportion of women in the workforce in the years to come.

This presents a unique opportunity for India to support the global workforce with its skill-based talent, which also includes the largest pool of English speaking STEM graduates with an annual addition of 2.14m (47% women) and 6.2m healthcare professionals which includes doctors and nursing staff.

The large pool of skilled and unskilled labor with a relatively inelastic labor market, provides a long runway for improving productivity at a pace faster than the growth in wages.

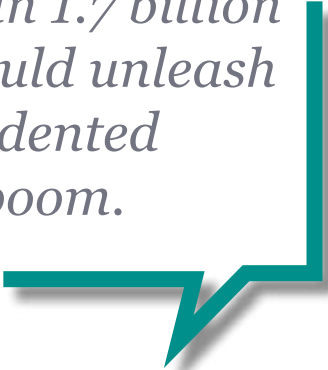
With a median age of 28.4 years, it is a young India which not only reinforces India's competitive advantage in the services and manufacturing sectors, but also unleashes the consumption power of a young population towards discretionary expenditure.

Domestic consumption has been important pillar of the Indian economy having grown at 11.5% in nominal terms over the last decade and thereby increasing the share of private consumption expenditure in the Indian GDP from 55%-60%.

Indian consumers have been opening up to credit driven consumption, evident from the fact that scheduled commercial banks have doubled disbursements of personal loans to ~ US\$ 425b, credit card debt has grown 3 times to US\$ 18.5b, vehicle loans have grown to US\$ 50b and housing loans have grown to US\$ 200b. The credit offtake from non-banks would be in addition.

This shift in consumer behaviour of a largely young population is supported by structural changes, driven primarily by the digital infrastructure and an enabling digital payments ecosystem.

6X growth in per-capita income by 2047 of more than 1.7 billion Indians would unleash an unprecedented consumer boom.



Combined with a shift in consumption patterns towards aspirational products and services would make India the fastest growing consumer market.

MAKING DOMESTIC MANUFACTURING COMPETITIVE >

Disruptions during the pandemic along with geopolitical conflicts have forced several global players to diversify their supply chains. Recognising this as a great opportunity to establish itself as a manufacturing hub, GoI has introduced various initiatives including 'Atmanirbhar Bharat' (self-reliant India).


Growth in manufacturing would help create new job opportunities for the 43% labor pool currently engaged in agriculture. Manufacturing growth also drives investments in infrastructure to move goods quickly and efficiently besides spurring further growth in services.

The initiative to aid manufacturing comprises competitive direct tax rates, a simplified indirect tax regime, incentives under Production Linked Incentives (PLI), a better quality of infrastructure, access to renewable energy and other factors. PLI scheme, by far, has been the most transformative reform, covering 14 sectors, which have attracted investment commitments to the tune of INR 2.5t (US\$31.3b). Many labor-intensive sectors such as textiles and food processing are covered by this scheme.

At the same time, sectors that would become more dominant and important in the future (for both India and the world)

or where the economy could be vulnerable to supply chain bottlenecks are also a part of the PLI scheme. Examples of such sectors include semi-conductors, electric vehicles, new energy related products like solar panels, advanced chemical cell batteries, green hydrogen, electrolysers, drones, among others. Whichever country establishes a competitive manufacturing eco-system in these products would have a significant advantage in the foreseeable future.

Success in complex, high value and emerging sectors would position India as a manufacturing hub catering to both domestic and global markets.



The Indian EV ecosystem, which is poised to see manifold growth in terms of adoption of EVs to the tune of over 100m vehicles by 2030, is a good example of such a sunrise sector. GoI has committed US\$14.5b for covering supply and demand side incentives and creation of charging infrastructure. On the back of this private investments are being made encompassing the entire value chain. This would serve as an opportunity

for domestic and global players to not only cater to domestic but also service global markets.

The scale of manufacturing operations, which has been a challenge so far, is also being addressed by a recalibration of the definition of Medium and Small Enterprises. There are ongoing efforts for simplification of labor laws considered a material impediment to the scaling of enterprises. This would be a definitive step toward improving the ease of doing business and making manufacturing more competitive.

BUILDING THE INFRASTRUCTURE OF THE FUTURE >

Acceleration in infrastructure investment, especially transportation and logistics, is directly boosting growth while steadily improving competitiveness for enterprises. After massive upgrades in roadways, the focus is now on rail, air, water transport along with the 'Gati Shakti' initiative which is aimed to improve intermodal visibility and synergies.

Investment in physical infrastructure is being supplemented by IT-based ease-of-doing-business initiatives such as the National Logistics Policy which aims to increase the speed and lower the cost of movement.

The target is to reduce the cost of logistics from 14-18% of GDP to global best practice of 8% by 2030¹⁰.

These are likely to show the greatest improvement in the next 3-5 years.

The National Infrastructure Pipeline (NIP) of US\$1.4t underpins the large infrastructure investment opportunity in India, duly supported with tax concessions for Sovereign Wealth and Pension Funds and an enabling market for Infrastructure Investment Trusts (InViTs) to monetize developed infrastructure assets and free up capital.

TRANSITION TO SUSTAINABLE ENERGY >

Rising global temperatures and associated climate risks are both a risk to the global economy and represent an opportunity to develop businesses relating to new sources of energy.

Recognizing the importance, the GoI has set a target to be net zero by 2070 and reduce carbon intensity by 45% by 2030 vis-à-vis



2005 levels. It has also set a target of 50% of power generation capacity from non-fossil fuel sources by 2030. These targets have been supported by policy changes and administrative actions covering a plethora of subjects such as green hydrogen policies, incentives for manufacturing Advanced Chemistry Cell (ACC) batteries, tendering for renewable energy capacity, tripling nuclear energy capacity and open access for sourcing green hydrogen.

The policy changes have spurred investments led by private players. Renewable energy capacity has increased from 40 GW in 2014 to 166 GW by 2022, with a target of non-fossil fuel based generation capacity of 500 GW by 2030. Over 7,000 kms of transmission lines have been constructed for providing green open access.

More recently, Govt has committed an incentive of US\$2.2b to achieve annual capacity of 5m metric tonnes of green hydrogen supported by associated renewable energy capacity of 125GW.

Besides cutting emissions in hard to abate sectors, development of green hydrogen can help India in its endeavour to achieve energy independence through cutting import of hydrocarbons. The goal is to meet 10% of global hydrogen demand by 2030. Private sector players along with state owned enterprises have committed over US\$ 200b to be invested till 2030 to meet India's new energy roadmap. There is significant excitement among Indian enterprises and entrepreneurs to strengthen India's plan for energy transition and its supporting ecosystem, given the strong economic value creation opportunity.

Ongoing investments by private players and strong policy support provides optimism that round the clock emission-free energy may become a reality sooner than what most commentators expect.

We believe these drivers of growth will impact sectors across the economy and will be key to India's growth and development cycle over the next 25 years.

Focus on social inclusion for equitable growth

What is distinctive to India's growth so far is the equal focus on the social sector. This is especially important and challenging to

implement in a country with a population of over 1.3b with extensive diversity. The country has used technology to effectively broaden and improve service delivery to the base of the pyramid and reflect the thrust on using digital technologies for equitable growth for 'Bharat', a vast majority of India's population.

Rural employment and public distribution of food have both been valuable instruments during the pandemic to serve the base of the pyramid, and the effectiveness of this public spending is expected to increase with time. India has achieved near-universal electrification of its rural households. Under the Jal Jeevan Mission, access to tap water has been extended since 2019, to nearly 76m rural households (56% of total rural households). These are clear indicators of the effect of the reform agenda at a grassroots level, making a positive impact on the quality of life for most Indians.

The social sector reforms and investments would further enhance domestic consumption and ensure more equitable growth.

Realizing the potential of a billion-plus nation

With a population of over a billion people, a nation has the potential to make a truly transformative impact on the world stage. Even as these eight growth enablers accelerate the economic engine, there will be areas that would require attention of the policymakers.

Ease of doing business

Improving the ease-of-doing-business parameters and reducing the regulatory and compliance burdens for enterprises in India, would be key to enhancing competitiveness.



Some of the areas that are acknowledged and need redressal include effective contract enforcement, reduced tax disputes with faster resolution and decriminalization of economic laws.

Urbanization and power sector

After lagging most large economies in its urbanization, India is now embracing it with a new resolve. There is an opportunity to develop an India-focused model, with a greater emphasis on sustainable development. In the power sector, while the over-dependence on government support and subsidies has been recognized and steps are being taken, more is required to make the sector self-sustaining.



Energy independence

Recent geo-political issues have underscored the importance of energy independence. India currently depends on imports for meeting 35%-40% of its primary energy needs with crude oil being largest constituent. Whenever price of crude oil increases, it is accompanied by depreciation of the Rupee, high inflation and slowing down of the economy. There is a need to continually reduce India's dependence on imported energy.

The GoI should continue to provide attractive policies for increasing the production of domestic hydrocarbons and accelerating the pace of the pursuit of non-conventional energy sources as demonstrated in its national hydrogen mission.

However, large scale transformation of the energy system is a long-drawn process. For example, as the world moves forward with decarbonization and India develops new capacities, access to critical minerals like Lithium and other rare earths would become



important. Access to these materials could make countries vulnerable in the future. Therefore, strategies to address any such potential vulnerabilities would be extremely important.

Education and healthcare

Considering India's accelerating working age population ratio, it is imperative to ensure that the workforce is educated, skilled and healthy, making them suitable for emerging employment opportunities, within

and outside the country. India's combined government expenditure on education was at 3.1% of GDP and for health at 1.4% in 2021-22. These levels need to be increased further to take advantage of the unfolding demographic trends.

Macro-economic stability

Incidences of the last few years such as the pandemic and the recent geo-political unrest have underscored the pivotal role of the government in addressing risks and ensuring macro-economic stability both in the short-term and the long-term. While the GoI has been strategic in its macro-fiscal response during the pandemic and the geo-political conflict, continued prudent macro-economic management focused on managing and stabilizing exchange rate, ensuring predictability in policies and proactively de-risking the economy would further enhance India's ability to sustain high levels of growth over an extended period.

As part of the prudent macro-economic management, the central and the state governments need to ensure that their revenue and fiscal deficits relative to GDP are within sustainable limits. In case both the central and state governments maintain a revenue account balance, the combined sustainable level of fiscal deficit of 6% of GDP supplemented by non-debt capital receipts averaging about 0.5% of GDP would enable the government to finance its capital expenditure to the extent of 6.5%

of GDP per year in a sustained way over a long period of time consistent with the budgetary 'Golden Rule'. Prudent fiscal management should ensure that subsidies should not be committed for short term welfare objectives. Instead, maximum policy attention should be focused on increasing employment especially using investments in infrastructure and funding enhanced expenditure on education and healthcare.

The government would also do well to emphasize augmentation of savings and investment rates in India. India's

investments are financed by domestic savings, net capital inflows (or foreign capital coming in) and withdrawals from foreign exchange reserves. Since FY08, Gross Capital Formation (GCF) has averaged around 35% of GDP and domestic savings have been the primary source for financing this investment. With capital as a scarce factor, it is crucial to ensure that the savings rate is boosted while attracting global capital to further uplift investments and thereby growth.



As we crystal-gaze into the 100th year of India's independence, we certainly hope that India exceeds our growth projections, with an equal and strong focus on providing inclusive and equitable opportunities and access to education, skills and better health, covering all sections of the population including women and economically and socially disadvantaged.

The aspiration should be to provide a higher standard of living and a better quality of life to all citizens, and for businesses to thrive and grow in an enabling environment to achieve their ambitions.

India, indeed, has the potential and opportunity to become a strong and resilient pillar in the changing global economic order.





INDIA@100 TRAILBLAZING

GLOBAL GROWTH



In slightly over two decades, India grew at an average rate of 6% despite a global pandemic and a global economic crisis, to rise from the 13th position in 2000-01 to become the fifth largest economy in the world.

This provides the springboard for the forthcoming decades of the 21st century. In projecting India's growth for the next 25 years from this base, we have considered the following factors, while taking cognizance of the ongoing global economic developments:

- growth-enabling multidimensional and multisectoral government initiatives
- fast pace of technological progress encapsulating the tangible thrust on digitization
- significant scope for the Indian services sector including its exports
- potential advantages emanating from the productive employment of India's burgeoning working age population



In our framework, we have taken guidance from two well-regarded global studies by the IMF (2022)¹¹ and the OECD (2021)¹² for the medium and long term respectively. In the medium term, the IMF has projected India's growth to average 6.5% per annum during FY2023 to FY2028, more than double the global growth at 3.2% on average during this period. In the long term, OECD's projections have been modified for India to suitably capture feasible growth paths. EY has forecasted three alternative growth paths as captured in Simulations 1, 2 and 3 (S1, S2, and S3). Details of the exhaustive methodology and key assumptions underlying these scenarios are discussed in "Understanding the EY Methodology".

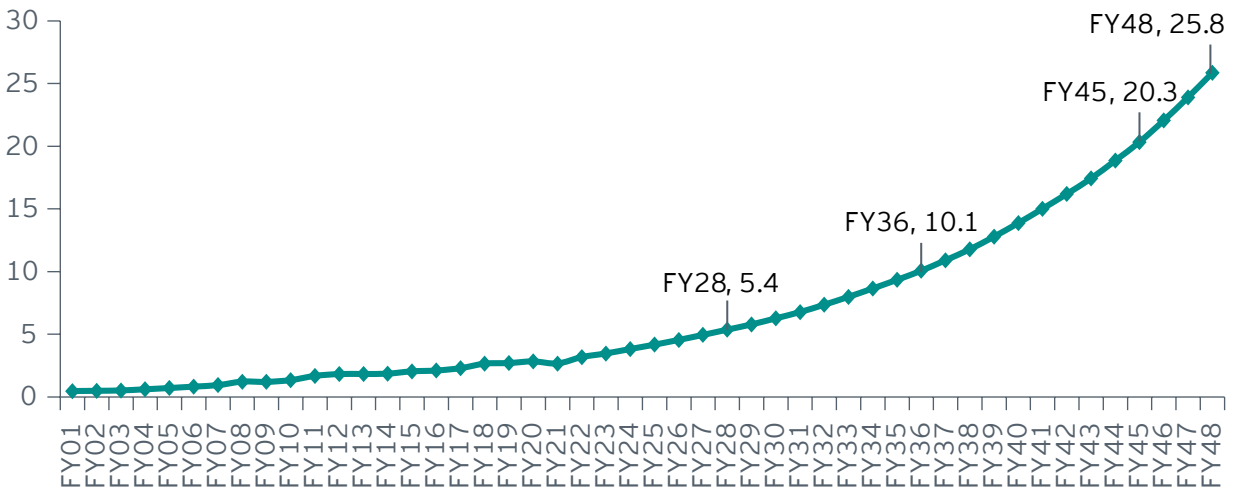
Key findings

In the most preferred scenario namely S3, India is likely to cross the critical thresholds of **US\$5, US\$10 and US\$20t** in market exchange rate terms in **FY2028, FY2036 and FY2045** respectively.

11 IMF's World Economic Outlook released in October 2022

12 OECD report "The Long Game: Fiscal Outlooks to 2060 Underline Need for Structural Reform" released in October 2021

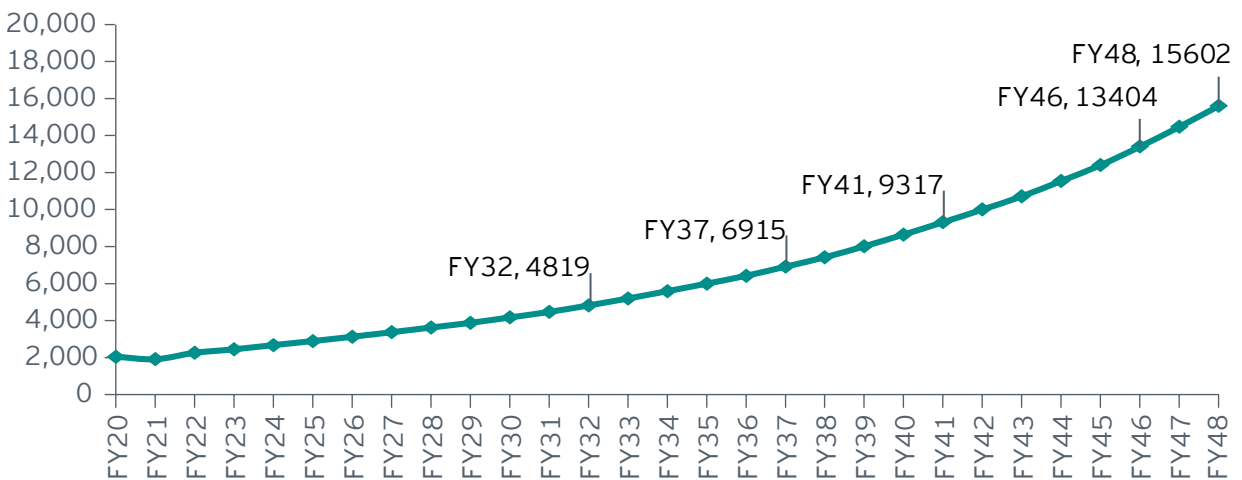
India's Amrit Kaal - Crossing critical thresholds Projected size of the Indian economy (in US\$ trillion)



Source (basic data): EY estimates

- India's per capita income in market exchange rate terms is expected to cross US\$13,000 by FY2045, putting it in the ranks of developed economies¹³. By FY2048, it is expected to reach a level of US\$15,602¹⁴.

From developing to developed Profile of India's per capita GDP (in US\$)



Source (basic data): EY estimates

13 According to the World Bank, a country is categorized as high income if its per capita income is at or above US\$13,205 (New World Bank country classifications by income level: 2022-2023)

14 Data on India's population projections have been sourced from UN World Population Prospects, 2022

Key features of alternative simulations and main results

Scenario	Key differentiating assumptions (Average during FY2023 to FY2048)			Nominal GDP in FY2048# (US\$ trillion)	Nominal GDP per capita in FY2048# (US\$)
	Nominal savings rate (% to GDP)	Nominal investible resources (% to GDP)	Technology factor*		
S1	30.5	35.0	2.9	23.9	14,442
S2	31.1	35.6	2.9	25.1	15,139
S3	31.1	35.6	2.8	25.8	15,602

* Technology factor refers to (Net Fixed Capital Formation to GDP)/ (GDP growth). A lower ratio indicates a higher productivity of capital owing to faster technological progress

The level of nominal GDP in the base year of FY2022 was US\$3.2t while per capita income was at US\$2,257

Results from the alternative simulations indicate that the estimates for the size of the Indian economy lie in a narrow range of US\$23.9t to US\$25.8t.

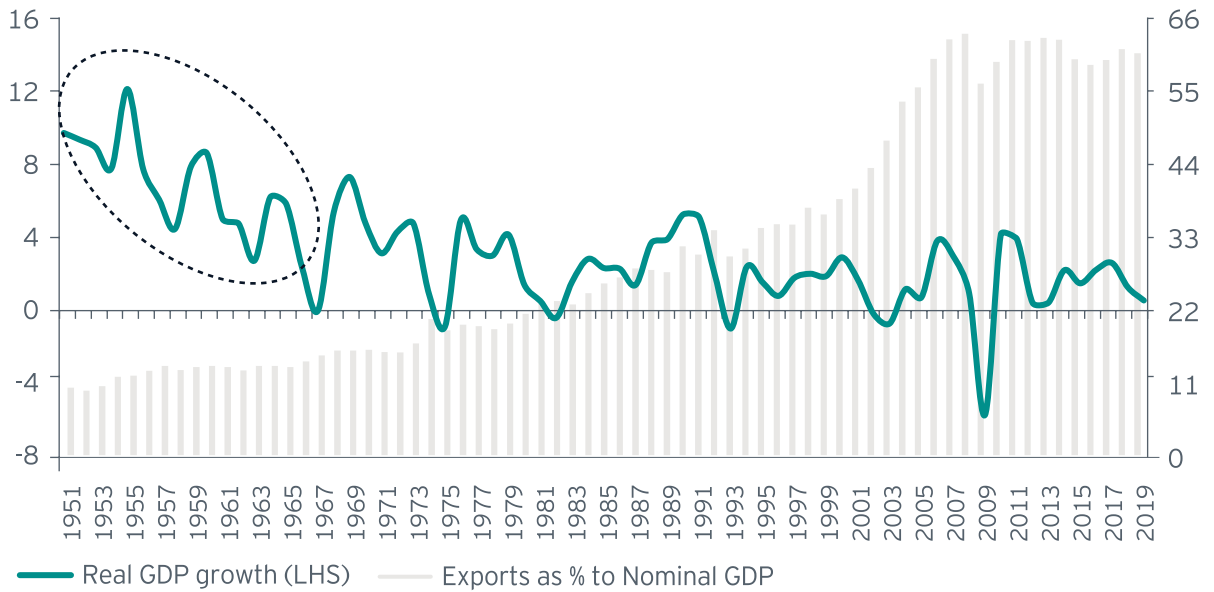
As per the most preferred scenario namely, S3, India's real GDP is projected to grow in the range of 6-6.4% over the period FY2023 to FY2048 although with a moderating decadal growth profile¹⁵.

Once real GDP growth is estimated, nominal GDP in INR terms is projected by assuming an IPD-based inflation of 4.5%. Nominal GDP is then converted into market exchange rate (US\$) terms using an average annual depreciation rate of 2.5%. Thus, projected GDP in US\$t terms shows an average annual growth of close to 8.4% over the forecast period (FY2023 to FY2048).

15 The easing of growth over time reflects the impact of (a) declining marginal productivity of capital, (b) increasing share of consumption of fixed capital (CFC) and (c) falling contribution of technological progress. This moderating trend in growth is also reflected in the OECD's long-term GDP growth projections for the US, China, India and the world. For details, refer to "Understanding the EY Methodology"

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Germany



Source (basic data): Penn World Table (version 10); www.ggdgc.net/pwt

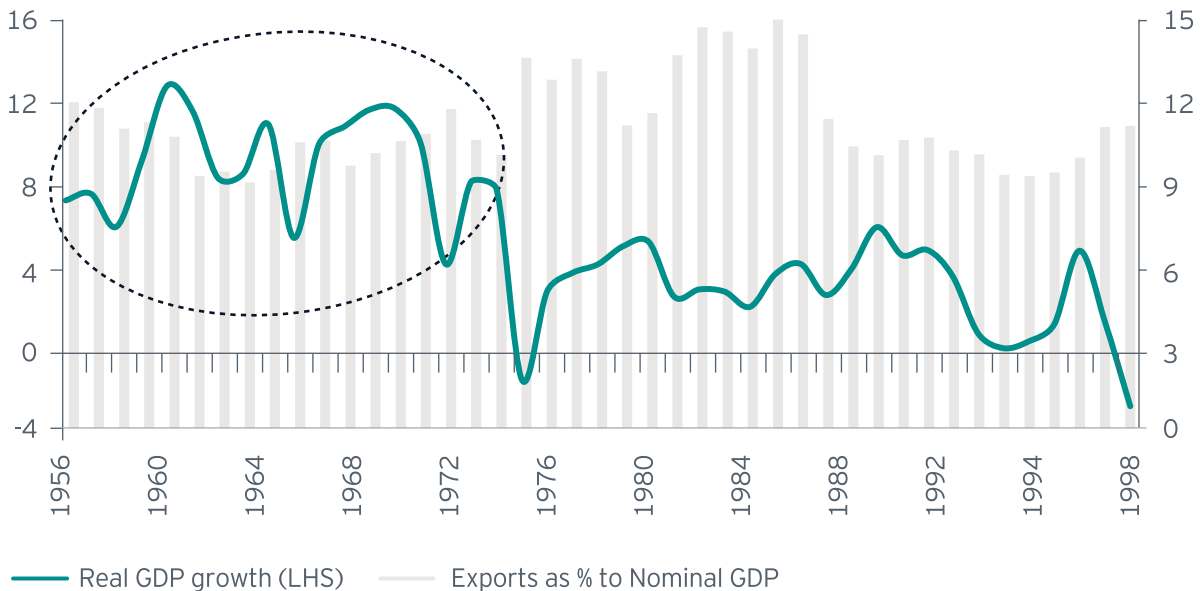
Notes on data:

- (1) Real GDP is measured at constant 2017 national prices (in 2017 US\$m)
- (2) Share of merchandise exports at current PPPs

- Germany experienced its post-World War II peak growth rates as West Germany 1950 onwards.
- In the earlier part of this period (1951 to 1960), average real GDP growth was 8.3%.
- The period from 1950 to 1969 is considered as Germany's Miracle Years.
- During 1951 to 1965, the share of merchandise exports in GDP was 12.4%.
- Growth during the period from **1951 to 1965** averaged 7.1%.



Japan

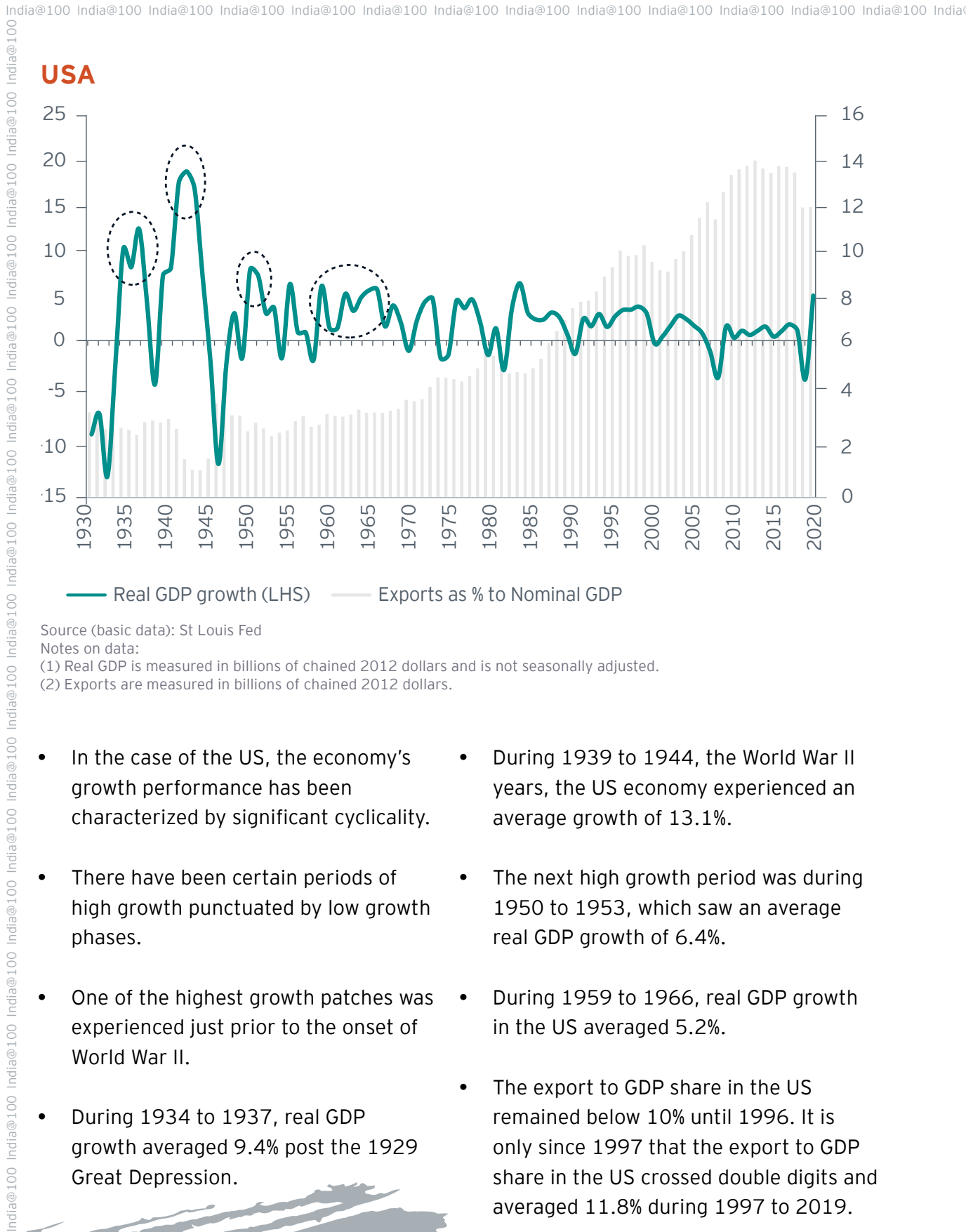


Source (basic data): Statistics Bureau of Japan (e-stat: portal site of official statistics of Japan)

Notes on data:

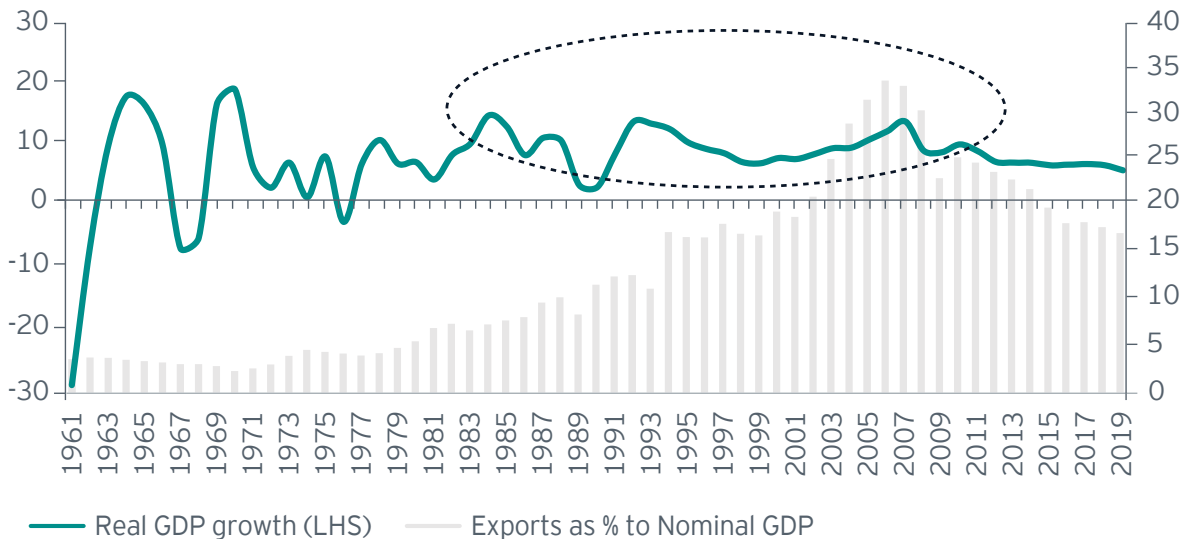
Real GDP is measured at market prices with CY1990 as the base year.

- Japan's post-war golden growth period is recognized to be from the mid-1950s to the early 1970s.
- During the period from **1956 to 1973**, its average annual real GDP growth was 9.2%.
- Within this period, during 1960 to 1970, GDP growth averaged 10.4%. This growth was predicated largely on support from the US which led to an explosive rise in the export to GDP share that averaged 10.5% during 1956 to 1973.
- The share of exports in GDP crossed 12% in 1974. From 1995 onwards, Japan's GDP growth had fallen sharply despite the high share of exports (*not shown in chart*).



- In the case of the US, the economy's growth performance has been characterized by significant cyclicity.
- There have been certain periods of high growth punctuated by low growth phases.
- One of the highest growth patches was experienced just prior to the onset of World War II.
- During 1934 to 1937, real GDP growth averaged 9.4% post the 1929 Great Depression.
- During 1939 to 1944, the World War II years, the US economy experienced an average growth of 13.1%.
- The next high growth period was during 1950 to 1953, which saw an average real GDP growth of 6.4%.
- During 1959 to 1966, real GDP growth in the US averaged 5.2%.
- The export to GDP share in the US remained below 10% until 1996. It is only since 1997 that the export to GDP share in the US crossed double digits and averaged 11.8% during 1997 to 2019.

China



Source (basic data): World Bank

Notes on data:

- (1) Real GDP is measured in terms of local currency units at constant prices.
- (2) Exports are measured in terms of local currency units at current prices.

- China's peak growth phase can be considered as a 30-year period from **1982 to 2011** when its real GDP grew at an average annual rate of 10.3%.
- During 1982 to 2011, the share of exports to GDP at current prices averaged 19% increasing from 8% in 1982 to 36% in 2006 before moderating to 26.6% in 2011.
- In fact, the latter part of this period covering the years from 2000 to 2011, the export-GDP share increased to an average of 28.2%.

In countries like China and Germany, high growth periods were accompanied by high or rising export to GDP shares. Post their peak growth phases, GDP growth fell in these countries even while the export to GDP share remained high. Although exports have been a key growth driver in the past, given the emerging global uncertainties, a pure export led growth model may have its own challenges.

With a moderating global trade to GDP ratio, India in addition to harnessing the full potential of exports would also have to emphasize on its domestic growth drivers.



8 GROWTH DRIVERS

OF AMRIT KAAL AND BEYOND



Where India reaches in 2047 would depend on its current strengths and momentum, future strategy, and its execution.

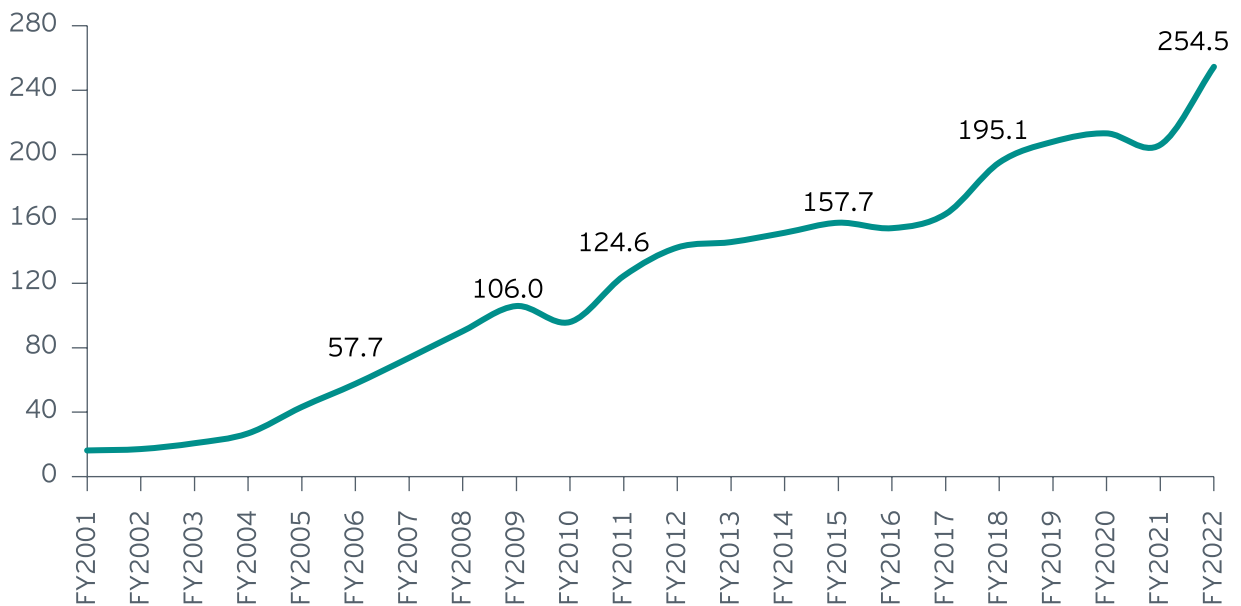
We believe India's current strengths such as high services exports, a growing digital ecosystem, availability of a large working age population, track record in creating renewable energy capacity, low private debt to GDP ratio, and defining reforms agenda and mega trends such as a growing entrepreneurship and start-up ecosystem, making Indian manufacturing globally competitive, funding and facilitation of infrastructure development, improving the competitiveness of the economy, will play a critical role in sustaining growth over the next few decades.

WORLD'S TECHNOLOGY AND SERVICES HUB

Services exports have been driving the overall export growth. IT and BPO services are the largest component and comprise over 60% of India's service exports, which has enabled the growth of overall services exports at a CAGR of 14% in dollar terms over the last two decades.

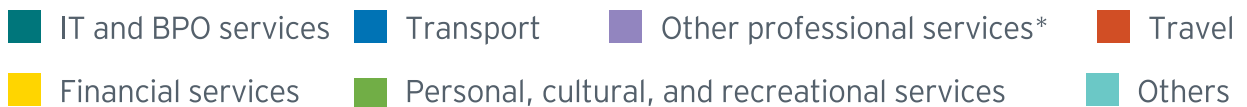
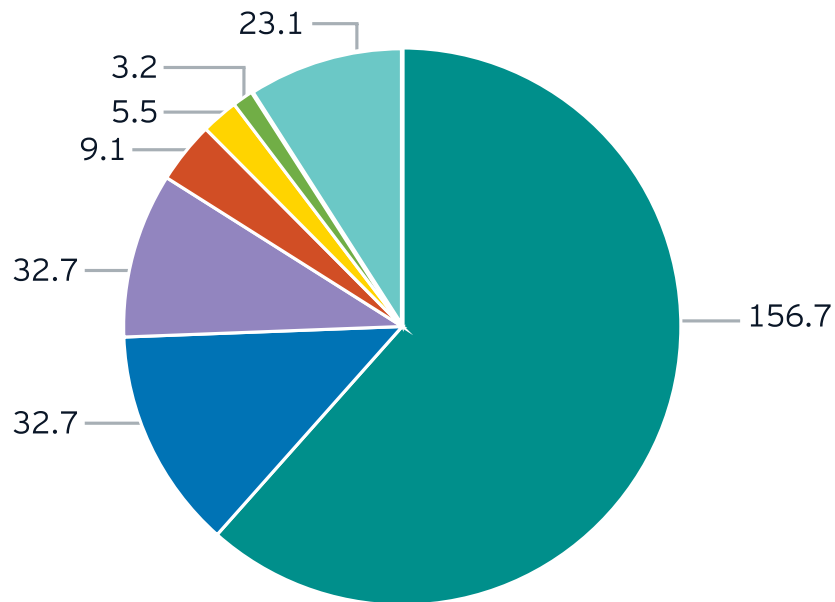


India's services exports (in US\$ billion)



Source: RBI

Composition of India's services exports in US\$b (FY2022)



Source: RBI Statement on India's Balance of Payments, and RBI Survey on Computer Software and Information Technology Enabled Services Exports: 2021-22

Note: * refers to other professional services not included in IT and BPO

IT and BPO Services

India has demonstrated its strength of being one of the largest exporter of IT and BPO services globally, estimated at about US\$157b¹⁶ in the fiscal year 2021-22 comprising US\$106b of IT services and US\$ 51b of BPO services. Direct employment in the IT and BPO segment is estimated at 5.1m in FY 2021-2022 and indirect job creation is estimated at over 12m¹⁷.

In FY 2021-2022 and indirect job creation is estimated at over 12m¹⁸.

In the next two decades, the share of transformational and more complex, expertise-based services will enable Indian IT services sector to grow faster.

- The Indian workforce is expected to solve the most complex problems and manage digital front-to-back-end functions of global corporations. It will help India transform from a technology back-office to a hybrid workforce

16 https://www.rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=54338#T1

17 <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1847841>

18 <https://www.meity.gov.in/content/employment>

powering the digital fabric of the world's largest corporations. Structural tailwind around a large employable base will push India's case further towards becoming the 'global capital' for technology talent.

- Potential to be the robotics and AI capital of the world with as many robots as engineers serving clients 24/7 in a hybrid workforce.
- In addition to "run the business" services, Indian and global IT services players will leverage India for higher value "change the business" services such as consulting, experience design, full stack digital engineering, product development and incubate and industrialize new business process management use cases and processes often considered core to businesses today.
- Opportunity to become a Platform and Product powerhouse - Indian IT services are being platformed and the Indian Business to Business ('B2B') Software as a Service ("SaaS") ecosystem has created its unique playbook. The impact is already visible - the first billion-dollar product company from India has emerged and there are over 20 India B2B SaaS unicorns. All this is creating a potent ecosystem for Hyperscalers to emerge over the next two decades.

Indian IT services companies will benefit from significant value creation enabled by accelerating on multiple levers:

- By creating new segments (e.g., Metaverse, 5G/xG)
- Powering market-leading growth in emerging segments (XaaS professional services, Cybersecurity, Digital and platform engineering, industrializing Automation and AI, Cloud managed services)
- Driving newer categories of middle and back-office managed services such as risk and compliance, and other services
- Transforming their value proposition shifts from largely "run and operate" to also include "advice, build and implement" with the ability to provide end-to-end solutions

India has emerged as the GCC hub for global corporations

Recognizing the value of the Indian demographic dividend, global corporations have set up over 1,500¹⁹ GCCs in India as of September 2022²⁰. The corporations with GCCs include some of the largest and most iconic companies in their sectors.

19 India GCC Trends: Quarterly analysis Q3CY2022 - November 2022, NASSCOM Zinnov

20 GCC India Landscape 2021 and Beyond!, NASSCOM, September 2021; <https://community.nasscom.in/communities/gcc/gcc-india-landscape-2021-beyond>

- All GCCs together employed approximately 1.3m people²¹ as of FY2021 and are expected to employ ~2-3m people by 2025. For many large global corporations, India has either the largest or the second largest workforce by geography.
- India accounts for over 45%²² of the GCCs in the world outside of the home country.
- 50-70% global technology and operations headcount are based out of India GCCs.²³
- From being “executors” to influencing the global enterprise strategy, GCCs are providing services relating to both cutting edge solutions such as cloud, data analytics, artificial intelligence/ machine learning, chip-design, system design, and software development to more administrative and procedural work.

Continuing investments and growth in GCCs have been fueled by the ability to scale up these centers as talent pools capable of supporting innovation and providing

services efficiently and competitively. Presence of so many large global corporations underscore their familiarity with India as a destination for locating their critical business operations, outside their home country.

Success of this sector in India has had a multiplier impact on the Indian economy as this workforce is also a large consumer of goods and services and contributes to savings and investments in the Indian economy. GCCs therefore can support accelerated economic growth as digitization grows in the world, while increasing the amount of business processes being managed from India.

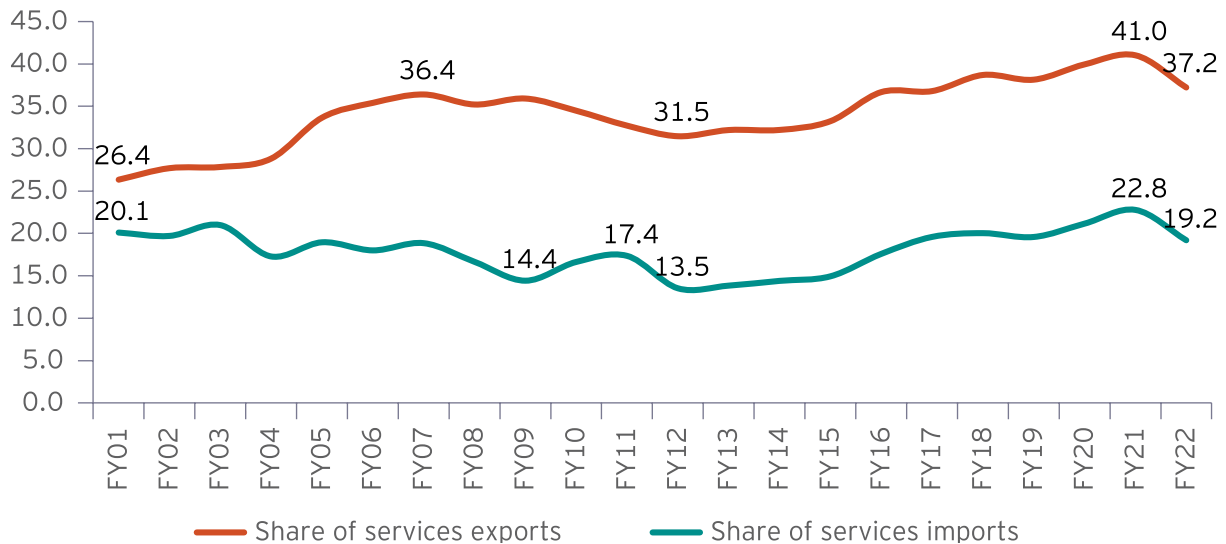


21 GCC India Landscape 2021 and Beyond!, NASSCOM, September 2021; <https://community.nasscom.in/communities/gcc/gcc-india-landscape-2021-beyond>

22 <https://nasscom.in/about-us/what-we-do/industry-development/global-capability-centres#:~:text=GCC%20centres%20in%20India%20over,the%20%E2%80%9Ccost%20centre%E2%80%9D%20stage.>

23 <https://www.prnewswire.com/in/news-releases/gccs-based-in-india-can-provide-cost-savings-up-to-45-over-3-to-5-years-as-per-nexdigm-891529293.html>

Share of services in total exports and imports (%)



Source: RBI

Opportunity to export services talent

It is important for India to diversify its services exports beyond IT and BPO services, with a focus to sustain and even accelerate its growth.

One area is to cater to growing demand in more skill-based and increasingly digitized services such as healthcare, education, and medical tourism. As of 2022, about 68%²⁴ of India's population was in the working age group and about 24.3% of the incremental global workforce over the next decade will come from India²⁵. This is significant considering the rapidly ageing population in the developed world creating potential

challenges to labor supply in various sectors of the global economy.

There is both an immediate and long-term supply crunch of healthcare workers globally. To illustrate, by 2025, the U.S. is estimated to have a shortage of approximately 446,000 home health aides and 95,000 nursing assistants²⁶. The demand for qualified healthcare professionals is projected to rise, particularly in developed nations that have a higher proportion of ageing population²⁷. The Ministry of Skill Development and Entrepreneurship (MSDE) has identified 300,000 jobs in the health sector alone in countries such as Australia, Germany, Canada, Japan, Sweden and Singapore²⁸.

²⁴ UN Population statistics 2022

²⁵ <https://www.thehindu.com/business/Economy/indias-gdp-can-grow-to-40-trillion-if-working-age-population-gets-employment-cii-report/article65286806.ece>

²⁶ <https://www.mercer.us/our-thinking/career/demand-for-healthcare-workers-will-outpace-supply-by-2025.html>

²⁷ <https://www.usnews.com/news/health-news/articles/2022-07-28/staff-shortages-choking-u-s-health-care-system#:~:text=By%202025%2C%20the%20U.S.%20is,industry%20market%20analytic%20firm%20Mercer.>

²⁸ <https://www.hindustantimes.com/india-news/healthcare-to-generate-jobs-govt-to-focus-on-skilling-for-employment-abroad-101615174695872.html>

While some of these shortages could be met through movement of people, with growth of technology, it may also be possible to outsource some of these services to India.

Recently, through various Free Trade Agreements (FTAs), India has endeavored to ease the global mobility of service professionals. India has also endeavored to provide dual recognition of educational and professional degrees with other nations which is expected to drive educational services exports and student mobility²⁹.

India and UK signed the Migration and Mobility Partnership Agreement in May 2021³⁰ allowing thousands of skilled professionals, students, researchers, and migrants, for professional and economic reasons, to work and live in each other's country for up to two years³¹. This is expected to drive easier mobility for those seeking to work overseas. In 2021, over 65,500 skilled worker visas were issued to Indian nationals, the largest group of foreign nationals who got skilled worker visa in the UK³².

Growing India's service exports faster

While India pushes ahead with growing its manufacturing sector, the services sector would continue to be an important pillar of growth for the Indian economy. It employs close to 31%³³ of the workforce, contributes to over 50%³⁴ of India's GDP and is one of the largest recipients of FDI inflows in India³⁵. It has been recognized as one of the primary drivers of domestic growth and exports. With the increasing share of services in world trade there is a large opportunity for expansion of services trade to grow from current US\$254.5b (2021-22).

To accrue benefits from a higher share of services in the global economy, it would be imperative to focus on diversification of our services exports by increasing our competency in other emerging services. For this, focus could be placed on those services that complement India's competitive ability and have potential for export growth. Sectors that can provide this opportunity include tourism, tele-medicine, medical value tourism, audio visual services with focus on mobile gaming and construction and engineering with focus on digital engineering services.

29 https://www.business-standard.com/article/economy-policy/india-uk-ink-agreement-for-mutual-recognition-of-educational-degrees-122072101445_1.html

30 <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1716095>

31 https://www.business-standard.com/article/current-affairs/union-cabinet-approves-india-uk-migration-and-mobility-partnership-121050600056_1.html

32 <https://economictimes.indiatimes.com/nri/work/indians-form-the-largest-nationality-among-those-getting-uk-skilled-worker-visa/articleshow/90367548.cms>

33 https://www.niti.gov.in/sites/default/files/2022-04/Discussion_Paper_on_Workforce_05042022.pdf

34 <https://www.indiabudget.gov.in/economicsurvey/doc/eschapter/echap09.pdf>

35 https://dpiit.gov.in/sites/default/files/FDI_Factsheet_March_2022_23May2022.pdf



DIGITALIZING INDIA: A FORCE MULTIPLIER

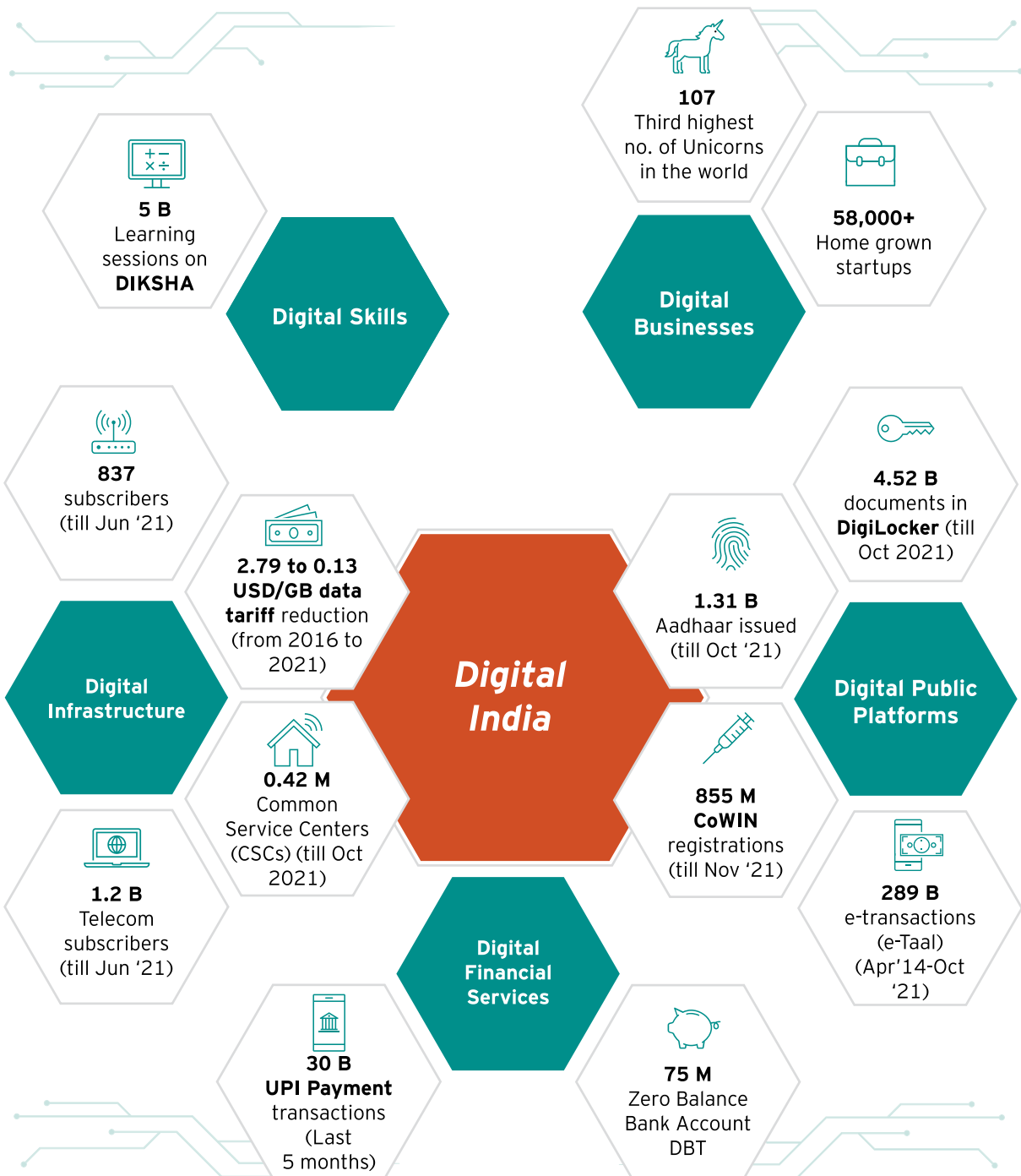
Digitalization is a big technological change which is underway and how countries adopt these technologies will lay the groundwork for the coming decades. It will be responsible for increasing economic efficiency and competitiveness, creating new businesses and products, and addressing challenges relating to increasing financial inclusion, improving governance and reducing disparities.

For India, digitalization is especially important given the large population with over 60% living in rural areas. Historically, there has been significant disparity in access to information, financial services, education levels and public services. Connecting the country together allows

greater access to benefits and opportunities of a modern economy to a larger number of citizens, thereby bridging the economic divide. Further, adoption of advanced technologies such as AI, Machine learning, blockchain, cloud computing, among others will improve the efficiency of Indian businesses, making them globally competitive, explore new markets, create new business models and position them for strong growth over the next few decades.

India has been digitalizing at a rapid pace driven by a combination of factors including growing broadband penetration, technological advancements, low costs of data usage, Government's thrust on building digital infrastructure. This provided an impetus to the emergence of the start-up ecosystem and entrepreneurship among the relatively young population, which has been quick in adopting and using digital technologies.

Digital India



Digital infrastructure built on India Stack

India has followed a different strategy in digitization of its economy vis-à-vis other developed countries. India has an open internet and there is no firewall between it and the rest of the world. However, the difference is that India has leveraged the internet to create a plethora of digital public goods and services. This has allowed India to connect a large number of citizens and provide a more democratic and an inclusive digital network and infrastructure.

Underpinning this infrastructure is the “India Stack”, a set of open Application Programming Interfaces (API), which is unlocking economic building blocks like identity, payments and data, thereby creating a platform for facilitating

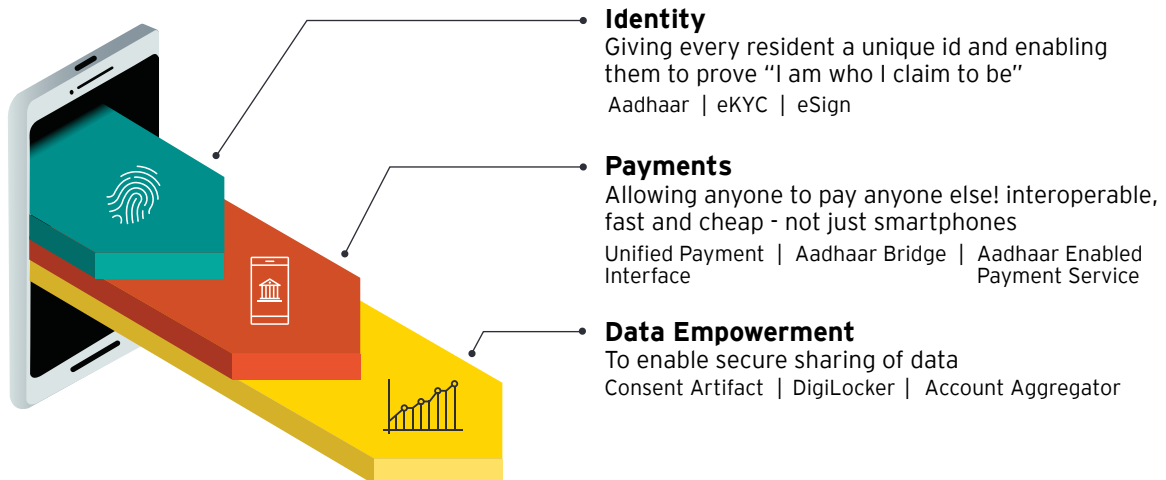
transactions and providing goods and services.

The Aadhaar layer provides online biometric based digital identities to 1.35b individuals. It is being used in a variety of ways such as a tool for providing targeted subsidies to the poor and marginalized (who previously struggled to establish their identity), while formalizing the economy by linking it with mobile, bank accounts, tax IDs, etc.

Another layer of the Indian Stack is the Unified Payments Interface (UPI). There are over 350 banks on the network with over 260m unique users and has grown to become India’s largest payment network and world’s fifth largest payment network by volume.

India Stack

India Stack is the moniker for a set of open APIs and digital public goods that aim to unlock the economic primitives of identity, data, and payments at population scale.



Development of the UPI interface has fundamentally changed behavior among Indians, with a long-term positive impact on:

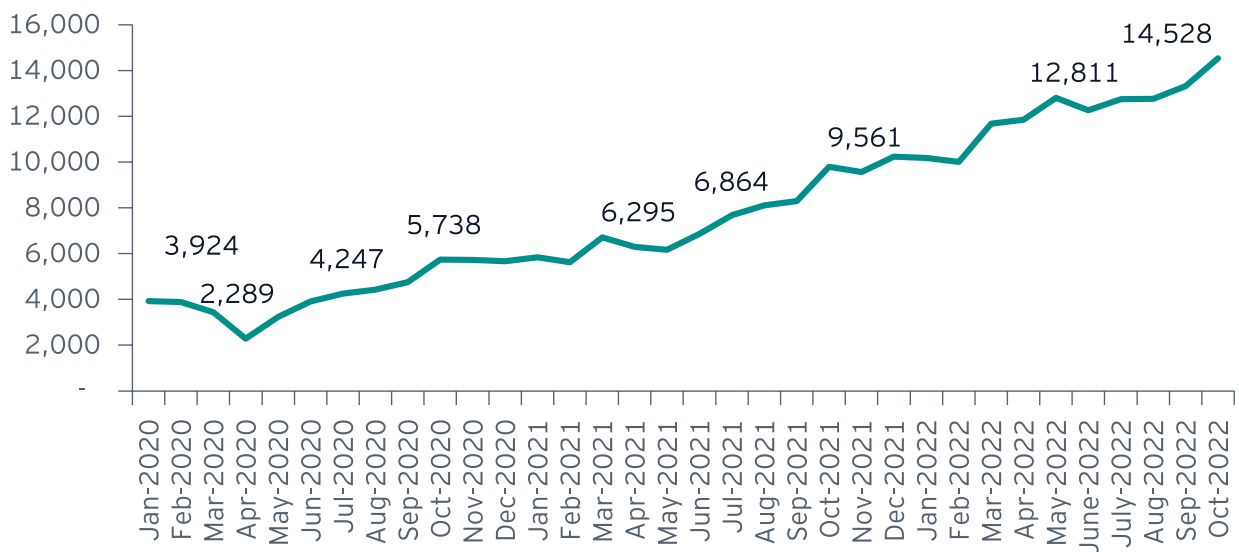
- Formalization of the economy - through cashless and paperless transactions
- Deepening of financial inclusion by bringing in number of small businesses and unbanked individuals into the formal economy by creating a financial record and credit history and allowing these businesses and individuals to easily access credit

- Provision of an alternate retail payment system and lowering of the dependence on existing card-based payment systems

- Provision of an architecture for private players to innovate and develop new business models, for example, fintech and e-commerce solutions

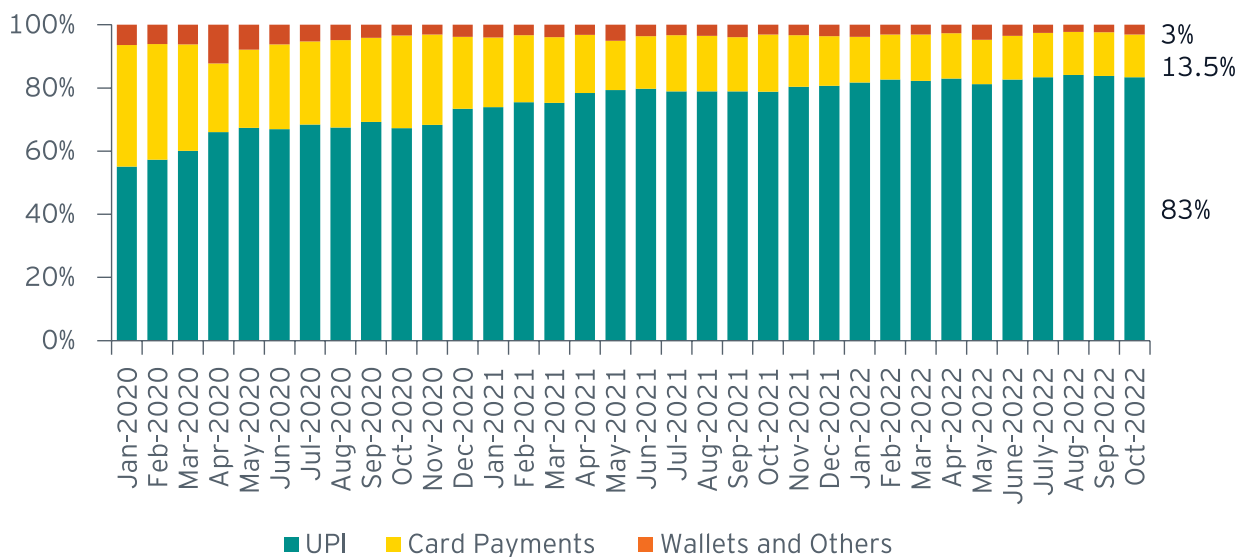
As a result of development of this stack, the impact of the pandemic and the growing e-commerce market, digital payments have been exploding with UPI leading the surge.

Digital payment trends - Total digital retail payments (in INR billion)



Note: Others include ECS, AEPS, APBS and BHIM
Source: TRAI, RBI

Digital payment trends - Share of different segments in total digital retail payments



Note: Others include ECS, AEPS, APBS and BHIM

Source: TRAI, RBI

A good example of the data stack relates to the digitization of health records under the Ayushman Bharat Mission. This envisages that health records and related data will have a unified interface and would be inter-operable between various health care providers. It would also lead to more efficiency and simplification for insurance. This would achieve what continues to be a challenge in many countries.

The stacks have been designed to be population scale, to facilitate transactions which cater to very high volumes and are designed to be low cost. These are building blocks for other platforms, whether developed by the government or private players. An ongoing project relates to developing the Open Network of Digital Commerce (ONDC), which is based on

open-sourced methodology, using open specifications and network protocols independent of any specific platform. It targets to connect customers, e-commerce platforms and sellers of goods and services. ONDC will facilitate onboarding micro, small and medium enterprises, and small traders on online platforms.

Built on the stack is the Open Credit Enablement Network (OCEN), which has been disruptive in enabling credit penetration at a low cost by making credit decisions/disbursals cash-flow based instead of the current asset-based. This holds the potential to democratize credit at scale and enable micro-lending for consumers and businesses across income and revenue segments.

The GoI has identified other key sectors such as education, agriculture, logistics etc. and proposes to develop nationwide sectoral platforms by weaving together multiple existing and new projects. With these building blocks in place, there is a tremendous opportunity for businesses to achieve scale across sectors.

Efforts for social benefits of education, healthcare and agriculture and skills are underway to give further push to the aspects of human prosperity and welfare.

Digitalization of government and governance

GoI has been progressively digitizing its interface with citizens and thereby making it easier to get licenses, certificates, payment of taxes and bringing efficiency in governance outcomes. The government has also digitalized procurement of goods and services by creating a centrally managed marketplace - Government eMarketplace (GeM), which is one of the largest procurement platforms with annual gross merchandise value of \$14.2b.

Social aspects of digitization, of bringing relief to people during the pandemic were driven on India's digital public infrastructure - COWIN³⁶, the technology platform created to control the rollout of the world's largest vaccination program.

Broadband usage has been surging, driving marketplaces

Broadband usage in India has been growing at an unprecedented pace. Mobile broadband (MBB) subscribers have increased from 345m to 765m over the past five years³⁷. Data traffic per user has seen a jump of 31% over the last five years reaching 17GB as of December 2021. As a result, India's data traffic usage during 2017-21 was amongst the highest in the world with CAGR of 53%. India's Gen Z spends an average of 8 hours per day online. The next wave of smartphone adoption is happening in rural India. It is now expected that India would have the second largest universe of online shoppers by 2030 estimated at 500m to 600m³⁸.

Online marketplaces have been exploding across all sectors of the economy. Reflecting the behavioral change, it is but logical, that these metrics will continue to explode. The size of the e-commerce market is expected to grow to US\$350b by 2030.³⁹

To conclude, India is digitizing at a rapid pace though adopting a strategy that is markedly different from that of other countries. Primarily, this is around the role that the government has taken in creating public digital goods. These will improve the quality of governance with a positive structural impact on increasing private debt

36 <https://www.cowin.gov.in/>

37 As per the Nokia MBit Index 2022 Report

38 Invest India, Nokia MBit Index 2022 Report

39 E-commerce in India: Industry Overview, Market Size & Growth| IBEF

to GDP, fostering entrepreneurship, and making the economic environment more business friendly.

Economic impact of digitalization

The economic impact of digitalization is being felt across the economy.⁴⁰

- India's core digital economy⁴¹ share in GVA increased from 5.4% in 2014 to 8.5% in 2019, with digitally dependent economy estimated to be around 22% of GDP in 2019
- In absolute US dollar terms, India's digital economy exhibited a growth rate of 15.6% over the period 2014 to 2019, which was 2.4 times faster than the growth of the overall Indian economy
- Digital output multiplier has increased over time from 1.35 in 2014 to 1.52 in 2019, highlighting the role of investments to drive growth
- 62.4m workers were employed in the digitally dependent economy in 2019.



40 December 2022 Monthly Bulletin, RBI

41 Constitutes economic activity from ICT goods and digital services producers

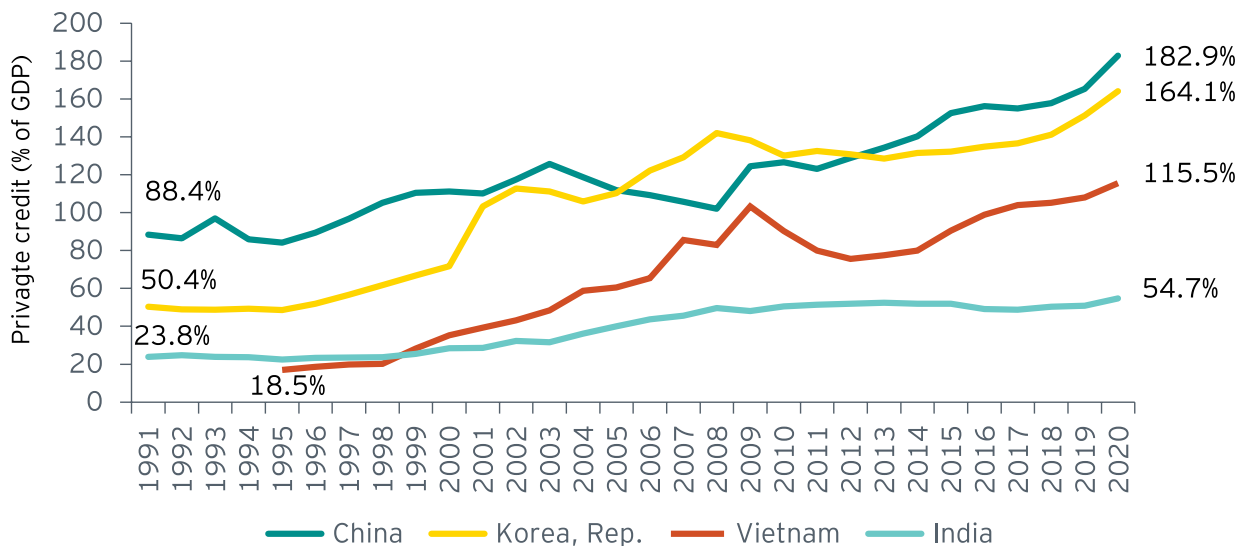
FILLING THE CREDIT GAP TO FUEL GROWTH

Globally, debt has played a crucial role in driving GDP growth. Being the world's fastest growing large economy, India has

headroom for increasing its total debt in relation to the size of the economy. India's private debt to GDP ratio remains one of the lowest among large economies, providing a tremendous runway for increasing leverage to drive growth i.e. 200 - 300 bps incremental annual GDP growth for the next 20-30 years to reach the current global average private debt to GDP levels.

Private debt to GDP ratio is low in India

Domestic credit to private sector as % to GDP



Source: World Bank

According to the World Bank, India's domestic credit to private sector at 55% of GDP in 2020 is remarkably below the world average (148%), and lowest among its Asian peers - China (182%), South Korea (165%), and Vietnam (148%).

The two primary sources of private debt - bank credit and corporate bond market could be better utilized in India.

Banks' ability to provide credit has improved

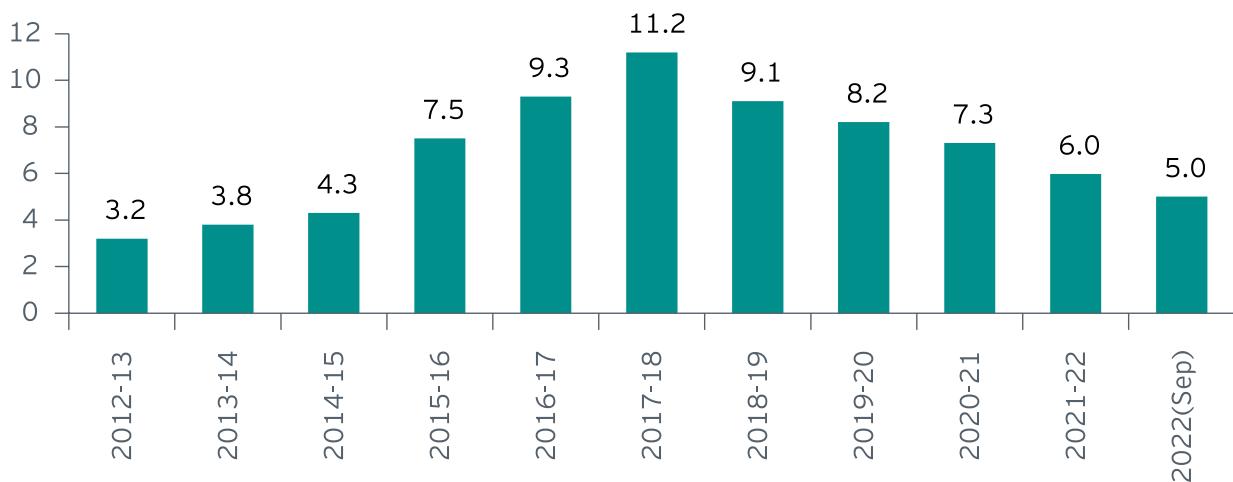
The Indian economy witnessed a bank credit boom during the period 2008 to 2014 with non-food credit registering a CAGR of 16.8%. However, in the subsequent years (2014 to 2021), credit growth decelerated to a CAGR of 8.3%. This was driven by a weak industrial sector credit growth and

banks being saddled with high levels of NPAs, which had skyrocketed due to the economic slowdown, overcapitalization of certain sectors, and certain other factors creating stress in corporate balance sheets.

This impacted the ability of banks to lend thereby exerting a negative drag on India's growth. The NPAs have since declined considerably with improved regulatory oversight, re-capitalization of banks by the government, implementation of the insolvency and bankruptcy code (IBC) and

progressive deleveraging by some of the stressed firms. Despite the pandemic, gross NPAs as of September 2022 have reached a seven-year low of 5%⁴². RBI's latest stress test of Indian banks indicate that they are well-capitalized and capable of absorbing shocks even in the absence of any further capital infusion. Even under the extreme stress scenario, the aggregate capital adequacy ratio of 46 major banks is estimated at 13.1% by September 2023, which is well above the minimum capital requirement of 11.5%.

Gross NPAs



Source: RBI

In the post-COVID period, a steady improvement has been witnessed in credit growth.

To illustrate, the mortgage market is expected to double from US\$300b to US\$600b⁴³ over the next five years in the

backdrop of rising income levels, improved affordability and fiscal support and yet remain at 13% of GDP well below China (18%) or US (52%). This is also visible from the fact that real estate developers have significantly reduced their unsold inventory levels post the pandemic. This

⁴² RBI's latest financial stability report released in December 2022

⁴³ <https://www.businesstoday.in/amp/real-estate/story/indias-mortgage-market-should-double-in-next-5-yrs-to-600-bn-hdfcs-deepak-parekh-336650-2022-06-07>

growth in private debt would therefore have a direct bearing on growth of the real estate market, which would in turn have substantial output and employment multiplier effects.

The most significant roadblock to growth in private debt was the lack of access and ability to assess creditworthiness, which therefore restricted banks and Non-Banking Financial Corporations (NBFCs) from growing their credit book to households. The digital infrastructure centered around a digital identity and a robust digital payments system has supported wide-spread financial inclusion. This has unleashed the potential to assess credit, underwrite risk and establish recovery mechanisms, reducing the friction in the process of distributing credit.

Similarly, a critical issue in India's credit market has been the burgeoning gap between the demand and supply of credit to Micro Small and Medium Enterprises ("MSMEs"), estimated at approximately US\$250 to 300b⁴⁴. Outstanding bank credit to industry shows share of medium enterprises steadily squeezed out, from 13.5% in 2007 to 4.3% in 2020. The government has recently changed the definition of MSMEs in 2020, a big move forward that has subsequently supported flow of credit from banks to MSME.

The financial services sector is now leveraging the data generated by the digital

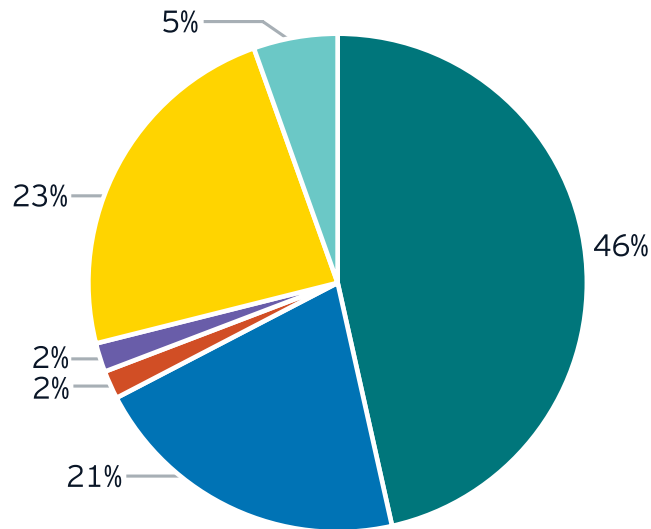
and payments infrastructure to provide a basis for higher quality underwriting, evident from the fact that banks and NBFCs have now started providing cash flow-based loans to individuals and MSMEs, which were hitherto not considered with banks insisting on collateral-based loans.

Development of corporate bond market crucial for long-term financing requirement

The Gol's NIP contemplates \$1.4t worth of investment in infrastructure assets over five years (discussed in detail subsequently). Given the fiscal constraints, there is limited room for expanding public investment and it is important that financing options, other than government and banks, should be explored.

Infrastructure projects often involve long gestation periods and domestic financial institutions do not have sufficient capacity to fund such projects. While enhancement of development financial institutions is in progress, they would also be better served by a more robust corporate bond market with far greater secondary market trading liquidity. Unlike developed markets, where long-term debt is largely mobilized from capital markets, India does not presently have the capacity due to lack of depth and breadth in the bond market reflected in very thin secondary market liquidity.

Outstanding amount of various fixed-income securities (%) as Dec'22



■ G-secs
 ■ Corporate bonds
 ■ CP
 ■ CD
 ■ SDL
 ■ T-Bills

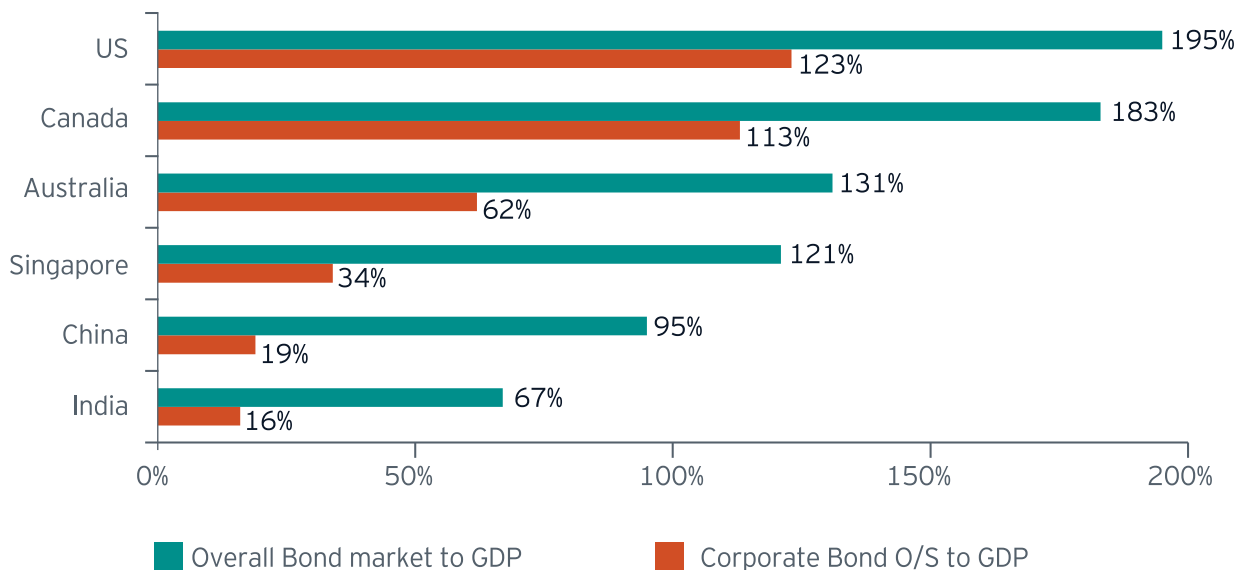
Source: SEBI, RBI and CCIL

The size of India's fixed income market was estimated at INR 192.5t (US\$2.4t) as of September 2021. G-secs and public sector enterprise bonds dominate the domestic debt market and account for ~92% of overall trading volumes in the secondary market.

The corporate bond market (total bonds outstanding) at 16% of GDP (2021) is an opportunity that remains sub-optimally utilized as compared to Asian peers - South Korea (87%), Malaysia (57%), and China (36%)⁴⁵.



Indian bond market was small relative to the size of economy in 2021



Source: World Bank and RBI

India's corporate bond market needs greater breadth with focus on all categories of investment grade bonds. 'AAA' & 'AA' rated bonds account for more than 90% of outstanding bonds, whereas 'A' & 'BBB' rated bonds constitute less than 10% of India's corporate bond market, compared to more than 60% in US, EU, and Japan. India's corporate bonds outstanding could more than double in five years growing from 16% of GDP to 22-24% of GDP while making the secondary market sufficiently liquid to drive the next leg of growth of the bond markets on its own steam.

A more liquid bond market and greater macro-fiscal stability will narrow the spread in yields (discount) due to trading liquidity and inflation, thus lowering the cost of capital for issuers. This would shift a greater portion of borrowings of large corporations

from banks to the corporate bond market, freeing up capital for banks to lend to smaller borrowers.

Building on the foundations of accelerated credit growth and development of the corporate bond market, an optimal financial architecture can help India sustain high economic growth over the long-term with a greater share of private sector debt and reduced cost of capital for the Indian economy.

Private non-bank credit in early stages of evolution with bright future

There is still an unmet need for enterprise credit beyond those currently served by the corporate bond market and banks. This gap

has been filled by NBFCs that were growing rapidly until mid-2018 when their access to the Commercial Paper market became more challenging, and the baton for growth in credit passed to private non-bank credit, primarily driven by fund-based private credit.

Private non-bank credit can be described as non-bank, non-NBFC lending in high-yielding and illiquid debt-like instruments. It is typically offered to mid-market firms, which are underserved by traditional sources of capital.

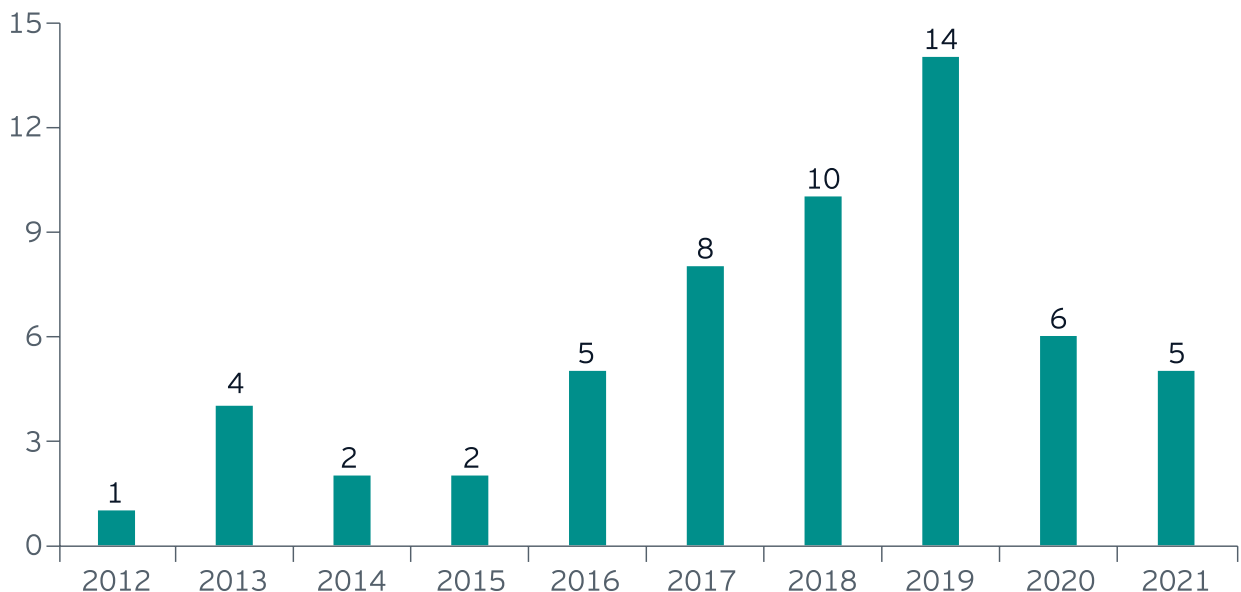
- From the borrower's perspective, private non-bank credit offers flexible capital

solutions in terms of structure and longer loan tenures to match the cash flow profiles of the business.

- From the investor's perspective, private credits appeal lies in the higher yields and diversification benefits this asset class offers.

Formation of National Company Law Tribunals and the introduction of a creditor in control Insolvency and Bankruptcy Code are the foundation for growth of private non-bank credit in India. India's high yield investment class is providing sizeable opportunities to non-traditional players to participate and create value.

Number of credit fund registrations as AIF Category 2 in India



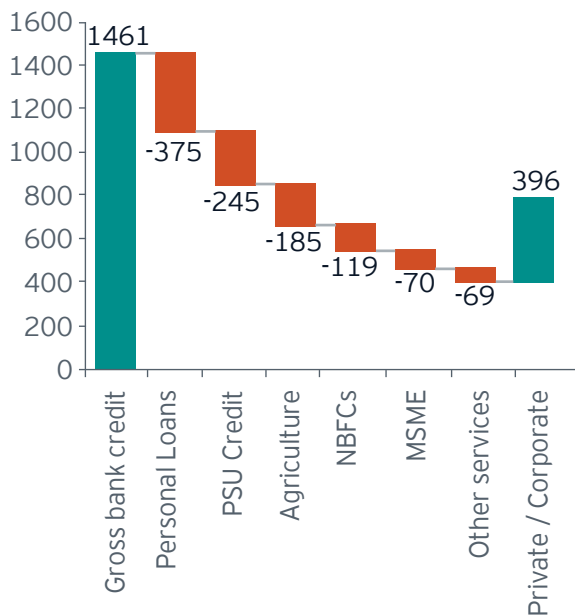
Source: SEBI

As of September 2021, existing credit markets comprised banks and non-banking financial companies (NBFC) players with aggregate credit outstanding of ~US\$1.46t and ~US\$ 318b, respectively. After deducting certain credit exposures, the outstanding wholesale credit to non-

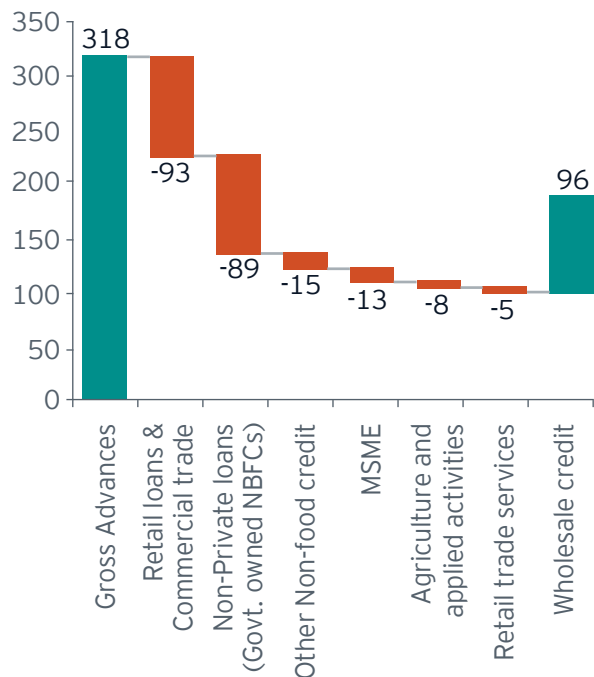
financial private corporates, represents the addressable opportunity for high yield credit, performing credit, special situations, etc. As depicted in the below graphs, total outstanding credit to private sector mid and large corporates aggregated to around US\$ 492b.

Opportunity size of high yield and performing credit in India in September 2021

Sectoral deployment of credit by Banks (US\$B)



Sectoral deployment of credit by NBFCs (US\$B)



Source: RBI

Attaining critical mass of an additional class of credit in the credit-starved Indian market will only serve to broaden the possibilities and addressability of the credit market and accelerate credit delivery to better meet the burgeoning requirement and bolster economic growth rates.

THRIVING ENTREPRENEURSHIP SPURRED BY PRIVATE CAPITAL

The India stack of digital assets and digital public goods and services have laid a strong foundation, on which the start-up

businesses are innovating and growing. It is the development of this digital infrastructure, which has fueled much of the growth of start-up India.

Start-ups often develop new products and services and thereby satisfy unmet or new needs and seed new industries. They bring in innovations, create new jobs and increase the competitiveness of the economy.

Start-ups have grown remarkably over the last six years, with India emerging as the third -largest ecosystem for start-ups globally after the US and China. The presence of start-ups in India is widespread, covering 56 industry sectors with 13% in IT services, 9% in healthcare and life sciences, 7% in education, 5% in professional and commercial services, 5% in agriculture and 5% in food and beverages⁴⁶. Till 2016-17,

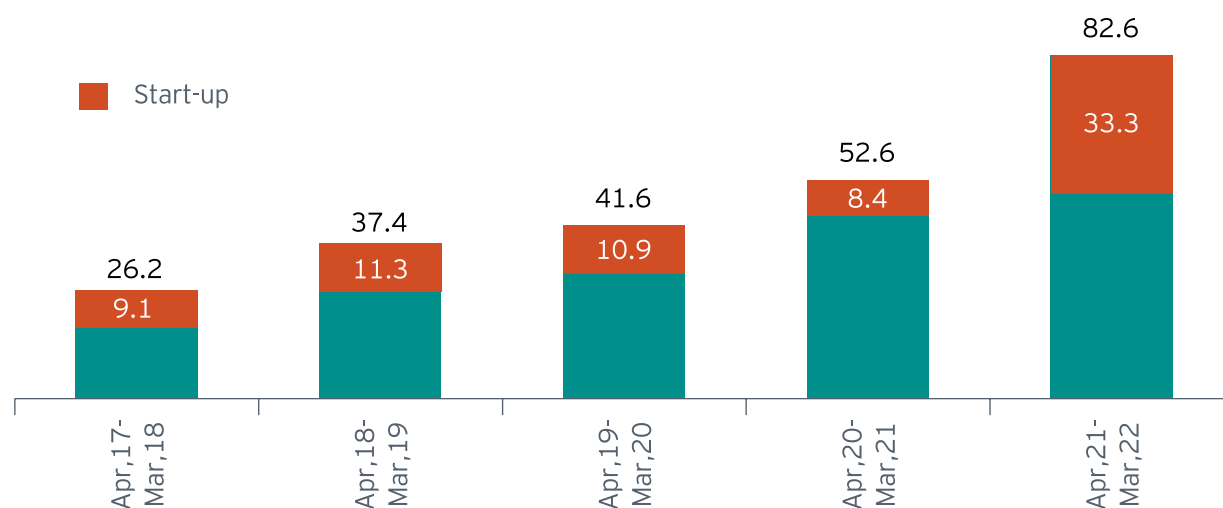
approximately only one unicorn was being added to the tally every year but over the past four years (since 2017-18), this number has been increasing exponentially, with 66% year on year growth in the number of additional unicorns every year. As of 7 September 2022, India had a total of 107 unicorns with a total valuation of US\$340.79b⁴⁷.

With greater access to private capital, equity markets and credit, the entrepreneurial spirit of India would continue to fuel growth, both in terms of employment and economic value addition.

Supportive VC and PE funding

The boom in start-ups has been supported by a robust availability of private capital from VC and PE funds.

PE/VC investments in India (US\$B)



Source: RBI and EY analysis

46 <https://www.pib.gov.in/PressReleaseDetailm.aspx?PRID=1823347>

47 <https://www.investindia.gov.in/indian-unicorn-landscape#:~:text=As%20of%2007th%20September%202022,Bn%20were%20born%20in%202022.>

While funding has gone to a variety of investments e.g., buyouts, real estate, infrastructure, etc, the largest flow has been to support start-ups. In 2021-22, US\$33.3b, approximately 40% of this funding was provided to start-ups⁴⁸.

Investment appetite has grown on the back of successful exits through both public markets and secondary sales. In 2021-22, the value of exits for PE and VCs was recorded at US\$42.5b⁴⁹ demonstrating the value investors have been to create in India through their investments.

While there has been a slowdown in the current year due to an increasingly uncertain global economic environment, this ecosystem of entrepreneurship supported by VC/PE funding, with a history of successful exits, is now well established in India.

REAPING THE DEMOGRAPHIC DIVIDEND

According to UN projections, India's population will become the largest in the world, in 2023. More importantly, the share of India's working age population to total population will reach its highest level at 68.9% by 2030. In absolute numbers, India

will have 1.04b working age persons by 2030. Correspondingly, India's dependency ratio would be the lowest in its history by 2030 at 31.2%. India's young dependency ratio - the number of children below 15 years of age relative to total population -- is expected to overtake the old dependency ratio (ratio of population aged above 65 years relative to total population) by 2056.

India would remain the largest provider of human resources in the world. About 24.3% of the incremental global workforce over the next decade will come from India⁵⁰. This is significant considering the rapidly ageing population in the developed world creating potential challenges to labor supply in various sectors of the global economy.

Equally important is the fact that India has a relatively young population with a median age of 28.4 years. Approximately 26% of the population is below 14 years and ~67% between 15-64 years and 7% above the age of 65. In contrast, the population over 65 years in US is ~17% and Europe over ~21%.

This young population not only reinforces India's competitive advantage in the services and manufacturing sectors, but also unleashes the consumption power of a young population towards discretionary expenditure.

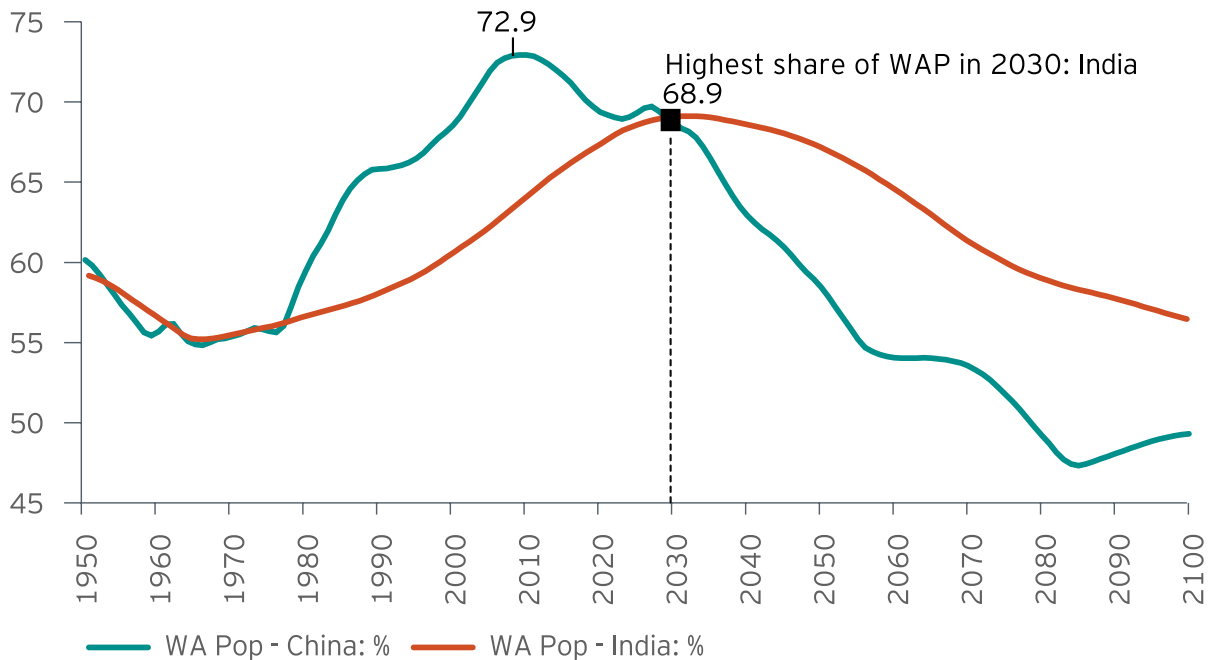
48 EY Estimates

49 EY analysis of VCC Edge Data; <https://www.livemint.com/companies/start-ups/vc-firms-may-garner-over-4-billion-from-exits-this-year-1564940913339.html>

50 <https://www.thehindu.com/business/Economy/indias-gdp-can-grow-to-40-trillion-if-working-age-population-gets-employment-cii-report/article65286806.ece>

A worker boom

India's working age population to total population ratio will be the highest of any large economy



Source (basic data): UN Population statistics 2022; WAP stands for working age population

The potential contribution of the growing population to India's GDP growth would depend, among other factors, on the rate of growth and size of total population and its contribution to the size of working age population who may be absorbed in productive employment.

The size and age of a country's workforce plays a huge role in its economic growth, and when complemented by new age skills and a strong entrepreneurial spirit, would define the country's progress.

Greater women participation will increase the size of the labor force

Labor Force Participation Rate (LFPR) for females which has declined for the past few years is expected to grow. Nearly 49% of the total enrolment in higher education consisted of female students⁵¹. With this rising trend, India should expect a much larger proportion of women in the workforce in the years to come.



Worker Availability vs Absorption

Labor force participation rate
(ratio of labor force to population above 15 years of age)

Employment rate
(ratio of employed population to labor force)

	Total	Male	Female	Total	Male	Female
FY92-95	54.1	78.8	27.9	93.2	93.2	93.3
FY96-00	55.7	80.5	29.3	92.7	92.7	92.7
FY01-05	56.2	80.5	30.3	91.9	91.9	91.7
FY06-10	54.7	78.4	29.6	91.5	91.6	91.2
FY11-15	53.2	78.2	26.9	91.9	91.9	91.7
FY16	50.5	75.9	23.7	92.1	92.1	92.0
FY17	49.5	75.0	22.6	92.2	92.2	92.1
FY18	48.5	74.1	21.5	92.3	92.3	92.2
FY19	47.6	73.1	20.5	92.4	92.4	92.3
FY20	49.4	73.6	23.7	93.5	93.4	93.9
FY21	48.2	72.3	22.7	89.8	89.4	91.3
FY22	48.5	72.7	23.0	92.3	92.0	93.1

Source: ILO, UN WPP 2022

Redeploying India's agricultural labor

India needs to emphasize on two critical dimensions to reap the benefits of the unfolding demographic trends - creating more jobs and thereafter improving labor force LFPR⁵². There is a need to accelerate job creation to lower unemployment and underemployment, thus providing enabling conditions for improving the LFPR.

As of 2018-19, over 42% of the total workforce was employed in the agricultural sector⁵³, while its share in overall nominal GVA was close to 18%. In fact, despite the falling share of agriculture in overall GVA, this sector supports for each 1% of its share, nearly four times the number of workers supported by industry and services⁵⁴, indicating massive levels of underemployment in this sector.

Defining opportunities

India's success in exporting IT and BPO services is a good example of how India has leveraged its demographic advantage. It has the largest pool of graduates with a Science, Technology, Engineering and Mathematics (STEM) background which is English speaking, giving India a differentiator

vis-à-vis other geographies. The annual increase to this pool is estimated at 2.14M⁵⁵ graduates and India is also the global leader in STEM women graduates at 47.1%⁵⁶.

There are 1.3m⁵⁷ doctors registered with the State Medical Councils and the National Medical Commission as in November 2021. Also, there are 0.29m⁵⁸ registered dentists, 3.3m registered nursing personnel and 1.3m allied and healthcare professionals in the country. Such a large pool of healthcare work force is not only required to support India's growth but also can be leveraged to provide health services globally.

This large pool of working-age population therefore provides a skill-based talent to address the needs in India and globally. Added to this is the ability to support a competitive manufacturing opportunity in India to address the global supply chain and the domestic consumption market.

Other sectors that may be able to accommodate this population include construction, public services, labor intensive manufacturing, services such as trade, transport and tourism, e-commerce, and other utility services in urban centers. These are the sectors where unskilled and semiskilled labor can easily be deployed.

52 The proportion of workers within the working age population who are actively seeking employment or are currently employed

53 Share in employment and output pertains to 2018-19 as sourced from PLFS (2020-21), MoSPI (<https://www.mospi.gov.in/documents/213904/301563//Annual%20Report%20PLFS%202020%20211655184532664.pdf>)

54 EY Economy Watch September 2019

55,56 India's Tech Industry Talent: Demand-Supply Analysis, February 2022, NASSCOM

57,58 <https://pib.gov.in/PressReleasePage.aspx?PRID=1809812#:~:text=Regarding%20healthcare%2Fmedical%20Professionals%20in,%20as%20on%20November%2C%202021.>



Alongside, it is also critical to ensure that the working age population in general, is suitably educated, trained and skilled for jobs of the future.

Reduction in poverty levels

The population of people living under extreme poverty is coming down, with over 415m Indians being uplifted from multi-dimensional poverty during the period 2005-6 to 2020-21⁵⁹. This has been achieved through a combination of higher incomes and impact of welfare programs such as provision of electricity.

Rising urbanization

Traditionally an agrarian economy, the rapid growth of manufacturing and services has driven migration from rural to urban India. The urban population has increased from 300m in 2001 to 500m by 2021⁶⁰ driven by both by growing population and increased urbanization.

Studies indicate a direct correlation between urbanization and consumption, as urban centers offer better employment opportunities leading to economic upgradation and better access to consumer goods. As India grows, urbanization would increase and drive further consumption.

59 As per UNDP report

60 Urban population - India | Data (worldbank.org)

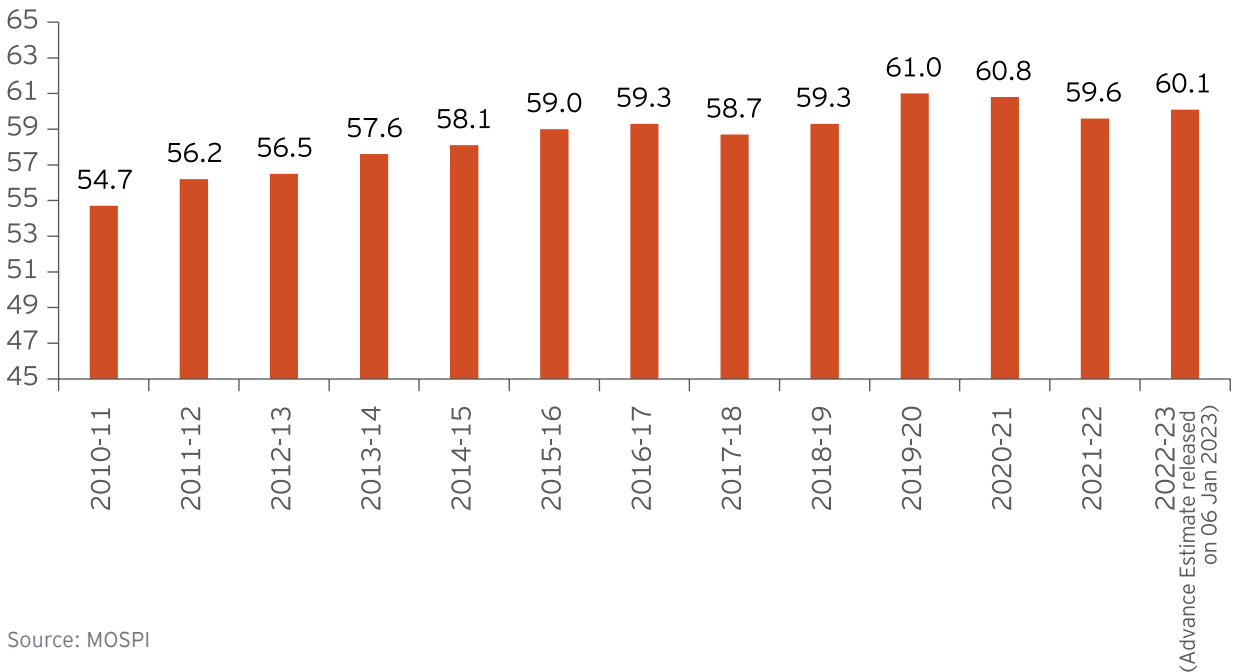
Purchasing power of over a billion people has driven economic growth

The economic growth over the last decade has been underpinned by increased consumption. Private Final Consumption Expenditure has grown at a CAGR of 11.3% (in nominal terms) over the last 10 years as against a nominal GDP growth rate of 10.6%. Consequently, the ratio of Private

Final Consumption Expenditure to GDP has increased from 55% to 60%.

While incomes have a direct correlation with consumption, there are various structural changes driving the Indian consumption story. With continued macro-economic growth and growing population, consumption expenditure is expected to continue to grow at high rates and an important driver of economic growth.

Trend in share of Nominal PFCE in GDP



Source: MOSPI

Increasing uptake of consumer credit ecosystem and increased financial inclusion

Indian consumers have been opening up to credit driven consumption. The uptake in credit from scheduled commercial banks underscores this trend.

During the period 2016-17 to 2021-22, outstanding personal loans of scheduled commercial banks more than doubled from INR 16.2t to INR 33.85t⁶¹ (~ US\$ 423b). During the same period:

- Outstanding Credit card debt increased from INR521b to INR1.48t (US\$18.5b), nearly three times in size
- Vehicle loans increased from INR1.71t to INR4.03t (US\$50.4b)
- Home loans increased from INR8.6t to INR16.84t (US\$210.5b)

The above does not include credit from other sources such as NBFCs but demonstrates the impact of consumer spending on the back of credit.

The country has witnessed a strong wave of financial inclusion through the Government's thrust on bank accounts and investments to build digital payments infrastructure. The formalization of the economy through digitalization of payment systems provides an avenue for better credit

assessment of citizens who in the past may not have been eligible for consumer loans. As the financial services sector develops and augments these solutions, credit to households would only increase, further fueling the consumption story.

Deeper distribution reach fueled by omni channel distribution

Rising internet connectivity, smartphone penetration and development of digital literacy has led to deep penetration of social influence and shopping. It is estimated that the number of online shoppers would increase from 150m in 2020⁶² to 500m by 2030. The rise of omni channel distribution over the last five years along with supply chain and logistics infrastructure, has connected brands to consumers stronger than ever before.

Traditional models of distribution had constraints that led to sub-optimal availability of consumer products and services in smaller cities and towns of India as well as in rural areas. Marketplaces, B2B commerce, Food tech platforms, Quick commerce and D2C (Direct to consumer) are growing rapidly in India. While these are at various stages of penetration, they have an important role in driving greater access and availability to consumers across urban and rural India. Funded by financial sponsors, these new distribution models and new age companies are transforming shopping and

61 Reserve Bank of India

62 https://bestmediainfo.in/mailer/mma_groupm_modern_marketers_guide_to_connected_consumers_journeys.pdf

consumption habits, as well as creating a level playing fields for new brands to play.

MAKING DOMESTIC MANUFACTURING COMPETITIVE

Investment in manufacturing drives creation of productive capacity, facilitates deployment of labor which would otherwise be deployed in agriculture, thereby helping India cater to domestic as well as global markets.

Increasing the share of manufacturing in GDP can help achieve all these three objectives.

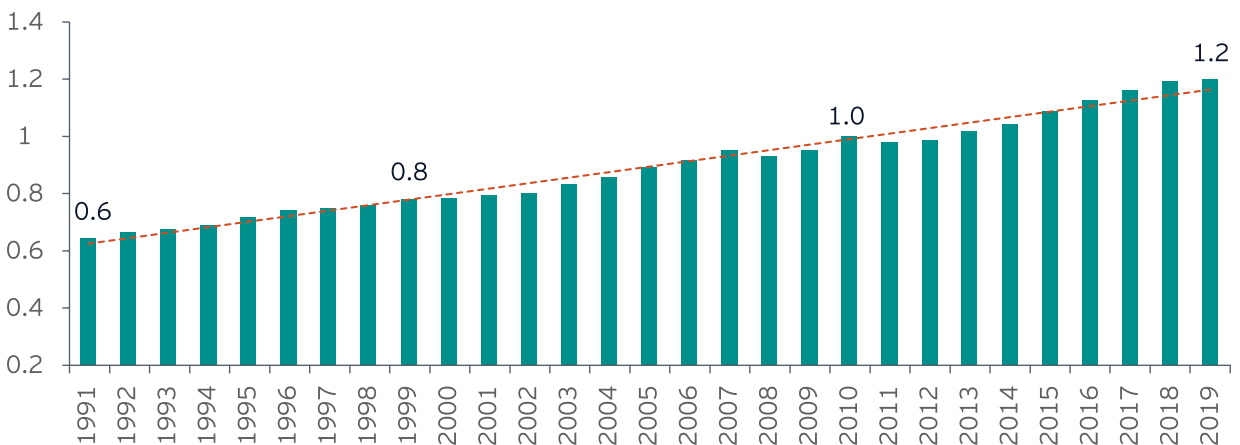
Increased competitiveness in manufacturing can be achieved through augmented factor

productivity which in turn is dependent upon adoption of new technologies and skilled human resources. Chart below shows the steady increase in total factor productivity in India since the 1990s.

Over the last few years, economies and companies have been exposed to supply chain vulnerabilities due to the COVID-19 pandemic and geopolitical reasons. As a result, several companies are looking to diversify their supply chains. The Govt has seen this as an opportunity to boost domestic manufacturing capacity by attracting companies looking to diversify their supply chain and also secure the supply of strategically important goods for the country.

Share of manufacturing in the Indian economy has been stagnant at average

Rising productivity - Annual trends in India's total factor productivity: Index (2010=1.0)



Source: Asian Productivity Organisation Productivity Database 2021

share of 16% in nominal GVA over the last decade⁶³. Recognizing the importance of increasing the share of manufacturing, the GoI has undertaken sustained measures over the last few years to foster manufacturing in India, with a relentless focus.

In 2017, the GoI enacted the Good and Services Tax (GST). Manufacturing, in particular, has benefitted through the enactment of GST in three ways (i) by removing the impact of cascading of taxes i.e., tax on tax, (ii) reducing the time for transportation of goods and (iii) enhanced access to credit for MSMEs from formalization of the economy. Thereafter in 2019, the GoI reduced the applicable direct tax rate for new manufacturing investments to 17.2% to make it competitive vis-à-vis other Asian economies.

In May 2020, it announced its 'Aatmanirbhar Bharat' (self-reliant India) strategy, that seeks to consciously reduce the country's dependence on imports while building self-reliance in a range of sectors. A natural corollary of this strategy is that it would reduce the domestic economy's vulnerability to external shocks such as the current supply chain disruptions.

To further boost the country's manufacturing capabilities, the GoI unveiled an innovative Production-Linked Incentive (PLI) scheme in November 2020.



The rationale behind the scheme was to provide incentives for sectors where manufacturing in India could benefit from scale of production at the enterprise level to make them globally more competitive. PLI scheme also aims to develop manufacturing capacity in sunrise sectors, including the strategically important high-tech ones. Presently, the PLIs cover 14 sectors, which have attracted investment commitments to the tune of INR 2.5t⁶⁴ (US\$31.3b), which include key sectors such as mobile phones, medical devices, pharmaceuticals, electric vehicles, solar panels, semi-conductors, electronic components, etc.

63 NSO and RBI

64 https://www.business-standard.com/article/economy-policy/pli-scheme-to-put-india-on-firm-footing-in-global-value-chain-amitabh-kant-122062201084_1.html

The PLIs have been formulated based on three key pillars:

The three pillars of the PLI scheme

Incentives are directly linked to production capacity/incremental turnover, compelling investors to create large scale manufacturing facilities.

This should lead to improvements in industrial infrastructure and economies of scale, benefitting manufacturers of all sizes, even if they are not direct recipients of the incentives.

Building Capacities

Currently, there is heavy reliance on imports for raw material and finished goods eg. the electronics industry has far more assembly units than manufacturing units.

PLI schemes intend to address this vulnerability by enabling domestic manufacturing of goods, triggering a two-fold impact – an immediate reduction in reliance on imports and in the long term, a higher quantum of exports.

Substituting Imports, Boosting Exports

With large scale investment and new capacities being built in a range of sectors, the new jobs created will also absorb India's expanding manpower.

The PLI framework envisages definitive steps towards India becoming a manufacturing power. They hold the potential to add an estimated US\$520b worth of manufacturing value to the economy*.

Creating Jobs

In addition, other complementary policy steps such as facilitating the sourcing of green power for manufacturing, recalibration of the definition of medium and small enterprises by more than an order of magnitude, enactment of model labor laws, national logistics policy to bring down the cost of logistics from the current 13-14 % to 8% of GDP through development of a unified logistics digital interface platform (developed by the government to incorporate approvals and certifications), preference for domestically manufactured goods in public procurement etc. have been undertaken.

An important part of the manufacturing strategy is the thrust towards sectors that would become more dominant and important in the future or where the economy could be vulnerable to supply chain bottlenecks. This is evident from the choice of focus sectors i.e., semi-conductors, electric vehicles, solar panels, drones, etc. If India develops competitive and large-scale manufacturing capacities for these products, it would reduce vulnerability of the economy while also providing opportunities for exports.

A good example of India's manufacturing capability was how within a few months of anti-COVID vaccines being approved, the Indian industry, with active support of the government, scaled up the production in a short span of time. India has not only administered 2.2b doses to its citizens but also supplied 242m vaccines to 101 countries. These vaccines were manufactured at a low cost to highest quality standards.

Another example of India's manufacturing success is that of mobile phones. The world's largest handset manufacturers along with their contract manufacturers have established and expanded production capacities. These investments have been incentivized by the Production Incentive Scheme (PLI) scheme. As a result, India has emerged as the second-largest mobile manufacturer in the world. Exports within the first year of the scheme, mobile phone exports saw a 66% increase from INR270b (US\$3.4b) in 2019-20 to INR450b (US\$5.6b). The production value of mobile phones has grown from INR900b



(US\$11.3b) in 2016-17 to INR2.8t (US\$34.4b) in 2021-22 with a CAGR of 25%.

One of the other significant areas of active investments and government incentives is Electric Vehicles (EVs) - both two-wheelers and cars. GOI's budget for 2022 includes investment plans for the EV sector up to US\$14.5b that are aimed at fostering component manufacturing, providing demand incentives and as well as creating robust charging infrastructure by 2030. New components and technologies driving EVs are emerging with higher degree of collaboration between traditional and new-age automotive companies. The rise of EV adoption has

also promoted several start-ups to explore manufacturing opportunities in chargers, ports, BMS systems and Battery packs.

To support this EV manufacturing ecosystem, oil marketing companies have etched plans to setup 22,000 charging stations. Several start-ups are investing in EV Supply Equipment (EVSE) manufacturing locally. Lastly, developing India's Lithium (Li) recycling capabilities would address raw material price fluctuations and reduce import dependency. On the back of these initiatives, India's EV market is anticipated to reach 10m in annual sales, growing at a CAGR of 49% between 2022 and 2030⁶⁵.



65 <https://www.investindia.gov.in/team-india-blogs/electric-vehicle-ev-sector-india-boost-both-economy-and-environment#:~:text=There%20are%20a%20total%20of,Mn%20EVs%20on%20the%20road.>

Rising up the complexity ladder

Economists have often linked a country's export competitiveness to the degree of complexity of its outputs. Two indices of economic complexity, one by the MIT (Observatory of Economic Complexity - OEC)⁶⁶ and the other by Harvard (Harvard Growth Lab -HGL)⁶⁷, based on the methodology developed by economists Hidalgo and Hausmann (2009)⁶⁸, have gained prominence. The HGL has also developed a complexity outlook index (COI) which indicates how close a country is to producing more complex products given its current capabilities. According to HGL, India's country complexity ranking improved to 46 in 2020 from 54 in 2010. Further, India ranked first in the COI. Some examples of evolving complex goods include robots, drones, self-driven vehicles, satellites and rockets and space products, high-definition cameras/ telescopes/microscopes, aircraft manufacturing, 3D printing of goods and buildings. Examples of complex services include financial derivatives, research and designing of semi-conductors, Artificial Intelligence (AI) and Internet of Things (IoT).

66 <https://oec.world/en/rankings/eci/hs6/hs96>

67 <https://atlas.cid.harvard.edu/rankings>

68 Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the national academy of sciences*, 106(26), 10570-10575.

Developing complex capabilities

Economic Complexity Index Rank

Country	2010	2015	2020
Japan	1	1	1
Switzerland	2	3	2
Germany	3	2	3
South Korea	8	4	4
Singapore	4	5	5
US	12	9	12
China	24	21	17
India	54	48	46

Source (basic data): MIT (Observatory of Economic Complexity - OEC) and Harvard (Harvard Growth Lab -HGL)

Complexity Outlook Index Rank

Country	2010	2015	2020
India	1	1	1
Turkey	2	2	2
Spain	7	4	3
Portugal	3	3	4
Indonesia	10	8	5
US	89	84	51
China	11	21	43

Source: The Atlas of Economic Complexity

BUILDING THE INFRASTRUCTURE OF THE FUTURE

Better infrastructure reduces friction in the economy and improves the competitiveness of all the sectors - from agriculture to mining to manufacturing to services. It also helps generate a significant quantum of jobs and drives consumption of basic materials such as steel, cement, etc.

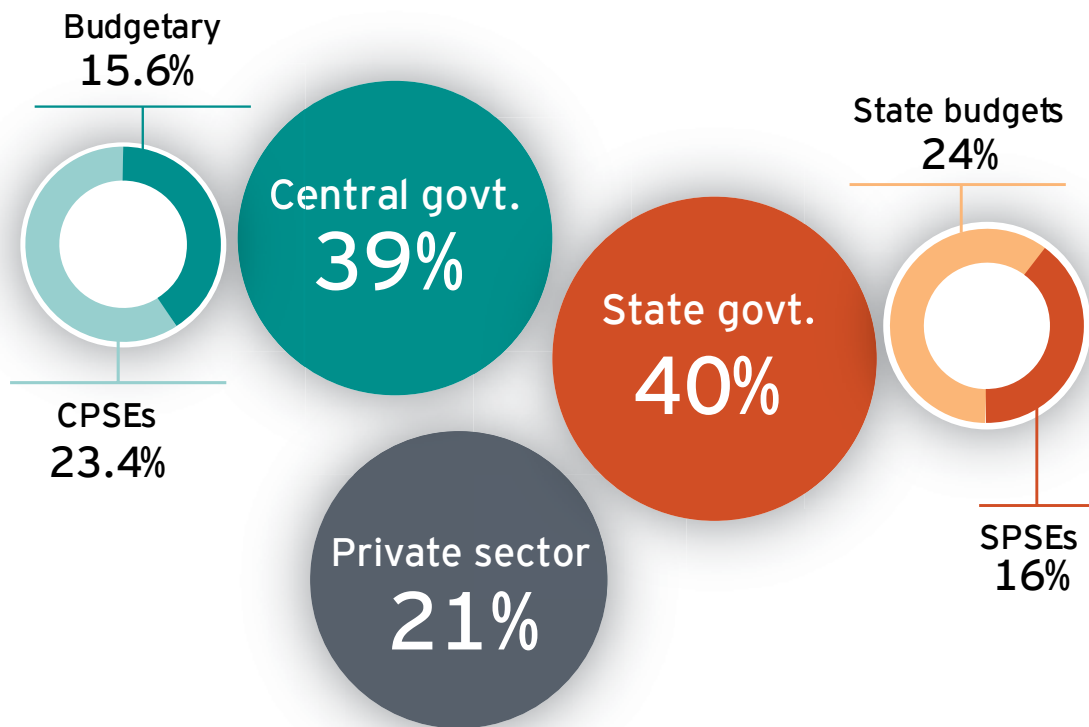
Recognizing the importance of improving and building new roads, railways, ports, telecommunications, energy infrastructure etc., the GoI has both increased its budgetary allocations to underpin creation of infrastructure, while simultaneously undertaking measures to raise and attract private capital and administrative reforms to make the process for planning and executing infrastructure investments more efficient.

The GoI has prioritized capital investment over revenue expenditure to drive longer-term growth. Capex outlay has increased from 1.6% (pre-COVID) to 2.9% of the GDP for 2022-23 (BE). It is largely directed towards the infrastructure sector, which has a high multiplier effect and leads to job creation. This is demonstrated by the 10,000 kms of new highways being constructed annually, double of the 4,400 kms being constructed in 2014-15⁶⁹.



Two key government initiatives aimed towards better planning and execution have been the National Infrastructure Pipeline (NIP) and Gati Shakti. NIP provides a comprehensive list of projects that would need to be implemented for India to upgrade its infrastructure in all areas i.e., transportation, energy, communications and social infrastructure. Goals of the NIP were to ensure seamless connectivity, prioritization of resources and timely creation of capacities. Originally, the NIP envisaged a total investment of INR 111.4t (US\$1.4t) covering the period from 2019-20 to 2024-25 with participation from central and state governments, their public sector enterprises, and the private sector.

NIP: Sharing responsibilities - Financing of National Infrastructure Pipeline: Relative shares (%)



Source (basic data): National Infrastructure Pipeline, Government, Union Budget FY22 and FY23

Due to COVID-19, some of these timelines will have to be reviewed and the NIP may have to be extended with revised targets.

The NIP was supplemented by a national infrastructure master plan which was announced under the title 'Gati Shakti' covering a period of 25 years with a focus on roads, railways, airports, ports, mass transport, waterways, and logistics⁷⁰. Gati Shakti envisages building a digital platform that will bring 16 ministries together for integrated planning and coordinated implementation of infrastructure

connectivity projects. It will incorporate the infrastructure schemes such as Bharatmala (highway project with the objective of providing connectivity to 550 district headquarters and remote areas), Sagarmala (coastal shipping and inland waterways), dry/land ports, UDAN (air transport) etc. under various ministries and state governments.

The aim of the National Logistics Policy is to reduce the cost of logistics from 14-18% of GDP to global best practices of 8% by 2030⁷¹.

70 <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1763638>

71 <https://www.investindia.gov.in/team-india-blogs/national-logistics-policy-india>

Dedicated Freight Corridors (DFCs) to expand capacity

Even as road transportation and logistics have improved by leaps and bounds over the past few years, rail transportation too is approaching an important inflection point. Several multiyear initiatives are approaching completion after long delays. East and West Dedicated Freight Corridors which have the capacity to take on 70% of India's current railway freight are approaching completion. Segments of the dedicated freight corridors have already begun operations resulting in modest gains in capacity. Significant gains in railway cargo capacity will be achieved over the next several years as all segments are completed and rolling stock deployment accelerates.

The shift of goods movement to the DFCs not only helps decongests roads but also serves to decongest tracks for faster and more frequent passenger train movement, offering an opportunity that has not been missed. Vande Bharat Express semi-high speed electric multiple unit passenger trains began operations in early 2019 and the Finance Minister in her budget speech of 2022 announced that 400 Vande Bharat trainsets would be manufactured over three years.

The DFCs augur a tremendous improvement in the next couple of years for what has been a stubborn constraint for Indian transportation and logistics. It promises to herald the modal shift back to the vastly more environmentally sound transport for

goods as well as passengers. The DFC and Vande Bharat initiatives, both with serious momentum, are likely to prove capacity and capability building for the historically conservative Indian Railways while ensuring greater competitiveness of Indian enterprises across primary, secondary and tertiary sectors with massive improvement in inefficiencies of time and costs.

Robust measures to finance infrastructure

Recognizing the need for attracting long-term capital for such infrastructure investments, the GoI has provided an enabling environment for private capital, which includes tax incentives for sovereign wealth funds and pension funds. Further, InViTs were put in place to fund developed infrastructure projects through yield-based investment opportunities. This is also complemented by the National Monetization Pipeline (NMP), a plan to monetize idle public assets for unlocking capital for deployment into new infrastructure projects.

The success would depend on the execution and effective mobilization of private resources to bridge the funding gap.

The thrust on infrastructure needs to continue for several reasons.

- Given the significant positive effect of infrastructure spending on direct, indirect, and induced employment, this would provide the much-needed impetus

to job creation in India. According to the RBI, spending on infrastructure and construction creates 5x-6x the employment of the average of the economy.

- Improved infrastructure, especially in areas of energy, transportation and logistics, and digital would translate into improved relative competitiveness of Indian enterprises across sectors driving greater growth driven by trade.
- It would also drive growth in the employment intensive MSME sector, where better transportation and logistics and reliable power are key ingredients for improved competitiveness, especially in sectors like apparel, footwear, furniture, and food processing.

TRANSITION TO SUSTAINABLE ENERGY

Recognizing the need for attracting long-term capital for such infrastructure investments, the GoI has provided an enabling environment for private capital, which includes tax incentives for sovereign wealth funds and pension funds. Further, InViTs were put in place to fund developed infrastructure projects through yield-based investment opportunities. This is also complemented by the National Monetization Pipeline (NMP) i.e., a plan to monetize idle public assets for unlocking capital for deployment into new infrastructure projects.

With more and more jurisdictions putting a price on carbon and carbon-pricing has been introduced in international trade, businesses would need emission free energy to be competitive. Availability of round the clock emission free electricity will become a pre-requisite for large scale investments in sectors like manufacturing, real estate and in asset classes such as data centers.

As the world decarbonizes, there is an opportunity for India to create new technologies, businesses and industries and take a leading position.

The geo-political developments have impacted the energy markets leading to both supply and price challenges, underscoring the need for energy security as never before. India also currently depends on carbon-based fuels for ~90% of its primary energy needs, of which ~40-45% is imported. The high dependence on imports with volatile pricing and availability has created avoidable stresses on its economy and elevated the risks and costs for Indian enterprises. Decarbonization and transition to new energy sources is also an important tool for India to achieve energy independence.

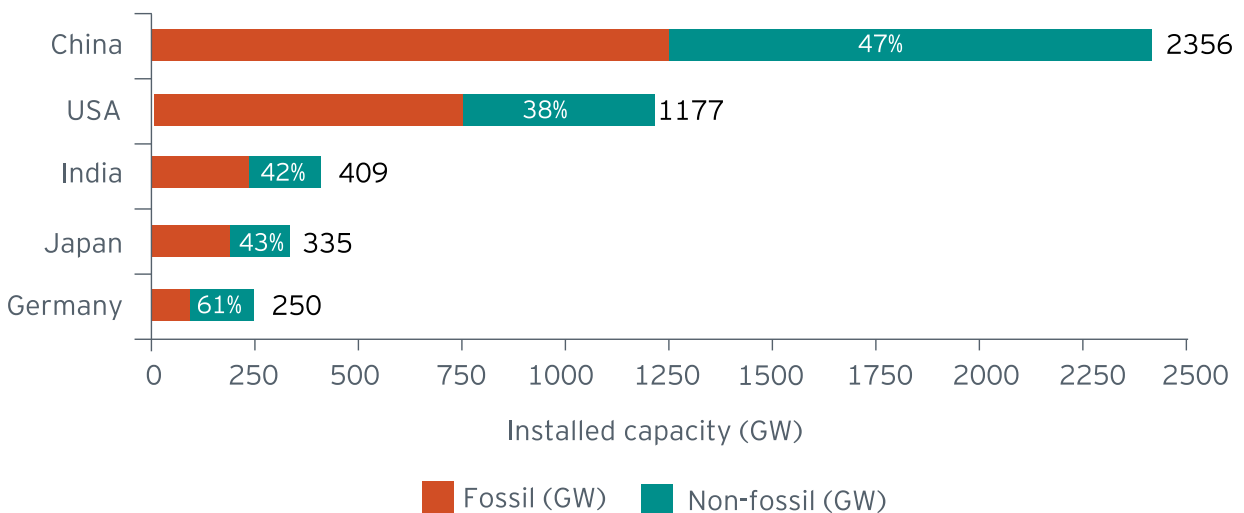
The GoI has therefore undertaken a number of policy initiatives to promote renewable energy capacity, battery storage, green hydrogen eco-system, electric mobility, de-risking supply chain, increasing nuclear power generation and capacity and making regulatory changes to facilitate access to green energy by commercial and industrial users, etc.

Renewable energy attaining critical mass

India is now the third largest producer of renewable energy in the world, with ~40% installed capacity coming from non-fossil sources. With close to 166 GW⁷² of renewable energy already installed, about 80% of India's power capacity additions are expected to come from renewables as it works towards a 500 GW non fossil fuel based power generation capacity by 2030. Over three quarters of this growth is expected from solar and wind, and rest from nuclear, hydro and biomass.

Over the last decade, the renewable energy market has attained critical mass, with accelerated scale-up on the horizon across utility-scale and distributed generation for commercial, industrial, agriculture and residential consumers. With this growth in renewable energy and an intent on indigenization, there is a huge opportunity for private players to create businesses across distinct value pools. These include equipment manufacturing (e.g., solar PV modules, wind turbines, ancillary electricals, etc.), renewable energy project development and building infrastructure to serve customers along their decarbonization journeys.

Installed electricity generation capacity of top 5 global economies



Non-fossil includes Renewables, Nuclear and Storage
Source: USEIA, India CEA

72 Invest India (<https://www.investindia.gov.in/sector/renewable-energy#:~:text=The%20installed%20power%20capacity%20in,the%20total%20installed%20electricity%20capacity.>)

Long-term growth across each of these value pools is supported by government and private-sector initiatives. For instance, PLI schemes for solar panels and import duties or restrictions favor local manufacturing. Aggregated project tenders by large, government-backed organizations such as SECI, de-risk projects and enable capacity additions at scale. Corporate commitments to their own sustainability targets are driving further growth by increasing renewable energy demand and introducing innovative business models for renewable energy procurement. There is a significant interest and activity of PE funding in this space with established enterprises and supporting young entrepreneurs through large sized investment platforms.

Large Indian conglomerates too have recognized this opportunity and are making significant investments into integrated plays across various renewable energy value pools, from equipment manufacturing to project development to serving consumption.

Access to green power by large commercial and industrial consumers

With the transition by global and Indian firms towards clean energy, there has been a shift towards sourcing renewable electricity from captive/third party projects with energy being delivered to

the consumers through open access i.e., by using the transmission and distribution network of state-owned utilities. The GoI and the various state governments have been supporting the adoption of renewable energy through various policies and regulations enabling open access and reducing the cost of access. Ease of transmission and distribution of green energy through open access can catalyze India's clean energy transition.

Energy storage: key to faster adoption of clean energy

Energy storage is the missing link in the faster and wider adoption of renewable energy in the country. Owing to the increasing share of variable renewable energy that will require storage, India is expected to emerge as the third largest country in terms of energy storage installation by 2040⁷³. Energy storage is expected to be a 230-300 GWh opportunity, an investment of US\$~45-55b across Battery Energy Storage Systems (BESS) and Pumped Hydro Storage Projects (PSP).

Government policy, incentives, interventions, and regulations are driving demand for energy storage, which include:

- Two standalone ESS tenders that SECI and NTPC recently issued with a combined storage capacity of 1GW/4GWh⁷⁴

73 [https://energy.economictimes.indiatimes.com/news/power/opinion-how-india-can-effectively-utilize-energy-storage-systems-to-address-energy-challenge/95419026#:~:text=BloombergNEF%20\(BNEF\)%20research%20implies%20that,power%20flows%2C%20which%20increases%20revenues.](https://energy.economictimes.indiatimes.com/news/power/opinion-how-india-can-effectively-utilize-energy-storage-systems-to-address-energy-challenge/95419026#:~:text=BloombergNEF%20(BNEF)%20research%20implies%20that,power%20flows%2C%20which%20increases%20revenues.)

74 <https://energy.economictimes.indiatimes.com/news/power/ntpc-seci-energy-storage-tenders-to-augment-indias-capacity-by-1-gw-report/92650088>

- Energy storage obligation (ESO) on discoms and other obligated entities notified for 1-4% of total energy consumption to come through storage by 2030.⁷⁵

De-risking supply chains to facilitate manufacturing

To de-risk the supply chain, the GoI has announced various PLI schemes and policies to facilitate domestic manufacturing:

- INR 195b⁷⁶ (US\$2.4b) allocated for photovoltaic (PV) module production to drive volumes and economies of scale for meeting desired demand and at lower costs.
- INR 181b⁷⁷ (US\$ 2.3b) for Advanced Chemistry Cells (ACC) and INR 100b⁷⁸ (US\$1.3b) for Faster Adoption of Electric Vehicle (FAME) to enable India's leapfrog from a traditional fossil fuel-based transportation system to an alternative, and more efficient Electric Vehicle (EV) based system.
- INR 174.9b (US\$ 2.2b) for strategic Intervention for Green Hydrogen Transition Programme, an incentive scheme to target the domestic manufacturing of electrolysers and production of green hydrogen⁷⁹.

Battery manufacturing in India has been restricted to assembling packs from imported cells in a fragmented market with many small players so far. With PLI for Advanced Chemistry Cell (ACC) Batteries, end-to-end manufacturing of batteries at giga scale (>5GWh) is picking up, as large players have now started setting up facilities, with announced plans to scale to ~140-150 GWh of manufacturing capacity (including battery demand for stationary applications and electric mobility). While large players have clear advantages in manufacturing BESS, value chain opportunities across project development, operations and maintenance will emerge for several people like RE project developers, public or private oil & gas/energy companies and technology players to participate in the growing energy storage market.

Green Hydrogen

Green Hydrogen is an emerging energy carrier with the potential to drive global decarbonization in hard-to-abate sectors. India already consumes about 6m tons of hydrogen primarily for refining and fertilizers, which is currently produced from coal gasification or natural gas reforming and results in huge CO₂ emissions. The GoI recognizes the importance of

75 Notification on Energy Storage Obligation Trajectory till 2029-30, 22 July 2022, Ministry of Power, Government of India; https://powermin.gov.in/sites/default/files/webform/notices/Renewable_Purchase_Obligation_and_Energy_Storage_Obligation_Trajectory_till_2029_30.pdf

76 <https://pib.gov.in/PressReleasePage.aspx?PRID=1861127>

77 <https://pib.gov.in/PressReleasePage.aspx?PRID=1717938>

78 <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1566758>

79 <https://pib.gov.in/PressReleasePage.aspx?PRID=1888547>

developing this area and has taken a series of measures to reinforce its development, with a goal to meet 10% of global hydrogen demand by 2030.

Enhanced budgetary allocations are being made under the National Green Hydrogen Mission that covers demand creation and utilization of green hydrogen (through incentives and pilot projects), creation of production capacity for both electrolyzers and green hydrogen and measures to drive growth. More recently, GoI has committed an incentive of US\$2.2b for capacity creation of nearly 15 GW of domestic manufacturing of electrolyzers to achieve annual capacity of 5m metric tonnes of green hydrogen leading to nearly 60 GW of electrolyzers by 2030. This would also be supported by associated renewable energy capacity of 125GW.

As a feedstock, green hydrogen may be used to refine petroleum products, manufacture ammonia-based fertilizers, reduce iron-ore for steel production or produce synthetic fuels for shipping or aviation. As a fuel, its applications vary across industrial heating, blending with natural gas for cooking or power generation, co-generation in coal-fired power plants, hydrogen combustion engines, fuel-cell-based electric vehicles or power backup, among others.

Currently, green hydrogen production cost in India is around US\$4-7/kg H₂. For it to be competitive against alternatives across the applications mentioned above, green hydrogen production cost needs to go down to US\$1-2/kg H₂. India has a distinct advantage in driving this cost reduction through low-cost renewable energy, technology innovation, economies of scale, value chain integration, policy, and regulatory support.

India's ability to leverage these advantages can help it become a low cost producer of hydrogen, drive decarbonization, make its manufacturing competitive in an environment where countries around the world put a price on carbon and create export opportunities for India. India has an aspiration to become the largest hydrogen producer, serving the domestic and global markets.

As India scales from negligible to million-ton-scale green hydrogen production and consumption, opportunities across giga-scale equipment manufacturing, project development, operations and maintenance, hydrogen storage and transportation services, building and securing offtake distribution networks for end-uses are emerging for private enterprises to capture quickly and decisively.

The image features a silhouette of an archer in the foreground, aiming a bow. The background is a vibrant sunset with a bright sun low on the horizon, casting a golden glow. The sky is filled with streaks of light and a pattern of binary code (0s and 1s) overlaid in a light gray color. The word "ACCELERATING" is written in large, bold, white capital letters across the center of the image.

ACCELERATING

THE GROWTH CURVE



While the above growth drivers and enablers that will underpin the rapid growth of the economy, there are areas that currently require the attention of policy makers to most effectively accelerate the growth curve.

Enhancing ease-of-doing-business

Ease-of-doing-business is the key to fostering entrepreneurship, innovation, investment, competitiveness and enabling faster economic growth. Simplifying and maintaining a business-friendly environment is a pre-requisite to a fast growth path.

Improving ease-of-doing-business has been a key focus area of the GoI. Steps like the introduction of GST, implementation of the insolvency code, leveraging digital tools and making tax assessments faceless, IT-enablement of many processes for getting permits and certificates, simplification of labor laws, repealing several old laws to lower the regulatory burden, are all steps in the direction of making it easier to do business in India.

While a lot has been done, some on-ground experience, and surveys point to several areas with scope for significant improvement. Successive Economic Surveys tabled by the GoI have discussed this issue and pointed out numerous areas where there is scope for doing more. Highlighted below are several areas where there are significant concerns and actions by the GoI which will help and make it easier to do business.

Enforceability of contracts

Enforcing contracts is one parameter in which India lags as compared to some of the other countries. According to the Economic Survey 2020-21, India takes an average of 1,445 days to resolve dispute, and ranks extremely low relative to its economic position. Further, the survey highlighted that the single biggest constraint to ease-of-doing-business in India is its inability to effectively enforce contracts and resolve disputes. One of the outcomes of this weakness is that some areas have now become over-regulated. A recent EY report, “Opportunities and Expectations of MNCs” listed this among the four key issues for ease-of-doing-business in India.

Given the potential economic and social multipliers of a well-functioning legal system, timely dispute resolution and confidence in contract enforcement would go a long way in driving economic growth.

Payment of taxes

Over the last few years, India has undertaken consistent and focused tax policy initiatives to encourage investments and support economic growth and development. The policy focus has been on improving India Inc.'s competitiveness through moderate direct tax rates, rationalizing the current tax law for simplicity and clarity, bringing technology-backed transparent administration and ease of compliance for taxpayers, and minimizing potential litigation.

However, while the above changes have made it easier to do business in India, there continue to be issues which lead to tax uncertainty. There are instances of tax disputes often due to aggressive positions that may be taken. Further, at times, the rules are drafted in a manner that leads to ambiguity in interpretation. There can be delays in resolving these through Alternate Dispute Resolution (ADR) mechanisms, due to inadequate capacity/resources.

Decriminalization of economic laws

A number of economic regulations provide for criminal penalties in case of non-compliance/being in contravention of law. In some of these regulations, even for minor transgressions, instead of using financial penalties as a tool to ensure enforcement, often the laws provide for criminal penalties. Such provisions increase

uncertainty, hamper decision-making, and can also be a tool for harassment.

The GoI is cognizant of this issue and is taking suitable steps to decriminalize laws. Faster and more focused action is required since each provision that needs to be decriminalized needs to be studied carefully and the amendments go through a parliamentary process.

Similarly, from an ease of doing business perspective, there are a few other areas where businesses are challenged, such as compliance with environmental regulations or regulations related to trading across borders. While this continues to be an important agenda item of the GoI, relentless focus of the Government is required for faster progress.

Macro-economic stability

In the past two decades, events such as the global financial crisis of 2008, the pandemic which swept the globe during the last couple of years and the recent geo-political tensions have impacted global GDP, put pressure on countries through disruptions in supply chains, impacted commodity prices, and created challenging financial environments. However, with inflation rising to multi-decade highs, Central banks reacted by tightening monetary conditions that have nearly triggered a slowdown and potentially even a recession in several advanced nations.

While it may not be possible to anticipate and prepare for many exogenous shocks and unanticipated circumstances, India's policies would need to ensure that shocks of domestic or global origins do not significantly disturb the long-term growth trajectory of the economy.

A good example is the response of the GoI and the RBI in addressing the fall-out of COVID-19. At that time, there was a strong demand from many quarters for the Government to follow developed economies in providing very large fiscal stimulus, mostly in the form of large doles. The government stayed away from that approach. It instead focused on directing credit to small businesses and individuals, backed by government guarantees, protecting the most impacted low-income segment of the society through free food grains distribution, and continued capital spending. As a result, we find India in a relatively stronger position with lower levels of inflation and government debt to GDP vis-à-vis several other countries. Thereafter, geo-political events impacted commodity prices and most countries across the world witnessed currency depreciations vis-à-vis the US\$. Since India had accumulated substantial amount of foreign exchange reserves, the RBI was able to intervene in the market and reduce the volatility of the Rupee.



While the GoI has been strategic in its macro-fiscal response during the pandemic and the geo-political conflict, laying strong foundations for a high and stable medium-term growth would be critical. There should be continued focus on fiscal discipline,



Adhering to fiscal discipline

The central and the state governments need to ensure that their revenue and fiscal deficits relative to GDP are within sustainable limits. If governments' revenue accounts are kept in balance or in surplus, government capital expenditure can be financed by a sustainable level of fiscal deficit augmented by non-debt capital receipts.

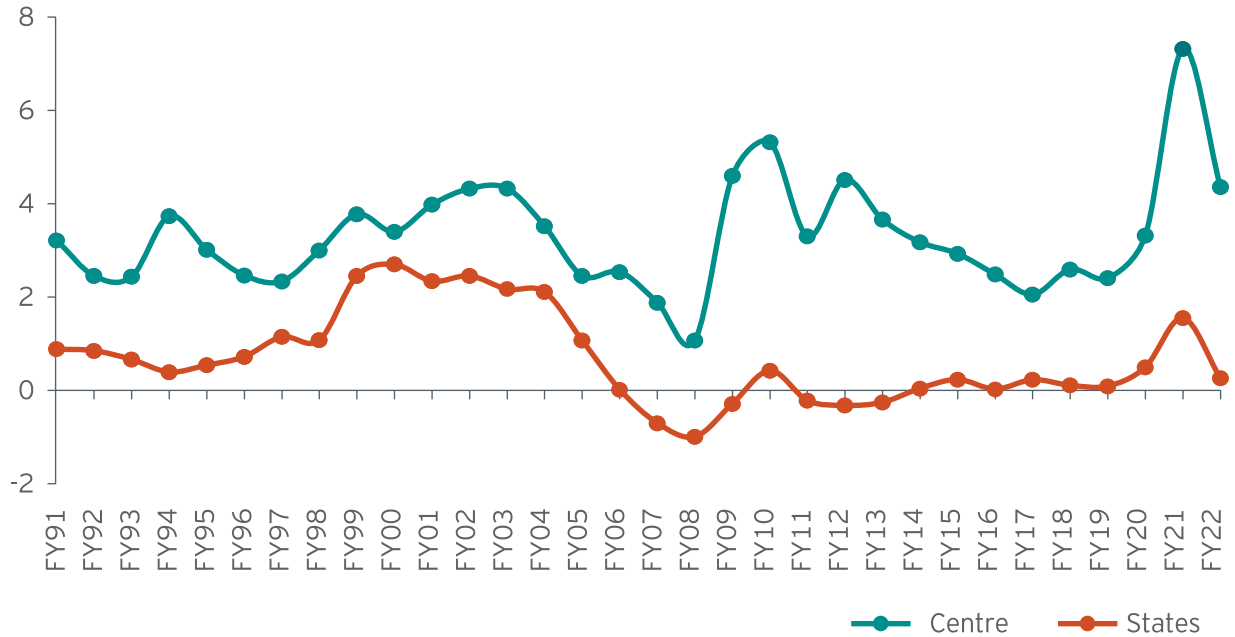
Throughout the period after the 1990s, the central budget has remained in revenue deficit. In comparison, the aggregate account of states shows a deficit profile which is lower than that of the central government throughout the period from FY1992 to FY2022. In fact, there are some years of revenue surplus in the mid-2000s and a near-balance situation in many years in the 2010s. Considering the combined government, except for FY2008, there has been a deficit on the revenue account relative to GDP. This had peaked at 6.8% in FY2002 considering the pre-COVID years, and at 8.9% in FY2021 which was the COVID-affected year⁸⁰.

augmenting savings and investment rates, stabilizing inflation, minimizing volatility in exchange rate, ensuring predictability in policies and pro-active de-risking of the economy.

80 The addition of revenue account balance across states implies that revenue surpluses of some states are adjusted against the revenue deficits of other states. Similarly, for the combined account, revenue surplus of states as a whole is adjusted against revenue deficit of the Center.

The Revenue Deficit track record: Center and States

Revenue deficit to GDP ratio (%)



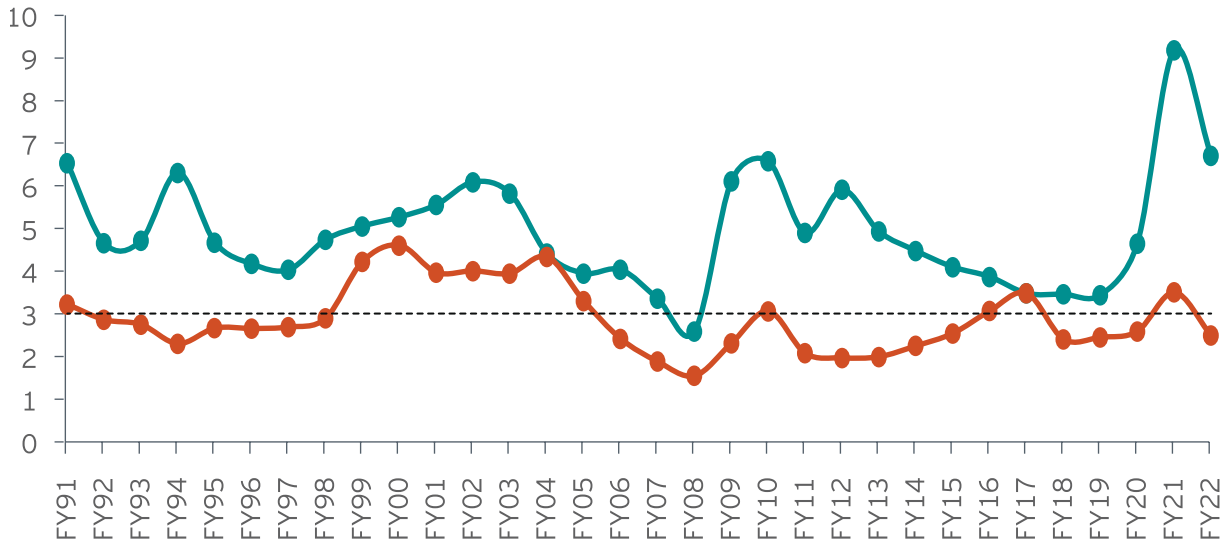
Source (basic data): CGA, Union Budget documents, MoSPI, RBI, and IPFS

A major landmark occurred in the 2000s when the central government and most of the state governments enacted their Fiscal Responsibility Legislations. However, the pattern of fiscal deficit in the ensuing years indicates that except for FY2007 and

FY2008, the threshold of 3% of GDP for the central government has been breached in most years. In the case of states, the threshold of 3% of GDP was attained in most years after FY2005.

Who is more prudent: Center or States?

Fiscal deficit to GDP ratio (%)



Source (basic data): CGA, Union Budget documents, MoSPI, RBI, and IPFS

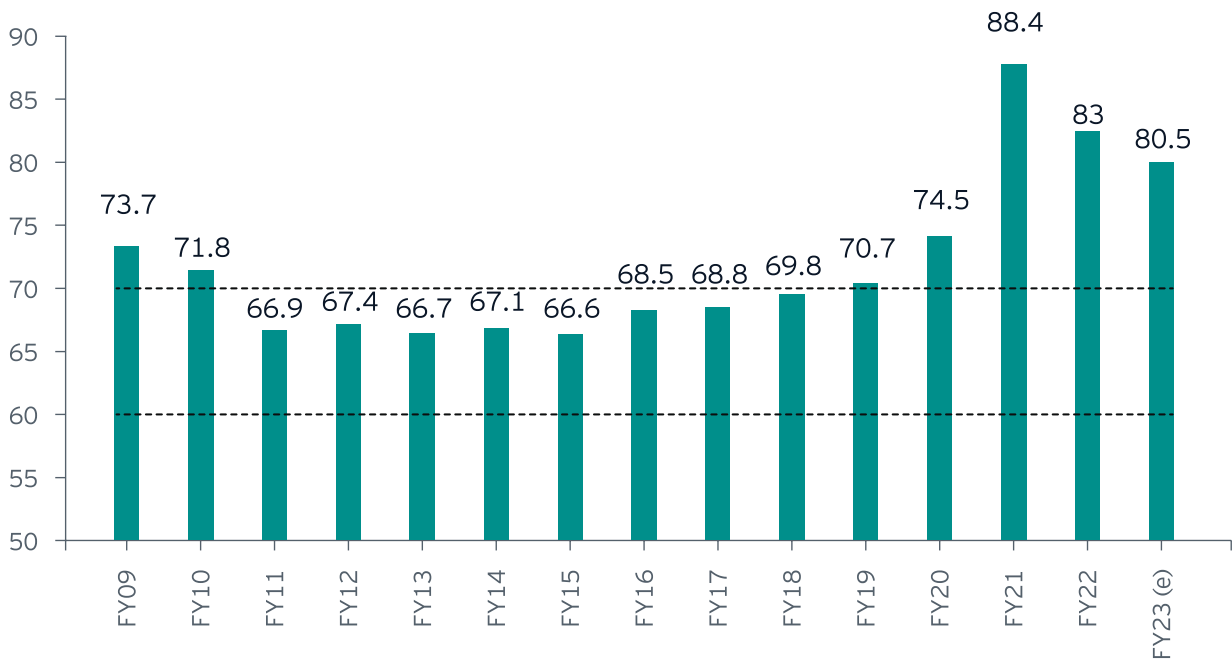
Centre States

The accumulation of fiscal deficit over time results into debt, subject to the relative levels of accumulated primary deficits, effective interest rate and nominal growth rate. According to the Center's FRBMA 2018, the sustainable threshold of the combined debt to GDP ratio is 60%. This target has been missed in all post-FRL years. The situation has considerably

worsened due to COVID's deleterious impact. In FY21, the combined debt-GDP ratio rose to an estimated level of 88.4%. Restoring government debt-GDP ratio to levels closer to sustainable levels is a prerequisite for re-strategizing government finances to create adequate fiscal space for reprioritization of education, health, and capital expenditure.

The rising debt burden needs to be controlled

India's combined debt-GDP ratio (%)



Source (basic data): CAG, CGA, Union Budget documents, MoSPI, RBI, IPFS(e): estimated

In case both the central and state governments adhere to showing a revenue account balance in their budgets, the combined sustainable level of fiscal deficit of 6% of GDP supplemented by non-debt capital receipts averaging about 0.5% of GDP would enable India to finance government capital expenditure to the extent of 6.5% of GDP per year in a sustained way over a long period of time consistent with the budgetary 'Golden Rule'.

Prudent fiscal management should ensure that unsustainable subsidies should not be committed for short term welfare objectives. Instead, maximum policy attention should be focused on increasing employment especially using investments

in infrastructure and funding enhanced expenditure on education and healthcare, that improve long term competitiveness.

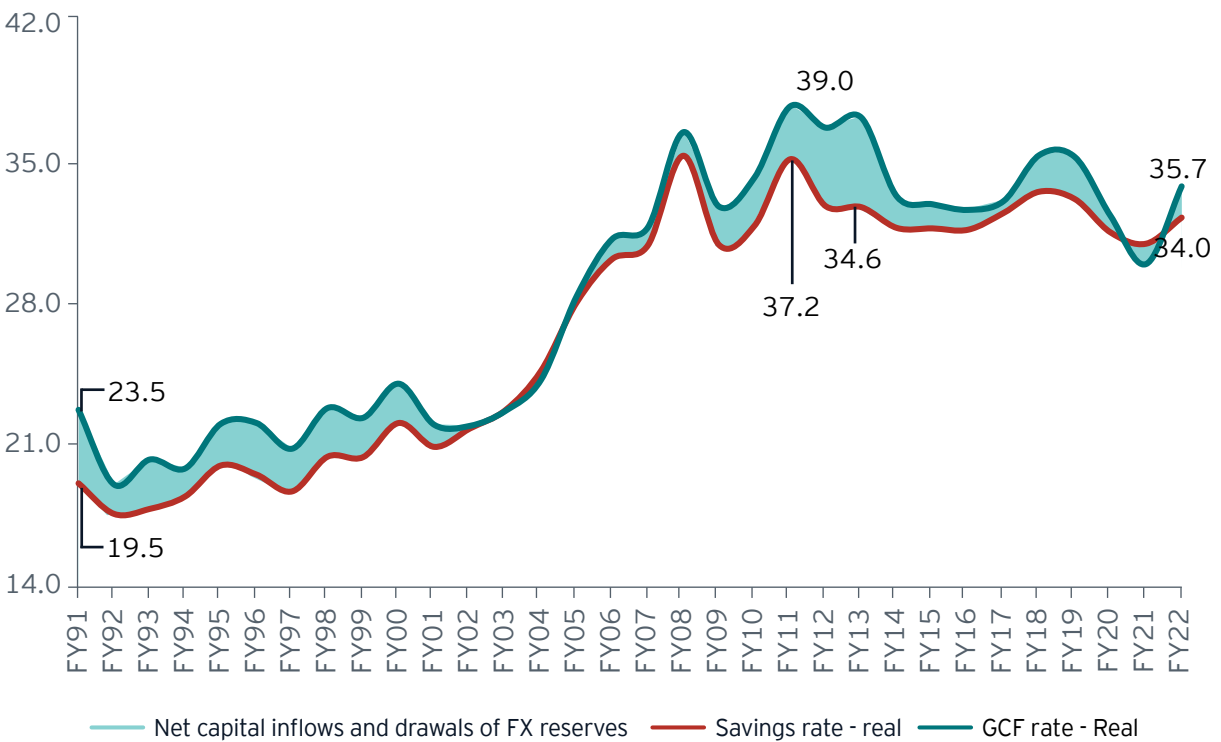


Boosting savings to uplift investment and growth

The government would do well to emphasize augmentation of savings and investment rates in India. India's investments are financed by domestic savings, net capital inflows (or foreign capital coming in) and withdrawals from foreign exchange reserves. Since FY2008, Gross Capital Formation (GCF) has averaged around

35% of GDP. Domestic savings has been the primary source for financing this investment. Net capital inflows and withdrawal from forex reserves have contributed 1.8% points on average to GCF during the period FY1991 to FY2022. With capital as a scarce factor, it is crucial to ensure that the savings rate is boosted while attracting higher levels of global capital to further uplift investments and thereby growth.

Save more, invest more (Gross Capital Formation closely tracks the savings rate)



Source: MoSPI

Notes: (1) Investment is captured by Gross Capital Formation (GCF), (2) Savings and investment rate (% to GDP) are depicted at constant prices.

Prioritizing education and health

Considering India's accelerating working age population ratio, it is imperative to ensure that the workforce is educated, skilled and healthy, making them suitable for emerging employment opportunities, within and outside the country. India's combined government expenditure on education was at 3.1% of GDP and for health at 1.4% in 2021-22. These levels need to be increased further to take advantage of the unfolding demographic trends.

Through the pandemic, there has been a significant boost to the spending on health that will likely persist for the next several years with many multi-year projects that will improve the healthcare scenario in India. This includes initiatives from boosting the number of medical colleges attached to hospitals, significantly upgrading tertiary facilities, to an unprecedented base of the pyramid health insurance program. The transformation in healthcare is already well underway.

While India produces a large number of STEM graduates and has been supplying talent for global IT development, however, its education system has weaknesses. As an example, although graduates from India's premier institutions are sought after, unfortunately, these institutions are not counted among the top-notch global institutions of research and rank relatively low in global rankings. Similarly, the secondary school education has weaknesses

such as high student to teacher ratios, lack of contracts for more than 60% of teachers in non-government schools, etc. Outcomes for a number of schools and higher education institutions is below expectations.

Recognizing the importance, the GoI has formulated the National Education Policy (NEP) 2020 which proposes some major reforms pertaining to the K-12 and higher education systems in the country. The success of the policy would depend on how it is implemented.

Moreover, both healthcare and education are concurrent subjects with the involvement of both the Central and the State governments. It would be important for the government to periodically review outcomes and make changes as appropriate.

R&D is necessary for long term competitiveness and growth

India has historically underprovided funds for research and development and a large share of these funds comes from the government. As per the NITI Aayog, the government's share of research and development expenditure was more than 55% (India Innovation Index, 2021). It would be appropriate to encourage the private sector to also participate actively in research and development and the overall allocation of resources needs to be increased from the present level of 0.7% of GDP to more internationally comparable levels. In this context, it may be noted that the global allocation of resources for

research and development relative to GDP amounted to nearly 2.2% in 2018 (World Bank).

Power sector reforms

A reliable and low-cost electricity supply is an essential input for economic activity and to attract investments. Conversely, high electricity costs and electricity shortages act as a disincentive to investment, bring down competitiveness, and increase complexity (for example, the need to make additional investments for captive generation capacity) resulting in reduced efficiency. Inadequate management of the electricity sector usually brings about electricity rationing and costly subsidies, which are often exacerbated by fraud and non-payment, or by weak enforcement. All these elements result in price distortions as well as fiscal costs.

India has one of the largest and most complex power sectors in the world. While the past few years have seen significant changes such as increased electricity access to Indian citizens, a decline in power deficiency, and increase in power generation including renewable energy capacity. However, the sector still faces significant challenges. Most power distribution companies (or discoms) incur losses every year—estimated at INR900b (approximately US\$11.3b) in FY21. Due to these accumulated losses, discoms are unable to pay to generators on time. As of March 2021, an amount of INR679b (US\$8.5b) was overdue. Poor financial health hampers investments necessary for ensuring



continuous high-quality power. With the GoI working on transitioning to emission free electricity, increased investments would be required in the Indian power sector.

The government has been cognizant of the issues involved in the power sector. However, reforming the sector and making it financially strong whereby it can attract investments on their own without government subsidies is challenging. Nevertheless, changes need to be made such that the power sector becomes self-sustaining.

Energy independence

Recent geo-political issues have underscored the importance of energy independence and the ability of countries to have access to energy at reasonable prices. Currently, India depends on imports for meeting 35-40% of its primary energy needs. In particular, it is dependent on imports to meet the demand for crude oil, natural gas and coal. These together comprise more than 35% of India's import basket.

Of these sources, crude oil is the largest import article and whenever price of crude oil increase it is accompanied by depreciation of the Rupee, high inflation and slowing down of the economy. Following the impact of the global economic and financial crises of 2008, global crude prices increased from US\$29.1/bbl. in 2000-01 to US\$84.2/bbl. in 2008-09. This led to an increase domestic inflation level (CPI-Industrial workers) from 3.1% in to 9.0% over the same period.

There is a need to continually reduce India's dependence on imported energy. The Gol has been addressing this issue by providing attractive fiscal terms for fresh exploration of oil and gas, incentivizing the development of coal mining capacity, incentivizing production and blending of ethanol with petrol and accelerating the pace of the pursuit of non-conventional energy sources. In this context, the National Hydrogen Mission envisages India to become a large producer and user of hydrogen. However, large scale transformation of the energy system is a long-drawn process that requires both technological advancements as well as significant amount of capital.

As the world moves forward with decarbonization and India develops new capacities, access to critical minerals like Lithium and other rare earths would become important. Access to these materials could make countries vulnerable in the future. Therefore, strategies to address any such potential vulnerabilities would be extremely important.



Urbanization paradigm

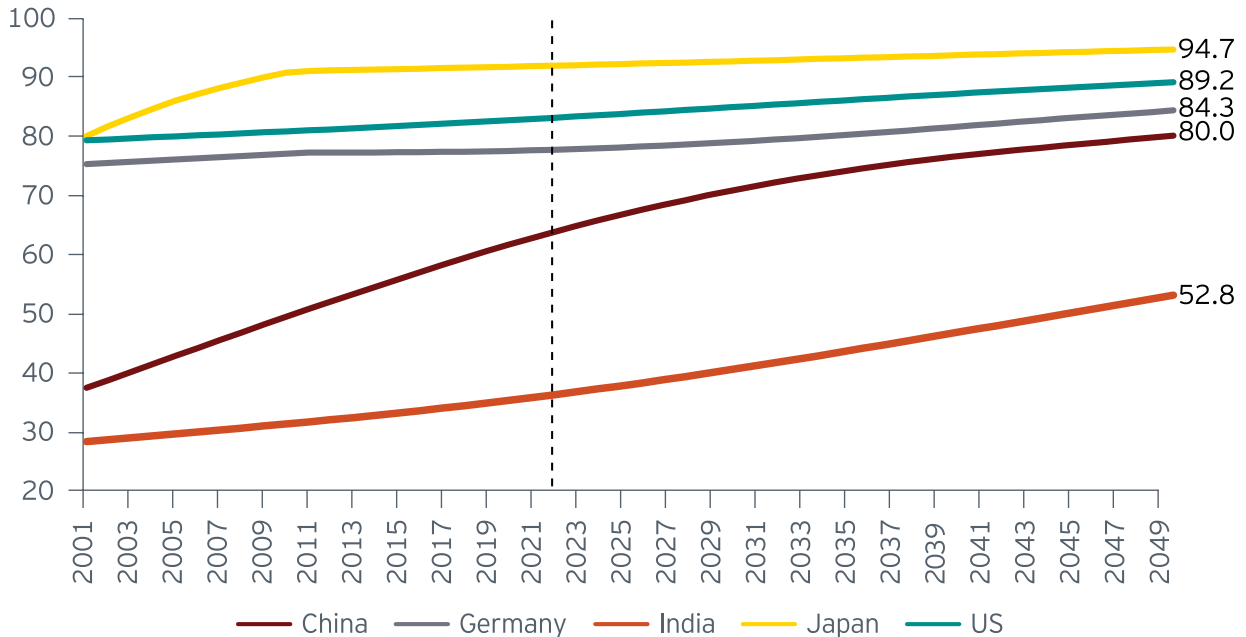
India is the second-largest urban system globally with nearly 11% of the total global urban population living in Indian cities⁸¹. The UN has estimated that Indian cities contribute nearly 60% to the GDP. Moreover, India's urbanization rate would exceed 50% by 2046 from nearly 36% in 2023. This brings out the pivotal role that urbanization is expected to play in the achievement of India's long-term economic and sustainable growth targets. Realizing this potential requires addressing some key challenges.

Despite a sharp increase projected in India's urbanization rate, it would remain tangibly below the levels achieved by other major countries. The extent of actual urbanization in India may be much higher than what the official data shows⁸². In this context, there is a need to bring census towns under the ambit of urban entailing application of urban regulations on these areas.

81 <https://rb.gy/u2dmyu>

82 para 7.86 of the Report of 15th FC

Urbanization rate (%) selected countries



Source: World Urbanization Prospects, 2018, UN; For India the year pertains to fiscal year

India needs to develop its own urbanization paradigm, learning from urbanization experiences of other highly urbanized nations. Substantial investment in developing urban infrastructure focused on transportation, affordable housing, drainage, waste management, and green spaces is required for Indian cities to harness their full potential. Planning and building dual use infrastructure in urban centers meant to serve both peace time requirements and crisis related emergencies would help cope with unanticipated exogenous shocks.

As also recommended by the NITI Aayog⁸³, concerted action is needed in the areas of:

- Integrated economic vision and planning,
- Policies, regulations and promotion of investments,

- Integrated master planning enabling integration of land use and infrastructure provision,
- Land supply and land regulations for enabling development, and
- Provisions for affordable and organized housing.

Already, a High-Level Committee has been constituted for recommending urban planning reforms. This Committee would assess the status of urban planning, identify gaps, and suggest measurable actions to be undertaken.

There is also a need to equip urban local bodies with capacity building and necessary tools to successfully translate governance principles to a local level so as to leapfrog towards sustainable and inclusive urbanization.

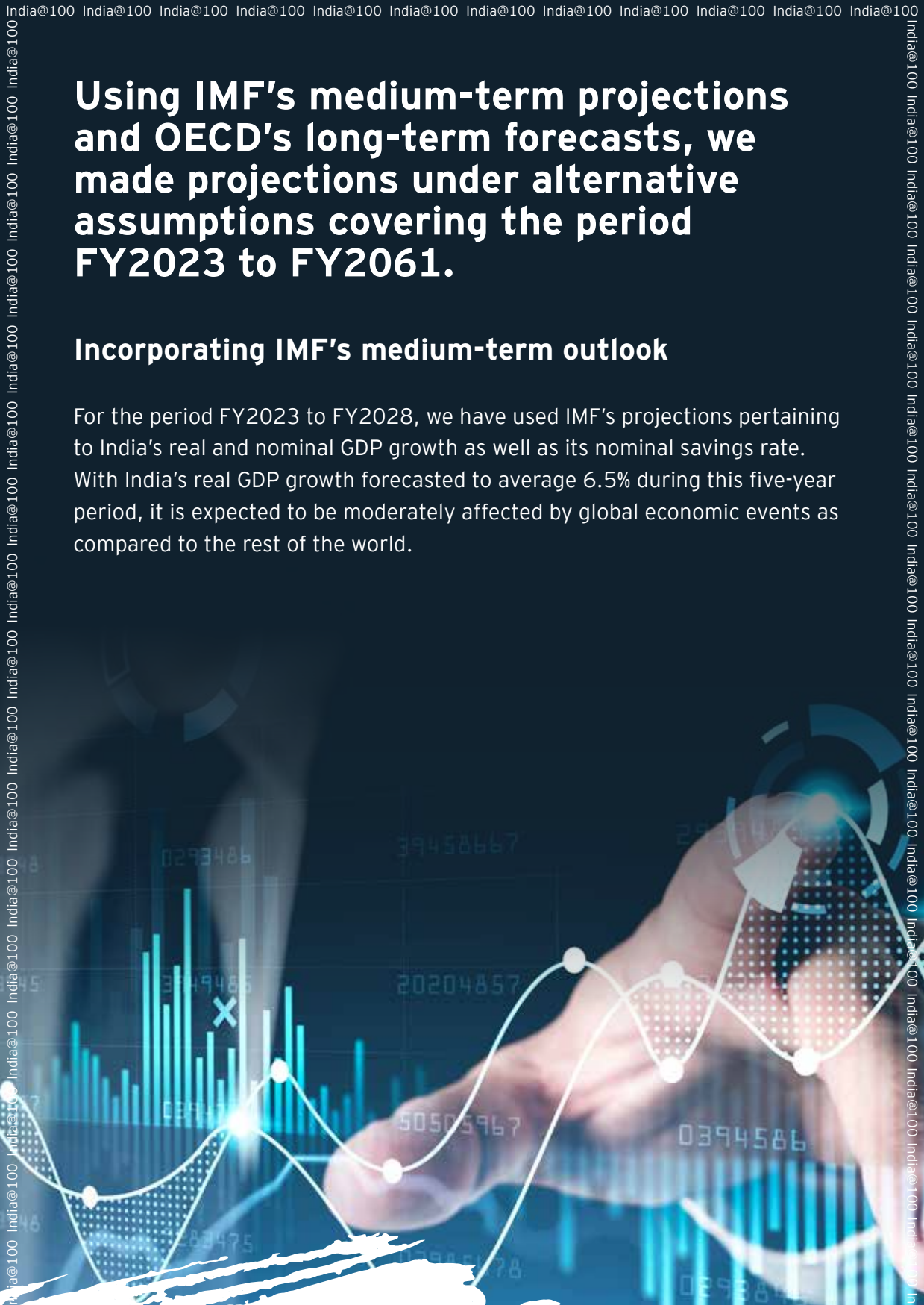
83 "Cities as engines of Growth" - Niti Ayog and ADB (May 2022)



UNDERSTANDING

THE EY METHODOLOGY





Using IMF's medium-term projections and OECD's long-term forecasts, we made projections under alternative assumptions covering the period FY2023 to FY2061.

Incorporating IMF's medium-term outlook

For the period FY2023 to FY2028, we have used IMF's projections pertaining to India's real and nominal GDP growth as well as its nominal savings rate. With India's real GDP growth forecasted to average 6.5% during this five-year period, it is expected to be moderately affected by global economic events as compared to the rest of the world.

Global growth is projected to ease from 6% in 2021 to 3.2% in 2022 and 2.7% in 2023. This would be the weakest growth profile since 2001, except for the 2008 global financial crisis and the pandemic.

The impact on advanced economies (AE) is expected to be more severe with their growth projected to slow from 5.2% in 2021 to 2.4% in 2022 and 1.1% in 2023, much of which will be concentrated in the US and European economies.

Sprinting ahead: India will grow far faster than peers in the medium-term (Growth, % y-o-y)

	2022	2023	2024	2025	2026	2027
US	1.6	1.0	1.2	1.8	2.1	1.9
Germany	1.5	-0.3	1.5	2.2	1.8	1.3
Japan	1.7	1.6	1.3	0.9	0.5	0.4
India*	6.8	6.1	6.8	6.8	6.5	6.2
China	3.2	4.4	4.5	4.6	4.6	4.6
World	3.2	2.7	3.2	3.4	3.3	3.2
AEs	2.4	1.1	1.6	1.9	1.9	1.7
EMDEs	3.7	3.7	4.3	4.3	4.3	4.3
Euro area	3.1	0.5	1.8	1.9	1.7	1.5

Source: IMF World Economic Outlook, October 2022; *data pertains to fiscal year







Modifying OECD's long-term projections

Our long-term projections beyond FY2028 are based on the OECD's methodology although with some suitable modifications made with respect to India's growth profile.

The OECD has focused on projecting the potential or trend output growth based on a long-term model in which the main determinants of growth include growth of capital stock and its productivity, growth of labor force and its productivity and the pace of technological progress (Guillemette and Turner, 2018; Johansson A. et al., 2013; OECD, 2014)⁸⁴.

84 Guillemette, Y. and D. Turner (2018), "The Long View: Scenarios for the World Economy to 2060", OECD Economic Policy Papers, No. 22, OECD Publishing, Paris; OECD (2014), "Growth Prospects and Fiscal Requirements over the Long Term", in OECD Economic Outlook, Volume 2014 Issue 1, OECD Publishing, Paris; Johansson Å. et al. (2013), "Long-Term Growth Scenarios", OECD Economics Department Working Papers, No. 1000, OECD Publishing, Paris

The heavyweights: how the top 5 economies will grow according to the OECD (Five yearly average growth rates in % terms)







	 China	 Germany	 Japan	 US	 India	 World
2022 to 2025	4.9	2.0	1.1	2.2	8.2	3.7
2026 to 2030	3.7	0.7	0.6	1.6	5.9	2.7
2031 to 2035	2.9	0.7	0.5	1.5	4.7	2.3
2036 to 2040	2.1	0.8	0.4	1.4	3.8	1.9
2041 to 2045	1.6	0.9	0.3	1.4	3.1	1.7
2046 to 2050	1.3	0.9	0.2	1.3	2.7	1.5
2051 to 2055	1.3	0.9	0.4	1.3	2.4	1.5
2056 to 2060	1.2	1.0	0.5	1.3	2.3	1.5

Source (basic data): OECD; Note: For India, data is on fiscal year bases. 2022 implies FY23 and so on.

The OECD's growth trajectory shows that the average growth rates for the world, China, India and the US progressively fall, decade after decade, although the rate of this decline eases after the 2030s. The

main reasons for the falling growth rates are: declining marginal productivity of capital increasing share of consumption of fixed capital and falling contribution of technological progress.

Changing global order - how the global economic dominance will change over time according to the OECD (Average share in global GDP - in % terms)

	 China	 Germany	 Japan	 US	 India	 World
2022 to 2025	24.4	3.7	4.6	18.5	9.5	3.7
2026 to 2030	25.6	3.3	4.1	17.5	11.0	2.7
2031 to 2035	26.5	3.1	3.8	16.7	12.6	2.3
2036 to 2040	26.9	2.9	3.5	16.2	13.8	1.9
2041 to 2045	27.0	2.7	3.2	15.9	14.9	1.7
2046 to 2050	26.8	2.6	3.0	15.7	15.9	1.5
2051 to 2055	26.5	2.6	2.9	15.6	16.7	1.5
2056 to 2060	26.2	2.5	2.7	15.4	17.5	1.5

Source (basic data): OECD

Notes: (1) For India, data is on fiscal year bases. 2022 implies FY23 and so on.

(2) Shares are based on measurement of GDP in PPP terms.

OECD projects that India's share in global GDP would increase to 15.7% in FY2048, from 8.9% in FY2023, making it the second largest economy after China.

Our projections for India are in terms of INR at 2011-12 prices. These are converted into current prices as well as in terms of the market exchange rate. Since the long-term GDP forecasts for the world and other major economies are provided by the OECD in PPP terms, we have also converted India's GDP projections into PPP terms for the purpose of estimating India's share in global GDP. The concepts of the two conversion rates - PPP and market exchange are explained.

We have projected alternate growth paths for India covering the period FY2023 to FY2061, leaving projections for other countries as per the OECD baseline scenario. However, the world growth and India's share in world output changes as the share of India in world output increases.

This is incorporated by first calculating difference between India's GDP in PPP terms as per the OECD baseline calculation and as per our respective simulations. This difference is then added to the OECD's baseline world GDP in PPP terms for the alternative scenarios (S1, S2, and S3).

India's modified growth trajectory in PPP terms under alternative simulations is given in table India's projected growth rate. These growth rates are marginally higher than those projected at constant 2011-12 prices. These growth rates are slightly higher than the corresponding OECD projections although they also maintain the pattern of declining growth rates during the latter years.

India's projected growth rates in PPP terms (five yearly average growth rates, %)

	S1	S2	S3
2023 to 2026	7.46	7.46	7.46
2027 to 2031	5.98	6.00	6.01
2032 to 2036	5.94	6.11	6.19
2037 to 2041	5.80	6.08	6.25
2042 to 2046	5.32	5.68	5.93
2047 to 2051	5.12	5.56	5.89
2052 to 2056	4.96	5.49	5.90
2057 to 2061	4.67	5.29	5.77

Source (basic data): EY estimates

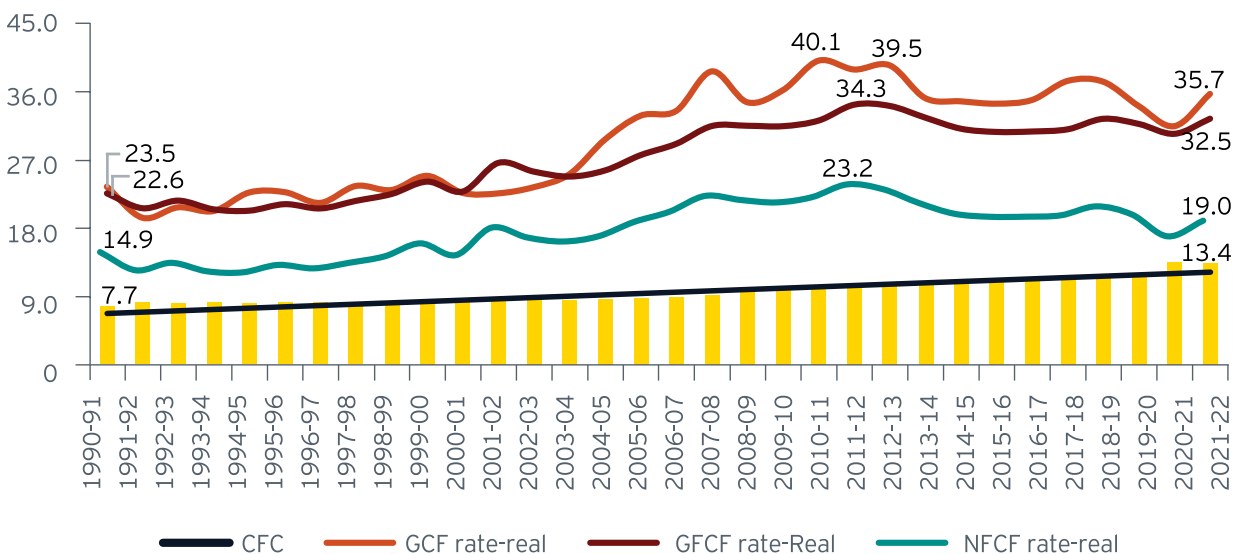
Technical framework

The key determinant of growth in India is investment which is largely financed by domestic savings. Labor supply is going to be abundant in India due to the increasing number of working age persons in line with the unfolding demographic trends. In our methodology, we start with the nominal savings rate. During the projection period, the nominal saving to GDP ratio is converted into the ratio of nominal investible resources to GDP by adding the current account deficit and change in foreign exchange reserves relative to GDP. The nominal investible resources to GDP ratio is then converted into its real counterpart by using the differential in the deflators pertaining to Gross Capital Formation (GCF) vis-à-vis.

GDP. It is notable that investment goods deflator has increased at a comparatively lower rate than the implicit price deflator (IPD) of GDP. On average, this differential has accounted for 3.8% points over the period FY2018 to FY2022.

After this, the investible resources are converted from gross terms to Net Fixed Capital Formation (NFCF) which is relevant for determining growth. This requires deduction of (1) change in stocks, valuables and discrepancies, and (2) consumption of fixed capital (CFC). In terms of relative importance, CFC is quite critical. It refers to obsolescence of capital formation, the rate of which in recent years has increased significantly reflecting a faster pace of introduction and absorption of new

From GCF to NFCF (% to GDP) (at constant prices)



Source: MoSPI

technologies. A higher CFC leaves lesser capital stock available for generating growth. Over the period from FY2016 to FY2021, this has averaged 11.8% relative to GDP. Its trend has been increasing over time reflecting that as technology changes, a significant portion of old capital becomes redundant. Recent trends in some of these variables is depicted in the following Chart.

In the process of conversion of nominal savings rate into NFCF, certain parametric assumptions are common across the three simulations. These are explained in endnote 1. NFCF is then related to the GDP growth rate by the technology factor that captures the impact of technological progress or an improvement in multi-factor productivity. Once real GDP growth is projected, nominal GDP is projected by using assumptions regarding IPD-based inflation. Nominal GDP is then converted into PPP terms and MX terms using alternative depreciation profiles.

Two changes pertaining to (1) nominal savings rate and (2) impact of technological progress as reflected by the ratio of NFCF to GDP relative to GDP growth, are critical differentiators between alternative simulations. The nominal savings rate is augmented so as to increase from the value of 30.5% in the base run (S1) to 32.4% by FY61 in S2 and S3. In S3, along with the change in the savings rate, the parameter reflecting technological progress is increased.

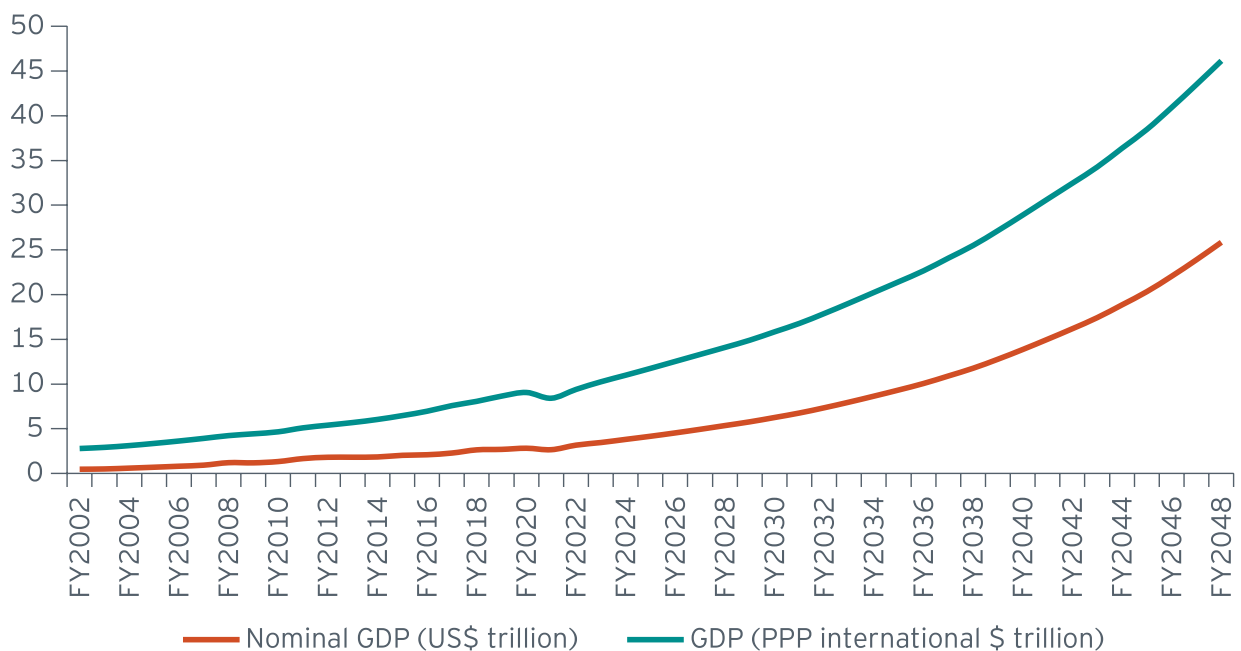
Whether India would be able to achieve these growth augmenting changes depends on taking advantage of the unfolding demographic trends, increasing job creation and employment rates and thereby generating higher per capita incomes. This would lead to higher savings rate. The second change is largely dependent on taking advantage of the global technological progress and investing in innovations domestically. India has already invested substantially in initiatives that would enable taking advantage of these factors.

Key EY projections

As shown in the chart below, the size of the Indian economy is measured in market exchange rate and PPP terms under S3. In market exchange rate terms, the critical thresholds of US\$5, 10 and 20t are crossed respectively in FY2028, FY2036 and FY2045.

In PPP terms, India has already crossed the PPP\$5t threshold way back in FY11. It is likely to cross the PPP\$10t in the current year of FY2023. It is projected to cross PPP\$20t in PPP terms by FY2034.

Projected size of the Indian economy in PPP and MX terms under S3

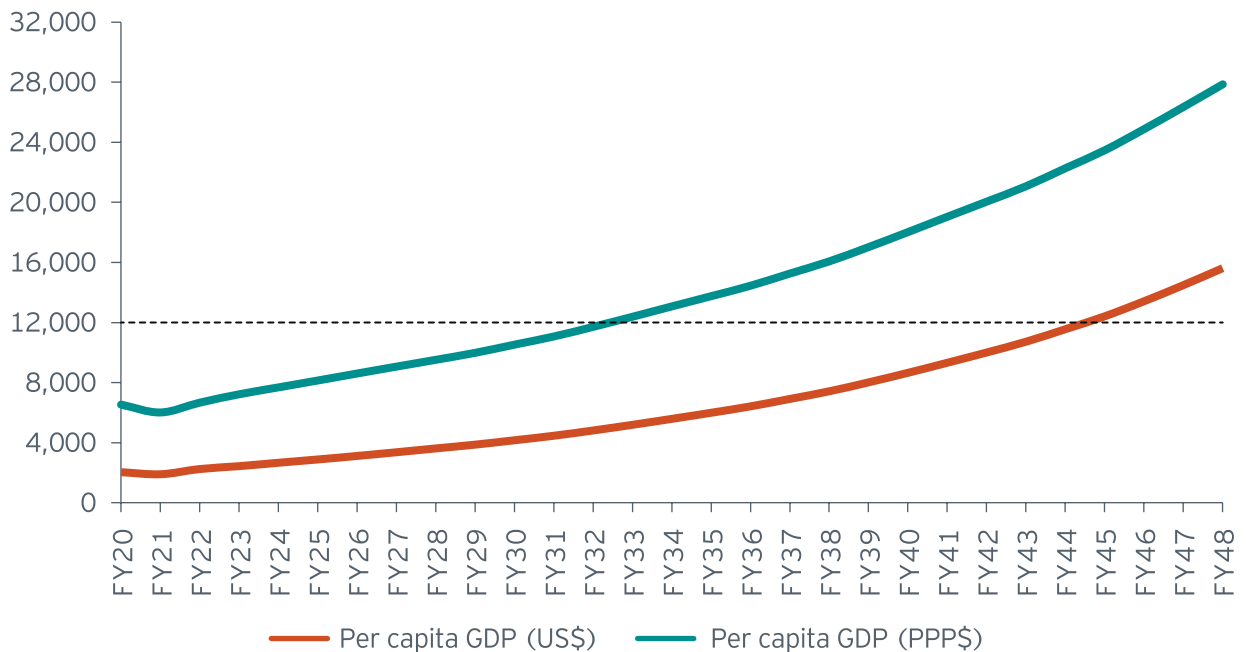


Source (basic data): EY estimates

It is also useful to look at the profile of per capita GDP in PPP and market exchange terms. India is projected to cross the threshold of \$13,000 in PPP terms in

FY2034 and in market exchange rate (US\$) terms in FY2045. By FY2048, India's per capita GDP in market exchange rate terms is expected to reach a level of US\$15,602.

India's per capita GDP - S3



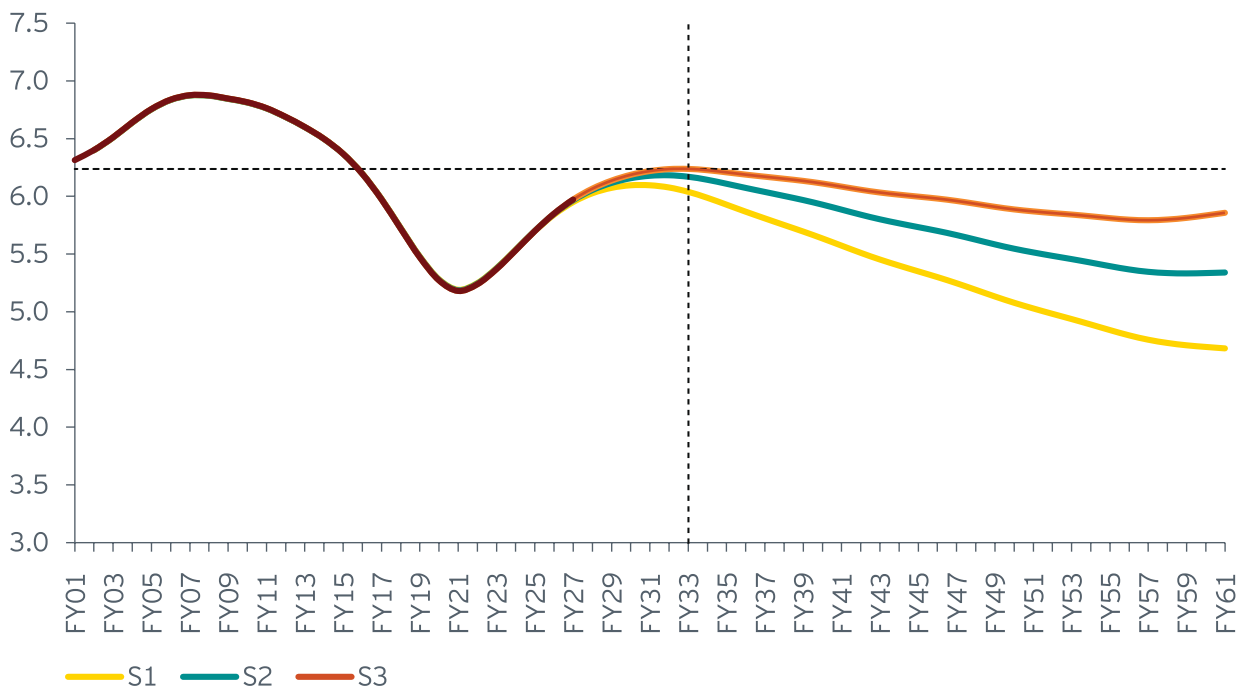
Source (basic data): EY estimates

India's recast growth path

The chart shows the time profile of real GDP growth rates at constant 2011-12 prices under alternative simulations. In S1, it increases to a peak of over 6% in the early 2030s and then falls to a little less than 5%.

This growth profile is progressively uplifted in S2, reflecting increase in the savings rate, and S3 reflecting both, an increase in the savings rate and the impact of technological progress. To smoothen the annual fluctuations, it is the trend values⁸⁵ of the projected growth rates that are plotted.

Charting the Growth Path (India's projected trend growth rates under alternative scenarios, % y-o-y)



Source (basic data): EY estimates

Note: Trend growth rates are based on GDP magnitudes measured in INR at constant 2011-12 prices.

85 Trend growth is calculated using Hodrick Prescott Filter in E-Views.

Endnotes:

1. (a) We have, based on average values of the CFC and change in stocks, valuables et. al., for the period FY2023 to FY2028, deducted 16.3% points of GDP from the gross investible resources in order to arrive at NFCF relative to GDP.
 - (b) In the case of valuables, change in stocks et. al. relative to GDP, which has historically shown year to year volatility, the pattern of volatility over a seven-year period from FY2022 to FY2028 is replicated for the future years in blocks of seven years. The CFC to GDP ratio is increased at a fixed rate of 0.15% points per year during the forecast period.
 - (c) NFCF is related to the GDP growth rate by a technology factor which is captured by the ratio - [NFCF to GDP]/ [GDP growth]. This factor has averaged at a value of 2.9 over the period FY2016 to FY2020. The real GDP growth would respond to technological progress which can be reflected by the changes in the incremental investment to GDP growth rate. In particular, it would reduce the value of the ratio of 2.9.
 - (d) Growth rates over the period FY2023 to FY2028 along with the relevant parametric values (such as nominal savings rate and nominal GDP) relate to the IMF projections, and do not change across simulations.
 - (e) The IMF has projected the nominal savings rate for the period FY2023 to FY2028 in the range of 29.3% to 31.1%, with the average level at 30.5%. The average level is maintained for the entire projection period in the base run (S1). This is increased in simulations S2 and S3. The profile of increase is slightly higher during the period from FY2030 to FY2035 when the ratio of working age population is close to its peak. After that, it is increased but by a smaller margin per year. By FY2061, it is thus increased to 32.4%.
 - (f) For projections from FY2029 and beyond, parameters that are common across different simulations relate to 1) CAD and change in FX reserves relative to GDP which is kept at 1.3%, close to sustainable levels, and 2) the contribution of the differential deflator of GCF vis-à-vis. GDP which is kept at 3.13% points.
2. Magnitudes in INR terms (except for EY Projections) have been converted to US\$ terms using a common exchange rate of INR80/US\$

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ABBREVIATIONS

ACC:	Advanced Chemistry Cell	MBB:	Mobile Broadband
ADR:	Alternate dispute resolution	MSDE:	Ministry of Skill Development and Entrepreneurship
BESS:	Battery Energy Storage Systems	MSME:	Micro, Small & Medium Enterprises
CAGR:	Compound annual growth rate	NLP:	National Logistics Policy
CFC:	Consumption of Fixed Capital	NDC:	Nationally Determined Contributions
GCC:	Global Capacity Centers	NFCF:	Net Fixed Capital Formation
ESO:	Energy storage obligation	NIP:	National Infrastructure Pipeline
ESS:	Energy storage system	NMP:	National Monetization Pipeline
EV:	Electric Vehicle	NPAs:	Non-Performing Assets
FAME:	Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles	OCEN:	Open Credit Enablement Network
FDI:	Foreign Direct Investment	OECD:	Organization for Economic Cooperation and Development
GCF:	Gross Capital Formation	ONDC:	Open Network of Digital Commerce
GFCF:	Gross fixed capital formation	PE:	Private equity
GDP:	Gross domestic product	PLI:	Production Linked Incentives
Gol:	Government of India	PPP:	Purchasing Power Parity
GVA:	Gross value added	PSP:	Pumped Hydro Storage Projects
GST:	Goods and Services Tax	RBI:	Reserve Bank of India
GW:	Gigawatt	SECI:	Solar Energy Corporation of India
IBC:	Insolvency and Bankruptcy Code	STEM:	Science, Engineering, Technology and Mathematics
InViTs:	Infrastructure Investment Trusts	UDAN:	Ude Desh ka Aam Naagrik
IPD:	Implicit Price Deflator	UN:	United Nations
IMF:	International Monetary Fund	UPI:	Unified Payments Interface
IT/ITES:	Information Technology/ Information Technology enabled services	VC:	Venture Capital
LFPR:	Labor force participation rate		



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