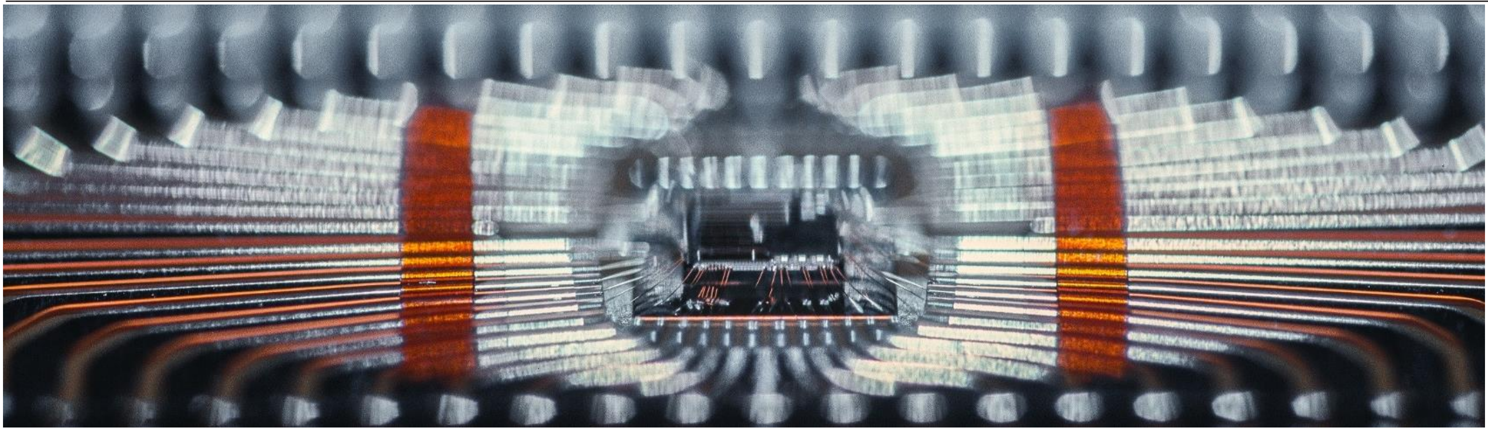
# CIO Academy

## India's Tech-tonic Shift: From DPI to AI

### Can India Leverage its Talent, Data, R&D, and 'Frugal Innovation' to Get Ahead in the AI Race?

April 2025



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**Highlights:** From launching successful space missions on a budget and landing on the dark side of the moon, to digitalising the Indian economy with its unique Digital Public Infrastructure (DPI) and unlocking new engines of growth – India's tech innovations in the last 10 years have been nothing short of a tech alchemy - transforming the nation and pushing out its productivity frontier. The rollout and rapid adoption of DPI, aka, the 'India Stack' unlocked the economic primitives of Identity, Data and Payments and **democratised tech** across India's population, making it the third most digitalised nation, with the third biggest start-up ecosystem in the world. But technology seldom stays still. India now finds itself in the midst of a global "AI arms race", led by the US and China. In this new digital world order, India can't afford to become a laggard. But does India have what it takes to be at the forefront of this global AI race? **Can India develop its own AI model?**

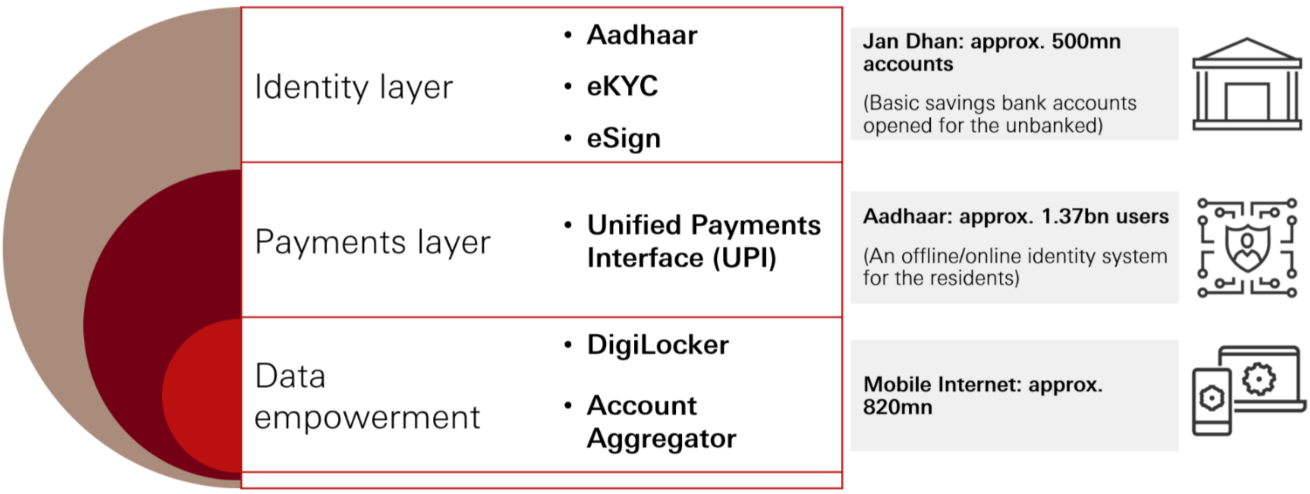
- Recent rise of cheaper & efficient models like DeepSeek has shown that **in this AI race, brains will conquer the brawn**. As such, 'distilling' the already exiting opensource AI models to develop an indigenous Indian AI model & localised applications is the way to go.

- Thanks to DPI, we believe India already has the basic building blocks in place. With one of the most thriving start-up ecosystems in the world already deploying AI powered tools in their core services, the scope for India to build its own AI model and develop its unique applications has widened. If India manages to: a.) Upskill, nurture, and retain its indigenous **Tech talent**; b.) Create a public repository of its unleveraged **Data** pools; c.) Up its **AI R&D** capabilities; and finally, d.) Top it all with its secret sauce of '**Frugal Innovation**', it should be able to develop its own AI model and potentially become an AI applications hub. In addition, India's ability and focus on developing its own renewable sources of energy like solar, wind and nuclear power should add to its energy security and self-reliance - an absolute essential in this global AI race.

- By taking such a strategic, comprehensive, and multi-pronged approach to addressing gaps in its AI ecosystem, we believe – India - already a tech superpower in its own right, can make yet **another 'tech-tonic' shift in its journey of innovation** - this time **from DPI to AI**. If this happens, AI will be able to turbocharge the benefits of its Digital Public Infrastructure and unleash enormous economic and social positives at scale. As such, AI is estimated to contribute $1trn to India's GDP by 2027 and create over 30 million jobs[5].

- In this report, we deliver actionable insights on how to best leverage the domestic opportunities created by India's tech revolution thus far and the new opportunities that advancements in AI could offer, especially in sectors like India's digital consumption, financials, and healthcare. Our investment themes on the Rise of India and ASEAN and Power up Asian Shareholder Returns capture these investment opportunities well.

**With DPI, India managed to democratise technology cross its population scale in the last 10 years**




Source: GoI, HSBC Global Private Banking, April 2025

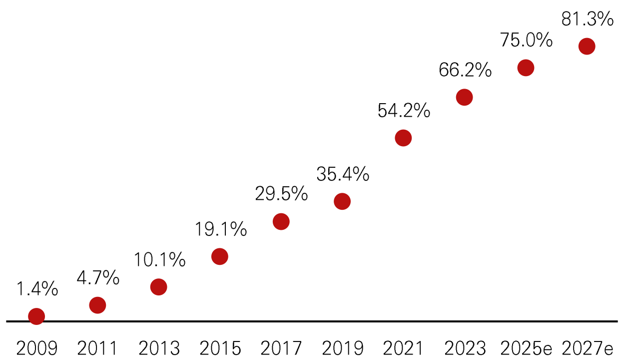
With the rollout and rapid adoption of a unique model of Digital Public Goods called the 'India Stack' or the DPI, India managed to unlock the economic primitives of **Identity, Data** and **Payments** in the last decade.

Also nicknamed as the '**JAM trinity**', India's DPI offered an innovative interlinking of:

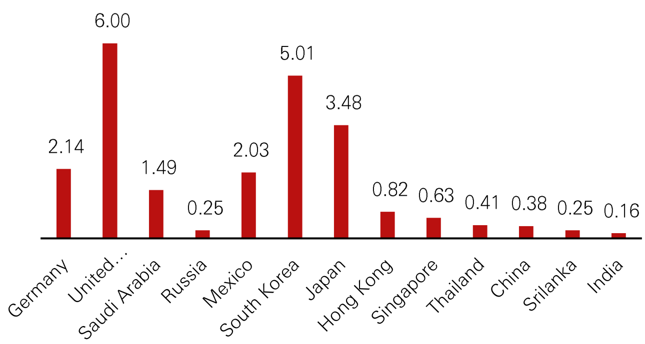
- **Jan Dhan** i.e. setting up low-cost bank accounts for millions of unbanked Indians, fostering financial and social inclusion.
- **Aadhar** - the digital identity of each Indian; &
- **The mobile phone number** of each individual.

This reduced frictions in the system and positioned India at the forefront of the internet age. Thanks to the APIs and the interoperability of India Stack, new business models solving pain points unique to India have come to the fore and have stoked new age entrepreneurship. Rising smart phone penetration, the availability of low-cost data and seamless connectivity of bank accounts and domestic payment systems (like UPI) on individuals' mobiles has **democratised technology for Indians**. It revolutionised India's e-commerce and digital consumption, and in doing so, pushed out India's productivity frontier and put it on a virtuous path of steady structural growth. It's not surprising therefore that the 'State of India's Digital Economy (SIDE) 2025' report, has ranked **India** as the world's **third most digitised nation**, following the United States and China. As such, **India's digital economy is growing at twice the pace** of the overall economy and projected to become one-fifth of the country's economy by 2029[1]. It is therefore quite clear that India's digital transformation has rapidly redefined its economy and its global standing.

**Smart phone penetration has rapidly risen in India…**

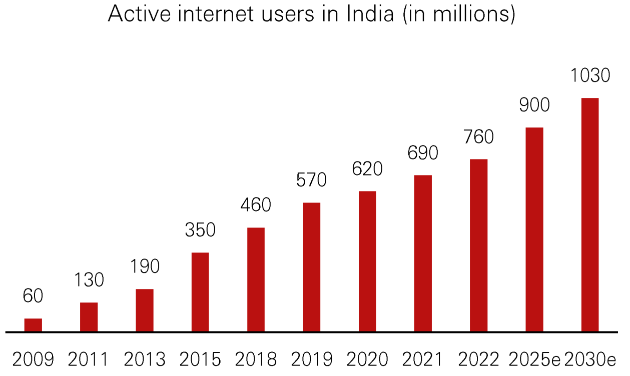



**…thanks to India's lowest data cost globally…**




Source: Bloomberg, GoI, HSBC Global Private Banking, April 2025

**...resulting in rapid growth of internet users.**




Sources: Bloomberg, Go, HSBC Global Private Banking, April 2025.

**But both in life and in tech, standing still means getting left behind**. This is especially true in an era of global AI race which is getting competitive by the day, with new and innovative AI models originating from both the US and China. The key question is, how can India leverage its existing digital strength and convert it into AI readiness? Although India has made strides in securing some pieces of its AI puzzle, it is yet to focus on the other missing pieces. Let us explore what has India done so far and what else does it need to do:

## What has India done in the AI space thus far?

- **India has focused on procuring AI hardware:** Having already secured 10,000 GPUs through Public-Private Partnerships, in February 2025, India's Ministry of Electronics and Information Technology (MeitY) committed to enhancing the available compute capacity to over 18,000 GPUs. These will be made available to start-ups and researchers at academic institutions.

- **India's need for language tech has driven innovation in Indic language AI**: India is a unique country where lanugage and food change every 50 kilometers. In a land of hundreds of local languages, and 22 official languages, knowledge sharing and upskilling are a formidable challenge. For example, the need for a rural Indian farmer to be able to speak to his phone in his own language and get the best information about farming, weather etc., and therefore improve his output is one of India's unique painpoints that AI enabled language tech can solve. Therefore, India is prioritisng the development of its own indigenous AI applications focused on knowledge sharing in the form of **Natural Language Processing (NLP)**, wherein vernacular language translation systems are used to develop and launch e-courses in regional languages and dialects. This should massively improve India's educational sector. A key example of this is the Indian government's MeitY's launch of the **Digital India 'Bhashini' initiative**, which aims to develop speech-to-speech machine translation systems for various Indian languages and dialects while establishing a **Unified Language Interface (ULI)** to provide AI-driven language solutions. Through this Bhashini platform, it facilitates voice-based access and supports content creation in 22 Indian languages. By collaborating with over 70 research institutes, Bhashini has developed advanced language AI models that host over 350 AI-based tools, including Automatic Speech Recognition (ASR), Machine Translation (MT), Text-To-Speech (TTS), and Textual Language Detection, covering more than 17 languages.

## But, is a focus on just developing AI applications enough?

What else does India need to do to build its **own AI model** and achieve its ambition of developing an Indian '**AI stack'**?

While India's digital transformation has rapidly redefined its economy and its global standing, research shows that it has a sizeable ground to cover in this AI race. Among the G32 countries, it ranks only 11$^{th}$ in AI research and 16$^{th}$ in AI infrastructure[1].

So, to get ahead in AI, the Indian government launched India's National AI Mission (NAIM) in 2024, which highlighted that success in this AI race requires multiple pieces of the AI puzzle to be in place. It laid out seven vital elements that India needs to build its 'AI stack': Computing/AI infrastructure, data, talent, R&D, capital, algorithms, and applications[3]. However, the focus thus far has mainly been on securing AI hardware/chips and building Indic language models[4].

If India wishes to achieve its AI ambition, we believe it will need to prioritise three key enabling areas: **Data, Talent** and **AI Research**[4] and deploy its secret sauce of "Frugal Innovation" throughout its AI journey:

1. **Data**: With data being the 'oil' for AI models, the demand for AI-ready, sovereign data infrastructure is accelerating in India. Despite being the world's third largest digital economy and generating copious amounts of raw digital transactions data, India lacks well structured, regularly updated datasets. **India specific data remains siloed, unstructured, and untapped**. India therefore needs to find ways to unlock its unique data advantage by proliferating its multilingual data and by leveraging India-specific datasets[4]. We think building a 'digital public repository' of Indic language data sets that allow Indian companies to train India-specific AI models and build applications for Indian customers and businesses is the need of the hour.

2. **Tech Talent**: While India has one of the largest Science, Technology, Engineering and Mathematics (STEM) graduates' pool, fixing its talent gap in AI, especially when it comes to the **quality and job readiness of Indian engineering graduates** is critical. Parallelly, upskilling India's existing IT workers into becoming an AI-enabled workforce remains a key challenge for India's tech industry. Furthermore, India's "**brain-drain**" issue persists because of the allure of better AI ecosystems and commercialisation opportunities in the West. If India is to produce the next wave of AI innovations for the world, it needs to "**reverse its brain-drain**" and continue to upskill its labour force to build an optimal level of tech talent. This would include having adequate number of AI-related R&D scientists; AI developers & architects; and AI integrators who possess sufficient knowledge of AI tools and solutions and hence are able to integrate them in corporate workflows.

   Fortunately, global corporates are now joining hands with the Indian government to provide complementary support in its policy initiative to **AI-educate** the Indian youth. For example, Microsoft's ADVANTA(I)GE INDIA initiative, aims to train 10 million Indians in AI by 2030. The IndiaAI Mission has also launched its "**YuvAi**" Initiative for skilling and capacity building in collaboration with the All India Council for Technical Education (AICTE). Such advanced skill development in AI should also enhance India's AI research capabilities.

3. **R&D**: India needs a research ecosystem that fosters AI R&D. To this effect, it's heartening to see Indian government's commitment to building several Centres of Excellence (CoEs). These will essentially be AI labs that will function as innovation hubs where government-backed institutions, corporate research divisions, and academic experts work in collaboration to develop foundational models with practical applications. Recent initiatives like the "**One Nation One Subscription**" which provide free access to world's top journals and hub-and-spoke models like **PAIR** (Partnerships of Accelerated Innovation and Research) are steps in the right direction, but more needs to be done. By encouraging private sector firms to invest in AI R&D and forging industry-academia partnerships with global tech firms; and incentivising researchers to commercialise their research, India could deliver cutting-edge AI R&D of India-centric AI applications.

If India manages to establish an **AI ecosystem** that has the right talent; availability of quality data sets; and AI R&D and deliver all three with a hearty splash of its secret sauce of '**Frugal innovation**', we believe India should be able to achieve its '**AI stack**', i.e. develop an indigenous AI model, plus the applications that boost local businesses. This could turbo charge the DPI and unleash enormous economic and social benefits across the scale of Indian population.

## India's focus on renewables for meeting the future AI energy needs

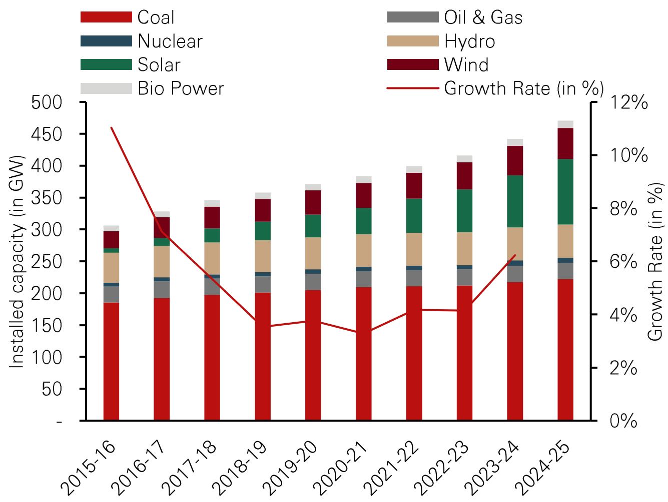
Another key element of building a sound AI ecosystem is building energy adequacy, self-reliance and **energy security**. In recognition of the upcoming energy needs of AI, India is simultaneously investing in expanding its renewables capacity - i.e. solar, wind and nuclear power.

In the last decade, **India's renewable energy production has gone up from 26% to 46 % of India's energy mix** (Source: Bloomberg). With 300+ sunny days per year, and a large coastline for wind power, harnessing solar and wind energy are enabling the country to increase its renewable energy production.

In addition, India aims to expand its nuclear energy capacity to 22,480 MW by 2031-32 and is therefore focusing on the research and development of Small Modular Nuclear Reactors (SMRs). In the February 2025 budget, India's Finance Minister allocated Rs 20,000 crores (~$2.4bn) for SMR research and development, alongside opening the nuclear energy sector to private players, with an ambitous target of adding at least 100GW of nuclear capacity by 2047[6]. This presents an opportunity for experienced US private players to collaborate with Indian agencies in developing, building, and operating SMRs. As such, the SMR sector could provide the necessary impetus to the India-US nuclear collaboration, taking it to the next level.

But it's not just the Indian government's policy and efforts that will make this AI ambition a reality. India's IT sector too needs to pull its weight.

**Renewables have grown in India's energy mix**




Sources: NiTi Aayog, HSBC Global Private Banking, April 2025.

## So, what role does India's IT sector need to play in this AI race?

We think the **Indian IT sector's 'outsourcing model'** is **ripe for disruption** in the new AI world. While India has come a long way from being the hub of outsourced call centres of the 90s to now being the hub of outsourced global professional services delivered via the GCCs (Global Capability Centres), to get ahead in the global AI race, India needs to now move on from being the world's back office.

For India's $263 billion IT services sector[2], change is imminent, and the big moment of disruption is upon it. In the past, India's IT companies charged for inputs such as the time and people involved in a project. This allowed for linear scaling of IT services. But in the new AI-led world this old Indian tech business of IT outsourcing model needs to dramatically change from being **input-based to** becoming more output and **outcome-based**.

We think India's IT sector needs to breakout of its existing revenue model and reinvent itself from currently being a provider of outsourced IT services to becoming one of the world's leading AI R&D hubs - one where AI innovations of the future (similar to DeepSeek) emerge from. To achieve this, India's software makers will need to make their next products and platforms 'AI native' by fostering internal innovation, leveraging enterprise-grade open-source technologies, and embracing cross-enterprise AI innovation through forging partnerships with global payers in AI and cloud computing. While the listed IT companies are yet to reposition, **India's vibrant start-up ecosystem is ahead of the curve** and is doubling down on AI applications focused ventures. For India's start-ups, Artificial Intelligence is the new MVP – not 'Minimum Viable Product' but rather the 'Most Valuable Player'.

India's AI start-ups are building their own solutions on top of western open-source LLMs to deliver enterprise applications, agentic AI, and AI driven services. Investors in these early/growth stage companies too are more interested in rapidly expanding AI applications and accepted use cases like automating enterprise IT workflows, Paas (Platform-as-a-Service) and agentic AI. As such, for the Indian start-ups, AI is no longer a USP, it's becoming fundamental to all things tech.

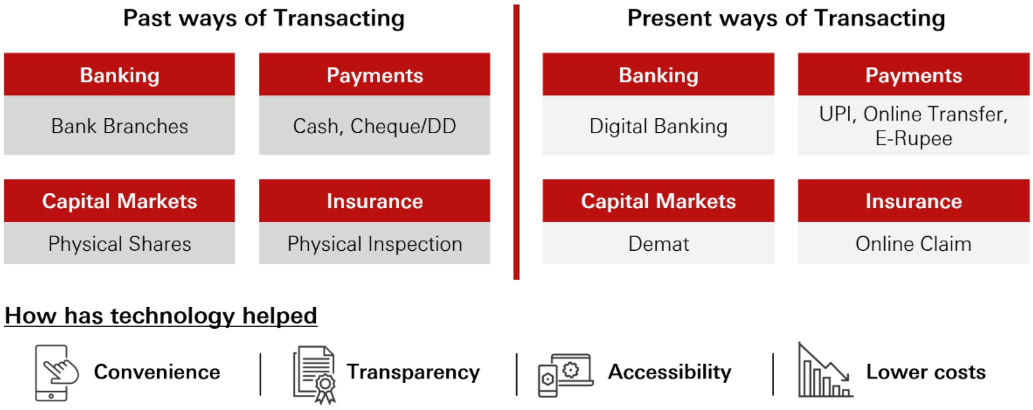
## Opportunities for investors

We see attractive investment opportunities in India's digital economy, which is now likely to be further underpinned by AI:

**Digital Consumption**: With rising incomes; recent lowering of income tax; access to quick-commerce on smart phones (a unique Indian model of local warehouses and operational excellence enabling under 10 minutes delivery of most things, from hot food to medicines and many more items); and a growing consumer shift from price sensitivity to speed and convenience, we see attractive investment opportunities in the rising digital consumption in India. These quick-commerce platforms have figured out a way to reach millions of Indian customers in a cost effective and profitable manner, and this trend is only just beginning, as the total addressible market in Tier 2 and Tier 3 cities and beyond just keeps growing with smartphones' and internet penetration. In a watershed moment demonstrating this growing importance of India's young internet firms, a well-known food delivery and quick commerce platform was recently added to India's flagship BSE index.

**Financials**: Technology has transformed India's financial landscape. It has increased convenience, transparency and accessibility of financial markets, while lowering costs. As the GDP and per capita income grow, mobile access to banking/fintech apps has grown. Indian households are becoming much more aware of different ways of investing and increasingly channelising their savings into productive financial assets like equities and mutual funds. Unlike before, **Indian savers** are fast becoming **retail investors**.

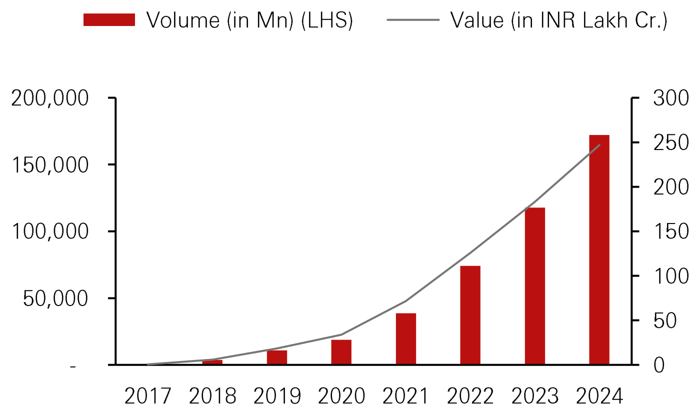
**Technology has reformed the Indian financial landscape**




Source: HSBC Global Private Banking, April 2025.

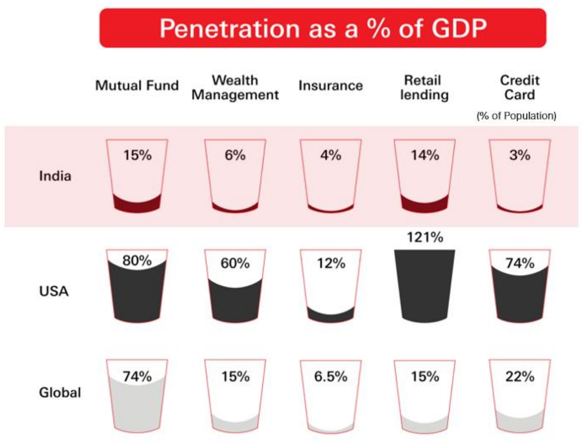
Whilst **financialisation of savings** is increasing at one end of the wealth spectrum, at the other end, availability of systematic and clear transactional data via bank accounts/UPI is facilitating accessibility and **availability of credit** via formal banking channels. This is a game changer, especially for those at the middle and lower end of the financial spectrum who were earlier ineligible for formal credit and had to borrow via informal channels. With financial services penetration still low in India we expect the depth and breadth of both non lending (Mutual funds, Asset Management companies benefitting from domestic flows) and lending (traditional banks and non-banking financial Corporations) financial companies to grow in India.

**UPI transactions' volume has grown enormously, making credit assessments easy**




Source: npci.org, HSBC Global Priavte Banking, April 2025

**Financial services products still have low penetration in India**




Source: HSBC Global Private Banking, April 2025.

**Healthcare and diagnostics**: With rising incomes and standards of living, one sector that's likely to benefit from Indians' focus on quality of life and wellness is its healthcare sector. India's emphasis on AI marks a pivotal inflection point for the future of diagnostics, treatment and medical research. Pre-configured AI solutions are empowering healthcare providers automate repetitive tasks and focus more on patient care. AI powered digital pathology and medical imaging solutions are improving diagnostics. AI is also being used to process large volumes of data quickly and accurately in scans like CT, MRI and X-rays. Large conglomerates are integrating AI in the healthcare market, which is forecasted to grow by 40.6% in 2025 and reach $1.6bn in 2025[6].

When it comes to accessing healthcare in rural areas and resolving the challenges like shortage of adequate healthcare professionals in the most remote corners of India, AI is proving transformational for India's healthcare sector. The government too is digitalising healthcare in India via the National Digital Health Mission which aims to create a unified health ID for every Indian citizen. Given the rising demand for hospital care, regular health checks and diagnostics, we see attractive opportunities in India's healthcare sector.

## Risks

If India is to meet its higher ambition of becoming a leading AI power, it will have to make synchronised, collaborative and concerted efforts in several directions, and fast. Any roadblocks in accelerating its AI talent, a data repository and AI R&D may relegate India to a minor role in this global AI competition.

One of India's missions is to develop "**AI for All**". But the digital divide in India, especially in rural areas still poses a challenge to this ethos. Bridging this digital divide to ensure AI-powered solutions reach all to create equitable social and economic upliftment remains a real challenge. Whilst India has managed to keep a cordial diplomatic relationship with President Trump, US tariffs on chips produced in India could hinder India's semiconductor ambitions.

## To Conclude..

The global AI race is on and may end up deciding which nation leads the world order. Until recently, US big tech dominated this race. But the emergence of DeepSeek has shown that **AI is no longer a one-horse race**.

Being the third most digitalised nation in the world, India has successfully displayed its capability in the past to surprise the world and leapfrog tech innovation through implementation of its own unique digital infrastructure. It's next challenge in this journey of tech innovation is to make a **shift from DPI to AI.**

**So, should India aim to develop its own AI model? Of course, it should**. AI is India's next trillion dollar opportunity. What favours India at this juncture is that this AI race has only just begun and is wide open to those players who strategise and use their resources wisely.

**But given the resource constraints, can India develop its own AI model? We think it can.** At the end of the day, the rise of cheaper AI models like DeepSeek have shown that this race may not necessarily be won by those can throw money at the problem, but rather by those who adapt, innovate frugally, find scalable implementations, bring real life AI use cases to the fore and democratise AI applications.

By taking a strategic, comprehensive and multi-pronged approach to addressing gaps in its **AI ecosystem** – i.e., Tech, Data and R&D – and topping it all up with its secret sauce of 'Frugal Innovation', we believe, India, already a tech superpower in its own right, can make yet another **'tech-tonic' shift** in its journey of innovation, **from DPI to AI**.

Until India manages to develop its own DeepSeek style frugal AI model, we believe it will do a great job in developing local applications that address painpoints specific to India, and in doing so, it has the potential to become one of Asia's leading AI applications' hubs. If India manages to establish a synergy around AI in key areas like agriculture, healthcare, finance etc., it could revolutionise the country into becoming one of the global hubs of AI innovation and applications. As such, AI has the potential to turbocharge India's DPI and could unleash new benefits at scale to make meaningful improvements in hitherto hard-to-transform areas.

For investors, India's continous tech innovation provides attractive investment opportunities in Indian sectors like **digital consumption, financials and healthcare**. Our investment themes on the Rise of India and ASEAN and Power up Asian Shareholder Returns capture these investment opportunities well.

**Footnotes:**

**1.) Prosus, Indian Council for Research on International Economic Relations, March 2025**

**2.) FY25 estimate, excluding hardware, Nasscom technology leadership forum, in Mumbai on 24 February 2025**

**3.) National security commission for Artificial Intelligence; Jan 2025**

**4.) Carnegie India, The missing pieces in India's AI puzzle: Talent, Data and R&D**

**5.) Yourstory.com; March 2025**

**6.) Bloomberg, March 2025**

# Risk Disclosures

**Risks of investment in fixed income**

There are several key issues that one should consider before making an investment into fixed income. The risk specific to this type of investment may include, but are not limited to:

**Credit risk**

Investor is subject to the credit risk of the issuer. Investor is also subject to the credit risk of the government and/or the appointed trustee for debts that are guaranteed by the government.

**Risks associated with high yield fixed income instruments**

High yield fixed income instruments are typically rated below investment grade or are unrated and as such are often subject to a higher risk of issuer default. The net asset value of a high-yield bond fund may decline or be negatively affected if there is a default of any of the high yield bonds that it invests in or if interest rates change. The special features and risks of high-yield bond funds may also include the following:

- Capital growth risk - some high-yield bond funds may have fees and/ or dividends paid out of capital. As a result, the capital that the fund has available for investment in the future and capital growth may be reduced; and
- Dividend distributions - some high-yield bond funds may not distribute dividends, but instead reinvest the dividends into the fund or alternatively, the investment manager may have discretion on whether or not to make any distribution out of income and/ or capital of the fund. Also, a high distribution yield does not imply a positive or high return on the total investment.
- Vulnerability to economic cycles - during economic downturns such instruments may typically fall more in value than investment grade bonds as (i) investors become more risk averse and (ii) default risk rises.

**Risks associated with subordinated debentures, perpetual debentures, and contingent convertible or bail-in debentures**

- Subordinated debentures - subordinated debentures will bear higher risks than holders of senior debentures of the issuer due to a lower priority of claim in the event of the issuer's liquidation.
- Perpetual debentures - perpetual debentures often are callable, do not have maturity dates and are subordinated. Investors may incur reinvestment and subordination risks. Investors may lose all their invested principal in certain circumstances. Interest payments may be variable, deferred or cancelled. Investors may face uncertainties over when and how much they can receive such payments.
- Contingent convertible or bail-in debentures - Contingent convertible and bail-in debentures are hybrid debt-equity instruments that may be written off or converted to common stock on the occurrence of a trigger event. Contingent convertible debentures refer to debentures that contain a clause requiring them to be written off or converted to common stock on the occurrence of a trigger event. These debentures generally absorb losses while the issuer remains a going concern (i.e. in advance of the point of non-viability). "Bail-in" generally refers to (a) contractual mechanisms (i.e. cotractual bail-in) under which debentures contain a clause requiring them to be written off or converted to common stock on the occurrence of a trigger event, or (b) statutory mechanisms (i.e. statutory bail-in) whereby a national resolution authority writes down or converts debentures under specified conditions to common stock. Bail-in debentures generally absorb losses at the point of non viability. These features can introduce notable risks to investors who may lose all their invested principal.

**Contingent convertible securities (CoCos) or bail-in debentures are highly complex, high risk hybrid capital instruments with unusual loss-absorbency features written into their contractual terms.**

Investors should note that their capital is at risk and they may lose some or all of their capital.

**Changes in legislation and/or regulation**

Changes in legislation and/or regulation could affect the performance, prices and mark-to-market valuation on the investment.

**Nationalisation risk**

The uncertainty as to the coupons and principal will be paid on schedule and/or that the risk on the ranking of the bond seniority would be compromised following nationalisation.

**Reinvestment risk**

A decline in interest rate would affect investors as coupons received and any return of principal may be reinvested at a lower rate. Changes in interest rate, volatility, credit spread, rating agencies actions, liquidity and market conditions may have a negative effect on the prices, mark-to-market valuations and your overall investment.

**Risk disclosure on Dim Sum Bonds**

Although sovereign bonds may be guaranteed by the China Central Government, investors should note that unless otherwise specified, other renminbi bonds will not be guaranteed by the China Central Government.

Renminbi bonds are settled in renminbi, changes in exchange rates may have an adverse effect on the value of that investment. You may not get back the same amount of Hong Kong Dollars upon maturity of the bond.

There may not be active secondary market available even if a renminbi bond is listed. Therefore, you need to face a certain degree of liquidity risk.

Renminbi is subject to foreign exchange control. Renminbi is not freely convertible in Hong Kong. Should the China Central Government tighten the control, the liquidity of renminbi or even renminbi bonds in Hong Kong will be affected and you may be exposed to higher liquidity risks. Investors should be prepared that you may need to hold a renminbi bond until maturity.

**Alternative Investments**

**Hedge Fund** - Please note Hedge Funds often engage in leveraging and other speculative investment practices that may increase the risk of investment loss. They can also be highly illiquid, are not required to provide periodic pricing or valuation information to investors, and may involve complex tax structures and delays in distributing important information. Alternative investments are often not subject to the same regulatory requirements as, say, mutual funds, and often charge high fees that may potentially offset trading profits when they occur.

**Private Equity** - Please note Private Equity is generally illiquid, involving long term investments that do not display the liquid or transparency characteristics often found in other investments (e.g. Listed securities). It can take time for money to be invested (cash drag) and for investments to produce returns after initial losses.

**Risk disclosure on Emerging Markets**

Investment in emerging markets may involve certain, additional risks which may not be typically associated with investing in more established economies and/or securities markets. Such risks include (a) the risk of nationalisation or expropriation of assets; (b) economic and political uncertainty; (c) less liquidity in so far of securities markets; (d) fluctuations in currency exchange rate; (c) higher rates of inflation; (f) less oversight by a regulator of local securities market; (g) longer settlement periods in so far as securities transactions and (h) less stringent laws in so far the duties of company officers and protection of Investors.

**Risk disclosure on FX Margin**

The price fluctuation of FX could be substantial under certain market conditions and/or occurrence of certain events, news or developments and this could pose significant risk to the Customer.

Leveraged FX trading carry a high degree of risk and the Customer may suffer losses exceeding their initial margin funds. Market conditions may make it impossible to square/close-out FX contracts/options. Customers could face substantial margin calls and therefore liquidity problems if the relevant price of the currency goes against them.

The leverage of a product can work against you and losses can exceed those of a direct investment. If the market value of a portfolio falls by a certain amount, this could result in a situation where the value of collateral no longer covers all outstanding loan amounts. This means that investors might have to respond promptly to margin calls. If a portfolio's return is lower than its financing cost then leverage would reduce a portfolio's overall performance and even generate a negative return.

**Currency risk – where product relates to other currencies**

When an investment is denominated in a currency other than your local or reporting currency, changes in exchange rates may have a negative effect on your investment.

**Chinese Yuan ("CNY") risks**

There is a liquidity risk associated with CNY products, especially if such investments do not have an active secondary market and their prices have large bid/offer spreads.

CNY is currently not freely convertible and conversion of CNY through banks in Hong Kong and Singapore is subject to certain restrictions. CNY products are denominated and settled in CNY deliverable in Hong Kong and Singapore, which represents a market which is different from that of CNY deliverable in Mainland China.

There is a possibility of not receiving the full amount in CNY upon settlement, if the Bank is not able to obtain sufficient amount of CNY in a timely manner due to the exchange controls and restrictions applicable to the currency.

**Illiquid markets/products**

In the case of investments for which there is no recognised market,

it may be difficult for investors to sell their investments or to obtain reliable information about their value or the extent of the risk to which they are exposed.

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