# Priming for a NO NORMAL future

## Technology Sector in India

Strategic Review 2023

nasscom

nasscom

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First Print: March 2023
**Published by nasscom**

nasscom is the industry association for the technology sector in India. A not-for-profit organization funded by the industry, its objective is to build a growth led and sustainable technology and business services sector in the country with over 3,000 members. nasscom Insights is the in-house research and analytics arm of nasscom generating insights and driving thought leadership for today's business leaders and entrepreneurs to strengthen India's position as a hub for digital technologies and innovation.

# Foreword

It would be no exaggeration to state that the last three years have made us re-think the meaning of a single word - "Normalcy". From emerging out of a deadly virus and its devastating repercussions across all areas, to be able to revive businesses, economies across the world were able to recover and build momentum for growth in 2021. The global technology industry witnessed extraordinary growth with focus on hybrid operating models, digital skilling, employee engagement, and were able to build trust, and extraordinary innovation once again. This was reflected in the IMF's Global GDP growth rate of 6.2% in 2021.

However, that we live in a Volatile, Uncertain, Complex, and Ambiguous (VUCA) world was never so evident! The year 2022 started with a black swan event - the Russia-Ukraine war. Further, record-high inflation, resurgence of Covid, along with persistent supply chain issues added to the turbulence. As a result, the global GDP is estimated to have grown at a much subdued 3.4% in 2022 as per IMF.

During all this, India, unsurprisingly, remained resilient. Being the only country with a GDP growth rate of 6.8% in 2022, India has emerged as a leader, the position that will further get strengthened by its G20 presidency this year. India also witnessed lower inflation, higher manufacturing PMI growth and continues to have a stable geopolitical climate, robust digital infrastructure and 5G related developments. India is expected to remain in a high growth trajectory, with expectations of above 6% GDP growth in 2023 and 2024. This view has also been reiterated by IMF which expects India to be one of the two countries that will be responsible for 50% of global growth in 2023.

Within India, the tech industry has been at the forefront of this growth story. Overall technology revenue from India is expected to cross $245 Bn in FY2023, growing at 8.4% over FY2022. The industry continues to be a net hirer, and is expected to add 2.9 lakh employees this year. The industry's value proposition hinges upon its diverse ecosystem, young and high quality talent pool, excellent physical and digital infrastructure, vibrant domestic market, and strong Government support.

nasscom's Annual Strategic Review report is an unmissable collection of facts, trends and examples about the Indian technology industry that not only provides an understanding of the year gone by, but also how the future looks like.

We hope you enjoy reading it, and welcome your feedback and comments.

**Debjani Ghosh**

President, nasscom

# Acknowledgements

The Strategic Review report is nasscom's annual flagship publication that analyses the performance of the industry, traces its continual evolution and highlights key trends that are influencing and driving the sector forward. The nasscom Insights team relies heavily on both primary and secondary research, internal and external research reports, and reaches out to stakeholders across the board – industry, government, research firms, etc. – for their inputs that add value to the report. We would like to thank all our stakeholders for their invaluable contributions, without which this report would not have been possible.

We would like to thank nasscom member organisations, who provided relevant data and insights about various industry trends and developments. We acknowledge the inputs and insights from all our research partners and various government bodies.

We would also like to thank all the leaders who participated in our Annual CEO Survey 2023 and shared their views on the future of the technology sector.

A detailed list of contributors is given in the Appendix.

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# Executive Summary

## Technology Industry: FY2023E Snapshot View

| | | |
|---|---|---|
| **7.5%** Relative share to India's GDP | **57-58%** Share in Global Sourcing | **~35K** Tech Firms in India |
| **53%** Share in India's Services Exports | **$245 Bn** Tech Industry Revenue | **1,570+** Global Capability Centers |
| **$14.6 Bn[1]** IT FDI Flows into India | **$194 Bn** Technology Exports | **~27K** Tech start-ups |
| **26%[1]** Share in Total FDI | **5.4 Mn** Employees; 290K Net Additions | **266K** Tech patents filed[2] |
| **$110 Bn** eCommerce Market | **32-34%** Share of Digital Revenues | **36%** Women Employees |

[1]Data for April to December 2022
[2] Patents filed during 2010-2022 in emerging technologies
Source: DPIIT, RBI, nasscom

## CY2022 - A Year of Mixed Outcomes

**VUCA world:** The disruptions bought on by the COVID-19 pandemic continued through CY2022. The new variant, BF.7, impacted most Asian economies including Japan and China. With the ongoing disruption of supply chain (esp. wrt semiconductors), both governments and enterprises are re-thinking their supply chain strategy. The surprising invasion of Ukraine by Russia in early CY2022 impacted food & energy security worldwide, leading to higher inflation. CY2022 also saw ongoing concerns around recession as the global economies saw slower growth. However, the growth of emerging economies has been more resilient, with India leading the economic revival at a rate much higher than the rest of the world.

**Technology, the focal point for businesses:** Among businesses, the Technology industry was the silver lining as enterprises reshaped and accelerated their digital transformation agenda, and as a result, sourcing, and talent strategies for CY2023. Increasingly, enterprises, including traditional enterprises, are leaning on technology for scaling automation while humanising UX, streamlining supply chain, enhancing cyber resilience, and delivering their sustainability goals towards becoming purpose-driven businesses.

**Global technology trends 2022:** In CY2022, the total global technology spend stood at $4.39 Tn, a slight decline of -0.2% over CY2021, driven by lower consumer spending on devices. Enterprise software and IT services crossed the $2 Tn mark, a growth of 4.5% y-o-y in CY2022.

## Indian Technology Industry Overview - FY2023E

While FY2022 was a year of milestones and resurgence-an outlier for the Indian technology industry, FY2023 has been the year of continued revenue growth with a focus on strengthening industry fundamentals and building on trust and competencies. The volatile global economic scenario and impending recession continues to support the demand for technology adoption and digital acceleration. Consequently, technology has become a strategic imperative that is a critical component of business innovation and transformation, as well as a source of improving operational and cost efficiencies.

In FY2023, India's technology industry revenue including hardware is estimated to cross $245 Bn (8.4% y-o-y growth), an addition of $19 Bn over last year. Exports, at $194 Bn, are expected to grow at 9.4% in reported currency terms, and 11.4% in constant currency terms. Domestic technology sector is expected to reach $51 Bn, growing at 4.9% y-o-y. In rupee terms, domestic tech revenues is expecting a 13% y-o-y growth on the back of continued investments by enterprise and the government.

The industry continues to be a net hirer, adding 290K employees, taking the total employee base to ~5.4 Mn (5.7% y-o-y growth), strengthening its position as the 'Digital Talent Nation' for the world.

## Prominent Tech Industry Trends and Business Strategies in FY2023

### Tech Industry Segment Trends

**01** IT Modernization continues to be the driving force behind Indian IT services

**02** The New Pillars of BPM - CX, Data and Modernizing the Core

**03** Rise of ER&D - Advantage India

**04** Building 'World class from India'- SaaS products and solutions, DeepTech start-ups

**05** eCommerce evolving through increasing penetration and business model change

### Strategies Strengthening the Fundamentals

**06** India Domestic Market - The vision of 'Digital India' on the path to reality

**07** India fortifying its position as a key GCC hub

**08** Reorganizing for the Future: Leadership Strategies

**09** Re-Imagining the Future of Work and Workforce

**10** Strengthening the Tech Talent Pipeline

**11** Emerging Global Technology Big Bets and the India Opportunity

Source: nasscom

## Tech Industry Segment Trends

1. **IT services** is expected to grow at 8.3% in FY2023 compared to last year. The key drivers of growth include Application Modernization, Cloud Migration, Platformization, and Cybersecurity.
2. **Business Process Management (BPM)** is undergoing a drastic transformation, growing at ~8.7% in FY2023. Digital CX, data driven transformation, as well the position of BPM industry as a key strategic partner to the customer is driving growth.
3. **ER&D** is expected to grow at a double-digit figure of 11.1% y-o-y backed by strong fundamentals and rising demand for Indian ER&D services. Key growth drivers include strategic long-term deals, widespread proliferation of digitalization and cloudification of engineering activities.
4. **Software products,** expected to grow at 7.8% y-o-y in FY2023, is drastically altering the landscape by creating world class products from India which are scalable, thereby showcasing India's entrepreneurial prowess, and a fast developing diverse and inventive DeepTech start-up ecosystem
5. **Indian eCommerce** industry is expected to leapfrog achieving 40% y-o-y growth in FY2023, driven by newer business models, rising demand from tier II/III cities, and extensive use of technology in retail through platformization for customer engagement and experience enhancement.

## Strategies Strengthening the Fundamentals

6. **India's Domestic technology adoption** driven by growing cloud adoption and deals focusing on digital transformation in existing and niche verticals. The Government is also playing a key role as an enabler of technology by building public platforms, digital public infrastructure and other projects, making the 'Digital India' initiative a reality.
7. **India strengthens its position as a GCC hub in 2022** with not only expanding centres in terms of scale and value but growing number of new GCCs setting-up base in India for the first-time. Global + local market focus, location diversification, positioning as 'Research and Innovation Hub' were some of the distinct highlights for the sector.
8. **Business and leadership strategies** revisited to transform existing models and unlock new value from emerging and niche opportunities. Firms are focusing on capability building through strategic acquisitions, partnerships and robust deal pipelines.
9. **Re-Imagining the future of workplace and workforce** Workplaces are witnessing a shift towards hybrid working and satellite offices, following decentralised delivery models and rise of satellite offices across Tier II and Tier III cities.
10. **Strengthening the tech talent pipeline** Digital skilling and emphasis on re-skilling and learning and development are expected to emerge as the leading drivers to grow digital talent and retain key employees within the organizations.
11. **Emerging technology big bets and the India opportunity** 12 technology big bets (that include sensor tech, smart robots, autonomous driving, computer vision, deep learning, autonomous analytics, AR/VR, sustainability tech, edge computing, distributed ledger, spacetech, 5g/6G) are areas where enterprise spend is expected to grow 2X higher than average. With investments in India for these sectors growing at a 31% CAGR, India is already home to a large number of innovative start-ups in these areas, and hence well placed to benefit from the opportunities.

# India's Value Proposition: A Strong Economy and a Diverse Tech Ecosystem

India, currently holding the prestigious Presidency of G20 nations, has grown from being the tenth largest economy ten years ago to the fifth largest today. India has been the fastest growing major economy for the third year in a row—poised for further growth, driven strongly by, among other factors, a robust and diverse technology ecosystem. Diverse and inclusive new-age skilled talent pool with strong entrepreneurial mindset,

people first innovation, responsible & ethical tech & governance built on trust, commitment to Environmental, Social & Governance (ESG) goals, & Corporate Social Responsibility (CSR), form the cornerstones of this vibrant ecosystem.

Cost competitiveness and efficiencies, stable and trusted Government consistently building a conducive business environment and infrastructure through reforms and policies, along with the largest and youngest working population and consumer market, makes the industry's foundation even stronger. India's inherent leadership skills have ensured Indian origin leaders occupy a seat at the table in global organizations, fronting global charters across various verticals.

## 2023-24 Annual Outlook - Towards a 'No Normal' Future

CY2023 has started with signs of moderation – with worldwide growth expected at 2.9%. Even as the global economic climate will continue to remain uncertain, volatility and business resilience will co-exist and that will define the 'No Normal' world that we embark on. Globally, enterprises are likely to see headwinds - demand contraction in some markets, and this uncertainty may result in delayed decision-making.

nasscom's Annual CXO Outlook Survey 2023, indicates that while enterprises digital transformation remains core strategic priority for 2023, cost takeout and optimization requirements are also in demand given the macro environment. Cybersecurity, cloud, AI and analytics continue to be the main focus but with more integrated use cases and higher value realization. Hyper-automation and virtual experiences are new themes, driving optimization and new business growth. End-user enterprises are demanding greater domain specialization as also purpose-driven partnerships from their technology partners.

As such, for technology providers, CY2023 is expected to be a year of rationalization (improving utilization & lower attrition), as they consolidate and strengthen current expertise, while making early moves into new business opportunities. The growth areas of technology segments will continue to focus on digital CX, digitization, cloudification, building SaaS-enabled products, cybersecurity and platformization - digital components that are increasingly being built into all deals, partnerships and M&As.

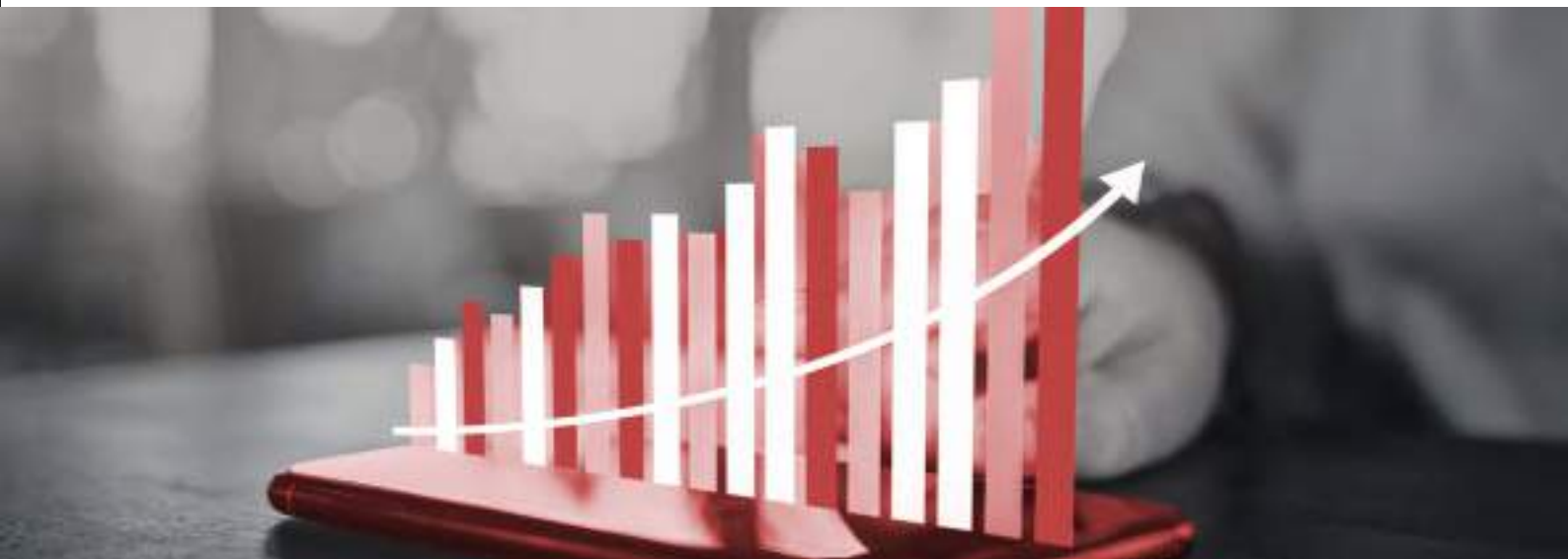
An underlying theme that will emerge stronger is 'Focus on Quality Talent' - strengthening capabilities in niche and pure tech areas like cloud, AI/ML/NLP through reskilling/upskilling, improved and increased thrust on employee engagement, culture, health and wellness.

Digital transformation will be the most critical transformation journey that enterprises will embrace to evolve into adaptive entities, capable of absorbing volatility and building sustainable growth models. In CY2023, the immediate focus may be on wins in cost control; however, the coming 6-7 years will test organizational agility to take on bolder risks and report practical gains.

Over this Techade, the playbook to thrive in a 'No Normal' future would converge around four key themes:

1. Adapt to a No Normal Future - Change is the Only Constant
2. Digital Transformation Partners - The Big Shift
3. Trust, Resilience, Inclusion & Sustainability - Redefining the Rules of Competition
4. Digital Mastery & Innovation - The Key Differentiators

Enterprises that adapt quickly and constantly are the ones that will lead in a "No Normal Future".



#1

# Global Macro-Economic Environment in 2022

# 2022 - A Year of Rarities

## Volatility, Resilience, and Digitization - All Rise

At this same time last year, most macro-economic projections for 2022 – global GDP, regional growth rates, capital spending, tech budgets, and COVID-19 decline – all looked bright and bullish. Global inflation, averaging 4.8%, was seemingly "record high". High technology spending, more expansive digital transformation budgets, and aggressive talent acquisition were seen as core drivers of business strategy.

Come 2022...and the world witnessed yet another black swan in the Ukraine-Russia conflict, alongside ongoing COVID-19. It completely altered the focus, outcome, and direction of re-growth policies globally! The conflict continues to rage with few signs of abatement. Furthermore, all factors that were beginning to turn positive, are now concerningly on the reverse trend.

We still believe that technology continues to be the silver lining, despite cautiousness, once one delves deeper into how enterprises have come to (re)shape their digital transformation agenda, and as a result, sourcing and talent strategies for 2023. Core, and even legacy sectors have started embracing bolder, outcome-oriented transformation initiatives. This trend is likely to strengthen, and so we hope, despite the multi-dimensional volatility that will continue to script much of 2023!

Source: World Economic Outlook



# 1. Macro Perspective CY2022

Macros in CY2022 have generally performed better than pre-pandemic CY2019. It is the comparison with CY2021 that has raised concerns. CY2021 was a spike year due to receding COVID-19, aggressive vaccination drives, pent-up sentiment of resurgence, and a record-low base of CY2020.

## CY2022 Global Macros in Perspective

| CY2019 | CY2022 | Macro-economic Factors |
|---|---|---|
| 2.8% | 3.4% | **Real GDP Growth**<br>The world grew 0.6% more in CY2022 than in CY2019 |
| 29% Y-o-Y | -19% Y-o-Y (from CY2021) | **Stock Market Performance**<br>S&P global index grew from its peak in CY2019 |
| 35% Y-o-Y | -33% Y-o-Y (from CY2021) | **Tech Stocks Performance**<br>Nasdaq listed global tech stocks rose 17% from the CY2019 peak |
| 101.4 | 104 | **Dollar Index**<br>From a 95.9 value in CY2021, CY2022's sharp rise led to rapid currency devaluation worldwide |
| 2.3% | 8.8% | **Core Inflation (CPI)**<br>Inflation is the singular metric that has risen consistently since CY2019, reaching nearly 3.5X the CY2019 levels in CY2022 |
| 51.7 | 50.8 | **Manufacturing PMI**<br>Manufacturing activity declined sharply after Q3, pulling the year average lower, despite H1 performing better than CY2019 |
| ~$25 Tn @ 1.0% Y-o-Y | ~$32 Tn @ 5.4% Y-o-Y | **World Trade Growth Rate**<br>Despite global supply chain crises since the beginning of CY2020, global trade volume and value steadily grew through CY2021 and CY2022 |

Source: IMF World Economic Outlook, JP Morgan, Macrotrends.net, NASDAQ, NSE Nifty, World Bank, World Trade Organization

## CY2022 was a year of mixed outcomes

While the overall global economic growth hit a break from the highs of 6.2% in CY2021, and the January CY2022 IMF WEO estimate of 4.9%, down to 3.4% for 2022, due to the Ukraine-Russia conflict, the growth story for select emerging markets (EMs), particularly India , Middle East, and China (in H1CY2022), has been that of resilience and new opportunities. Compared to an average 2.7% GDP growth for advanced economies (AEs), EMs have registered an average 3.9% growth in CY2022.

Global stock markets recorded the 2nd and the 3rd best performance year, in overall, and in tech stocks, respectively. Here again, EMs, such as India, showed strong positive divergence with both S&P BSE Sensex and NSE Nifty 50 reaching lifetime highs, despite record foreign fund outflows.

Major pain in the economy was seen with unprecedented strengthening of the dollar. The dollar index reached levels unseen in the past decade, at a time when most countries are borne with highest ever debt-to-GDP levels threatening steep currency devaluation. This strengthening emerged as a result of 425 bps of policy rate tightening by the US Fed through 2022. From major quantitative easing to sharp tightening, the shift in stance led to deep fears of recession. As a result, the top 7 AE currencies and the top 11 EM currencies dropped sharply against the dollar, between 0.5% to 12.5% devaluation.

Deepening of the Ukraine-Russia conflict exacerbated conditions of bloc-allegiance, pushing back the focus on worsening global economy, trade balance, jobs and social well-being, and climate crisis, all of which need greater co-operation and collaboration, of all times.

World trade activity took another blow as COVID-19 came back with a new variant, BF.7. Most East Asian economies – Japan, South Korea, Taiwan, Singapore, Hong Kong, and China – were severely impacted by the new variant. China's zero-COVID policy led to slowdown in the world's manufacturing capital, and protest-driven relaxations further accelerated the decline with record high levels of infections and mortality.

With lingering fears of a global recession, although moderate as per January 2023 IMF WEO, COVID-19 resurgence fears with a new variant, and no imminent signs of thaw between Ukraine and Russia, the direction of events, or rather, the lack of direction of mitigative strategies could hurt global growth prospects the most in 2023.

## Macrotrends of CY2022

**01** Twin Black Swans - Pandemic and the Ukraine Crisis

**02** Global Inflation to Local Recession

**03** China - Between a Rock and a Hardplace

**04** No De-globalization, it is Adaptive Glocalization

**05** Talent Turmoil - From Resignations to Layoffs

Source: Forbes, IMF World Economic Outlook, NSE Nifty, S&P BSE Sensex, S&P Global

**Pandemic to geopolitical crisis – twin "black swans" in two years:**
According to a World Bank estimate, it could cost $750 Bn - $1 Tn to rebuild Ukraine alone, while another ~$1 Tn will likely be the cost to manage Europe's energy crisis. EU27 countries agreed to cap gas prices, and minutely control consumption. Both measures could have benefitted significantly with smart grids. Higher debt-to-GDP in AEs, alongside margin pressures for businesses, could potentially impact jobs and wages in 2023.

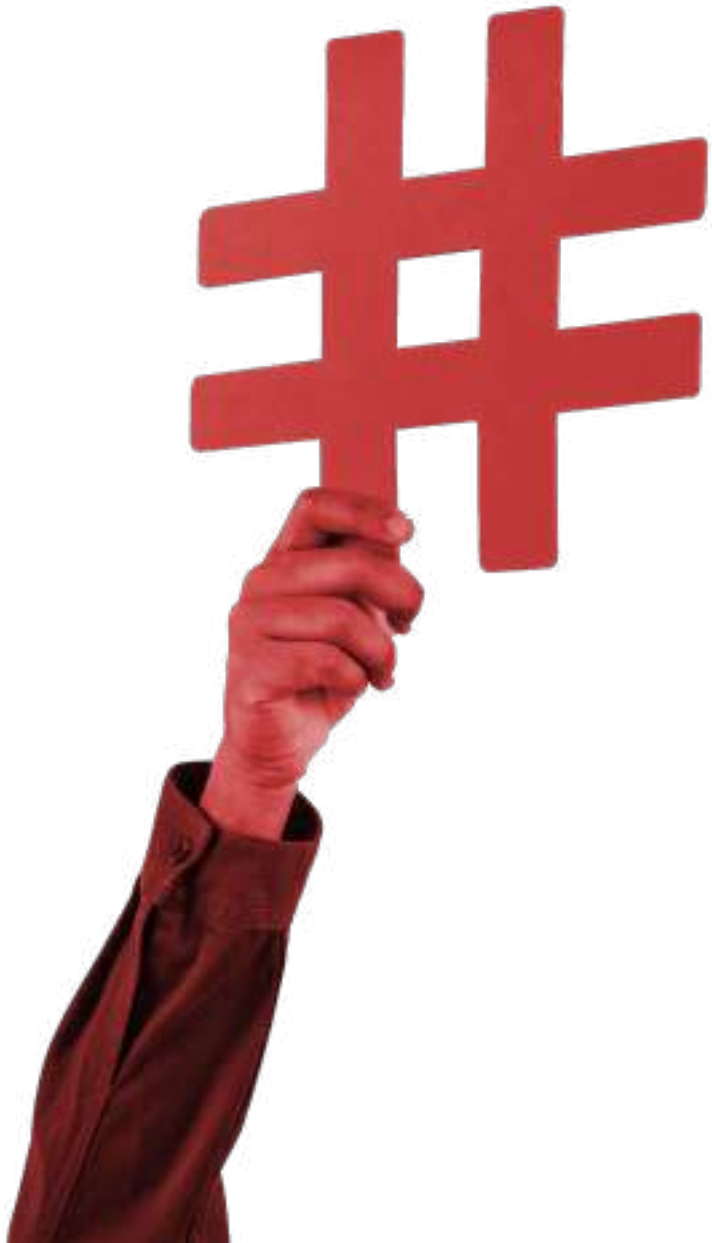
**Global Inflation to Local Recession – global growth forecast rises, with small pockets of moderate recession:**
IMF has upgraded its CY2022 global growth estimate by 20 bps to 3.4%, in its January 2023 WEO, from 3.2% in October 2022; while the CY2023 estimates have been revised up by the same measure, to 2.9% (from 2.7%). This has been on the back of resilient Q4CY2022 with a sharp decline in inflation, a modest European energy crisis, and restraints by both Ukraine and Russia in engaging in more advanced warfare. However, economists continue to warn of sticky inflation as consumption stays robust with tighter labor market but better wage growth, possibly leading to more volatility and less stable strategic direction in 2023. EMs are likely to grow faster, only restrained by more than expected slowdown in AEs leading to lower exports and higher input prices.

**Zero-COVID to opening-up – China, and global trade, stuck between a rock and a hard place:**
China's rapid opening towards the end of CY2022 has led to massive infections, and a worsening outlook for Q1CY2023. China's COVID policy misses led to exports de-growing by over 8% consecutively in Nov-Dec 2022, the highest decline since January 2020, as demand shock shifted to supply crisis from the world's factory.

**Global semiconductor supply crisis – an opportunity in adaptive glocalization:**
Continuing from 2020, the semiconductor supply crisis has already affected 169 industries. Rising COVID infections in the heart of semiconductor hubs – Taiwan, China, Japan – offers little hope. Most global supply chains have been disrupted forcing a sourcing rethink – from cost-led globalization to control-led reshoring, to now, adaptive glocalization. With $340+ Bn capital commitments during 2021-22 towards locally building semiconductor manufacturing facilities, consumer regions are aiming to balance this supply chain skew in the next few years. India's $10 Bn semiconductor Production-Linked Incentive (PLI) scheme is one such adaptation strategy.

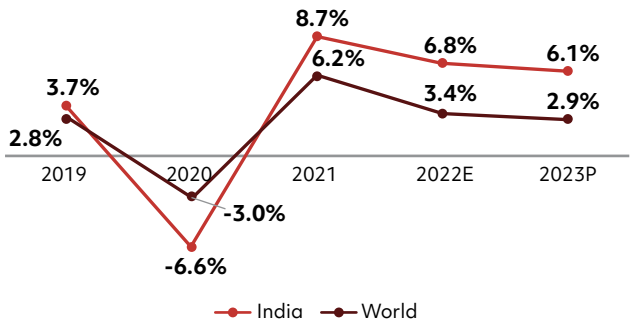
**Great Resignations give way to Layoffs – telling lessons from the great talent turmoil:**
Amidst the myriad reports on tech layoffs touching highs in 2022 after the Great Financial Crisis (GFC) of 2008-09, analysis of the 2021 hiring trends is critical. Just the global five BigTechs – Meta, Amazon, Apple, Netflix, and Alphabet – increased their headcount collectively by nearly 80% between 2019 and 2021. However, the quantum of layoffs across nearly 850 tech companies globally in 2022, is about 15% of the additional hiring that just these five BigTech made in 2021! Tech layoffs have garnered attention due to global volatility fears, forcing further tightening of the pyramid and instead, greater use of automation. Growing digital transformation demand is likely to temper bulk talent outflow in the long term with focused skill-based hiring. Enterprises are now more actively reorganizing workplaces and value systems to integrate the growing Gen Z workforce.

Source: HT Mint, IMF World Economic Output, Invest India, Supply Chain Digital, World Bank, World Trade Organization



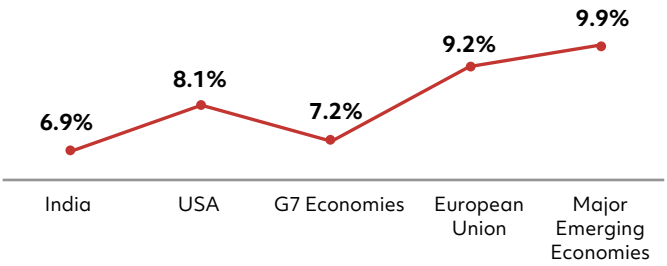
# Impact of CY2022 Macrotrends on India

## Real GDP Growth %

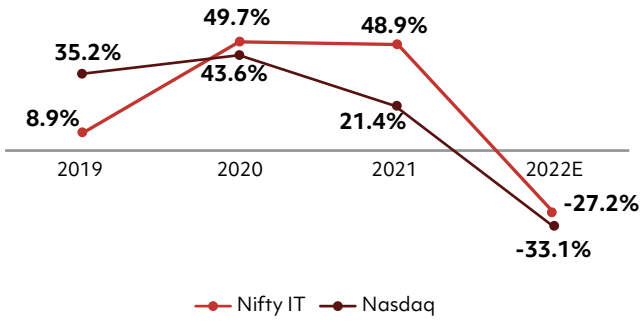



## Consumer Price Index

2022 Average

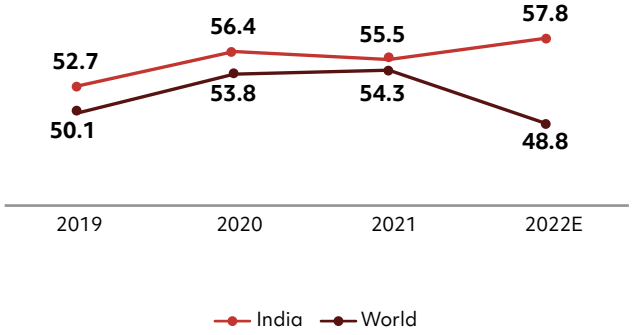



## Tech Stocks Y-o-Y Growth Rate




## Manufacturing PMI

December Y-o-Y




Source: Forbes, IMF World Economic Output, JP Morgan, Macrotrends.net, NASDAQ, NSE Nifty

**India** Performs Well Despite Global Pressures in CY2022

**Declining, but comparatively strong economic growth:** India's economy grew at 8.7% in CY2021. In CY2022, it is estimated to grow at 6.8%, revised down from 7.4%, at still the highest global growth rate. Lowering crude prices, abating supply chain challenges despite higher input prices, and a buoyant China+1 shift will likely boost high-value exports, jobs, and growth for India in CY2023. Coupled with strengthening domestic market that out-balanced foreign investment outflows, strong broad-based corporate earnings, and a cash-rich banking sector, the world's youngest major economy with a median age of 27.9 is expected to grow deep roots in technology, infrastructure and core sectors in CY2023.

**Eminent stabilizing geopolitical role:** India has assumed a crucial role in international politics with its endorsement of strategic blocs, such as the QUAD, bilateral trade agreements with developed economies (UAE, Australia, UK, Singapore, Canada), and its neutral stance on the Ukraine conflict. Further, India's G20 premiership is aimed at strengthening dialog and diplomacy to resolve critical issues on disaster risk and resilience, Startup 20 engagement, climate, and cryptocurrencies.

**In-control inflation:** Consumer inflation, particularly food inflation, affected India for majority of CY2022, hurting retail savings and big-ticket consumption. Headline inflation touched an 8-year high of 7.8% in April, driving policy rate hikes of 225 bps until the end of CY2022, with more, but moderated, raise expected in H1CY2023. While inflation subsided in December, a decade-high aggregate input price to output price ratio of 1.03 is likely to force price rise pass-on and sticky inflation in CY2023.

**Least volatile currency:** CY2022 was historic with US inflation staying above rates in India as US faced a 40-year record inflation. US Fed raised rates by 425 bps through the year, driving out FIIs in record selling, thereby further strengthening the dollar. India's currency declined the least, however, due to domestic investor support that kept up market performance. This record domestic participation was driven by the sustained digitalization of financial inclusion, alongside improving personal and corporate savings since 2020.

**Ready-to-deploy investments:** In CY2022, India announced $2.4 Bn worth of tech-focused production linked incentive schemes (PLIs), and a y-o-y 63% rise in capital outlay for infrastructure expenditure. Private investments, that were in wait and watch mode for most of CY2022, are expected to be deployed in 2023. According to a year-end report by a leading financial daily, India-focused global and domestic PE/VC funds hold nearly $13 Bn of deployable cash. GoI and RBI's collective policy initiatives to boost growth will be key to investments in 2023.

**A young workforce:** 70% of the Tech industry workforce are millennials. 77% of India's working age population will be Gen Z + Millennials by 2025, the largest such working age population worldwide, giving India strategic talent advantages across the board.

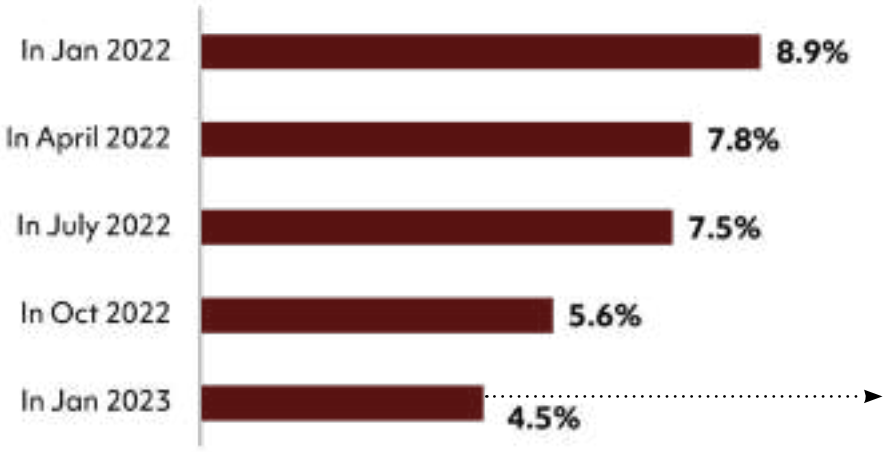
**Digital technology adoption:** India became the second country in the top five global economies, after China and ahead of USA, France, and Germany, to have initiated pilots of the central bank digital currency (CBDC) across both wholesale and retail use, in November/ December of CY2022. Public digital infrastructure, particularly UPI, and now ONDC, have become hallmarks of scalable, affordable, next-gen tech ecosystems for mass digitalization. India has scored 19th in the 2022 Global Innovation Index in the category of market readiness for innovative product/services consumption, an indicator of the maturing retail consumption market in India. 500 Mn+ mobile internet subscribers are expected to be on 5G by 2025, making India one of the largest 5G-ready markets globally.

Source: Business Standard, Ericsson Mobility Report, G20.org, HT Mint, IMF World Economic Outlook, Invest India, nasscom, Populationpyramid.net, Reserve Bank of India, Trade Promotion Council of India, World Intellectual Property Organization

# 2. Global Technology Spend Trends in CY2022

## Global Technology Spend*, CY2022

(q-o-q growth estimates)




### 2022 Segment-Wise Growth Estimates

**7.1%** Enterprise Software

**3%** IT Services

## CY2022 Technology Spending Headwinds and Tailwinds

### Traditional Sectors Dial Up Digital

- Enterprise software spending grows, albeit slow, with traditional business going digital
- Companies are shifting from buy to build/compose, driving up fresh spend in software and applications

### Pricing and Labor Pressures Drive IT Services

- Companies seek time-to-value acceleration and cost optimization impact with their technology spend, driving up the need for IT services
- Traditional companies facing IT talent exodus seek more IT services for their digital needs

*Based on Gartner's January 2023 updates on global technology spending estimates for CY2022. Includes only IT services and enterprise software revenues in reported currency terms

Source: Gartner Inc.

According to Gartner, in CY2022, the global technology spending (including devices and communication services) reached $4.39 Tn, at a subtle degrowth of -0.2%. While most sub-segments declined from the start-of-year estimates, majority impact was driven by a significant decline in consumer spending on devices.

Enterprise software and IT services breached the $2 Tn mark, grew at 4.5% y-o-y in CY2022, in a show of resilience in a year marked by significant pricing pressures and a shift towards shorter and lower value deals. This was nearly half of the estimated 9% at the start of the year when it was expected that the CY2021 wide runway would continue.

## Global Technology Contracts

Global Annual Contract Value (ACV), or deals signed in CY2022, grew by 6.5% to $93.5 Bn, according to ISG's analysis of 500 global companies. Against the start-of-year estimates of ~14%, it came lower due to reprioritization towards shorter, cost optimization contracts.

- **Managed Services ACV –** Managed services' grew at 5.7% y-o-y in CY2022, at an overall $36.5 Bn, higher than the 5.1% estimate in January 2022. BFSI and manufacturing led this growth. With legacy sectors onboard the digitalization drive, this trend aligned with a global rise in data center services. Industry-specific BPM services, ER&D, and digital customer experience (CX) drove the demand.
- **As-a-Service ACV –** As-a-service ACV grew slower, by 7% y-o-y in CY2022 to reach $57 Bn, against a 38% jump in CY2021 that was on the back of a sudden spurt in digital demand. Healthcare, Energy and Travel and Transport sectors drove this growth. Slowdown in China impacted APAC's ACV, dragging down the global market.

## Global Tech PE/VC Investments

CY2022 witnessed $405+ Bn of PE/VC investments globally across 20,776 deals, a 16% decline in deal volume and a 66% decline in deal value from CY2021. Compared with pre-pandemic levels of 2017-2019, averaged, the CY2022 deal volume went up by ~30%, although deal value declined by 19%, in line with the broader global contracting sentiment of more value for less money as easy capital evaporated from the markets in CY2022.

## Global Tech M&As

Key technology M&A trends in 2022 include:

1. **Digital-Focused Capability Expansion -** Majority deals were driven by focus on Cloud, AI, and analytics.
2. **ITO Demand on an Uptrend -** Deals were driven by the need to serve a continually growing demand for ITO, followed by pure BPO, and hybrid contracts.
3. **Digital Convergence Led New Opportunities -** Convergence of traditional tech with business tech demand (OT-IT, etc.) drove companies to acquire niche capabilities.
4. **Corrections in Unicorn Valuations -** 2022 made several unicorns and other startups attractive from an asset and aqui-hiring perspective.

Source: EY, Everest Group, Gartner, ISG, nasscom

# The New Imperatives

Volatility has underwritten majority of 2022. In addition to uncertainty, it is the rapidly changing nature of trends that has led to caution and moderation in major investments. Whether the suddenness of the Ukraine-Russia conflict, China's pandemic resurgence -led production crisis, alarming natural disasters, heightened US-China trade conflict, or the scope and spread of economic moderation in the next 1-2 years, that it is the rising amplitude of volatility in much smaller time spans that is thwarting even the most well-thought mitigation strategies.

## Volatility – The De-Facto Factor

**$1 Tn**

Potential cost of rebuilding Ukraine today

**3X**

Climate disasters will be seen by those born after 2020, compared to past generations

### Ukraine-Russia Conflict

The cascading impact of Ukraine-Russia escalation could trigger more trade/ physical conflicts

### US-China Trade Conflict

More than the quantum of tariffs, it is the constantly shifting positioning that has led to volatility in strategizing and sourcing for the global companies

### Pandemic Resurgence

New variants and China's failure in infection control have brought back fears of new COVID-19 waves

### Unequal Economic Moderation

Advanced economies grew much faster in 2021. Steep financial tightening in these markets could lead to rapidly slowing growth compared to the emerging markets, causing deeper trade imbalances

### Climatic Upheavals

Speed and localization of extreme weather events will change at a much more rapid pace

Source: HT Mint, World Bank, World Economic Forum, World Health Organization

# **Resilience –**
# The New Business Mantra

Despite heightened VUCA, business resilience is a core mantra for enterprises and governments going into 2023. This is indicated in the focused hiring and employee engagement strategies, impetus on operational agility, rigorous outcome-driven investment strategies, and relentless customer-centricity.

### Global Hiring Uptrend

More than numbers, enterprises are focused on resetting for relevance and better workforce planning with growing Gen Z + Millennial mix

### Shoring Follows Talent Strategy

Reshoring and nearshoring have picked up in manufacturing, only to be balanced by more tech offshoring

### Sustainability Focus Sustains

In a Gartner CEO survey on top-10 strategic priorities in 2022-23, environmental sustainability emerged as the biggest gainer from 2021

### Operational Agility Goes Hi-Tech

A McKinsey study predicts that going by adoption of industry cloud, hybrid and multicloud, cloud-led EBITDA realization will cross $1 Tn by 2030

### Digital is Survival

Global tech spend in CY2023 is likely to be higher than pre-pandemic levels, despite a slower CY2022, as digital becomes tablestakes

Source: Gartner, McKinsey, nasscom

#2

# India Technology Industry Performance FY2023E

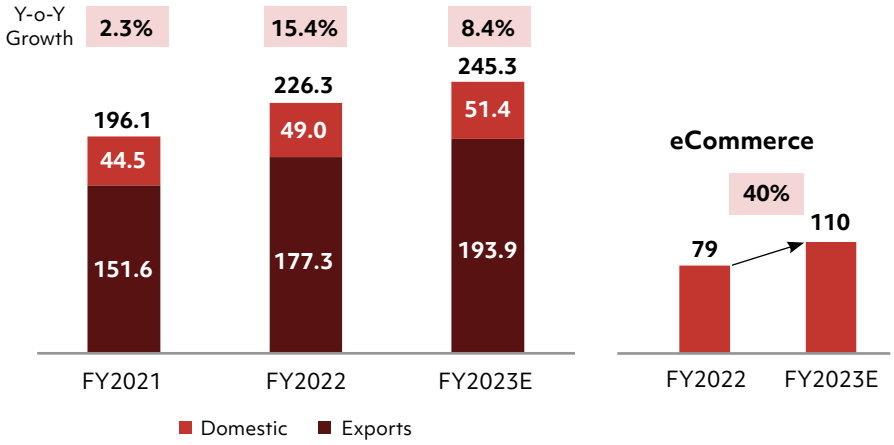
# India Technology Performance: Resilience Continues

India's technology sector, which showed remarkable resilience in FY2021, the year impacted by COVID-19 virus, followed up with a strong resurgence in FY2022 and continues to move forward in FY2023. nasscom estimates that India's technology revenue is set to grow 8.4% in FY2023 - from $226 Bn in FY2022 to $245 Bn (including IT services, BPM, software products, ER&D and hardware). eCommerce industry is growing and is expected to see a 40% y-o-y growth to reach $110 Bn in FY2023, from $79 Bn in FY2022.

Overall, the direct employment is expected to be nearly 5.4 Mn people, which reflects a net addition of 290,000 people over FY2022. Digital revenue, at $73-77 Bn, is estimated to be 32-34% share of total industry revenue, a 16% annual growth.

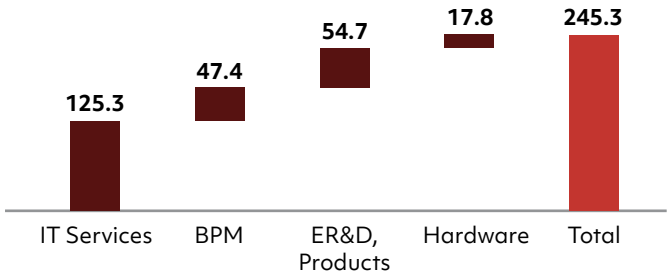
## India's Technology[1] Market set to Achieve $245 Bn

($ Bn)

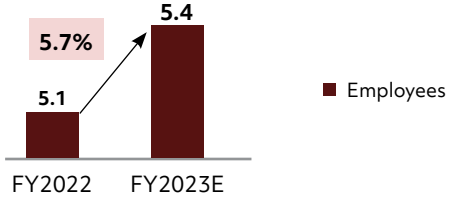



## FY2023E: Growth Year for all Segments; Employee Addition of ~3 lakhs

($ Bn)




Mn Nos.




E: Estimate

[1] Includes IT services, BPM, ER&D, Software products and Hardware

Source: nasscom

## FY2023E – Key Facts

### Leading India's Economic Growth

**7.5%[1]**

- Relative share to India's GDP
- 53% - share in India's services exports

### Technology Industry Workforce

**5.4 Mn**

- 2,90,000 net new hires
- 86-90% share of Gen Z and Millennial employees

### 3rd largest Tech Start-up ecosystem in the World

**~27K**

- 1300+ new start-ups in CY2022
- 23 new unicorns

### Increased Focus on Innovation

**260K+**

- Tech patents filed during 2010-2022P
- 60%+ filed in the emerging tech domain

### Digital Acceleration

**32-34%**

- Share of digital revenues, growing at ~16%
- ~2 Mn digitally skilled workforce

### Strengthening Diversity, Equity & Inclusion

**36%**

- Share of Women in India's tech workforce
- 165+ Nationalities

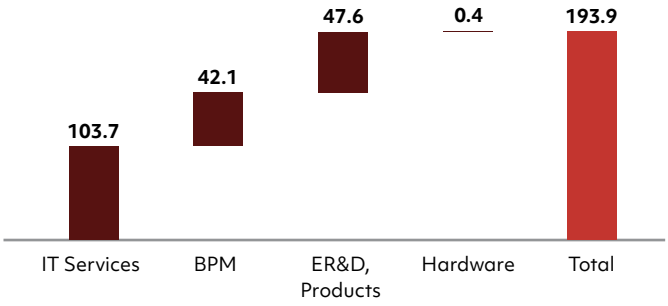
[1] Excluding eCommerce

Source: DPIIT, Han Digital, Patseer, RBI, Zinnov, nasscom

Indian technology exports are likely to cross $190 Bn (incl. hardware), a growth of 9.4% and an addition of $17 Bn over FY2022. ER&D at 11.1%, Software products at 9.1%, BPM at 9.0% and IT services at 8.9%, are driving growth.

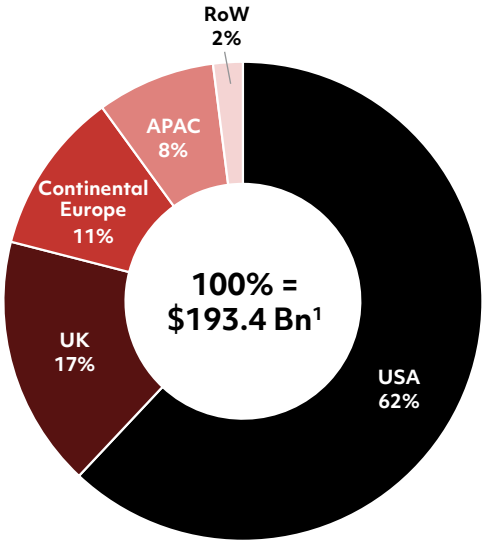
## FY2023E: Exports closing in on $200 Bn

($ Bn)



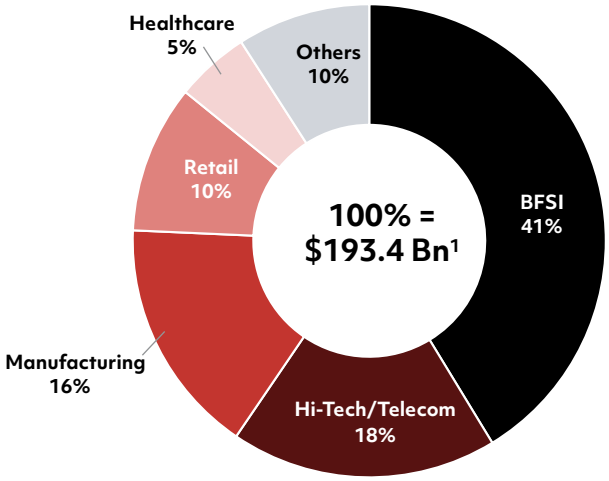

## Key Growth Geographies - USA and APAC

(% share of exports)




## Key Growth Verticals- BFSI, Manufacturing, HiTech/Telecom

(% share of exports)




[1] Excludes hardware
Source: nasscom

All major markets are witnessing growth in exports with USA, Europe (excl. UK) and UK continuing to be the major markets growing at 10.4%, 7.3% and 7.5%, respectively, driven by increased focus on digital maturity and technology adoption across functions.

Most industry verticals also continue to witness growth. BFSI sector witnessed a shift towards consolidation of projects and cloud native transformations to reduce costs. Traction in the Telecom sector is due to increased deployments of 5G for enterprises; healthcare is seeing wellness monitoring and connected health, teleconsultation and e-diagnostic services on digital medical platforms.

In Manufacturing, cloud adoption is becoming mainstream with digital technologies picking up pace across different subsectors; Retail - omni-channel presence with smart stores and cloud+online platforms for digital sales, smart beacons at stores; smart inventory management with robots, virtual customer experience leveraging AR/VR for features like virtual fitting rooms, etc.

Customer experience is another key focus area where B2B clients are working towards a direct-to-consumer strategy. Overall, though the client focus continues to be on innovation and transformation-led investments, there is an increased focus on cost and optimization amidst the macroeconomic uncertainties.


## Prominent Tech Industry Trends and Business Strategies in FY2023

Digital transformation coupled with increased focus on building resilience and capacity, cost takeout and optimization requirements are defining FY2023 for the Indian technology industry. We discuss these trends in detail in the subsequent sections.

### Tech Industry Segment Trends

**01** IT Modernization continues to be the driving force behind Indian **IT services**

**02** **The New Pillars of BPM -** CX, Data and Modernizing the Core

**03** Rise of **ER&D –** Advantage India

**04** Building 'World class from India'- **SaaS products** and solutions, DeepTech start-ups

**05** **eCommerce** evolving through increasing penetration and business model change

### Strategies Strengthening the Fundamentals

**06** **India Domestic Market -** The vision of 'Digital India' on the path to reality

**07** India fortifying its position as a key **GCC** hub

**08** Reorganizing for the Future: **Leadership Strategies**

**09** Re-Imagining the **Future of Work and Workforce**

**10** Strengthening the **Tech Talent Pipeline**

**11** **Emerging Technology Big Bets** and the India Opportunity

Source: nasscom

# 01

# IT Modernization Continues to be the Driving Force Behind Indian IT Services

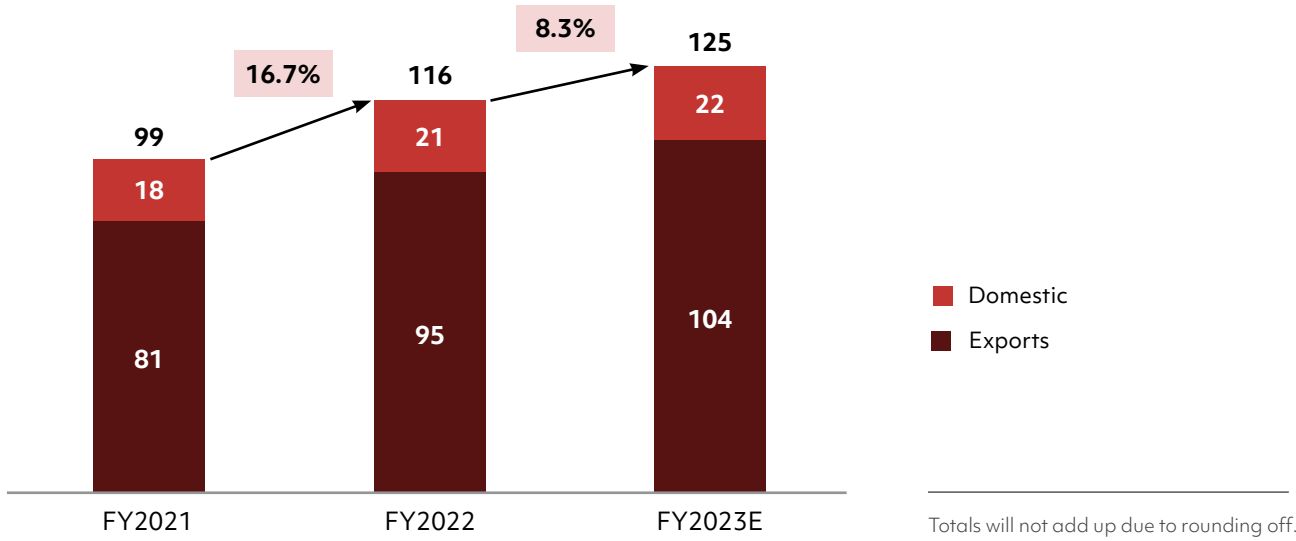
The Indian IT services revenue is expected to see a y-o-y growth of 8.3% in FY2023. Since FY2019 (pre-pandemic), the total revenue of IT services has grown ~1.4X.

Organizations are rethinking IT infrastructure priorities amidst rapidly changing business needs. The demand remains strong for simplifying complex structures and increasing speed across the entire enterprise technology stack. Pre-pandemic, the spend on modernization was 15-20% of the digital contract value. In FY2023, this has more than doubled to 35-40%.

The key driver for the growth of IT services in the last couple of years has been IT Modernization, that includes Application Modernization, Cloud Migration, and Platformization.

## Indian IT Services Revenues

($ Bn)




Totals will not add up due to rounding off.
Source: nasscom

**1.1 Application Modernization**
A key aspect of Digital Transformation

**1.2 Migration Begets Modernization**
Cloud migration becomes mainstream

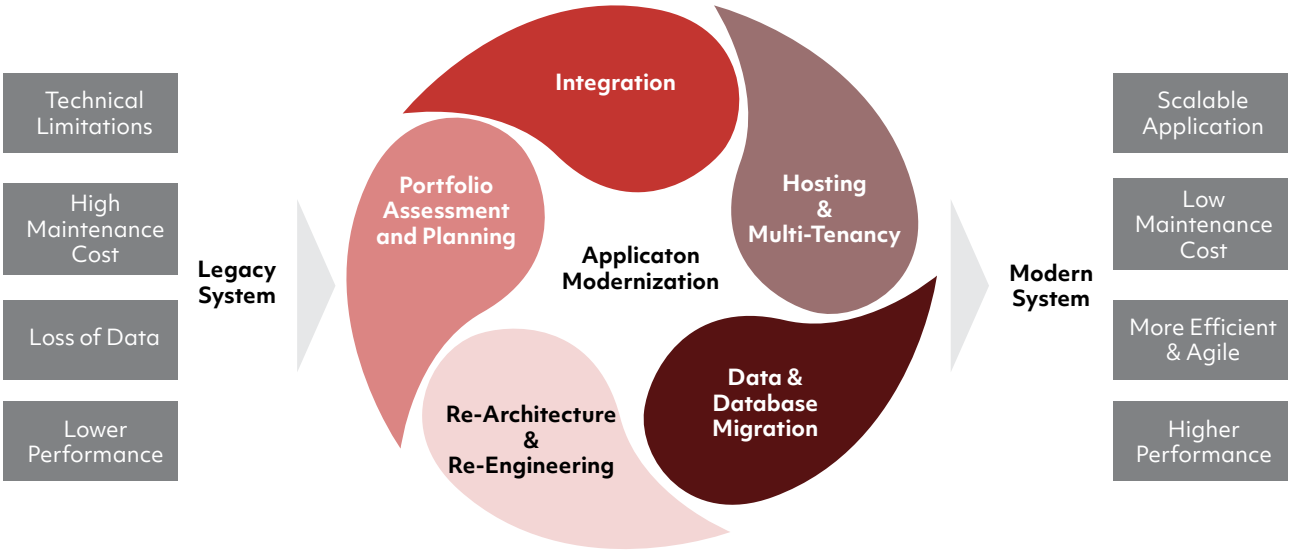
**1.3 Reducing Technical Debt**
Driving Platformization

**1.4 Cybersecurity Modernization**
Reducing Risk in Evolving Tech Landscape

## 1.1 Application Modernization: A key aspect of Digital Transformation

Over the years, the technology landscape has changed a lot. The challenge for most organizations today is that they operate in an entirely new digital arena but continue to rely on legacy monolithic systems. Organizations that depend on legacy applications often face barriers such as technical limitations, high maintenance cost, loss of data, lower performance, and a shortage of legacy coders. This makes it difficult for organizations to effectively complete digital transformation and integrations. Application Modernization constitutes of rearchitecting data centre applications, reengineering the whole application, updating legacy databases, thus, making the applications more scalable, maintainable, and efficient. These benefits help organizations adopt new emerging technologies as well as optimize overall cost, thereby driving the growth of the Application Modernization services market.

### Application Modernization Process and Benefits




**14%**
Revenue increase made possible by successful modernization efforts

**30-50%**
Lower application maintenance and running costs

**50%**
App rationalization effort saved by an automated offering

Source: IBM, nasscom

**Case Study**

**Wipro**

*A Global Data Company Reinvents its Business Model through App Modernization*

**Problem:** The client partnered with Wipro to embark upon an Application Modernization journey.

**Solution:** Wipro helped the client break down the monolithic system into microservices architecture, built components and wrappers, and delivered containerized applications on Google Cloud.

**Impact:** The company reduced customer onboarding time from 6 months to a few hours and delivered exceptional customer experience by modernizing applications.

Case Study

### Infosys

*Optimizing Total Cost of Ownership with Low-code Adoption for a Semiconductor Manufacturing Company*

**Problem:** The client wanted to accelerate application software development and delivery with low-code adoption. The requirement was for a common platform and framework for custom applications and enablement of citizen development at scale.

**Solution:** Infosys led the product evaluation, product selection, negotiations, licensing, and procurement of a leading low-code/no-code platform for the client.

**Impact:** 5 times faster development of applications, resulting in reduced turnaround time and quick deliveries.

## 1.2 Migration Begets Modernization: Cloud migration becomes Mainstream

Cloud has become a strategic priority for enterprises, government and SMBs today. Comparing to pre-pandemic level from FY2019, the cloud deals in FY2023 have grown by more than 4 times. Cloud's potential is boundless, and it forms a crucial foundation for successful digital transformation. Cloud underpins several emerging technologies like AI/ML, IOT, RPA, AR/VR, etc. which rely on cloud computing to maximize their benefit. Organizations continue to embrace multi-cloud and are looking for cross-cloud management and interoperability from cloud providers. They are prioritizing to retain investment flexibility along with best-of-breed cloud capabilities to continue implementing a hybrid or multi-cloud strategy.

Industrials, Retail, Education, Healthcare, and Agriculture are the traditional industries which are at the cusp of cloud adoption and have high potential to grow. Whereas Financial Services, Communication, Media and Entertainment are relatively ahead in their cloud journey, with eCommerce and Internet companies (Fintech, Edtech, Healthtech, etc.) being industries that are born in the cloud and have leveraged cloud solutions since inception.

Case Studies

### BookMyShow

*An India based entertainment company, planned to migrate to cloud with the objective of having a cost-effective technology architecture.*

**Problem:** The traditional on-premise servers were often overprovisioned to meet peak demand.

**Impact:** During migration, storage needs were reduced by 75% by eliminating duplicate data copies while integrating 200 TB of data from 10 databases. The company switched to pay-as-you-go model and lowered its total cost of ownership by 70% which included "compute cost" reduction by 30%.

### Telangana State's ITE&C Department

*Migration of 33 districts' workloads to AWS, achieving virtually zero downtime.*

**Problem:** The Department found that its compute needs had outgrown its existing on-premise infrastructure. The department sought ways to turn its steep capital expenses into operating expenses and to improve its availability, scalability, and information security by migrating to AWS.

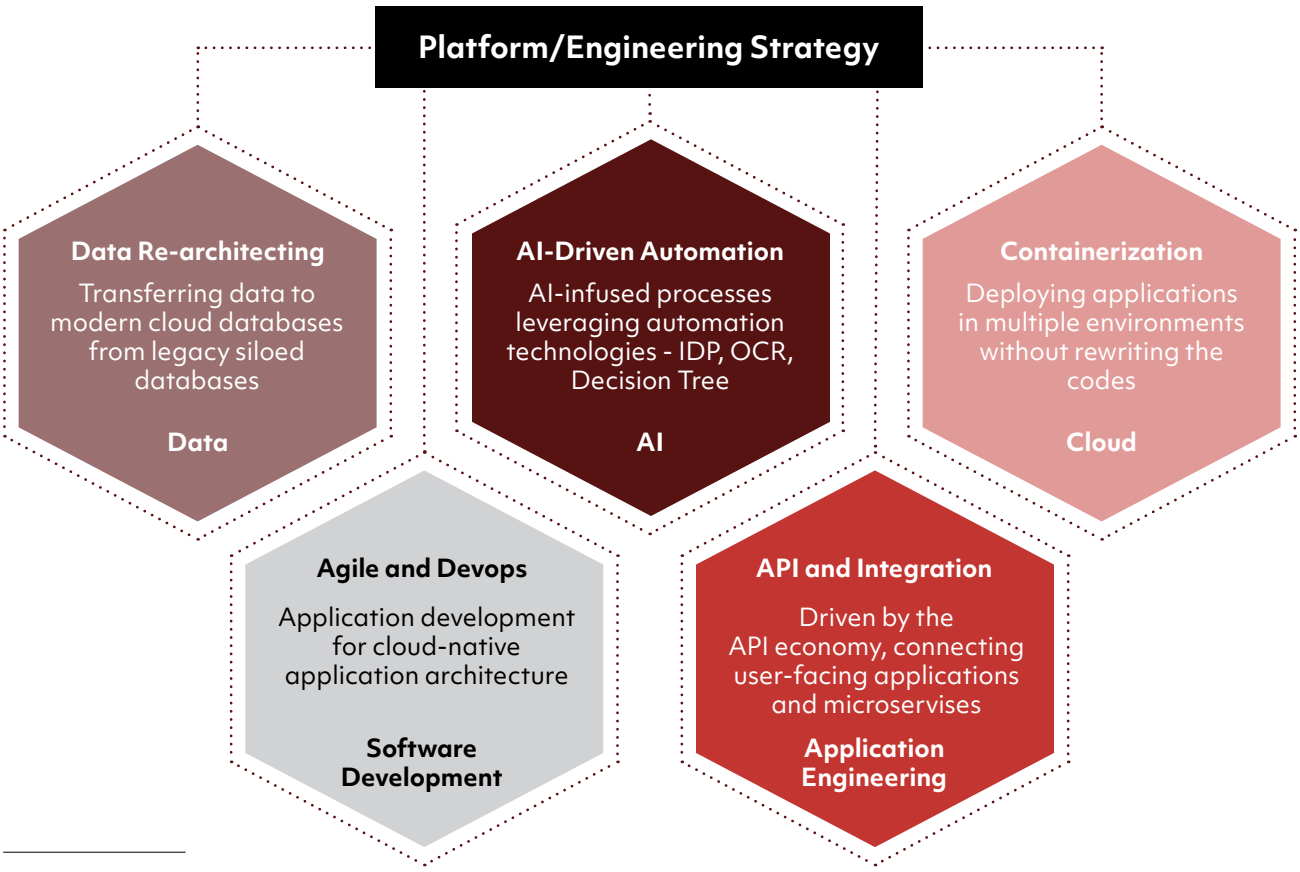
**Impact:** In total, the department moved nearly 95 TB of data, 150 servers consuming about 7,000 GB of memory, and more than 600 CPUs. Its file management system application now runs entirely on AWS, and the ITE&C Dept. (Information Technology, Electronics and Communications) estimates that 3,000–5,000 people use the application regularly. By migrating to AWS, the ITE&C Dept. has achieved virtually 100% availability and has experienced zero downtime across all 33 government districts.

## 1.3 Reducing Technical Debt: Driving 'Platformization'

AI and the Cloud are the fundamental pillars of the emerging 'Digital Platform Economy'. A major portion of technology budget is being spent on Digital Transformation initiatives across departments and functions. Application and Infrastructure modernization are the two key levers to transition to the global 'Platform Economy'.

Indian enterprises are adopting the platform play via increasing investments in cloud platforms, AI-based services, Cybersecurity and application modernization. In 2023, IT Operations teams will need the support of AI-driven tools, such as AIOps to maintain uptime of network systems. The Indian tech ecosystem is expected to drive most of the transformation initiatives leveraging platform-based solutions. The rise of LCNC platforms is making the entry of non-coders easier in application development.

### Approaches to Platformization – Key components




Source: nasscom

# India Tech Platformization Landscape

*Illustrative*

## Cloud Platforms

- Azure
- Google AI
- H2O.ai
- IBM Watson
- TensorFlow

## Intelligent Automation

- Arya.ai
- Antworks
- CoRover
- Grey Orange
- Jiffy.ai
- Uniphore

## AI Platforms

- Fractal
- Myelin Foundry
- Katonic
- Wipro Holmes

## Value drivers for platform-led modernization initiatives

Gartner expects that by 2026, 80% of software engineering organizations will establish platform teams as internal providers of reusable services, components, and tools for application delivery.

## Data Analytics

- Data Sutram
- Bert Labs
- Druva
- Crux Intelligence
- SW Data Science Wizards
- Realbox

## Vertical-focused AI Solutions

- Arya.ai
- Artivati.ai
- Cropin
- LocoNav
- HEAPS
- Ripplr

Source: nasscom

**Case Studies**

### Digital India Corporation (MyGov)

*Accenture and Microsoft worked with the Government to harness the capabilities of Microsoft's Power Virtual Agent low-code solution*

**Problem:** To provide a Responsible AI tool that provides accurate and useful information on the pandemic. The traditional on-premise servers were often over-provisioned to meet peak demand.

**Impact:** The agent, referred to as MyGov Saathi (meaning "companion" in Hindi), can handle up to 300,000 users per day and 20,000 concurrent users per minute.

### Maini Group

*Infosys helped design an autonomous golf-cart for the Group, leveraging its existing expertise in building prototypes*

**Problem:** To build a prototype that could navigate from point A to point B

**Impact:** The association resulted in success when the team not only launched the autonomous buggy, but also received their first commercial order in a short span of time. Infosys incorporated new-age technologies such as a Drive-by-Wire system, advanced LiDAR and vision technologies, AI and deep learning, among others to build the prototype

## 1.4 Cybersecurity Modernization Reducing Risk in Evolving Technology Landscape

The rapid digitization has led to increased regulatory attention from a data and privacy perspective. These trends combined with the growing awareness at board and CXO level around cyber threats is pushing the cybersecurity demand and spend. The Indian IT services with its global expertise and experience, along with the innovative Indian cybersecurity product ecosystem, have been the twin growth engines securing the digital transformational journey of customers globally. The tremendous growth in revenue of Indian Cybersecurity services industry can be attributed to surge in demand for securing infrastructure & networks on private networks & cloud. The highly regulated industries continue to drive revenue for the services players owing to their cyber maturity levels with Indian Cybersecurity services serving all industries. Global customers contribute 80-85% and the domestic (India) market accounts for 15-20% of cybersecurity revenue.

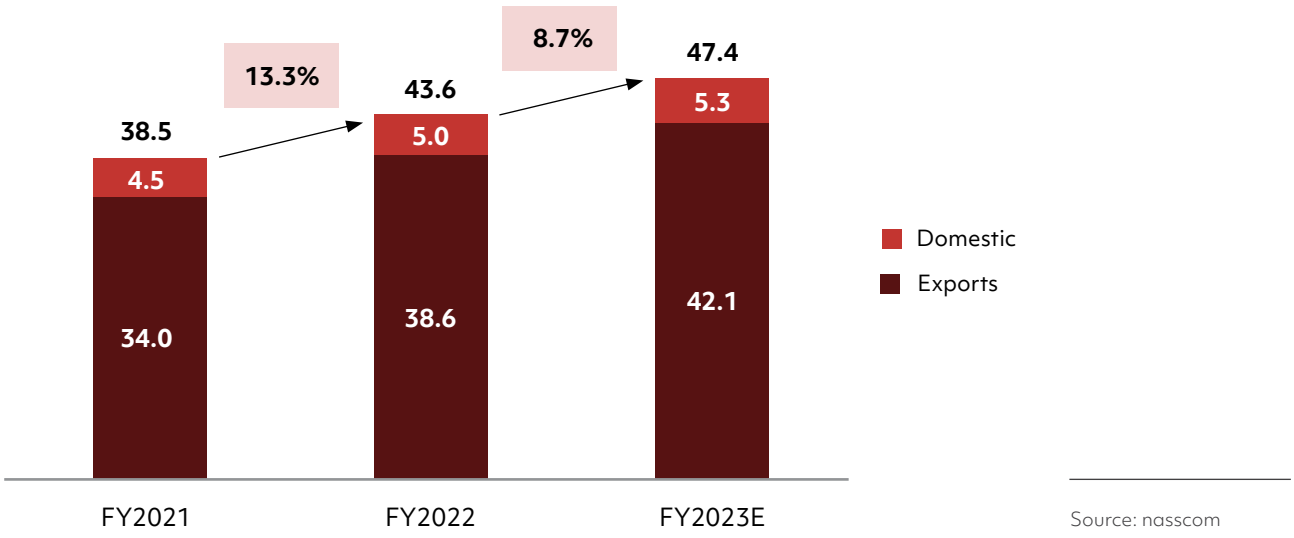
# 02

# The New Pillars of BPM - CX, Data and Modernizing the Core

Business Process Management (BPM) Industry has evolved tremendously in the last few years. From playing a task execution role to process ownership to now process transformation and managing end to end outcomes and impact through digital technology. The industry is clearly transitioning and positioning itself to provide Intelligent AI operations and digital customer experiences.

## BPM Revenue Continues Uptrend, Registers 8.7% Growth

($ Bn)




Source: nasscom

## Key Growth Drivers

**2.1**
**An Orchestrator of Capabilities & Strategic Partner to the Customer**

**2.2**
**Digital CX Becomes A Must Have**

**2.3**
**Data-Driven Transformation**

## 2.1 An Orchestrator of Capabilities & Strategic Partner to the Customer

Over the years, the BPM industry in India has transformed itself to shift from backend voice services to intelligent operations and data driven services adding value to the customer:

- Reaching beyond the traditional focus of non-core and transactional services
- Driving business outcomes and demonstrating a deeper understanding of underlying processes, besides functional-domain knowledge
- Offering transformation as a service – Service offerings that focus on design thinking, agile delivery, COEs, at-scale business-process automation to improve legacy tech and business process models
- Demonstrate innovative use cases with clear pathways to scale-up and value capture
- Driving trust and safety through implementation rigor to ensure data security and privacy on infrastructure, systems, people, and processes

**Case Study**

### Genpact's Transformation Journey for a Customer

*A multi-year relationship with a UK client*

**Impact Created:** Increase in depth and breadth of services with work mix shift from operation management (75%) to transformation servces (25%) between 2014 to 2020

- 2014: $8.6 Mn Impact, offshored 1900+ FTEs
- 2016: $14 Mn Impact, Right mix of human and digital - 150+ BOTs deployed
- 2018: $19 Mn Impact, Embedded intelligence with MIA to smoothen customer journey
- 2020: $35 Mn Impact, AI powered conversational agents to transform customer servicing

## Five pillars driving strategic partner relation with customers

### People

- Diverse and inclusive
- Problem-solving, technical, analytical, and hard-to-find skills
- Global: offshore, nearshore, onshore, anywhere shore

### Change Management

- Baked into the solution versus an invoice line item
- Value driven commercial order

### Process

- Eliminate process debt
- Trust, governence, risk, and compliance
- Backed by process/domain expertise

### Data

- Make data a first-class citizen
- Organize services around enterprise data-flows (customer, employee, vendor)

### Technology

- Leveraged as a competitive differentiator
- AI-powered Cloud-enabled solutions
- Partner ecosystem

Source: HFS Research, nasscom

## 2.2 Digital CX Becomes A Must Have

Digital first CX is about combining digital concepts, digital tools and solutions, and high touch human intervention, as needed, to deliver a fundamentally superior digital stakeholder's experience.

- Hyper-personalization of customer experiences - Chatbots, Omnichannel
- Customers expect value beyond costs

*Illustrative*

**CIS Revenues**

| FY2020 | FY2023E |
|---|---|
| $13 Bn + | $17 Bn+ |

**Share of Digital CIS**

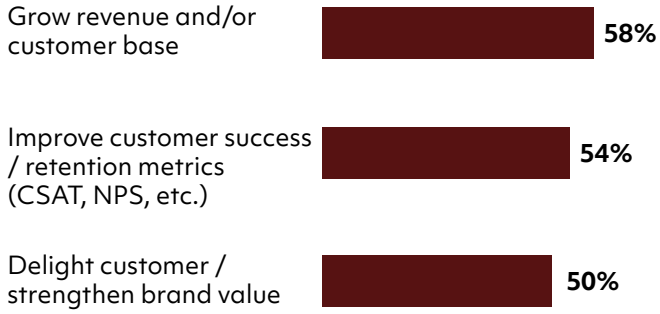
| | |
|---|---|
| 30-35% | 50-55% |

**Focus areas of companies providing CX****

| | |
|---|---|
| **Hyper-personalization** 45% | **Omni-channel** 25% |
| **Chatbots** 68% | **Cognitive AI** 15% |

**Top reasons for Digital CX to be a priority in 2022***

(% Respondents)




*Based on survey by CMS
**nasscom BPM Awards 2022 Analysis
Source: CMSWire Insights, HFS Research, nasscom

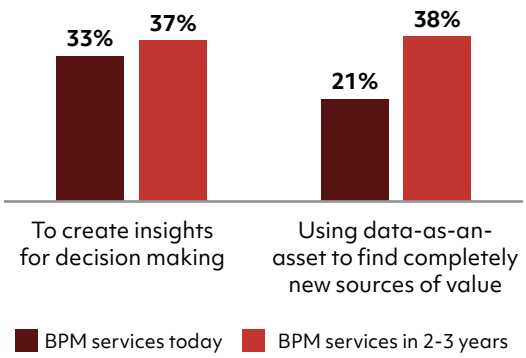
## 2.3 Data-Driven Transformation

Data has emerged as the foundation of all services - an asset for customers, employees and vendors

- Customers are using underlying data to support decision making and find new sources of value, not merely for reporting
- Data mapping playing the important role of aligning employee skills and job roles and creating enhanced Employee Experience
- Vendors/Partners using data as a tool for building new streams of data monetization services

### Customers using underlying data to support decision making and find new sources of value

(% Respondents)




Source: HFS Research, nasscom

**Case Study**

EXL harnesses the power of data and AI in their finance operations by strategically deploying AI solutions, analytical tools and hyper-automation to create new clean data, intelligent workflows and improve the effectiveness of existing platforms and technologies.

**Impact Created for Customers:**

- 36% have mature, data-driven finance functions
- 32% cite key driver for data-driven strategies is the ability to become a strategic advisor to their business

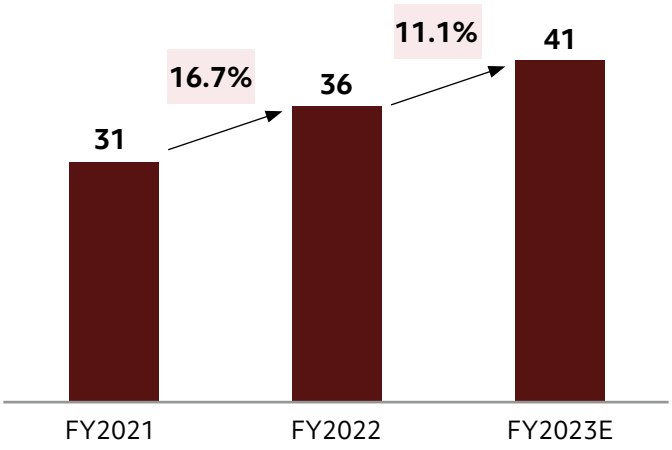
# 03

# Rise of ER&D – Advantage India

The ER&D industry has been spearheading growth of the technology sector in the past 2 years, backed by strong fundamentals, rising demand for Indian ER&D services, and availability of robust talent pool. The industry has been witnessing a paradigm shift and a whole new era of accelerated growth, innovation, and large-scale digital transformation.

## Indian ER&D revenue

($ Bn)




Indian ER&D revenue is expected to post double digit growth in FY2023 to $41 Bn. This year, digitalization in ER&D went deeper as the use of technology matured, organisations moved up the value chain, and witnessed a steady increase in digital ER&D spend. This is clearly visible in the increasing engineering and manufacturing expansion for India and the globe, digital going mainstream across engineering and adjacent verticals, leading to cloudification of engineering activities across all sectors.

Source: nasscom



## 3.1 Deals of Strategic Nature – Large-sized Deals of Longer Duration

From April-Dec 2022, the industry witnessed over 135 ER&D deals, up from 90+ deals for the same period in FY2021. Many deals in FY2023 have been of longer duration and larger sized multi-million-dollar deals ($33 Mn-$100 Mn), compared to April-Dec 2020 where the deal size was largely $50 Mn or less.

The duration of many deals is 5 years and above and moving away from project-based work. ER&D companies are strategic partners and becoming multi-functional transformation hubs, engaged in end-to-

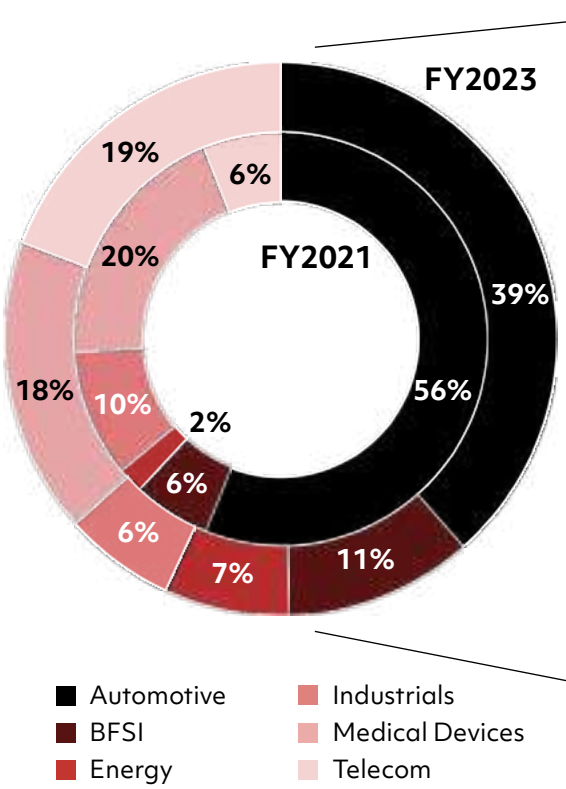
end product and business ownership. These projects are in the areas of digital transformation, connectivity, autonomous, 5G, etc., which are long term projects, requiring long term strategic investments, planning, and execution.

## ER&D deal analysis*

*Illustrative*

### Key deals by leading verticals

(% Share)




### Select long duration deals in FY2023

**€ 70 Mn+**

KPIT selected for next generation ECU Platforms Software

**5 Years**

LTTS-BMW for infotainment for hybrid vehicles

**6 Years**

TCS-RDG for rail data marketplace

*Select industries; Apr-Dec 2020 = 93 nos.; Apr-Dec 2022 = 136 nos.

Source: EIIR Trend, nasscom

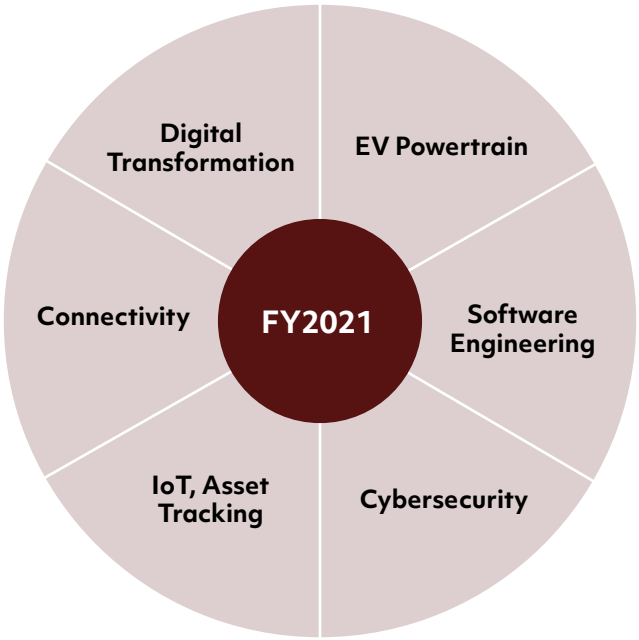
In FY2023, Automotive, Telecom, and Medical Devices emerged as the top sectors in terms of deals.

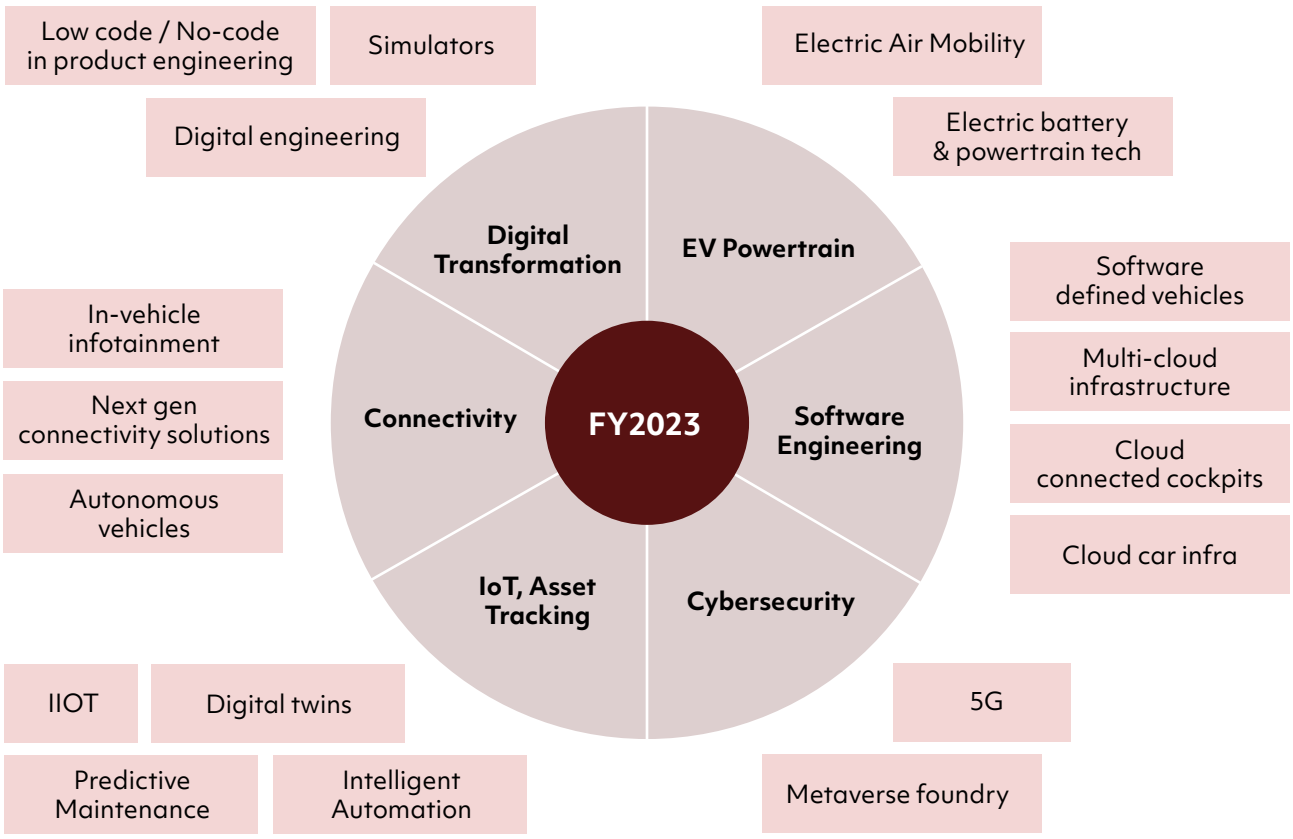
- Among the selected deals, Automotive related deals are at the forefront, with a share of ~40% of the total deals. The core themes continue to be electric vehicles, software defined vehicles, ADAS and infotainment systems, connected vehicles, etc.
- Automotive is closely followed by Telecom, focusing on 5G, digital transformation, etc. With the onset of 5G in India, a lot of use cases have emerged across industries
- Deals in Medical Devices sector have focused on diagnostics, digital health, etc. this year

## 3.2 Digital goes Mainstream in Engineering

Digital Engineering is gradually taking the lead over traditional engineering and becoming mainstream. The share of digital engineering in Indian ER&D revenue was about 28-30% in FY2022, led by platform engineering and device-as-a-service. Further, as digital engineering continues to find inroads beyond the main engineering verticals of automotive, aerospace and defence into adjacent verticals like BFSI, Healthcare, CPG, and Retail, its share in overall engineering revenues is expected to reach 50-60% in the coming years.

# Digital Engineering: Evolving Use Cases




Source: Company news, nasscom

5G, electrification, autonomous, etc. that were finding their foothold in FY2021 became mainstream in FY2023, with many ER&D deals and projects focused on these use cases.

Case Studies

## AXA

**Customer Challenge:** AXA was looking to reduce the manual effort in authentication and estimation of settlement claims.

**Solution:** Insurance products are becoming increasingly modular, covering specific risks that the customer is exposed to. Aside from automating the claims processing activity, AXA uses drone technology and computer vision to determine the authencity of claims in large risk / calamity situations. The India GCC is working on training the model through image labelling and maintaining the algorithms in production.

**Impact**

- Improved internal processes by automating time-cosuming tasks
- Incread speed and accuracy of claims' settlement

### BFSI

- Hardware in BFSI
- Intelligent Middleware
- Digital Marketplace
- Next Gen Banking

## Tech Mahindra

**Customer Challenge:** The customer wanted to improve bio-vaccine production efficiency and throughput.

**Solution:** Tech Mahindra built a plant process digital twin to monitor real-time status of the vaccine production across three stages and predict quality deviation so that timely corrective action is taken.

**Impact**

- Reduce batch rejection and improve throughput from 30% to 80%

### Healthcare

- Medical manufacturing incl. additive manufacturing, and bioprinting
- Hospitals of the future
- Connected Health

## Tata Consultancy Services (TCS)

**Customer Challenge:** The client was looking for a robust digital data governance system for ensuring data quality and completeness for net zero emissions management.

**Solution:** TCS built an end-to-end carbon management solution for net zero pledge from multiple departments - procurement, logistics, processing, packaging, and distribution. The custom solution leveraged components and frameworks of TCS ENVIOROZONE™ with a robust governance system for ensuring data quality and completeness.

**Impact**

- 10-20% reduced carbon footprint and offset costs
- Substantial long-term savings (>US $100 Mn)
- Industry first audible carbon management system to drive visibility
- GHG data disclosure for geo/suppliers/brands

### CPG/Retail

- Performance optimization including supply chain & route planning
- Industry 4.0
- Customer experience & brand recognintion

Case Studies

### Wipro

**Customer Challenge:** A multinational food manufacturing company was looking for a user-centric digital engagement and dynamic decision making platform.

**Solution:** Wipro's S.M.A.R.T. (Sustainable, Monitored & Managed, Automated & Autonomous, Reliable & Resilient, and Turnkey) manufacturing framework provided Intelligent physical automation, seamless orchestration of operational technology and IT, digitalisation of operations, and dynamic decision making enabled by real-time analytics.

**Impact**

- On-time supply increased to 98%
- Yield impoved by 5%
- Equipments efficiency improved by 5%
- Product quality improved by 3%

### CPG/Retail

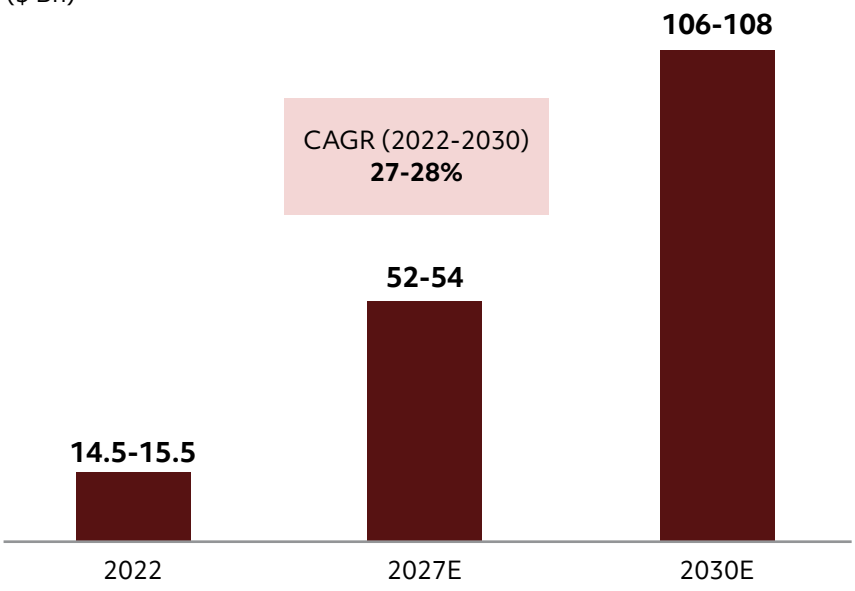
- Performance optimization including supply chain & route planning
- Industry 4.0
- Customer experience & brand recognintion

## 3.3 Cloudification of Engineering

Engineering activities / functions are fast moving to cloud. The global cloud market for engineering is expected to reach $106-108 Bn in 2030 from $15 Bn in 2022. With increasing digitalization, cloudification of engineering activities is a natural shift and this is visible from various engineering activities moving to cloud, owing to availability of private 5G solutions, faster adoption of smart manufacturing, growth of product servitization, and improvement in security mechanisms for OT systems.

### Global Engineering Cloud Market

($ Bn)

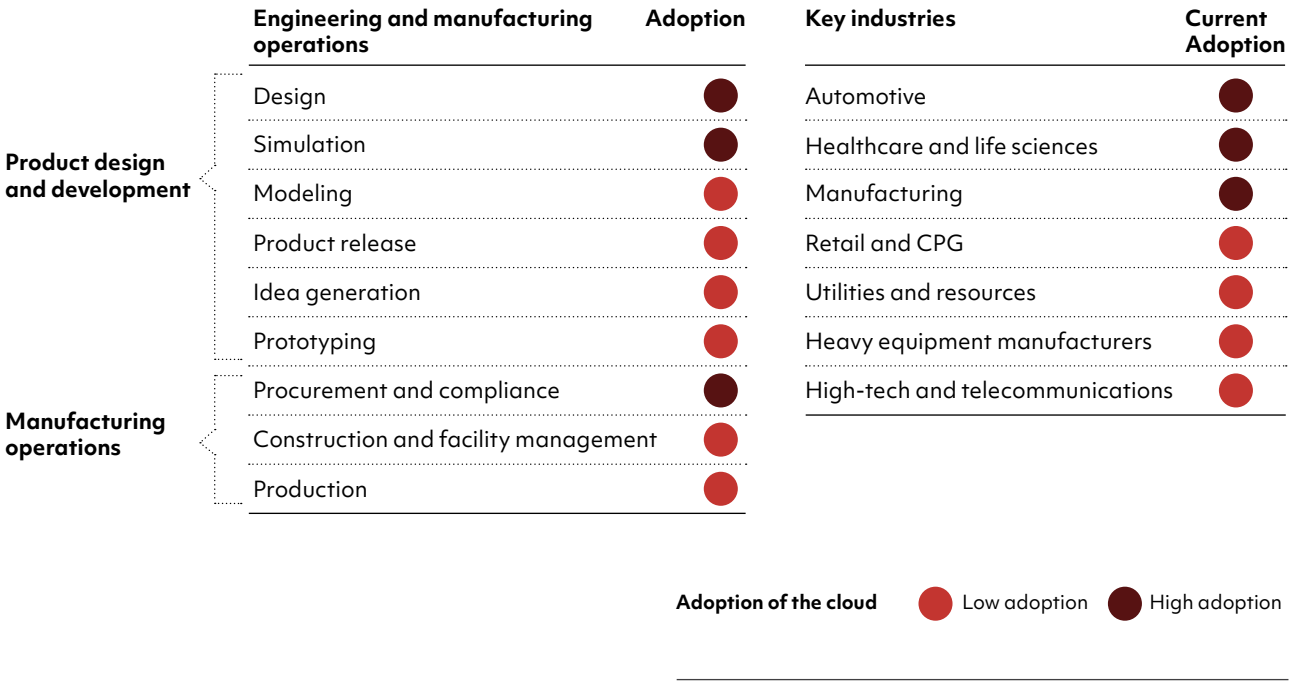



Source: Avasant, nasscom

PLM systems have the highest adoption of cloud as these systems are costly and complex to manage on-premises. Design and simulation systems such as CAD/CAM/CAE have heavy workloads and high collaboration requirements. These systems have medium-to-high adoption of cloud and will further grow because of high product innovation requirements.

Sector wise high adoption includes automotive, healthcare, and manufacturing.

# Cloudification of engineering activities and key industries leading it




Source: nasscom Engineering and Manufacturing Transformation

**Case Studies**

## HCLTech

*Client - An American beverages company*

**Business Challenge:** The client wanted to digitize product engineering design and data management to reduce costs and improve efficiency and wanted to leverage a cloud-first strategy for hosting engineering applications.

**Solution and Impact:**

- HCL enabled digital transformation by moving CAD and PLM applications to the public cloud.
- It enabled seamless integration between applications hosted on the cloud and on-premise for smooth data exchange.
- This improved the client's product design cycle time by up to 20% and reduced IT costs by 25%.

## Hitachi Vantara

*Client - A consumer goods packaging manufacturer*

**Problem:** The client wanted to automate its manufacturing and quality check processes to reduce penalties paid to end customers.

**Solution and Impact:**

- Hitachi Vantara designed an IIoT-based solution to automate manufacturing processes.
- It created dashboards for displaying the machine speed, availability, and downtime.
- It helped the client improve quality of its products and reduce penalties paid to end consumers.
- It also minimized waste during the production processes and improved customer satisfaction.

Source: nasscom Engineering and Manufacturing Transformation report

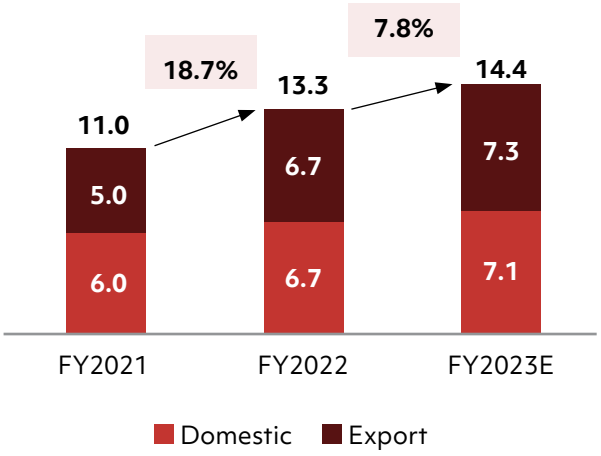
# 04 World Class from India

The highlight for FY2023 is that the revenue from software product exports is set to be marginally bigger ($7.3 Bn) than domestic revenue ($7.1 Bn). This is due to rapid digitization and the growing acceptance of software products from India by global SMBs.

Global economies continue to embrace Indian products. No matter the company's size, whether big or small, the software from India is efficient and helpful for everyone. SaaS has maintained its leadership in creating world-class businesses from India, and with time, their global reach has grown quickly. The strong Indian tech start-ups and DeepTech start-up ecosystem, which continues to astound us with its inventiveness, business models, and strategies, lend further credibility to this.

**India Software Products**

($ Bn)




Source: nasscom



## 4.1 Software as a Service (SaaS) taking India to the World

### SaaS expanding and spreading across globe

The SaaS ecosystem's scalability is a model that other industries wish to emulate. Indian SaaS has a lot to offer the globe, as indicated by increasing unicorns, significant growth in worldwide sales, increasing investments, and ongoing market penetration.

- Indian SaaS companies can enter the underserved and rapidly expanding global markets primarily due to cost advantages and improved UX/UI.
- 59 - Number of SaaS unicorns and potential unicorns
- Most products by Indian businesses are readily extendable, either through native integrations or open APIs.

**2X**

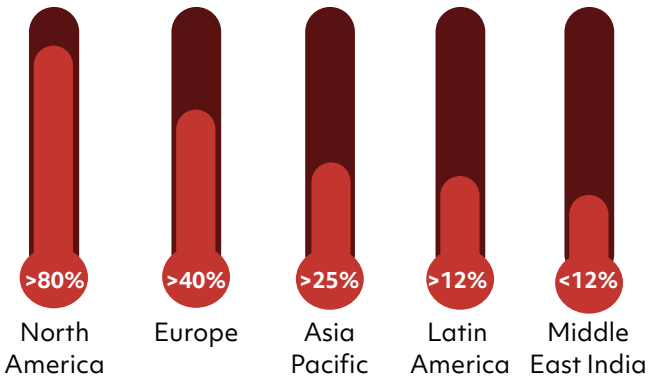
Growth in the share of global markets for Indian SaaS companies during 2019-2022

**20%**

Funding raised in CY2022 by tech start-ups went to SaaS

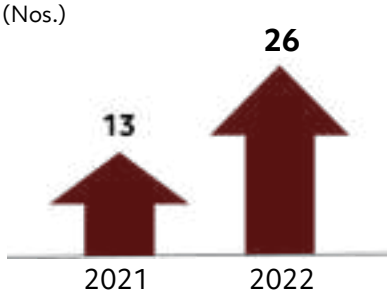
## Increasing penetration of Indian SaaS companies worldwide*

*Illustrative*




## SaaS unicorns in India surpassing UK this year

(Nos.)




* Analysis based on revenue, sales, partners etc. for a set of SaaS companies

Source: nasscom Software Product Report, Zinnov SaaS Report 2022

## International Businesses adopting SaaS Products

Many of the Indian SaaS product users are international. The verticalized approach to product creation, which helped Indian enterprises expand, is another trend-supporting factor. The rising demand for Indian SMB solutions on a global level has resulted in considerable revenue growth for large SaaS companies.

- Indian companies provided improved banking products to enter the Southeast Asian market including India, such as 50+ clients implementing Finacle and BaNCS
- Indian SMBs increased spending on SaaS products (especially post COVID) driving growth
- Indian software products firms have built custom pricing for both Enterprises and SMBs giving them the flexibility to buy and slowly scale the solutions across geographies
- 3000+ SMBs in UAE adopted Zoho SMB software, Zoho also recorded >45% increase in Zoho One demand from Indian Tier II and III cities

*Illustrative*

**RateGain**

**>70%** Customer from global Travel/ Tourism, Airlines and Leisure sector

**TCS BaNCS**

**>60%** Customer from Southeast Asia, US, Australia markets

**NewgenONE**

**60%** Adopters in Malaysia, Indonesia, Singapore in BFSI

**Infosys Finacle**

**>70%** Adopters of digital banking from UAE, Southeast Asia, US, Japan

**Verticalization** helping product companies to tap global markets

**20-40% ARR** growth in last 2 years for sectors like FinTech, MarTech, Logistics, etc.

**40-60% ARR** growth in last 2 years for sectors like Retail, Gaming, Store Digitization, etc.

Source: nasscom Software Product Report, Zinnov SaaS Report 2022

## 4.2 Indian Start-ups Building World Class Scalable Solutions

The effort to place India on the map globally is further fuelled by Indian tech start-ups. SaaS may be taking the lead, but India's tech start-ups are improving worldwide trust in their products through faster global expansion and collaboration. These start-ups are in the lead in terms of the number of start-ups, unicorns, potential unicorns, funding, and other factors. Indian start-ups are an ideal partner for multinational corporations for mergers, acquisitions, open innovation, etc. in addition to their products.

### Indian tech start-ups' strong and resilient growth even in tough market

**1300+**
New tech start-ups added

**2nd**
Highest no. of unicorns added in 2022 after USA

**>$18 Bn**
Funding in 2022, greater than the previous 4-year average

**>$7 Bn**
Funding raised by seed and early-stage start-ups in 2022

### Indian Tech Start-ups well aligned with global requirements

| Serving Global Markets | | Global Trust for Collaboration | |
|---|---|---|---|
| **>40%** | **~40%** | **25%** | **>60%** |
| **Unicorns** servicing global markets | **Potential unicorns** (174) servicing global markets | Share of **Global MNCs** in total acquiring corporate | Open innovation programs operated by **Global MNCs** |

**Fast pacing integration of Indian Tech Start-ups with the world**

Source: nasscom Start-up Report 2022

- 50% of 2022 investments by mature start-ups are in global start-ups, driven by new-age technologies like Web3, for B2B product/market expansion
- Global GCCs actively working with Indian corporates for co-creation, GTM, etc. under open innovation programs
- Despite dynamic global sentiments, India added 23 unicorns - 2nd highest addition in the world
- Potential unicorn club also swelled to reach 170+ this year confirming the scalable potential of India early-stage start-ups
- Start-ups across verticals are expanding their global reach:
  - **Moglix:** A B2B e-commerce unicorn has reach in 50+ countries to export certain products on its platform
  - **Car24:** A car marketplace expanded its business to Australia and UAE
  - **Urban Company:** Expanded to Singapore, Saudi Arabia and few other countries for business expansion

## 4.3 DeepTech Start-ups Innovating for the World

Deep-Tech start-ups are active tech start-ups that create, deploy or utilize advanced technology which largely include Artificial Intelligence/ Machine Learning, Internet of Things (IoT), Blockchain, Big Data & Analytics, Augmented Reality/ Virtual Reality (AR/VR), Robotics, 3D printing and Drones etc.in their products or services. DeepTech start-ups are diversifying and thriving more and more. These start-ups are creating innovative, intellectual property-based items that are well-liked across the world. In the previous five years, there has been a huge surge in patent filings, indicating that these DeepTech start-ups are well along their path to invention. The expanding use of DeepTech products in various fields is being supported by this invention.

### DeepTech Start-ups - Inventing and penetrating

- 485+ inventive DeepTech start-ups creating patentable products through their technical workforce
- Majority of the inventive patents are filed in verticals like Enterprise Tech (Video analytics, Drones, etc.), HealthTech (Image diagnosis, bionics, etc.), SCM & Logistics (Automation robots, etc.) and more
- >60% of inventive DeepTech start-ups are leveraging Artificial Intelligence for their products

### Diverse Landscape

**~27K**
Tech Start-ups

**3.2K**
DeepTech Start-ups

**485+**
Inventive DeepTech

**>50%**
increase in adoption of DeepTech based software products in HCM, Cybersecurity, and more

**1.4K+***
Patents filed by DeepTech start-ups

**>90%**
Patents are filed in last 5 years

**350+**
Patents filed in India

**20-25%**
share of DeepTech in overall software products

* A sample set of 450+ start-ups are considered for patent analysis

Source: News Articles, nasscom DeepTech Report 2022

### DeepTech Start-ups Creating Global Impact

- Indian DeepTech start-ups and their products and solutions continue to gain popularity and global recognition
- The majority of DeepTech businesses want to expand internationally, and many of them have already done so with great success
- Global companies are increasingly acquiring Indian DeepTech start-ups because they see the potential
- Funding pools are being established by investors from other sectors specifically to promote DeepTech start-ups including 8X Ventures, YourNest Venture, Speciale Invest, and others

## Indian DeepTech start-ups getting global recognition and acceptance

*Illustrative*

### Grey Orange
Global Leader in Customer Impact Technology

### Netradyne
1000+ customers, major clients based out of US

### Niramai
Global Women's HealthTech Awards (by The World Bank Group)

### Bidgely
Finalist in S&P Platts Global Energy Awards 'Grid Edge' category

### Qubole
A leading data lake solution provider, acquired by global B2B software brand Idera

### Qure.ai
Projects US to be its largest market by FY2024

### Innoplexus
Wins Silver Edison Award for Ontosight® Explore

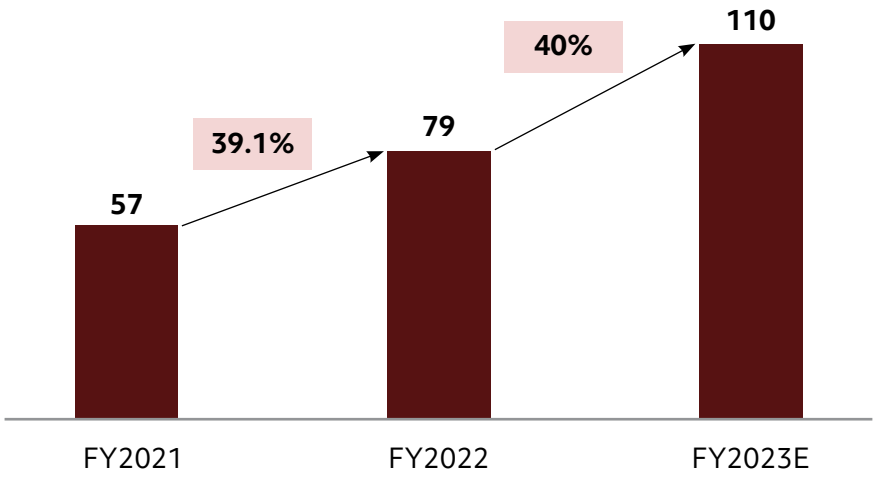
Source: News Articles, nasscom DeepTech Report 2022

# 05

# eCommerce Evolving Through Increasing Penetration and Business Model Changes

## India eCommerce

($ Bn)

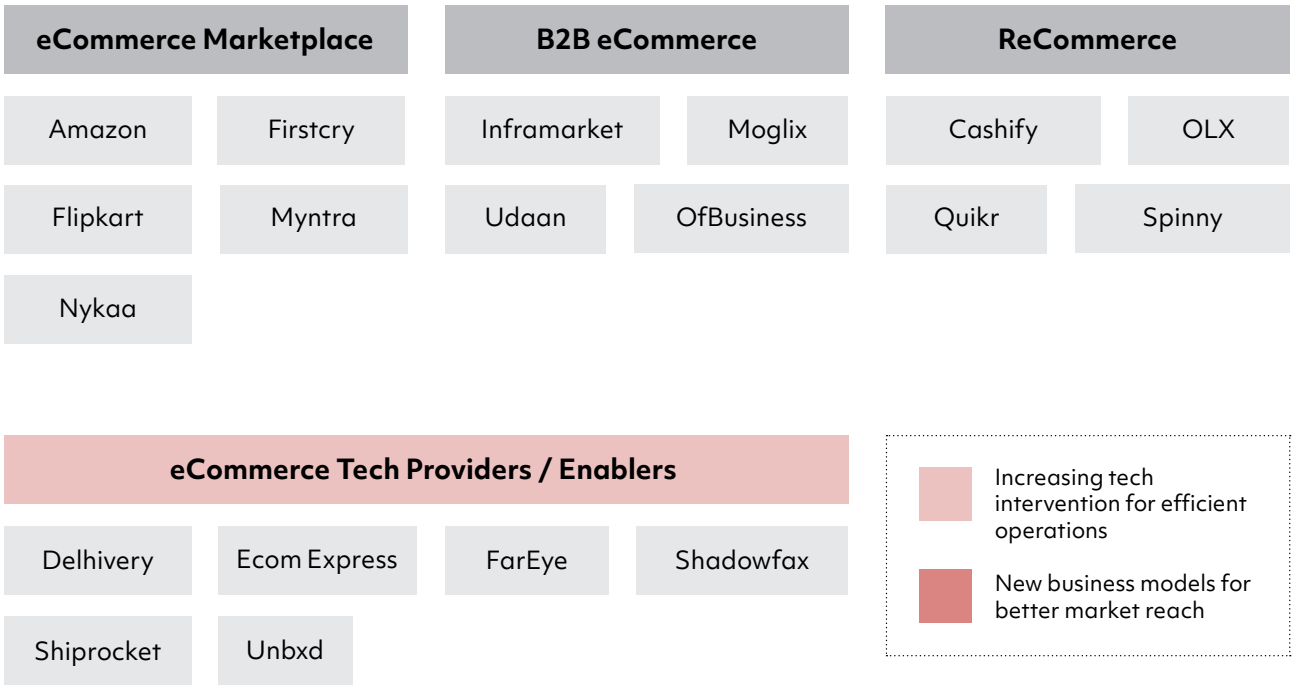



Source: nasscom

India has surpassed the USA to become the second-largest online consumer base. A great deal of innovative company models have also advanced tremendously. Due to this, the eCommerce market's reach has increased, and low tier cities are now more involved than major areas. Technological interventions have increased operational efficiency and the range of solutions available to eCommerce firms.

## Evolving Indian eCommerce Landscape

*Illustrative*




Source: nasscom

With the help of technology and evolving business models, India's eCommerce market is growing quickly in both size and market penetration. In the eCommerce industry, reaching out to customers directly or changing course to grow the customer base is evident. The substantial rise in demand from Tier II+ cities and the expanding retail value chain, which is utilising digital more frequently, are driving the penetration rate.

## 5.1 O+O 2.0: eCommerce Model is Taking a New Shape

eCommerce businesses are working on multiple approaches to penetrate and scale their businesses. In the last few years, reaching out to retail consumer directly has become the norm for most of the eCommerce business stakeholders, which has led to the scaling up of new business models in a short period of time. The "Offline + Online" (O+O) model which is the convergence of traditional and online channels into a digitally-enabled ecosystem led by active interplay of tech solutions and digital-savvy consumers has gained prominence.

- Estimated ~ 70 Mn social commerce users added in 2022, an increase of 45% from last year
- D2C enterprises are growing their market reach, and their base exceeds 600 brands
- Many large businesses are moving towards fast commerce rather than pivoting in order to expand their markets

*Illustrative*

### Social Commerce Expanding Wings

Total social commerce consumers in 2022

**200+ Mn**

**>40%**

Consumers added in 2022 alone

### D2C's Evolving Business Structure

D2C taking offline mode to expand market

THE MAN COMPANY

**20 >> 65**
Outlet in a year

EDAMAMA

**0 >> 60**
Outlet in a year

**3-10X**

Growth in D2C brand offline outlets

### Quick action of quick commerce

Offering faster business growth

**25%**

Faster deliveries growth in quick commerce

**4X**

Growth of quick commerce market in a year

Source: News Articles, Inc42, YourStory

## 5.2 Technology Powers the New Face of Retail

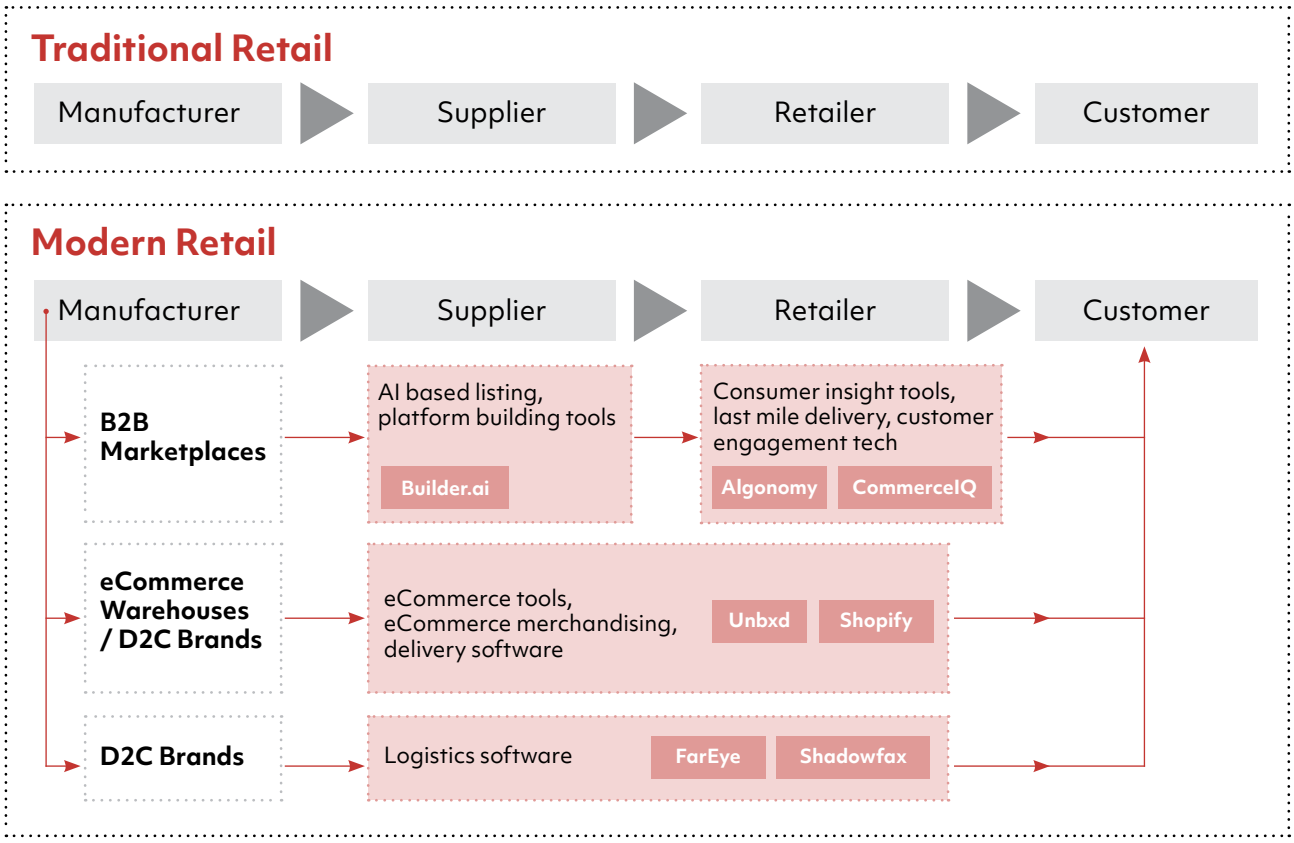
Technology is altering the way retail was previously conducted. It has also led to the further breaking down of retail into multiple facets, leading to more stakeholder participation and reducing the dominance of traditional channels.

Technological transformation of retail:

- Product Platforms: From building platform to showcasing product, technology is playing a key role
  - eCommerce Tools: Shopify, Magento, Ecwid, Zoho
  - eCommerce Merchandising: Tagalys, Unbxd, The Merch Bay
- Delivery and Logistics: Focus more on cost efficient and fast delivery operations through tech
  - Delivery software: Fareye, Shadowfax
  - Last mile delivery: Ecom express, Delhivery, Rivigo, Edgistify, etc.
- Retail experience: Obtaining consumer insights is crucial to boost customer experience and engagement
  - Store Operation Analytics: Algonomy, Intelligence Noda, Infilect, Commerceiq
  - Virtual Shopping Experience: Flipkart (Flipverse)

## Technology Interventions Across the Retail Value Chain

*Illustrative*




Source: Company Websites, News Articles

Increasing Tech intervention for effective and efficient business operations

## 5.3 Tier II and III Demand Driving Growth of eCommerce Platforms

eCommerce is no longer driven by metropolises. The 2022 holiday sales data have shown the purchasing power of Tier II+ cities. This could be the game changer in the eCommerce industry, as it will make all companies build strategies to tap into this high-growth market.

- Festive sales dominated by the demand from Tier II+ cities
- B2B retail marketplace platforms have shown exceptional growth
- Fashion, key growth area from Tier II+ cities
- More than half of the transaction users on eCommerce platforms came from Tier II and III cities

*Illustrative*

**2X**

Rise in 2022 eCommerce festive sales compared to 2019 majorly driven by low Tier cities

| | | |
|---|---|---|
| >75% | Orders placed from Tier II and III | GoKwik |
| >65% | New signups on Amazon Prime from Tier II and III | Amazon |
| 64% | Orders from Tier IV+ cities | Meesho |
| >50% | Orders from Tier II and III cities | Unicommerce |

Source: News Articles, Inc42, YourStory

# 06

# India Domestic Market - The Vision of 'Digital India' on the Path to Reality

Going digital has been India's growing strength which has not only empowered India but also opened a plethora of related businesses and opportunities. India's ambition of a trillion dollar digital economy is expected to catapult it into the Top 5 global economies.

## 'Digital India' growth agenda led by all key stakeholders

### 6.1 Service Providers

Domestic tech revenues crosses the $50 Bn mark

Domestic deals focusing on digital transformation

### 6.2 End-users

Sectors - Varying levels of maturity in adopting tech

Consumers growing acceptance of online transactions and usage

### 6.3 Enablers

Government as an enabler of tech - Growing public platforms and Digital Public Infrastructure

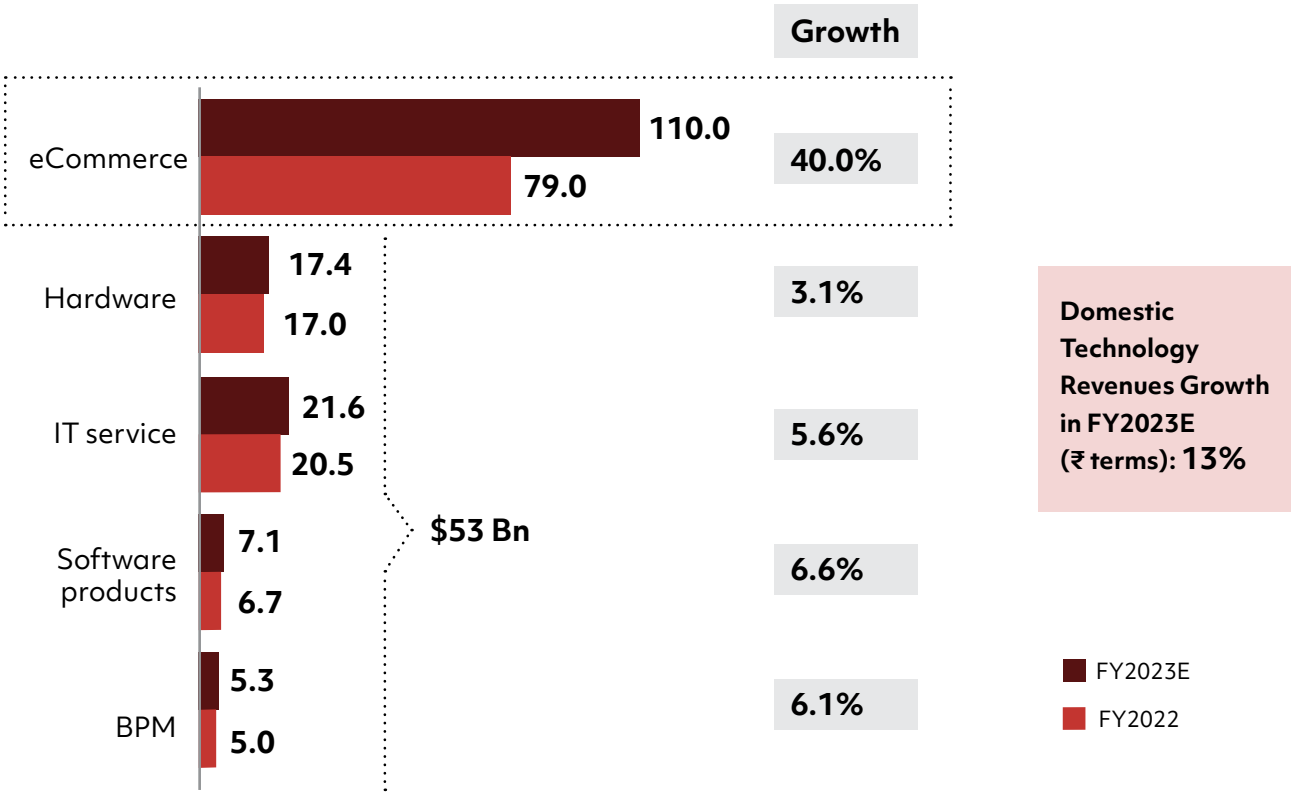
Government as a user of technology

## 6.1 Service Provider: India Domestic Tech Revenues Crosses the $50 Bn Mark

The domestic technology market has continued to grow over the years with the service providers continuously building India centric solutions and solving for India specific problems. In Rupee termss the segment is set to grow y-o-y at 13% (~5% in dollar terms) in FY2023. Over the years the digital component of key deals has not only gone up but many new niche sectors have also emerged.

## Domestic Technology Growth- Highest since FY2018 (₹ terms)

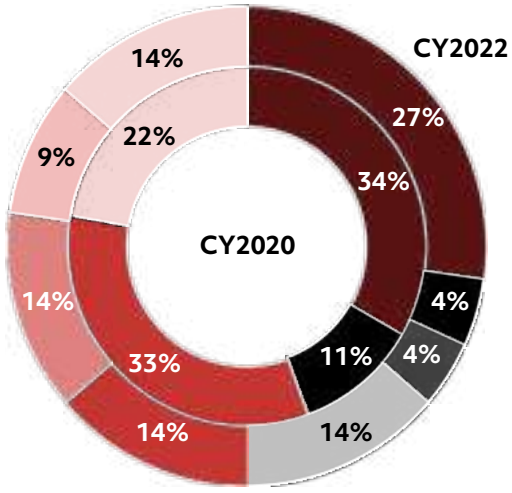
($ Bn)




Source: UnearthInsight, nasscom

## Domestic Deals Volume

(% Share)

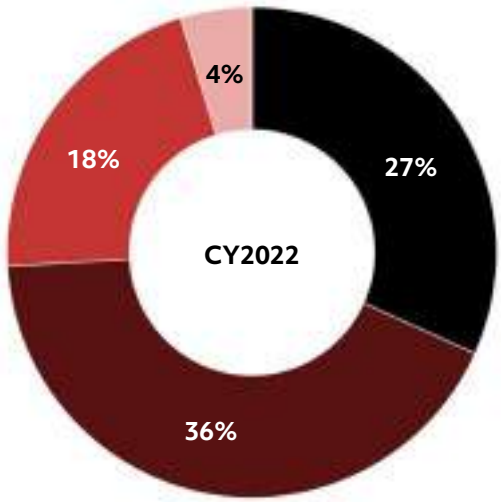



- CPG & Retail
- BFSI
- Energy and Utilities
- Healthcare
- Manufacturing
- Other
- Technology
- TME

## Digital Component in Domestic Deals

(% Share)

*Indicative*




- Cloud
- AI, ML, Data Analysis
- Digital Transformation, Automation
- Others Including Blockchain

Source: BNP Paribas

### IT services

- Cloud adoption has grown largely because insurance, and media and entertainment verticals in India have been quick to adopt cloud. In FY2023, banks, manufacturing companies, fintech, healthtech, gametech and SMBs too are increasingly opting for cloud services.
- App Development (CADM) grew across domestic enterprises due to COVID 19 led rapid digital transformation and increasing demand to automate payment, warehousing, supply chain, consumer interactions.

### Software products

- Cloud Enterprise Planning & CRM continues to be the largest segment of domestic software product market accounting for over 50% of revenues
- Vertical Products continue to be a critical theme for software product companies in segments like FinTech, MarTech, Logistic Products & Sales Enablement Products

### BPM

- Customer Interaction Services (CIS) and Finance & Accounting continues to be the largest segment accounting for 55-65% of domestic BPM market; however, Data/Analytics, Chat Support/Chatbot, RPO/ HR BPM, Background Verification/BGV, Marketing BPM have grown faster compared to call center, translation services, & domestic banking support.

## Domestic Deals Focusing on Digital Transformation

The domestic technology market has continued to grow over the years with the service providers continuously building India centric solutions and solving for India specific problems. Over the years, the digital component of key deals have not only gone up but many new niche sectors have also emerged.

## Key deals focusing on digital transformation

*Illustrative*

| Category | Client | Company | Vertical | Details |
|---|---|---|---|---|
| Government, Public Sector | Atal Incubation Center | Tech Mahindra | Healthcare | Jointly build a next-generation healthcare ecosystem |
| | International Financial Services Centres Authority | Infosys | Trade Finance | Pilot its blockchain-based trade finance solution |
| | Ministry of External Affairs | TCS | Other | Delivering electronic passport (e-passport) |
| | National Insurance Company | Cognizant | BFSI | Elevate its technology roadmap |
| | Steel Authority of India Limited | HPE | Manufacturing | Implement HPE Greeklake edge-to-cloud platform |
| | Union Bank of India | Infosys | BFSI | Implement Finacle Conversational Banking, Finacle Remote Banker, and Finacle Mobile Teller Solutions |
| Private Sector | Aditya Birla Fashion and Retail Limited | Accenture | CPG & Retail | Digital Transformation |
| | Aadhar Housing Finance | TCS | BFSI | Implement blockchain-based cloud platform |
| | Eros Investments | Wipro | TME | AI/ML-powered content intelligence platform |
| | Hero MotoCorp | Accenture | Manufacturing | Implement a digital supply chain platform |
| | HFCL | Wipro | TME | Engineer a variety of 5G transport products |
| | Lupin | HPE | Healthcare | Edge-to-Cloud platform |

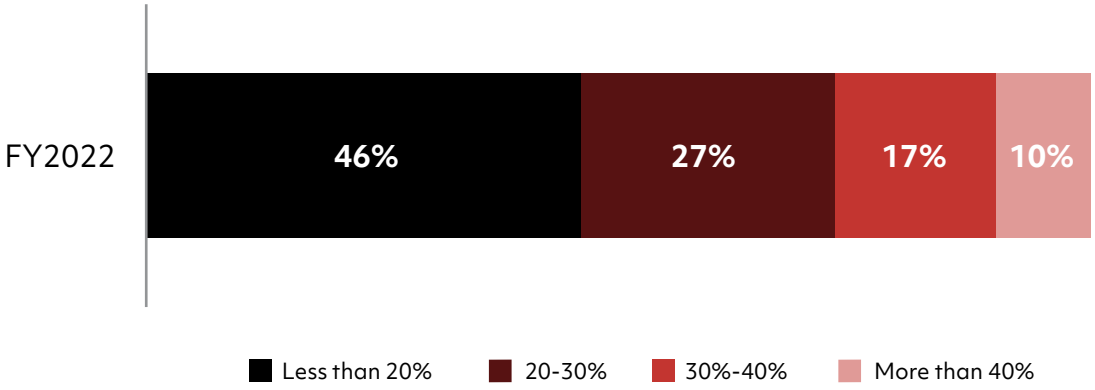
Source: BNP Paribas

## 6.2 Varying levels of Maturity in Adopting Technology

Indian enterprises are betting big on digital investments and tech transformation to leverage multiple benefits in the form of boosting efficiency, mitigating costs, augmenting revenue growth, developing/ modifying operating models, increasing flexibility & transparency, streamlining business processes such as supply chain management, customer service, sales & marketing, etc., enhancing customer experience (CX), enabling employee engagement & experience (EX), building organizational culture, and gaining competitive advantage.

### Digital Budget of Enterprises as a % of IT Budget

(% Share)




Source: Secondary sources, nasscom

India has been a huge market for many businesses and COVID made this market even more lucrative as lockdown and WFH saw a rise in adoption of current solutions prevailing in the market. The last 2 years have created a paradigm shift in consumption to online especially in sectors like eCommerce, Ed-tech, Fintech & Gaming leading to these sectors expected to record double digit CAGR over the next 5 years.

Domestic technology industry is also seeing continued growth as various government initiatives encourage technology usage (push factor) and Indian enterprises across industries are rapidly implementing digital technologies to adapt to a changing competitive landscape and cater to the ever-demanding customer.

## BFSI

Indian Banking Digitising Rapidly - Indian Banks, NBFCs & FinTech are most matured when it comes to adoption of technology. All banks have invested heavily in omni-channel and user experience; a trend accelerated by the Covid-19 pandemic. Digital payments, video KYC (know your customer), WhatsApp banking and paperless and online loan approval to operating call centres in work-from-home mode, banks have been unveiling measures aimed at more customer convenience and fewer branch visits.

## Telecom

Indian telcos digitise & invest heavily in 5G - Indian Telcom industry is the 2nd most matured when it comes to technology adoption with all Telcos investing heavily in cloud services, value added services and digital revenue channels, omni consumer channel and user experience.

## SMBs

Small and medium business (SMBs) in India lead their global counterparts in spending on technology, with about 35% spending over 10% of their revenue on technology based on a study by Microsoft.

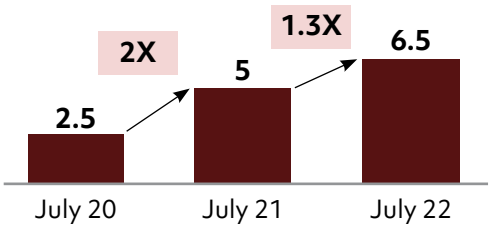
# Consumers - Growing Acceptance of Online Transactions and Usage

Until recently the majority of go to market models were focused on the top 100 Mn affluent users in the country. These are now expanding to cater to next 100-200 Mn as credit availability is helping drive usage. There is an evident shift in the consumption pattern of the middle class and the next category of consumers

# Digital adoption across consumers increasing over the last 3 years

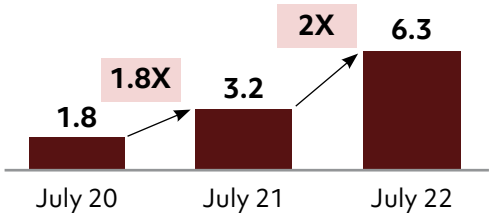
### E-grocery

GMV ($ Bn)



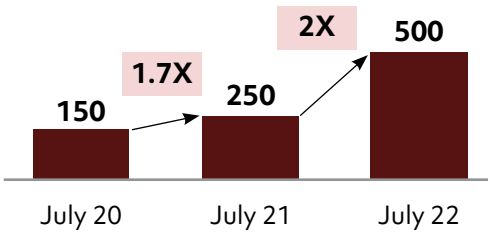

### Digital Payments

# of Monthly UPI Transactions (Bn)



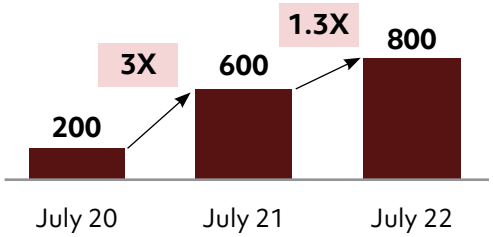

### Content

MAU of short video apps (Mn)




### Edtech

(Ed-tech company*): Number of paid subscribers (thousands)




Source: NPCI, Redseer, Inc42, Elevation Pulse Report

# 6.3 Enabler: Government as Enabler of Tech - Growing Public Platforms and Digital Public Infrastructure

India is inching towards being the 3rd largest economy in the World, as the government is working tenaciously to fulfill its ambition of making India a $5 Tn economy by 2024. Indian government has initiated various programs in the last few years to improve ease of doing business, encourage Make in India, invite foreign companies to India with schemes like PLI (production-linked incentive), tweak the legacy labour laws, Agri polices etc. which is acting as an enabler for the overall value proposition for the country.

## GoI's Focus on Tech-enabled Public Platforms Strengthening the Foundation of Digital India

*Illustrative*

### Online Identity & Commercial Rails

- **Aadhar Card:** World's largest biometric system. Enables KYC and authentication; launched in 2009
- **DigiLocker:** Govt. platform for storage, sharing and verification of documents and certificates; launched in 2015
- **Open Network for Digital Commerce (ONDC)** stack can enable higher eCommerce penetration through an open network of buyers, retailers and fulfilment service providers

**1.33 Bn Aadhar generated - 99% of the Indian adult population has an Aadhar card**

### Financial Inclusion

- **PM Jan Dhan Yojana (PMJDY):** Financial inclusion program launched in 2014
- **Unified Payments Interface (UPI):** inter-bank P2P and P2M transactions; launched in 2016
- **Open Credit Enablement Network (OCEN)** to enable access to alternative data for lenders and potentially allow credit access to underserved userbase

- **476 Mn new bank accounts opened**
- **Processed 78.17 Bn transactions; transaction value of over $140 Bn in July 2022**

### Logistics & Infrastructure

- **Goods and Services Tax (GST) Platform:** Improved efficiency of interstate logistics by removing check points at state borders; introduced in 2017
- **Unified Logistics Interface Platform (ULIP)** to enable efficient multi-modal logistics management by offering an interconnected system for visibility and compliance

- **Registered over 14 Mn taxpayers n GSTN**
- **Over 1000 Mn returns filed on the portal**

### Healthcare

- **National Health Digital Mission or the Ayushman Bharat Digital Mission (ABDM)** aims to develop the backbone necessary to support the integrated digital health infrastructure of the country
- **ABHA- Ayushman Bharat Health Account (ABHA)** is one of the core components of ABDM

- **237 Mn health records linked digitally**
- **100 Mn usage on e-Sanjeevani as of February 2023**

Source: Government websites, Elevation India Pulse Report

## Government as a User of Technology

Technology adoption for its citizen and inter-departmental services through its e-Gov initiatives, Aadhar (for transparency), GSTN (tax reform), internet infrastructure (wi-fi hotspots), Cloud adoption

*Illustrative*

| | |
|---|---|
| **$9.5 Bn** | Spend on technology by Indian Government organisations and public sector enterprises |
| **$2-3 Bn** | Spend on Cloud by Indian Government organisations and public sector enterprises |
| **$2-3 Bn** | Spend on New Age Tech by Central Govt, State Govt organisations and public sector enterprises |

- BHIM
- Aarogya Setu
- UMANG
- Digital Gujarat
- IRCTC Rail Connect
- mPassport
- MyGov
- mParivahan
- ePathshala

Source: Gartner, UnearthInsight

# 07

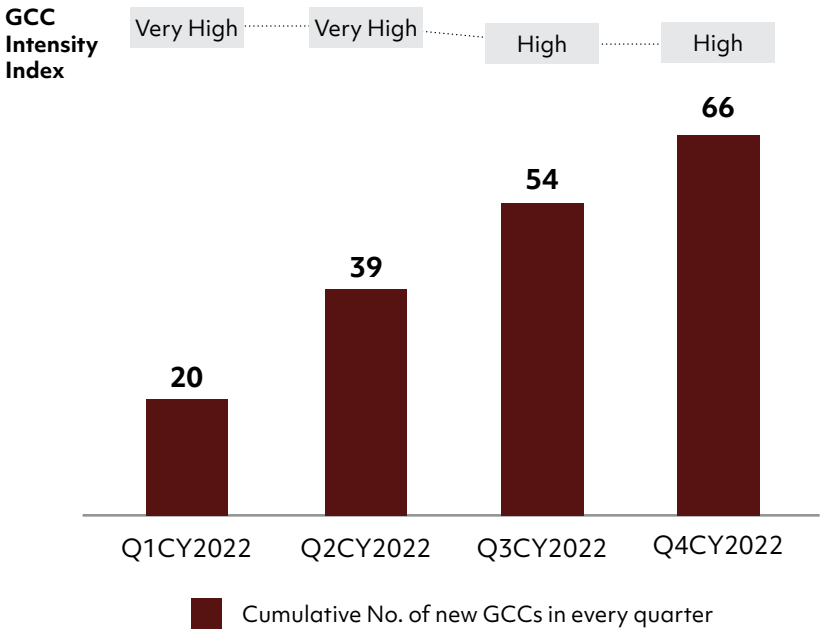
# India: Fortifying its Position as a Key GCC Hub

Unabated growth of GCCs continued in CY2022 as 66 units were setup this year across diverse cities (Tier I as well as Tier II and Tier III), verticals (Software & Internet, BFSI, Automotive, Retail, Healthcare, etc.) and segments (IT services, BPM and ER&D). Availability of affordable, abundant, and highly skilled digital talent, maturity of start-ups and the peer GCC ecosystem continue to be the major drivers that make India an attractive destination for setting up/expanding GCCs.

## New GCCs Setup in India in CY2022

*Illustrative*

(Nos.)




- 66 global companies have set up their first GCC in India
- 30+ existing GCCs have added new centers
- 'GCC Intensity Index' rating of 'High' and 'Very High' across CY2022

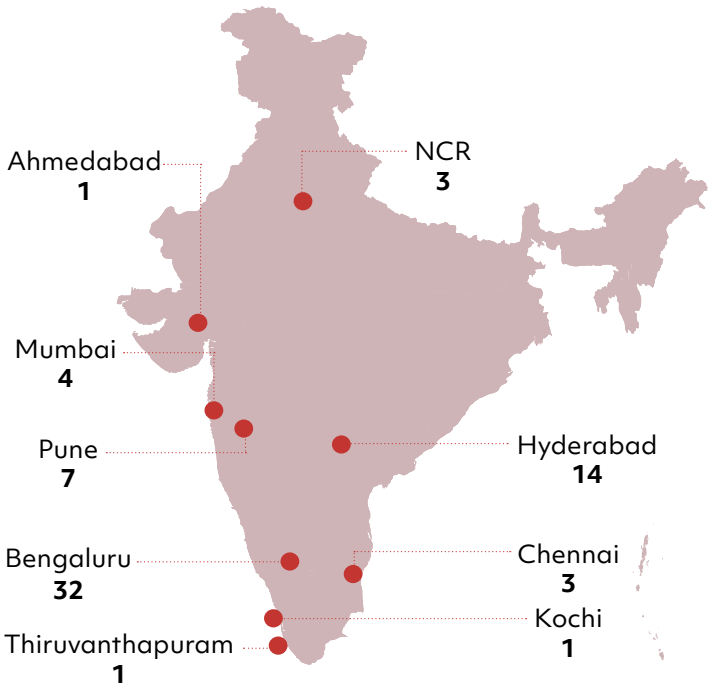
Note: 'GCC Intensity Index' is a multivariate assessment model intending to track and measure the activity of GCCs in India on a quarterly basis. The Index encompasses various parameters such as GCC establishment/expansion, industry verticals, functions, tiers, headquarter locations, India presence in terms of number of locations, envisioned work profile, etc.

Source: nasscom-Zinnov India Quarterly Reports, News, Articles, Company Website, etc.

## New GCCs set up in India – CY2022

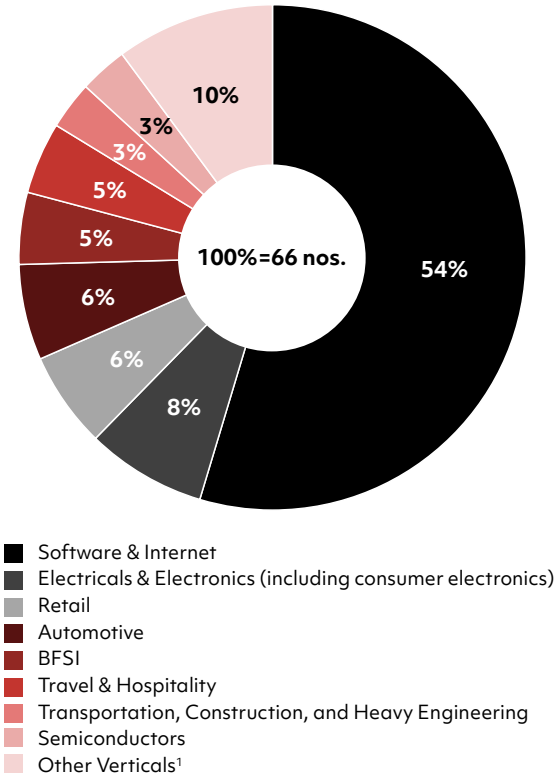
(Nos.)

*Illustrative*




## Diverse Verticals and Tech Focus Areas of new GCCs

(% Share)




[1] Other verticals include Healthcare, Industrial, Aerospace and Defence, Pharmaceuticals, Chemical & Materials, etc.

Source: nasscom-Zinnov India Quarterly Reports, News Articles, Company Website, etc.

Further, with the energy crises and inflationary pressures in Europe and UK and on the back of the Russia-Ukraine war, the GCC Value Proposition for India has become even more lucrative. CY2022 has been another year where GCCs have not only expanded in terms of scale but value as well. Apart from new GCCs, a multitude of existing GCCs continue expansion in India through new centers, not only in Tier I but Tier II and Tier III cities as well. This indicates the sustained strength and robust growth of the India GCC ecosystem.

## New GCCs Set up Across India in CY2022

*Illustrative*

| | | | | |
|---|---|---|---|---|
| PureStorage | Deliveroo | Ethos | Fictiv | Daimler Truck |
| Corestack | Aptos | EV Gateway | Winsupply | OEC |
| Kagool | Graymatics | Mercari | Point checkout | Fisker |
| Reliaquest | Egencia | Mode | Neiman Marcus Group | blackline |
| DFE Pharma | Nuport | Fluence | Advance Auto Parts | iqmetrix |
| Cerebras | Suzuki | AGCO | Safesend | Ceremorphic |
| moveworks | Surface Measurement Systems | | Upland | Tech 5 | Modivcare |
| adform | granicus | Cion Digital | Calix | TEV |
| CRITEO | Shield | Genesis | Graphcore | Appian |
| Sentinel one | koreai | portescap | Treezo | airbnb |
| Abacus Ai | Pratt & Whitney | | | |

Source: nasscom-Zinnov India Quarterly Reports, News Articles, Company Website, etc.



## 7.1 Glocal Market Focus & Growing Intrapreneurship

GCCs are driving market expansion activities with high quality and cost-efficient products from India for the local market as well as the world. In fact, several global parent organizations are progressively looking at the India center as the Hub and their GCCs in other countries as spokes, which the India center can mentor, monitor, and assist in growth, enabling India to truly become a Global GCC hotbed offering state-of-the-art products/solutions to the world.

India is progressively becoming a hub not just for innovation and digital capabilities but for digital leadership as well, as Indian leaders are leading globally in business as well as technical roles.

Case Study

**Mercari, Inc.**

A Japan-based eCommerce company, set up a new GCC in Bengaluru in Q2 CY2022, to leverage India's rich tech talent for development of Mercari's Japanese domestic businesses, and Mercari's US operations. The India center will soon be responsible for overall product development at Mercari, Inc.

## 7.2 Location Diversification

Interestingly in CY2022, ~52% of the new GCCs were instituted in locations other than Bengaluru. This holds true for the vertical split (including Software & Internet) as well. In fact, in the Software & Internet vertical, new GCCs are increasingly coming up not just in Tier I cities like Hyderabad and Mumbai, but also in Tier II and Tier III cities like Kochi and Thiruvananthapuram. Additionally, three-fourths of Automotive GCCs and over 60% of BFSI and Electrical & Electronics (including Consumer electronics) GCCs setup in CY2022 are housed outside of Bengaluru.

GCCs are increasingly spreading into Tier II and Tier III cities to leverage low-cost infrastructure, high quality untapped talent pool, for risk diversification, and because of congestion in Tier I cities. Further, to establish a better working model, in terms of quality, speed, insights, processes, control and innovation, spoke shore models are being deployed as a key growth strategy.

Case Study

**Karnataka Digital Economy Mission (KDEM)**

The organization came up with a spoke-shore strategy (Beyond Bengaluru initiative) which entails a GCC setting up a spoke office in Beyond Bengaluru clusters such as Mysuru, Hubballi and Mangaluru. The program endeavors to propagate digital economy development in selected clusters in the state (known as 'Emerging Tech Clusters (ETCs)') by setting up and enabling a product-based ecosystem, and aims at attracting at least 100 GCCs, 5,000 technology companies and start-ups by 2026 under the gamut of ETCs.

## 7.3 Acting as Colocation Centers

In current times, GCCs are not instituted simply as Operational Excellence (OE) centers, but Functional and Tech Centers of Excellence (CoEs) as well, handling 85-90% of the portfolios present at the global headquarters. In fact, more than 54% of the GCCs are handling Multifunction Portfolios driven from India, indicating a marked shift from managed services to verticalization for GCCs.

Participate & Co-create - Access to a unique vibrant ecosystem (with academia, start-ups, service providers, industry bodies, and the Government), collectively developed and leveraged by GCCs, enables high-quality innovation and co-producing world class products.

Case Study

**IBM**

It has expanded its GCC presence in India by setting up a new Global Innovation Center (GIC) at Kochi in Q2 CY2022. The new Software Lab focuses on building automation solutions end-to-end through their lifecycle - product design, engineering, and support - to support clients with business automation, AIOps and integration solutions. Indian IT majors TCS and Wipro will jointly work at IBM's new Automation Innovation Center to co-create and co-innovate solutions in AI-powered automation.

## 7.4 Boosting their Position as 'Research and Innovation Hubs'

Notably, post-pandemic, there has been a marked shift in the positioning of GCCs as they transitioned from being *'best cost'* to *'best value-addition'* centers. These *'mini-headquarters'* and *'Innovation hotspots'* are capable of handling end-to-end product development across sectors, embracing a variety of technology stacks, user experiences and compliances for customer-facing products.

**Case Study**

### Daimler Truck

The German automotive major, launched an Innovation and Development center in Bengaluru in Q1 CY2022, which will act as the backbone for all innovations and technology developments for Daimler Truck globally, and will soon move to owning all parts of the lifecycle in vehicle connectivity for the parent. The India center is the company's only large-scale R&D center for software, electronics and IT, and works on areas like Connectivity, Cybersecurity, Big Data and Advanced Analytics, System Integration Lab for Bus, Shared Mobility and Electrification.

## 7.5 Digital Transformation & Talent Hubs

Increasingly, GCCs are acting as core tech hubs for their HQ specializing in niche skills around Cloud, AI/ML/NLP, Cybersecurity, LCNC, Advanced Analytics, Blockchain, IoT, etc. GCCs are also exploring nascent technologies like Web 3.0, Digital Twins, Metaverse, etc. Indian GCCs act not only as the incubation ground for digital enablement but are also handling end-to-end digital requirements of their parent organizations.

In fact, in CY2022, ~80-85% of the new GCCs setup in India have portfolios with a core digital focus.

**Case Study**

### Modivcare

The largest manager of non-emergency medical transportation (NEMT) stationed in the US has set up a Center of Excellence (CoE) in Bengaluru in Q3 CY2022. The CoE will focus on building digital platforms and applications to help the underserved US patient population access quality, life-saving care by leveraging emerging technologies in data science, AI, ML, IoT, Telematics, Blockchain, and Big Data to create innovative digital services for patient transportation, meal delivery, and in-home care.

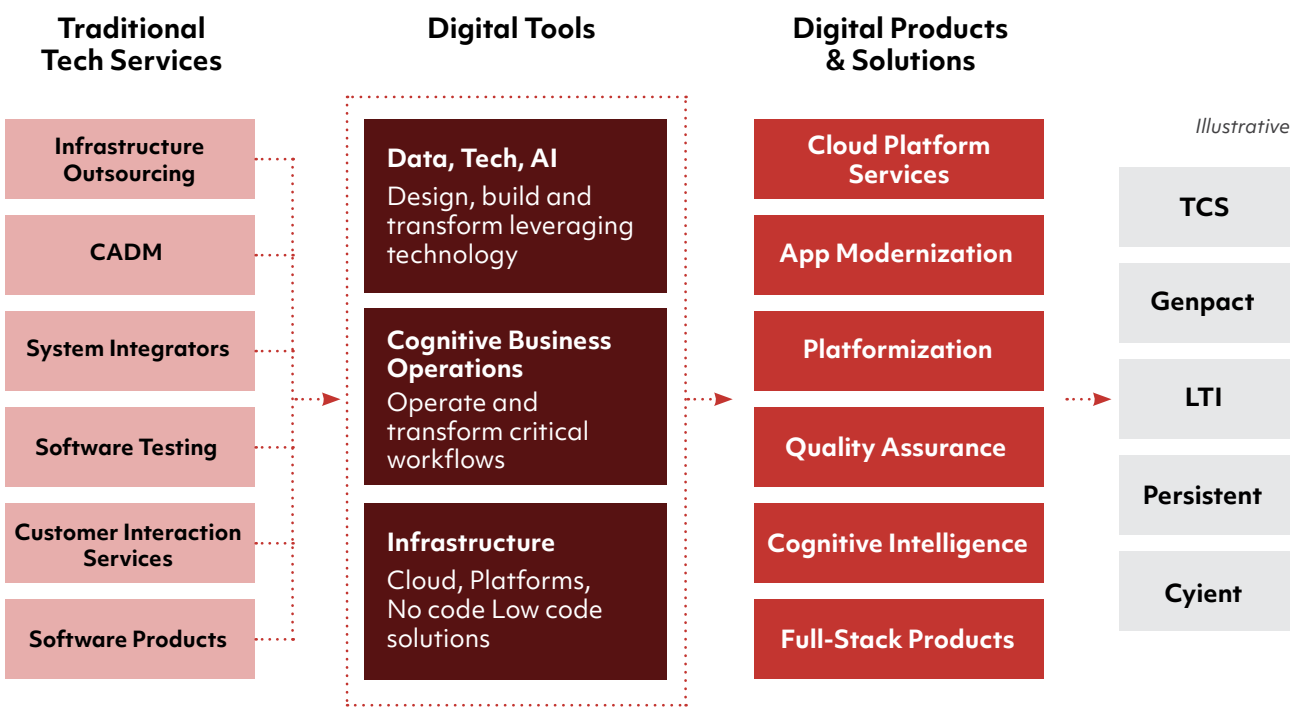
# 08

# Reorganizing for the Future: Leadership Strategies

COVID-19 pandemic forced many companies to reinvent themselves and accelerate their transformation and organization strategy. Often, business transformation initiatives were largely restricted to automation and reimagining processes. In FY2023, this transformation accelerated with an urgent need to revisit the business strategy and transform existing models to unlock value from emerging opportunities. Firms have focused on capability building through M&As, partnerships and more importantly relook at their business strategies.



## 8.1 Portfolio Shifts & Pivots

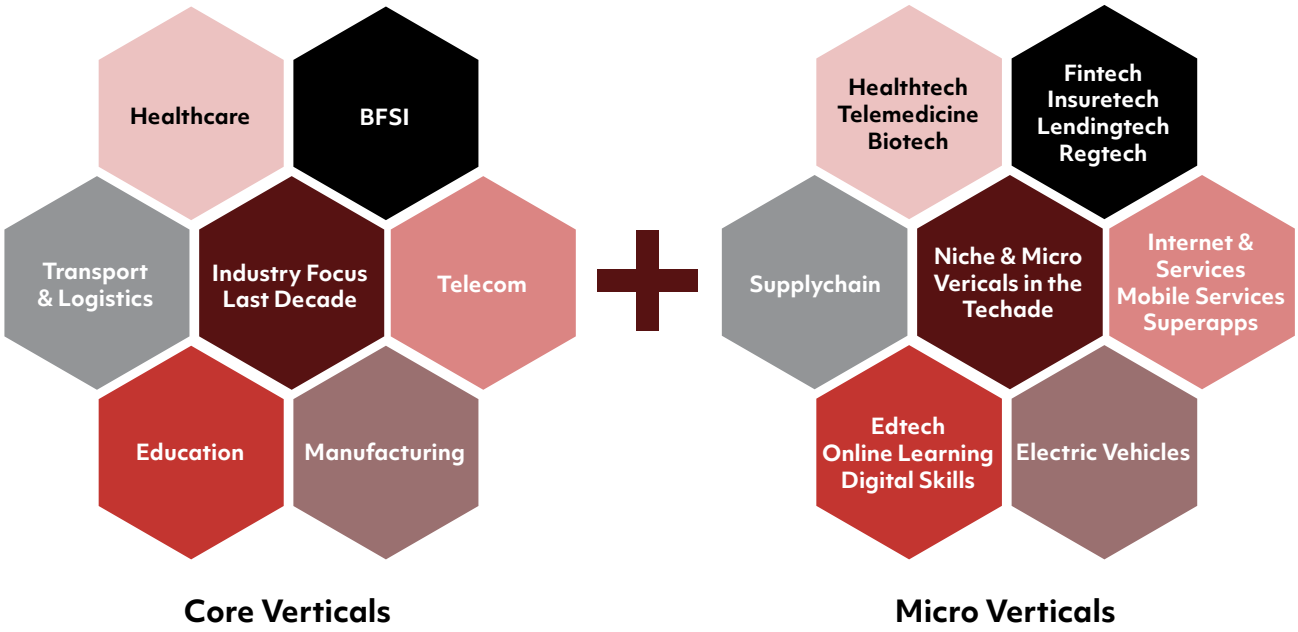



Source: nasscom

## 8.2 Micro Verticals Emergence

Focus on vertical specific products and services. Emergence of micro verticals focused on solving for specific customer requirements.

*Illustrative*




Source: nasscom

## 8.3 Rejig of Leadership Roles

Rejig by building leaders of the future by reinventing employee experience and talent journey. Emergence of roles that have strategic and leadership specific roles, for example Chief Data Officer, Chief Sustainability Officer, etc.

## 8.4 Business Model Revamp

Customer becomes the pivot and the core of all business solutions. Embed purpose and sustainability as a core part of business. There is a need to embed trust, responsible ethics and governance becomes an imperative. Building strong partnerships between stakeholders and customers, acquiring for strategic purposes and the digital deals becoming even more entrenched in organisational transformation.

## Deal pipeline continues to remain strong

The year witnessed a strong deal volume for majority firms with the top 5 companies reporting a deal pipeline of $18 Bn+ at the end of Q2FY2023. There was an increase in the number of smaller deals, with mega deals being relatively muted. On the vertical side, BFSI maintained its lead with technology related deals showing significant growth. Digital technologies such as AI and cloud have gained traction post the pandemic.

# Indian Technology Providers Deal Analysis*

## Verticals

- BFSI continues to lead
- Share of technology focused deals have increased 3X compared to pre-pandemic

## Technology

- Share of Cloud deals has increased 4X compared to pre-pandemic levels
- AI deals have witnessed significant growth, accounting for ~15% share compared to negligible share pre-pandemic

## Geography

- North America maintains its lead
- Europe has witnessed significant growth post the pandemic

## Deal Duration

- Number of multi-year deals have declined compared to last year

*The analysis is based on the select number of deals as reported by major listed Tech companies for calendar year 2022

Source: BNP Paribas, nasscom

# M&A Deal activity increased, although inbound deals declined

*Illustrative*

## Overall M&As

**Number of transactions:** 1,130

**Value:** $77 Bn

**Avg. value per transaction:** $137 Mn

## Tech Industry M&As

**Number of transactions:** 339

**Value:** $14 Bn

**Avg. value per transaction:** $107 Mn

## Top Capabilities in Demand

- Cloud
- Analytics
- Customer Experience

## Leading Geographies for Expansion

- USA
- Central Europe
- Australia

## Primary Target Segments for M&As

- Product & Platform (SaaS, Analytics)
- eCommerce & Online (E-Learning, Marketplace)
- IT services (Consulting Services)

Note: Value depicts the aggregation of disclosed transaction amounts

Source: Venture Intelligence, nasscom

- Overall M&A transactions including eCommerce rose by 21% in CY2022, inbound decreased by 7% while outbound and domestic M&As increased by 15% and 31%, respectively.
- Overall M&A value rose by 6%, with outbound and domestic value rising by 35% and 54%, respectively. Value of inbound transactions declined by 45%.

## Capabilities in Focus - Cloud, Analytics and Customer Experience

- Building cloud capabilities was the biggest focus followed by analytics and customer experience. Companies focused on cloud related capabilities that included advisory, transformation and enhancing product suite. Examples include Data Glove and Media Agility acquisitions by Persistent and Knowlarity by Gupshup.
- For Analytics, companies focused on strengthening data science, AI and ML related capabilities whereas, customer experience related deals focused on enriching product/platform experience and service quality. Examples for analytics include Hinduja Global acquiring Teklink and Scaler Academy acquiring Applied Roots. MX TakaTak acquisition by Sharechat and Rocketbox by Ship Rocket are some examples for customer experience related transactions.

## Scalability related M&As increased by 20% in CY2022

- Geographical and business expansion - the driving force behind most M&A transactions
- United States, Central Europe, and Australia are the most popular locations for business expansion - United States tops the list in inbound and outbound transactions; however, these are still lower than last year

## Partnerships & Collaborations - The Cornerstone of Growth

FY2023 witnessed a steady growth in partnerships by tech firms, underlying their commitment towards growth and digital transformation. On an average, the top tech companies had over 50 partnerships. Partnerships are likely to influence 40-50% of revenue pool (2x of current state) and are increasingly critical to win large deals and high growth services.

Over the years, the role of partnerships have evolved from 'authorized reseller, implementation and support partner' to building joint IP/solution, joint GTM and access to specialized talent.

Partnerships have assumed strategic significance for companies, with dedicated teams being set up, as they help in attracting top talent to build alliance leaderships, where there are defined operating models, end-to-end P&L ownership, upskilling and reskilling opportunities, building capabilities across delivery and sales.

# Partnership ecosystem of top tech companies in FY2023

*Illustrative*

## HCLTech

**Academia:** Purdue
**Cloud:** Google Cloud
**Companies:** HFCL, Microsoft, Avaloq, IBM

## LTI Mindtree

**Academia:** IIT Madras
**Cloud:** Google Cloud
**Companies:** Microsoft
**Startups:** Saviynt, EPOS, Rubrik, Finastra

## Cyient

**Academia:** IIT Hyderabad
**Companies:** iBASEt

## Infosys

**Academia:** Harvard
**Companies:** Rolls Royce

## Wipro

**Companies:** Cisco, Palo Alto Networks, Intel
**Startups:** Finastra
**Peer:** TCS

## Quest Global

**Companies:** ARM, NXP Semiconductors
**Associations:** COPA

## Tech Mahindra

**Companies:** Axiata, Foxconn, Altice Labs, SoftTech, SSIC, isMobile, Indosat, Cisco, Nokia
**Government:** Gujrat Govt.
**Startups:** ColorTokens, FireCompass, Pyze, Yellow.ai

## TCS

**Academia:** IIT Delhi, IIT Madras, Deakin Co, Nettur Technical Training Foundation
**Cloud:** AWS
**Companies:** AEMO, IBM
**Peer:** Wipro

## WNS

**Company:** Actuarial Risk Management

## eClerx

**Academia:** IHFC

Source: News articles, nasscom

# 09

# Re-Imagining the Future of Work and Workforce

The post Covid world is witnessing a shift towards hybrid working and satellite offices as employees who returned to their hometowns are still thinking what to do next. Also, these models are supportive in getting new talent which is a major challenge for organisations these days. Another key strategy that companies are following to combat the talent challenge is fresher hiring, which is shaping up the new age workforce with rising share of Gen Z, which account for nearly 20% of the technology industry workforce.

**9.1**
**Future of Workplace**

Rise of Hybrid Model

Expansion to Tier II/III Cities

**9.2**
**Emergence of New-age Workforce**

The Rise of Gen Z

Gig Workforce

Talent from Other Industries

## 9.1 Future of Workplace

### Rise of Hybrid, the new reality in the new normal

During the pandemic, the tech industry was forced to move towards remote working. This shift is shaping the future of work models in the new normal - that relies on hybrid working and virtual delivery.

Moreover, majority of the companies in the tech industry are working in hybrid mode and adopting various spectrums available in this new work model with the evolving times.

### Success of hybrid work requires organisations to calibrate on many issues and come up with variations

Transitioning to future of work models - Key themes...

| | |
|---|---|
| **How we work and deliver?** | Variations in Hybrid Model; Delivery Team Architecture; Innovation Cycle; Customer Proximity |
| **How we lead?** | Wining Leadership Behaviour; Social Engagement; Personalisation |
| **How we organise?** | Hyper-distributed agile; Tapping Talent Pool; Gig Talent |
| **What we need?** | Information Security; Lab Ecosystem |

...Need to provide employees with a range of hybrid models

**Degree of Remote Realisation by Employee** (% time remote)

| <10% | 10-85% | 85-95% | >95% |
|---|---|---|---|
| Fully Co-located | Hybrid/ Flexible Remote | Connected Remote | Fully Remote |

**Case Studies**

### TCS: 25/25 Model

- Announced that its employees will have to return to office from November 15, 2022
- Plans to adopt a new hybrid working mode by 2025 called 25/25
- 25% of employees will work in the offices for 25% of their workweek, with not more than 25% of employees within a project team co-located

### Infosys: Flexible hybrid work model

- Announced a flexible hybrid work model for all its employees
- Plans to invest aggressively in technology, network, and cybersecurity frameworks to operationalize hybrid delivery

### WNS: Hub-spoke, and edge model

- Plans to gradually transition to have a blend of a hub-spoke and edge model
- Plans to significantly increase its leverage of Tier II/III locaions in its delivery portfolio

### Wipro: No-shore approach

- Launched a no-shore appoach, which leverages distributed-delivery models
- Plans to leverage a common security and network infrastructure to create a location-independent workforce

Source: BCG, Everest Group, nasscom

## Expansion to Tier II and Tier III Cities...

- Though companies continue to maintain their presence in Tier I cities, they are also exploring options away from central hubs
- Aggressively expanding in Tier II and Tier III cities as it provides a range of benefits including lower salaries and lower attrition

*Illustrative*

**Persistent Systems** opening satellite offices in the outskirts of Bengaluru and Pune to save employee commute, which will help the company's ESG goals

**Nagarro** is expanding across the country, with a focus on smaller cities such as Dehradun, Indore, Lucknow, and Chandigarh.

## ...Offers a number of benefits to companies

### Cost Savings

The cost of operations in tier II/III locations is comparatively lower than tier I cities, resulting in cost advantage (~15-20% cost savings over tier I locations)

### Untapped Talent Pool

Tier II/III locations offer a skilled talent pool at lower cost

### Risk Diversification

Tier I locations are maturing and saturating quickly; providers are entering tier II/III locations to minimize risk, capitalize on the cities' advantages, and ensure business continuity

### Lower Attrition

Lower attrition (14-18%) and compensation (10-13% differential for 0-3 years of experience) than tier I cities, resulting in better service delivery and lower cost of hiring and training

### Differentiation

Opportunity to create differentiation in the market by capitalizing on the early-mover advantage

### Better Living Standards

Many tier I cities suffer from traffic congestion, worsening quality of life, and health-related issues; tier II/III cities generally offer a better quality of life

*Illustrative*

Global sourcing flexibility limitations which are now relaxed from Tier I locations in favor of Tier II

**Accenture** is expanding into Tier II cities such as Jaipur and Coimbatore

**Tech Mahindra** bets on Tier II talent where retention is easier: CFO

**Infosys** is setting-up offices across Tier II cities including Coimbatore, Vizag, Kolkata and Noida

**TCS** plans to open offices in Guwahati, Nagpur and Goa

Source: Everest Group

# Emerging Technology Hubs to Watch Out For

**Chandigarh:** Ranked 12th Top Start-up destination; The Chandigarh Start-up policy 2021 has special provisions for Technology Startups

**Ahmedabad:** 3rd best city to live in based on the Ease of living index in the year 2021

**Indore:** International Airport and Railway Connectivity

**Nashik:** Good Connectivity to the major technology hubs Mumbai and Pune by road and railways

**Mangalore:** Declared as the 1st Startup District in India, home to first Government established incubator for Start-ups

**Coimbatore:** Ranked 13th best start-up destination in India. Start-upTN Initiative to encourage startups in the city

**Lucknow:** Ranked 2nd in Ease of Doing Business

**Guwahati:** Airport is operational in full capacity and connects to major technology hubs

**Bhubaneshwar:** Literacy rate of 93.15%, higher than India's average literacy rate

**Vijayawada:** International airport, with connectivity to major cities

**Madurai:** Good connectivity to the major technology hubs Bangalore and Chennai

**Tiruchirappalli:** Home to an international airport and development of 11 railway stations underway

**Thiruvananthapuram:** Home to Premier Institutes like Indian Institute of Space Science and Technology, College of Engineering Trivandrum and focus on development of start-up ecosystem by Kerala Startup Mission

**Jaipur:** Has a diverse array of start-ups offering solutions in sectors like technology, education technology, and eCommerce. It is also home to unicorns- CarDekho and Dealshare

**Bhopal:** 3rd greenest city in India

**Nagpur:** With the construction of Samruddhi Mahamarg, it will be directly connected to the technology hubs Mumbai and Pune

**Hubbali:** Airport connecting to major cities Mumbai, Bengaluru, Kochi, Goa, and Hyderabad

**Mysore:** Good connectivity to the major technology hub Bangalore, with a 10 lane expressway to be operational shortly

**Kochi:** 11th most preferrable start-up destination

**Kanpur:** Airport connecting to all major IT hubs, an excellent railway connectivity

**Ranchi:** Airport connecting to all major IT hubs along with other Tier II locations, an excellent railway connectivity

**Raipur:** Ranked 6th in Ease of doing business

**Vishakhapatnam:** A strategic port city of India with the Eastern Naval Command Headquarters situated in the city, is a hub for industries ranging from Ship Building/Repairs, Logistics and Maritime activities

**Warangal:** Lower real estate prices compared to Hyderabad and airport expected to be ready by 2023

**Vellore:** Being equidistant from IT hubs Bengaluru and Chennai, it can act as a spoke to both hubs simultaneously

**Tirupati:** Setup of incubators has set pace for the city in the space of technology innovation

Source: Deloitte

# 9.2 Emergence of New-age Workforce

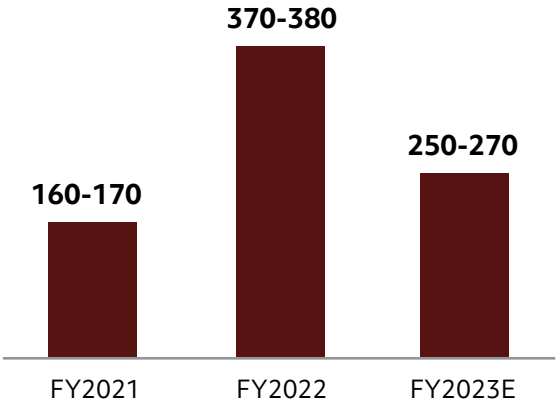
## The rise of Gen Z and Millennials

- Fresher hiring has been a key strategy to hire talent in the industry for years. As a result the younger generations i.e. Millennials and Gen Z dominate the overall workforce
- Companies are redesigning their benefits and working models to meet the expectations of the younger workforce

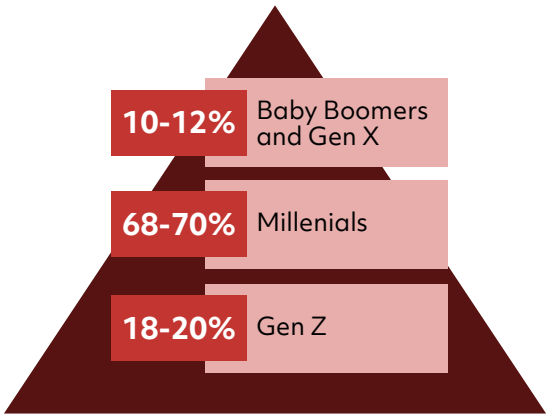
## Companies are redesigning their benefits to suit the new age workflow

### Tech Industry Fresher Hiring

(in 000s)




### Tech Industry Workforce Generational Break-up




## What are companies doing for the new age workforce?

### Learning and Growth

90%+ companies are focused on fresher hiring, and reskilling initiatives

### Career Growth

Majority organizations are refining and effectively communicating employee growth progression plans

### Gig Work Model

Majority CHROs are open to Gig - however, data privacy, confidentiality a challenge

### Good Work Environment

Organizations have increased referal hirings and are also working on redesigning offices

### Hybrid Work and Flexibility

Nearly all have moved to hybrid work model and are giving location flexibility

### Financial and Non-Financial Benefits

Organizations are aligning their benefits in line with the requirements of the younger workforce

Source: nasscom Aon Report on Gen Z and Millennials: Reshaping the Future of Workforce

## Gig Workforce becoming a growing phenomenon

- 6 out of 10 organisations are hiring gig with a focus on specialised skills being the key driver. Large organisations are also leveraging internal gig platforms to best utilise their internal talent.
- This focus on gig is in turn driven by the numerous advantages and impact that it is creating for the industry.

## The Tech Industry is witnessing emergence of Gig

*Illustrative*

### Specialised Skills - Key Driver for Gig

Specialised Skills

Employee Demand Elasticity

Cost Optimization

### Gig is Creating Positive Impact

Increased Efficiency in Completion of Tasks

Reduced Time to Hire

Ability to Attract Diverse Talent
- Retired Professionals
- Women

### Internal Gig Platforms

**TCS: Talent Cloud**

Building a "talent cloud" - a virtual talent pool, available for any project as per client demand

**Infosys: Accelarate**

Initially envisaged to keep the bench occupied, now also used for internal gig

Source: nasscom-Aon Report on Gen Z and Millenials: Reshaping the Future of Workforce

## Technology Industry Attracting Talent from Other Industries

- Technology industry witnessed employee addition from outside the technology domain. These industries include Education/Trainers, Manufacturing, CSR, Medical, Marketing and Legal.
- Senior leadership hiring also witnessed a similar trend. According to an Executive Access Survey, technology industry witnessed the highest share of CXO inflow from other industries accounting for 26% of the total cross-sector CXO movements in 2022.

*Illustrative*

In November 2022, **Wipro** hired Warren Zambelli as the Managing Director for Africa. Warren has over 20 years of experience spanning capital markets, banking, insurance, telecom and retail. In his last role he was with Mastercard as the Advisors Division Lead and member of the OpCo across Sub-Saharan Africa.

In October 2022, **Sterlite Tech** hired Tushar Shroff as CFO. Tushar is a CA and was the Group CFO for Intas Pharmaceuticals in his last assignment.

In May 2022, **Yotta Infrastructure** appointed former Mercedes CIO Pratap Joshi as the EVP-IT and Chief Evangelist

Source: Han Digital

# 10

# Strengthening the Tech Talent Pipeline

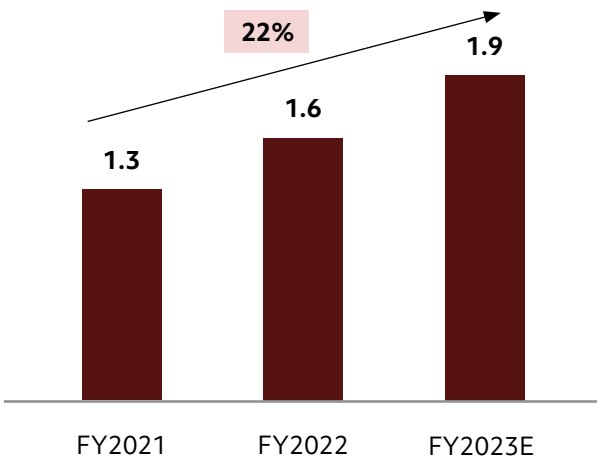
Talent has remained and continues to be a key challenge for companies over the years, with digital being the key demand driver. Though, compared to its global counterparts the tech talent demand supply gap in the country remains the lowest, it still remains a constraint for the industry considering the growth business Indian organisations are witnessing. Consequently, companies continue to work towards skilling talent and newer strategies to attract and retain talent.



## 10.1 Digital Skills Driving the Demand for Tech Industry

### Digital Talent Continues to Grow in the Indian Tech Industry

(Mn nos.)




### Demand for Various Digital Skills, 2022

| | |
|---|---|
| **319-349K** IoT | **629K** AI/BDA |
| **765-795K** Cloud Computing | **143K** RPA |
| **1.1-1.2 Mn** Web and Mobile | **221K** Cybersecurity |

Source: Draup, Deloitte, nasscom

Overall, companies are looking at re-imagining their talent and work models to suit the new normal as well as the ever evolving technology skills landscape.

## Major Skills in Demand

| Core | Digital | BPM |
|---|---|---|
| Mobile Development | Data Scientists | Business Analytics |
| DevOps | Robotic Process Automation | Risk Modelling & Governance |
| UI/UX | Blockchain | Quantitative Modelling |
| Full Stack Develoment | AI/ML | Predictive Modelling |
| Cybersecurity | SEO/SEM | Cybersecurity |

Source: Draup, Deloitte, nasscom

## 10.2 Emphasis on Reskilling/L&D across the Indian Tech Industry

Reskilling remains a key focus with companies working on improving their internal platforms as well as forging partnerships with various online training platforms and academia.

### Company Initiated Online Learning Platforms

*Illustrative*

| | | | |
|---|---|---|---|
| **TCS ION** | **Mindtree YORBIT** | **Infosys Lex** | **Tech Mahindra NAD** |

### External Partnerships

*Illustrative*

| | | | |
|---|---|---|---|
| **Wipro + Udemy** | **Mphasis + BITS Pilani** | **Tech Mahindra + Coursera** | **FutureSkills Prime + Cyient** |

Source: News Articles

Moreover, skilling and L&D has emerged as a key retention tool for companies. Companies are focusing on both technical skills such as programming, neural networks and cloud, as well as soft skills including problem solving, communication critical thinking, etc. for their L&D investments.

As per LinkedIn's Workplace Learning Report, 70% of Indian L&D professionals across all industries confirmed that they see an increase in their L&D budgets for 2022, compared to 48% globally.

## Tech companies are witnessing a positive impact on retention from L&D investments

**Building focus on cross-functional roles**

**74%**

Leaders agree that L&D has become more cross-functional

**Reskilling/Upskilling trainings rather than new hiring**

**79%**

Leaders agree that reskilling a current employee is less expensive than hiring a new one

**2.2% ▼**

Share of total work hours expended using physical and manual skills

**3.3% ▲**

Time devoted to technological skills

**63%**

Companies are willing to hire people with transferable skills and train them

Source: Linked In Learning Workplace Learning Report 2021

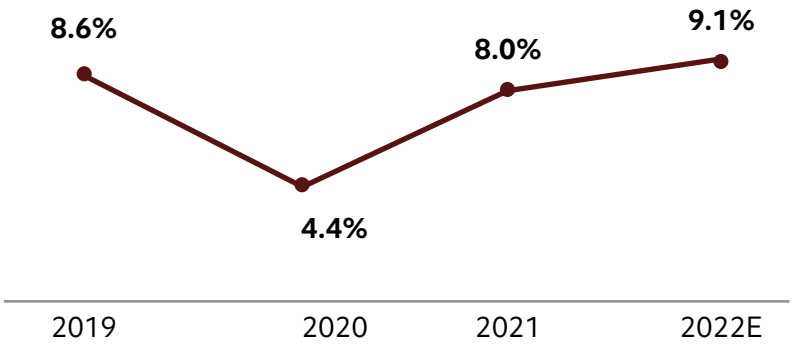
## 10.3 Hiring New Talent and Retaining Existing Talent

Companies remain focused on fresher hiring which is reflected in the rising number of freshers joining as well as the increments given by the companies to their campus hires.

Moreover, higher financial benefits continue to be a key phenomenon witnessed across organisations irrespective of their size as well as business line.

### Indian Tech Industry (Average) Salary Hike*

(% Change)

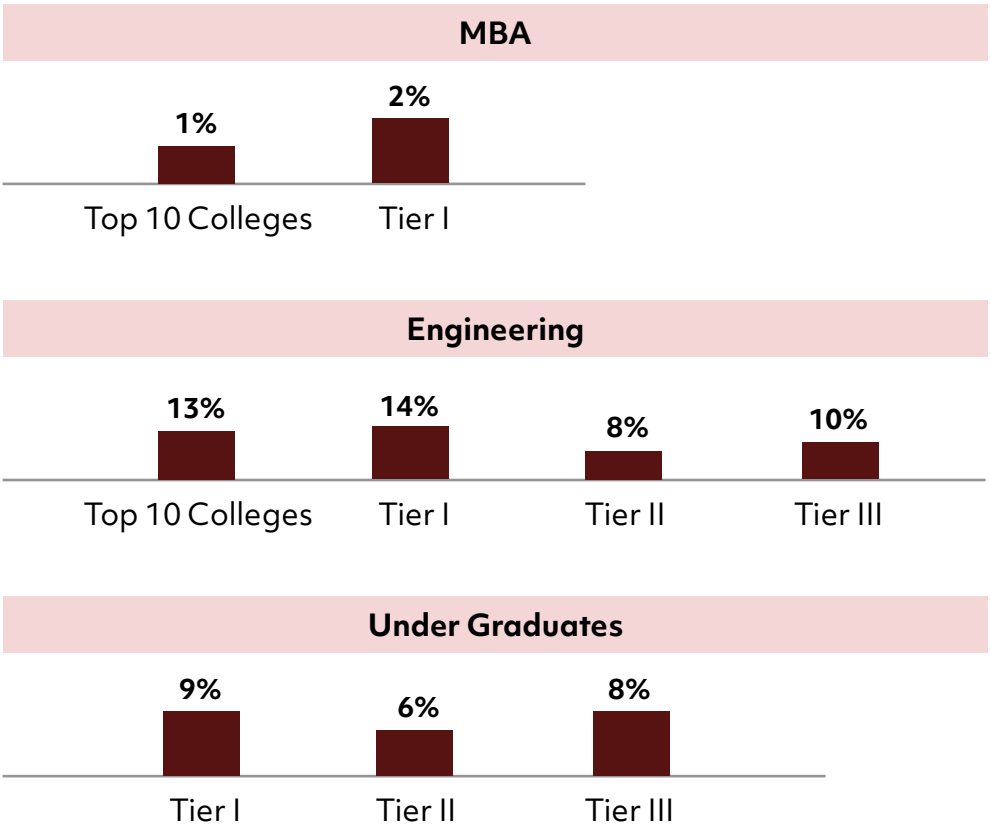



*Based on Compensation Benchmarking Survey Findings: 2022

Source: Deloitte, nasscom

## Percentage Increase in Compensation for Campus Hires*

(from 2021 to 2022)




*Based on Compensation Benchmarking Survey Findings: 2022

Source: Deloitte, nasscom

Companies are revising their compensation packages as well as work models both for freshers as well as laterals. They are also working towards customizing their hiring and retention strategies basis skills demand, which is also supporting them in meeting the ever growing demand for digital skills.

## Hiring has changed in the new normal

### Shift to remote hiring

**80%**
of employers have shifted to remote interviewing and hiring process

**94%**
Virtual Hiring Platforms

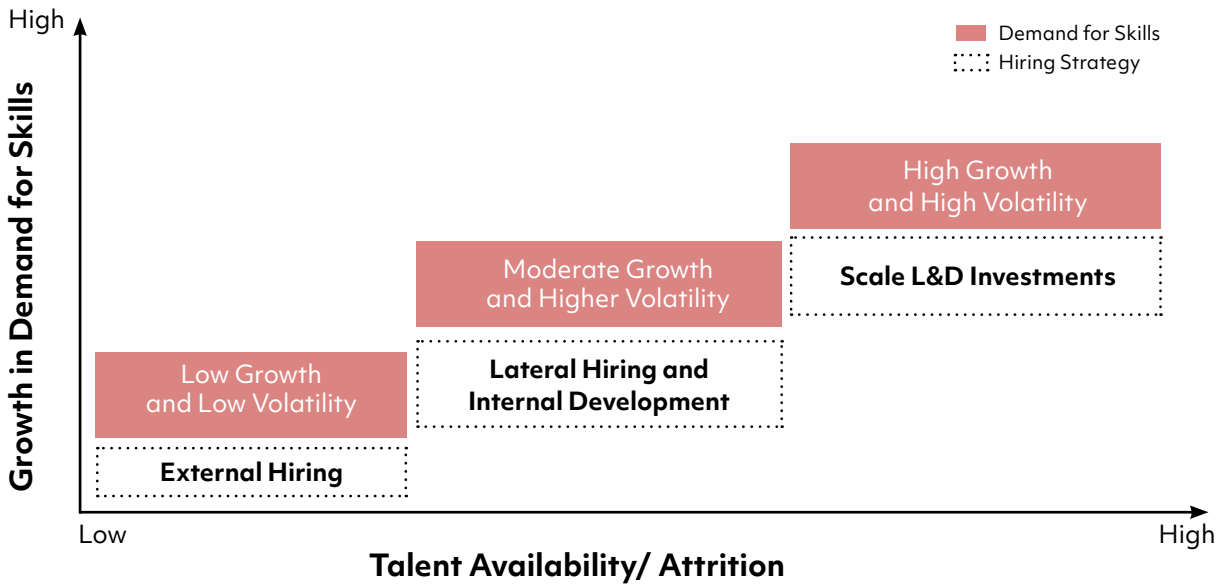
**44%**
Using Interview Coaching & Analytics Tools

**39%**
Video Interviewing

Source: Deloitte, Everest Group, nasscom

## Skill based hiring strategies

Companies are devising their hiring plans based on skills and talent availability




Source: Deloitte, Everest Group, nasscom

# 11 Emerging Technology Big Bets and the India Opportunity

The emerging generation of disruptive digital technologies is getting noticed among tech leaders in the post-pandemic world, and this resulting focus has shaped investments and IP creation in the last 3-5 years. Based on funding momentum and patent activity from CY2017 to CY2022, 11 technology families, and specifically 12 technologies, have garnered disproportionate funding and patent attention worldwide. With increased enterprise tech spending in the techade, these technologies are set to achieve higher commercialization in the next 3-5 years.

## 12 Technology Big Bets that are at "Inflection" to Commercial Adoption

Global enterprise spend on commercialized technologies ranges between $50 Bn and $200 Bn, having offered companies significant topline runway and cost efficiencies. The 12 big bets are technology areas where enterprise spend is expected to grow 2X the average technology market growth rate in the next 3-5 years, thus providing disruptive business opportunities.

# The Twelve Tech Big Bets of the Next 3-5 Years

Based on funding and patent momentum between Sep 2017 and Sep 2022

## Technology Family: IoT Systems and Platforms

### SensorTech

**Key Use Cases**
Industrial IoT, Wearables

**Top Investing Verticals**
Telecom, Transportation Healthcare

**Fastest Investing Verticals** (>15% CAGR)
Media, Telecom, Industrial Goods

**Illustrative Indian Startups**

**RoamBee**
Real-time railcar tracking in yard with 70% rise in ETA accuracy

**MinionLabs**
RF-enabled IoT kit to prevent hardware failure in industries

**Aigroedge**
KRAASHAK IoT sensory system to track soil, environ, location in real-time

## Technology Family: AI/ML Robotics

### Smart Robots

**Key Use Cases**
Manufacturing/ Warehousing Automation, Surgical Robots

**Top Investing Verticals**
Transportation, Healthcare, Tech

**Fastest Investing Verticals** (>15% CAGR)
Healthcare, Industrial Goods, Public Sector

**Illustrative Indian Startups**

**Genrobotics**
Bandicoot robot Saves lives of sanitation workers during work

**Planys**
Planys' ROV Beluga helps robotic marine jetty inspection in Oil and Gas sector

**Ati Motors**
Autonomous Sherpa robots in warehouses – use ML and 3D digital LiDar

### Autonomous Driving

**Key Use Cases**
Robo-Taxis, Autonomous Forklifts and Pickers

**Top Investing Verticals**
Transportation, Tech, BFS

**Fastest Investing Verticals** (>15% CAGR)
Transportation, Tech, BFSI, Industrial Goods, Retail and CPG

**Illustrative Indian Startups**

**Fisheyebox**
Human-inspired intelligent driving operable on any automotive grade drive-by-wire platform

**Swaayatt Robots**
Level-5 autonomous driving for highly stochastic traffic dynamics

**Flux Auto**
Autonomous commercial trucking for unstructured driving

### Computer Vision

**Key Use Cases**
Enhanced Medical Diagnostics, Smart Homes

**Top Investing Verticals**
Healthcare, Tech, Transportation

**Fastest Investing Verticals** (>15% CAGR)
Healthcare, Transportation, Public Sector, Industrial Goods

**Illustrative Indian Startups**

**Artivatic**
AI underwriting platform AUSIS with OCR, AI-based decision system and API integration

**Accubits**
High accuracy ML-based computer vision algos for consignment tracking

**Blackstraw.ai**
Integrated AI with thermal imaging and RFID technology for employee health tracking

### Deep Learning

**Key Use Cases**
Digital Assistants, Voice-2-Voice Translators, Marketing Personalization

**Top Investing Verticals**
Transportation, Healthcare, Tech

**Fastest Investing Verticals** (>15% CAGR)
Transportation, Public Sector, Energy and Utilities

**Illustrative Indian Startups**

**Arya.ai**
Enterprise-grade deep learning platform Vega uses neural networks and autonomous analytics for massive-scale data analysis

**Streamingo.ai**
Deep label is a low-code AI platform to simplify real-time activity based video analysis

**Myelin Foundry**
Computer vision and edge platforms that can function in low-cost, low-compute edge devices

## Technology Family: AI-Enabled Data Solutions

| | Key Use Cases | Illustrative Indian Startups | | |
|---|---|---|---|---|
| Autonomous Analytics | Predicting Buyer Behavior, Predictive Maintenance<br>**Top Investing Verticals**<br>Healthcare, BFSI, Industrial Goods<br>**Fastest Investing Verticals** (>15% CAGR)<br>Public Sector, BFSI, Telecom, Energy and Utilities | **Sigtuple**<br>AI-assisted autonomous digital microscopy using AI, robotics, and cloud | **Uniphore**<br>Platform X combining AI and automation with emotional intelligence in customer service | **Flutura**<br>Cerebra Industrial IoT and AI platform for operational tracking with self-service analytics |

## Technology Family: Immersive Media

| | Key Use Cases | Illustrative Indian Startups | | |
|---|---|---|---|---|
| AR & VR | Immersive Gaming & Entertainment, Medical Imaging<br>**Top Investing Verticals**<br>Media, Healthcare, Transportation<br>**Fastest Investing Verticals** (>15% CAGR)<br>Healthcare, BFSI | **Avataar.ai**<br>Life-size 3D product catalog and interactive augmented reality for big-commerce retailers | **Avidia Labs**<br>Avidia AVR Magicpedia offers an interactive science learning platform | **Cusmat**<br>Metaverse-based skilling platform to operate automated warehouse forklifts |

## Technology Family: Climate Change

| | Key Use Cases | Illustrative Indian Startups | | |
|---|---|---|---|---|
| Sustainability Tech | Energy Solutions, Carbon Capture and Management<br>**Top Investing Verticals**<br>Transportation, Energy and Utilities, Industrial Goods<br>**Fastest Investing Verticals** (>15% CAGR)<br>Transportation, Healthcare, BFSI, Tech, Retail and CPG | **Greenko Group**<br>Integrated renewable energy storage projects with smart grid connectivity | **SenseHawk**<br>Clean energy platform that integrates UAVs, sensors and data analytics to drive energy productivity | **Attero Recycling**<br>Tech-led 100% metal extraction and recycling with end-to-end carbon-neutral operations and reverse logistics |

## Technology Family: Next-Gen Computing

| | Key Use Cases | Illustrative Indian Startups | | |
|---|---|---|---|---|
| Edge Computing | Contactless Kiosks, In-store Personalization<br>**Top Investing Verticals**<br>Tech, Healthcare, BFSI<br>**Fastest Investing Verticals** (>15% CAGR)<br>Media, Retail & CPG, Industrial Goods, Energy and Utilities | **Asquared IoT**<br>Sound and video analytics solutions based on deep learning with real-time inferencing at the Edge | **Alef**<br>Enterprise mobile connectivity API platform that enables private mobile network as a service at the Edge | **Ignitarium**<br>Deep neural network based Edge solutions for human-machine integration, defect detection, and digital compliance |

**Technology Family: Blockchain**

| | Key Use Cases | Illustrative Indian Startups | | |
|---|---|---|---|---|
| Distributed Ledger | Parallel Banking, Administrative Payments<br><br>**Top Investing Verticals**<br>BFSI, Retail & CPG, Healthcare<br><br>**Fastest Investing Verticals** (>15% CAGR)<br>BFSI, Public Sector, Tech | **Loco**<br>India's first tradeable NFT platform dedicated for eSports and play-to-earn gaming | **Persistence**<br>pSTAKE resolves locked liquidity in staking blockchains using a liquid staking protocol | **InstaDapp**<br>DeFi application uses interoperability of smart contracts to convert DeFi protocols into 'money legos' |

**Technology Family: Connectivity**

| | Key Use Cases | Illustrative Indian Startups | | |
|---|---|---|---|---|
| SpaceTech | Satellite Communication, Earth Science<br><br>**Top Investing Verticals**<br>Transportation, Telecom, Public Sector, Tech<br><br>**Fastest Investing Verticals** (>15% CAGR)<br>Transportation, Telecom, Public Sector Tech, and others | **Pixxel**<br>Hyperspectral satellite technology for remote crop health monitoring with 50X higher resolution | **Skyroot Aerospace**<br>Low-cost satellites using advanced Cryogenic Methalox engine with low-cost strapped on solid rocket boosters | **Digantara**<br>ROBust Integrating proton fluence meter (ROBI) for equatorial satellite-based space weather and debris tracking |
| 5G/6G | **Key Use Cases**<br>Extreme Mobile Broadband, Logistics and Tracking Solutions, Integrated IoT Solutions<br><br>**Top Investing Verticals**<br>Telecom, Transportation, BFSI<br><br>**Fastest Investing Verticals** (>15% CAGR)<br>Transportation, Tech, Media, Retail & CPG | **Illustrative Indian Startups**<br>**Vrinda Nano Technologies**<br>5G ready solutions in super high-efficiency SMPS, small cell technology, and smart panels | **IG Drones**<br>India's first 5G-enabled enterprise drone platform and drone services | **Niral Networks**<br>Cloud-native 5G and Edge platform for enterprises using a disaggregated networking OS, NiralOS |

Source: BCG-nasscom analysis

## India has a low base but the fastest growing investment rate

India's thriving emerging tech ecosystem and progressive tech providers are at the forefront of shaping customer journeys and demand in emerging technologies, with ready tech stacks and solution accelerators. Despite a low base of $2.3 Bn of invested capital in the 12 tech big bets, the rate of investments between CY2018 to CY2021, at a CAGR of 31%, has been the highest worldwide.

# India's Emerging Tech Story

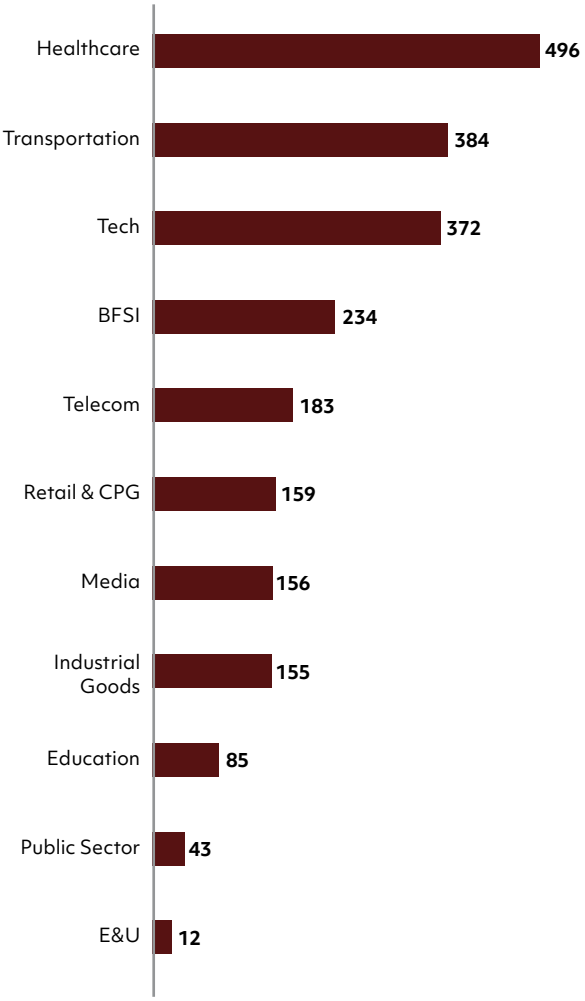
**$2.3 Bn**
Total Funding in 12 Big Bets

**31%**
3-Year CAGR

**Rising Domestic PEs/VCs**
Key Trend

## Sector-Wise Funding, *2018-2021*

($ Mn)




| | CAGR | Tech Bets | Key Use Cases |
|---|---|---|---|
| Healthcare | 38% | Smart Robots, Autonomous Analytics | Predictive patient care, Robot-assisted surgeries, Telehealth, Connected devices |
| Transportation | 53% | Space Tech Autonomous Driving | Location training, Smart inventory, EACVs |
| Tech | 19% | Sensor Tech, Computer Vision | Smart IoT Platforms, Industry accelerators |
| BFSI | 24% | Sensor Tech, Computer Vision | Intelligent process automation, Smart consumer interfaces |
| Telecom | 14% | 5G/6G, Sensor Tech | Enterprise 5G, Low-latency connectivity solutions |
| Retail & CPG | 77% | Smart Robots, Computer Vision | Predictive demand analytics, Robotic warehousing, Omnichannel optimization |
| Media | 23% | AR & VR, Computer Vision | Metaverse marketing, Smart advertising |
| Industrial Goods | 29% | Sensor Tech, Sustainability Tech | IT-OT integration platforms, Carbon capture solutions (CCS) |
| Education | 26% | AR & VR, Smart Robots | Virtual labs, Robot - assisted learning |
| Public Sector | <5% | Sustainability Tech, Autonomous Analytics | Massive LCNC - based public platform utility, sustainable cities, green energy transition |
| E&U | 39% | Sustainability Tech, Sensor Tech | Real-time asset monitoring, remote predictive maintenance, smart grids |

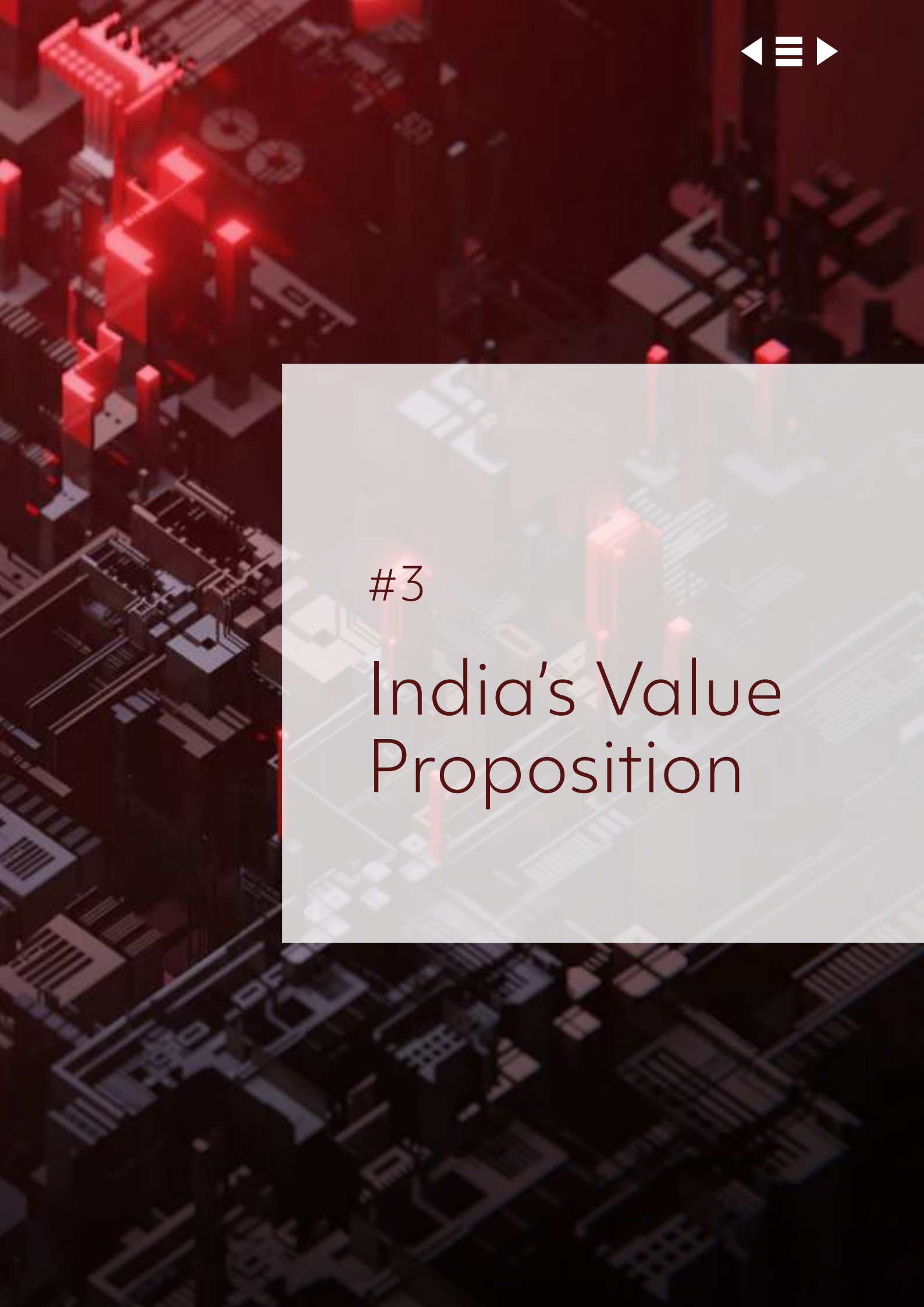
Note: Funding data from Sep 2017 - Sep 2020 based on publicly disclosed deals and reflects private investment for applications technology

Source: BCG-nasscom analysis

India particularly leads in its ability to rapidly scale digital talent and innovation ability.

**India's Emerging Tech Talent –** Digital talent comprises 36% of India's 5.4 Mn tech workforce, having grown ~19% y-o-y. DeepTech start-ups talent in foundational digital technologies – AI/ML technologies, Sensortech, AR&VR, Distributed Ledger, and Edge Computing – collectively comprises more than 55% of installed digital talent.

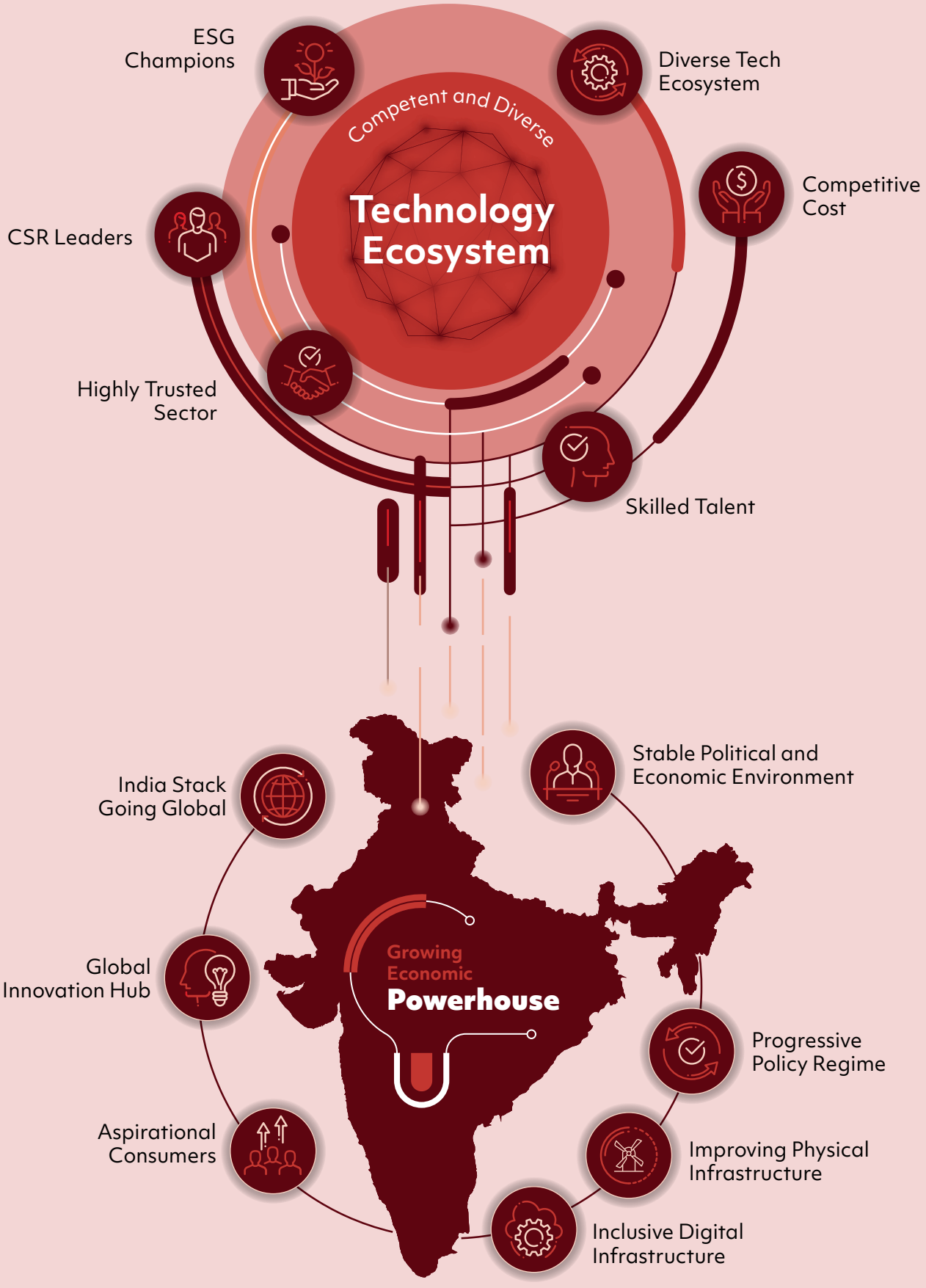
**Strategic Innovation Partnerships –** India ranked 40$^{th}$ in the Global Innovation Index in 2022, #1 rank in consumer market sophistication and investments-to-impact amongst economies of its GDP per capita segment, 28$^{th}$ in patents by origin per $Bn of GDP PPP, and 33$^{rd}$ in value of JVs and strategic alliances per $Bn of GDP PPP. There is multi-level government start-up push with ready-to-use public tech stacks, innovation financing, and federated model of technology development across the country.



#3

# India's Value Proposition

# India's 'Tech'vantage



# Most Diverse Tech Ecosystem in the World


## GCCs

Housing more than

**1,570+**

capability centers

## Start-ups

**3rd Largest**

Tech Start-up Hub Globally

**~27,000**

Tech Start-ups

## Emerging Tech

**560+**

IoT Start-ups

**240+**

Blockchain Start-ups

**210+**

AR/VR Start-ups

## Scale-ups

**89**

Active Start-up Unicorns

**160+**

Potential Unicorns

## Technology Firms

**~35,000**

Technology firms, leader in offshore locations

## SMEs

**75+ Mn**

India's aspiring corporates

## Incubators/ Accelerators

**350+** Programs by academic institutions

**80+** Programs by large Indian enterprises and Global MNC

## Inventive DeepTech

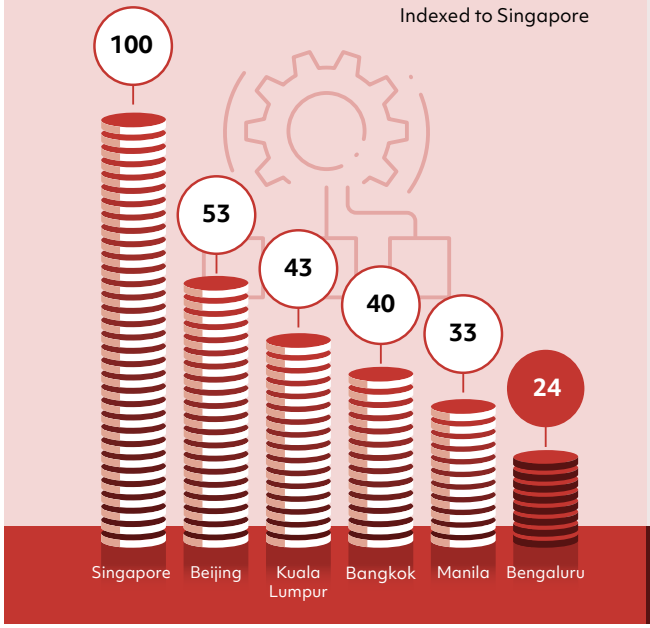
**485+**

DeepTech start-ups developing IP based products

Source: nasscom Start-up Report, Scale-up Report, GCC Landscape Report, nasscom-Zinnov India Quarterly Reports 2022

# Most Competitive Destination in the World

## Operating cost per FTE for IT-ADM Services, 2022




## Operating cost per FTE for BPM-F&A Services, 2022


## Cost differentials driven by

- India average salary lower than closest competitor
- Lower cost of living
- Lower real estate costs
- Higher supply of technology and adjacent skills
- Lower telecom and internet costs

Note: Operating costs include compensation and benefits of delivery staff only, real estate and facilities, telecom and other ongoing costs. Excludes ongoing travel, governance and initial setup costs

Source: Everest Group

# India – The Global Tech Talent Leader

**>36 Mn**

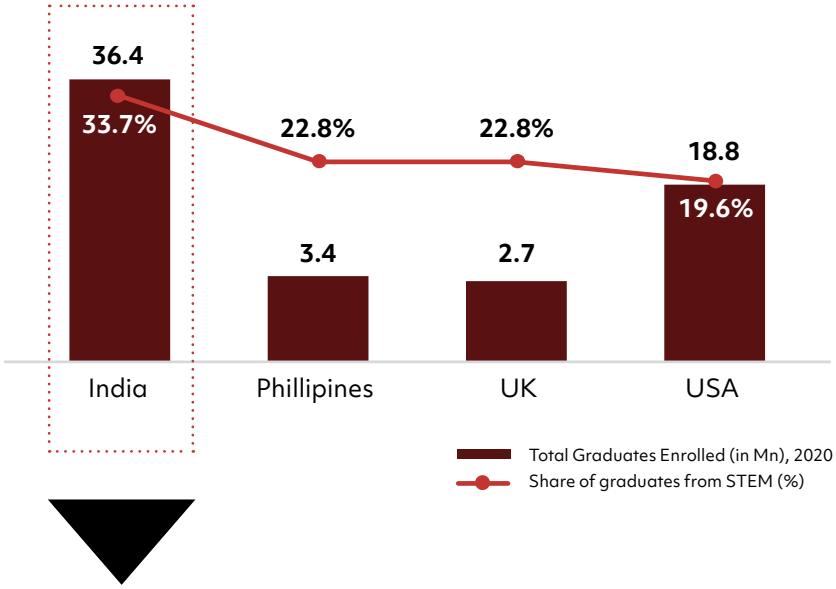
Graduate enrolments in 2020, with over 30% graduates coming from STEM

**70 Mn**

Total number of graduates in 2021, next to only China

Source: UNESCO Institute for Statistics, OECD, nasscom

### Total Graduate Enrolments and Share of STEM Graduates




## Young India is Leading the Global Tech Talent Landscape

### Lowest Tech Talent Demand Supply Gap

At 23.9%, it is the lowest among top tech locations such as USA, China, UK

### Third Largest Active Developer Community on GitHub

10 Mn developers from India expected to join GitHub by 2023, making India the GitHub's largest community

### Leader in English Speaking Tech Talent

India s the leading producer of English-speaking tech talent around the world

### Young India Leading the Global Tech Landscape

25% of Silicon Valley start-ups are managed by Indians. Many global companies are lead by Indian CEOs.

Source: Draup, Github, News Articles

*"58 top-notch company CEOs are Indian in origin. Out of these 11 companies are multinational firms with a collective revenue of $1 Tn"*

**Nirmala Sitharaman**
*Finance Minister India, September 2022*

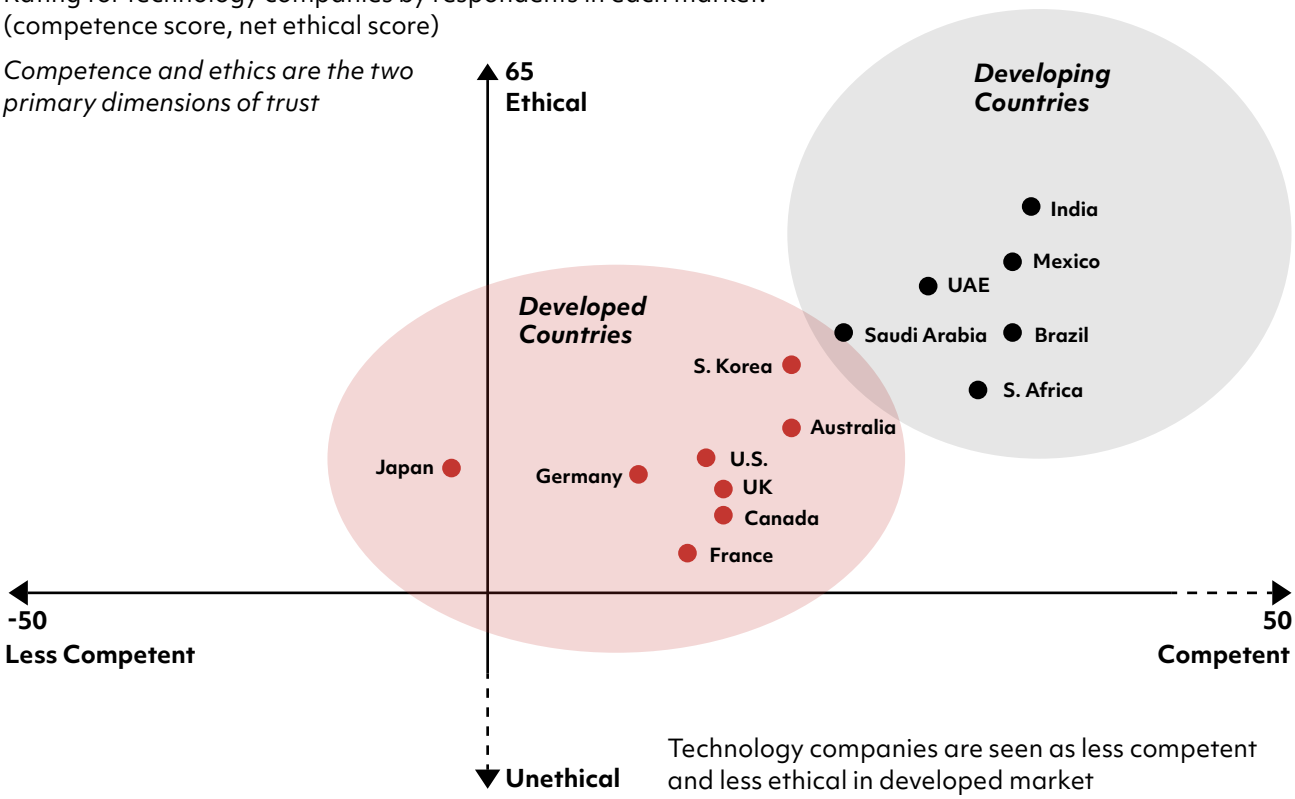
# Trust in India's Tech Sector is Among the Highest Globally

India is one of the 11 countries where the Tech sector remains the #1 Trusted sector as of 2022. This trend has remained unchanged since 2016, while the developed countries have fallen off the list in the same period. India is among the countries in which the Tech sector is seen to score high on 'Competency' as well as 'Ethical' practices.

## Headwinds for Tech Strongest in Developed Countries

Rating for technology companies by respondents in each market:
(competence score, net ethical score)

*Competence and ethics are the two primary dimensions of trust*




Technology companies are seen as less competent and less ethical in developed market

Source: World Economic Forum, Edelman Trust Barometer (Jan 2022)

India's Tech sector scores the highest with respect to Trust in people belonging to the sector. The Tech sector surpasses the other core sectors of the Indian economy when it comes to trust.

## Trust in People by Sector

| Sector | Average | India | China | US | UK |
|---|---|---|---|---|---|
| Tech | 34% | 55% | 50% | 27% | 22% |
| Banking | 28% | 52% | 63% | 30% | 24% |
| Pharma | 31% | 47% | 50% | 23% | 32% |
| Public Services | 28% | 41% | NA | 32% | 33% |

Source: IPSOS Global Trustworthiness Monitor, 2022

# Indian Technology Industry Places a Strong Emphasis on Social Responsibility[1]

## Top CSR Spend[2]

**7** Tech companies on the list of the Top 50 CSR spending Indian companies

## Tech Sector CSR Spend

**₹138 Bn**

**Share of Tech Sector in Total CSR Spend** **11.3%**

## #3 High CSR Spend Across Sectors

**#1** Spender on **Education**

**#1** Spender on **Poverty, Eradicating Hunger and Malnutrition**

**#1** Spender on **Environmental Sustainability**

**₹14 Bn** Spent on **Healthcare**

**₹6.1 Bn** Spent on **Rural Development Projects**

**₹3.1 Bn** Spent on **Livelihood Enhancement Projects**

[1] All data as updated on MCA portal as of Mar 2022 and calculated cumulatively from 2014-15 to 2020-2021
[2] 2022 data as per National CSR Portal
Source: State of CSR in India Report, CSR Gov website, News Articles

# Indian Tech Companies Leading the Sustainability Charter

## Indian Executives more concerned for climate change

Rank 5th in their concern for climate change as per "Deloitte 2022 CXO Sustainability Report"

**80%** See the world at a tipping point for responding to climate change compared to 53% in 2021

**94%** Agree that immediate action can limit the worst impacts of climate change compared to 61% in 2021

## Indian Technology companies lead their global counterparts on sustainability

Indian companies form half of the Top 10 in Avasant's Service Provider ESG Maturity Index 2022-2023

### Average Score of Top 5*

**66.4** Indian Technology Companies

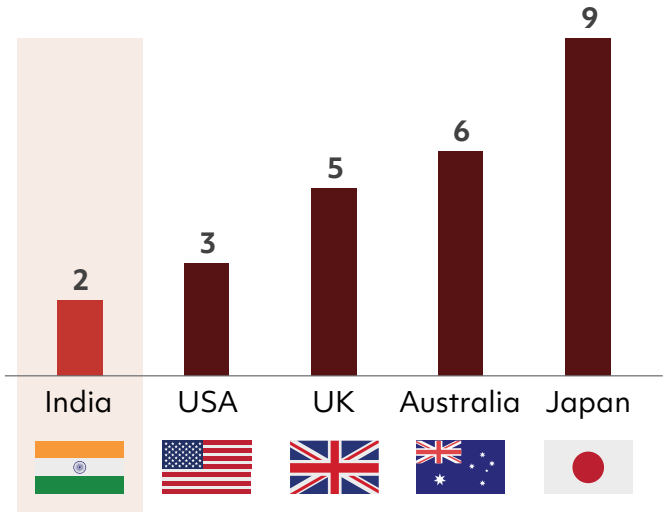
**65.6** Global Technology Companies

*Score out of 100
Source: Avasant, Deloitte, nasscom

# Neutral and Stable Country with Rapidly Improving Business Environment

## Indian Government Tenure Stability

Change in Leadership since 2004 (Nos.)

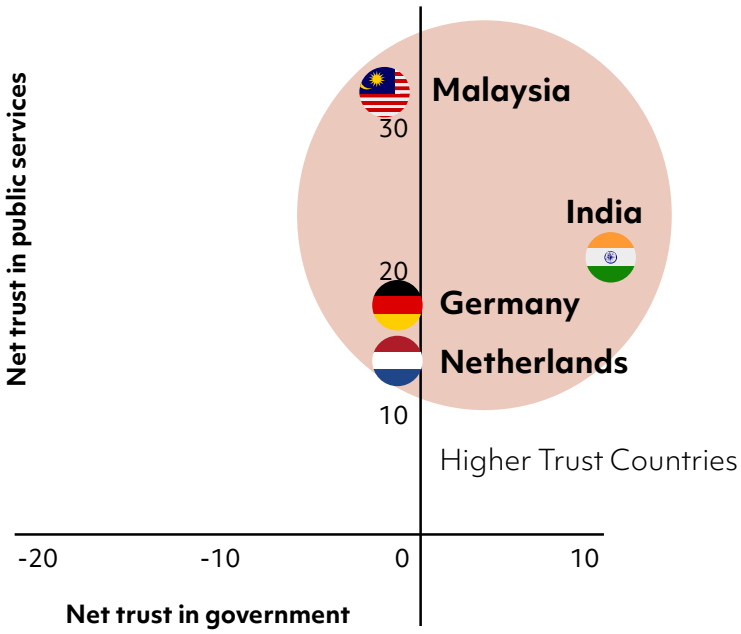



India is emerging as one of the largest economies. Over this past decade, the federal structure has come into a sharper focus, with more policy-making powers and funds devolving to the states and village panchayats

Source: Visual Capitalist

## Factors that make India one of the countries with highest government trust levels

Which Countries Trust their Government?




- **Handling** of the **pandemic**
- **Buy-in on sustainability** and larger **social concerns**
- **Responsiveness** to public feedback
- **Diplomatic relationships** with other countries

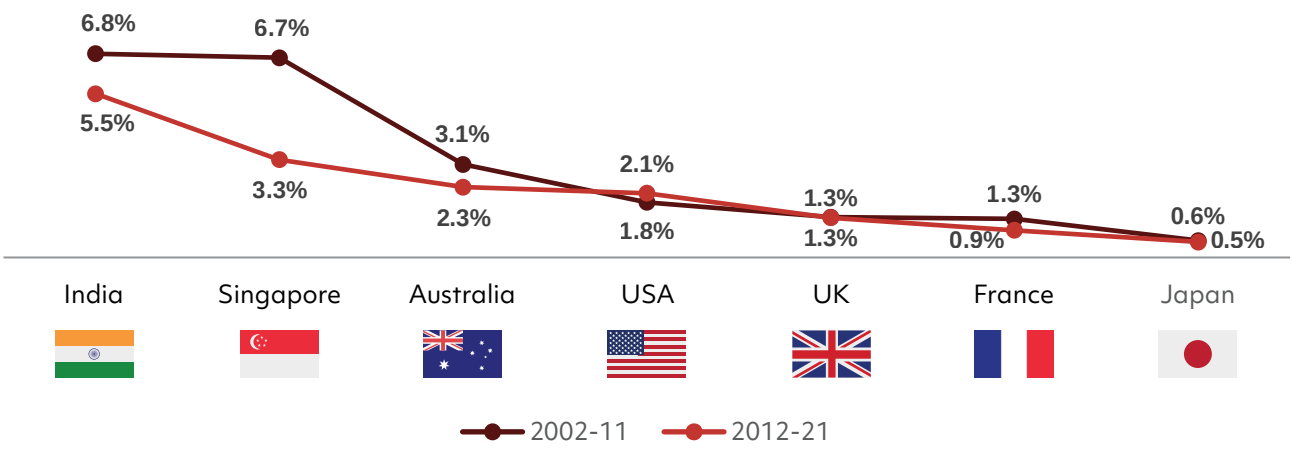
* Includes a selective list of countries

Source: IPSOS Global Trustworthiness Monitor

# India: A Rapidly Growing Economy

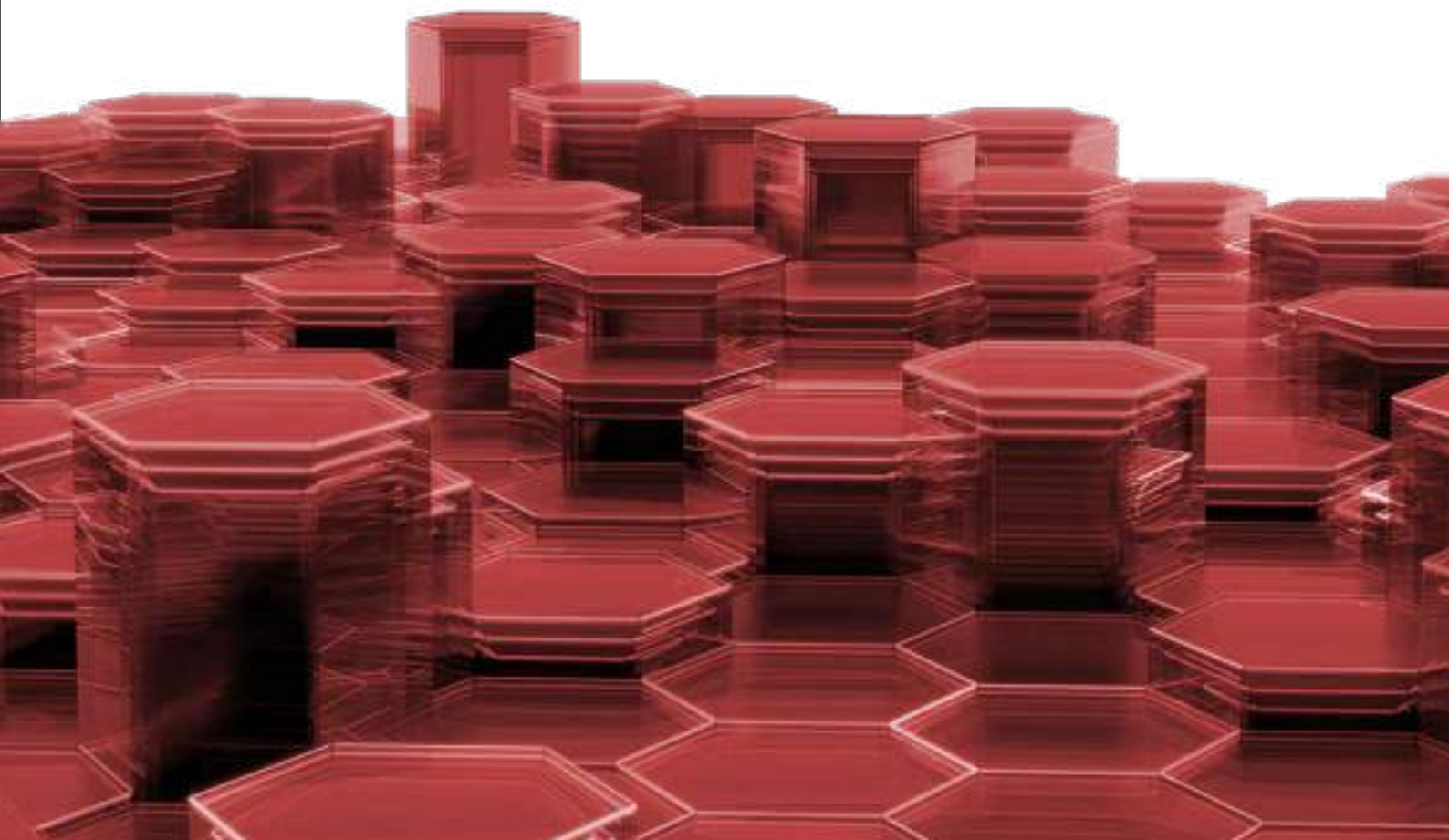
## Average 10-year GDP Growth of major world economies since 2002

(% Growth)




Source: World Bank

At 6.1% GDP growth for 2023, India is set to be the fastest economy, both globally and in the G20



# Most Adaptive & Progressive Policy Environment

Over the years, the government of India has introduced breakthrough policies to develop and expand the Indian tech industry. In the last 25 years, successive governments have established the most adaptive and progressive policy environment for the tech industry to grow, thrive, and become one of the best in the world. From the establishment of nasscom in 1988 to the latest Digital Personal Data Protection Bill, the Indian technology industry has been able to grow by leaps and bounds and emerged as a globally preferred location due to the watershed decisions and policies. This has been through introduction of policies which first helped lay the foundation through infrastructure and then by building the digital infrastructure and later on enabling the ecosystem to adapt to the post pandemic world.

## Key Policy Interventions in the last 3 Decades

### Infrastructure

**1988-90**

1988 - nasscom created
1990 - Software technology parks (STPs)

**2000**

Information Technology (IT) Act

**2005-10**

2005 - SEZ Act
2008 - IT (Amendment) Act
2010 - Aadhaar

### Digital Capability

**2015-16**

- Digital India
- Startup India
- Standup India
- Unified Payment Interface (UPI)

**2017-19**

- National Policy on Software Products
- Angel Tax Exemption for investments in start-ups
- GAICT for export of SCOMET items /software/ tech

**2020**

- Regulation of Payment Aggregators & Payment Gateways
- Indian unlisted companies to list in overseas stock exchanges

### Future of Work

**2021**

- Revised guidelines for OSPs
- Technology services not classified as intermediary services under GST
- Drone Rules, 2021

**2022**

- Flexible hybrid work for Technology units in SEZ
- Digital Personal Data Protection Bill, 2022
- Non-Personal Data Governance Framework
- Indian Telecommunication Bill

Source: Secondary research, nasscom

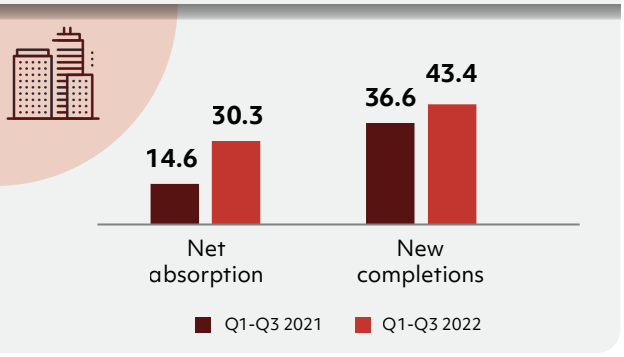
# Fastest Spending in Physical Infrastructure in the World

Infrastructure is a key factor in driving a country's growth and development. Infrastructure development can also help in narrowing development gaps between developed and lagging regions. Physical infrastructure through its backward and forward linkages facilitates growth and the performance of infrastructure is largely a reflection of the performance of the economy.

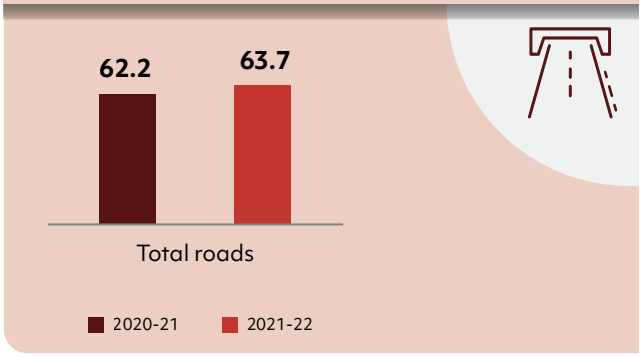
## Traditional Infrastructure

Traditional infrastructure lays the foundation for other systems to survive and thrive. India has witnessed massive growth in physical infrastructure in the last 2 years.

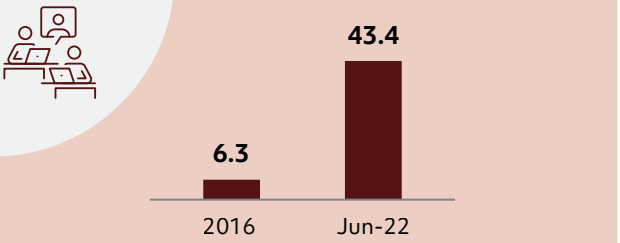
### Rising Commercial Office Space
(Mn. sq. ft.)



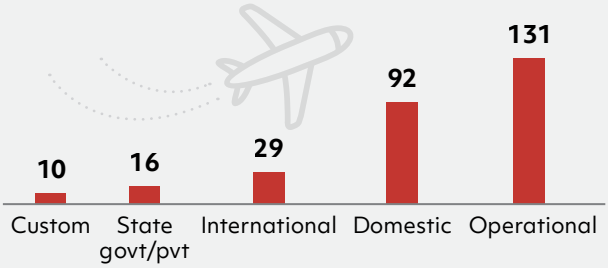

### Increasing Road Infrastructure
(Lakh kms.)



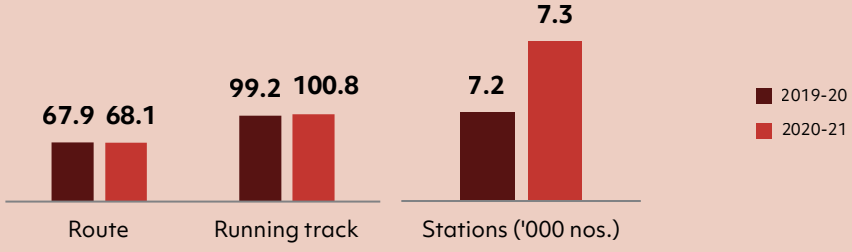

### Rising Co-working Area
(Mn. sq. ft.)




### Rising Airport Infrastructure
(Dec 2022) (nos.)



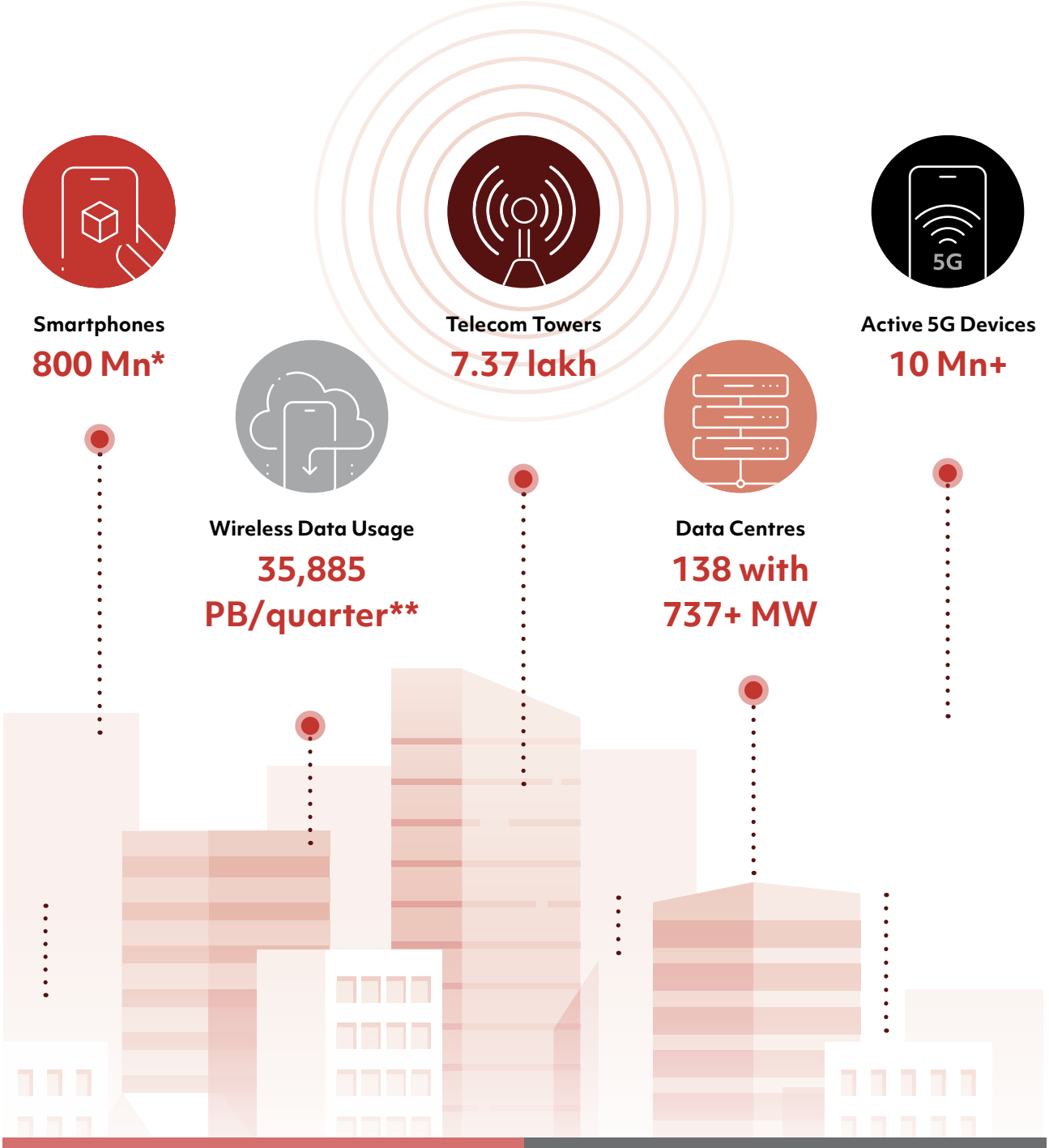

### Growing Rail Infrastructure ('000 km)




Source: JLL Monthly real estate monitor, Business Today, Ministry of Transport and Highways (Annual reports), Ministry of Railways, Ministry of Civil aviation

# Modern Infrastructure

On the bedrock of the traditional infrastructure, growth of modern infrastructure is also necessary for overall growth of a country. India has witnessed massive growth even during the pandemic for modern infrastructure as well.




India ranks among the leading countries for digital infrastructure

Not only with respect to the telecom infrastructure, but also with the advent of 5G, new growth opportunities will be unlocked

*Data as on Dec 2022
**Quarter is 3 months
Source: Department of Telecommunications, Biswanger Anarock report – Under the Lens – India's Data Centre explosion

# Inclusive Digital Infrastructure

Growing consumer adoption can be witnessed through the digitization metrics. India leads in digital payments, vaccine registered and administered. India also the most evolved payment service in the world in addition to the fastest growing internet and telecom subscribers.

## Rank 2
**in Total Telecom Subscribers**

**1,172.96 Mn** as on Jun 2022

## Rank 2
**in Total Internet Subscribers**

**836.86 Mn** as on Jun 22

## Rank 2
**in Total Wireless Internet Subscribers**

**808.13 Mn** as on Jun 2022

## Rank 1
**in Unique Govt ID generated - AADHAR**

**1,349 Mn** as on Dec 2022

## Rank 1
**in real time payment – UPI**

**7,309 Mn** transaction volume & value **₹11.90 lakh cr** as on Dec 2022

## Rank 1
**in Vaccine registration**

**1,108 Mn** CoWin registrations as on Dec 2022

## Level 5*
**most evolved in IMPS volume**

**463.48 Mn** IMPS transaction volume as on Nov 2022

## Level 5*
**most evolved in IMPS value**

**₹4.54 lakh cr** IMPS transaction amount as on Nov 2022

## Rank 1
**in vaccines administered**

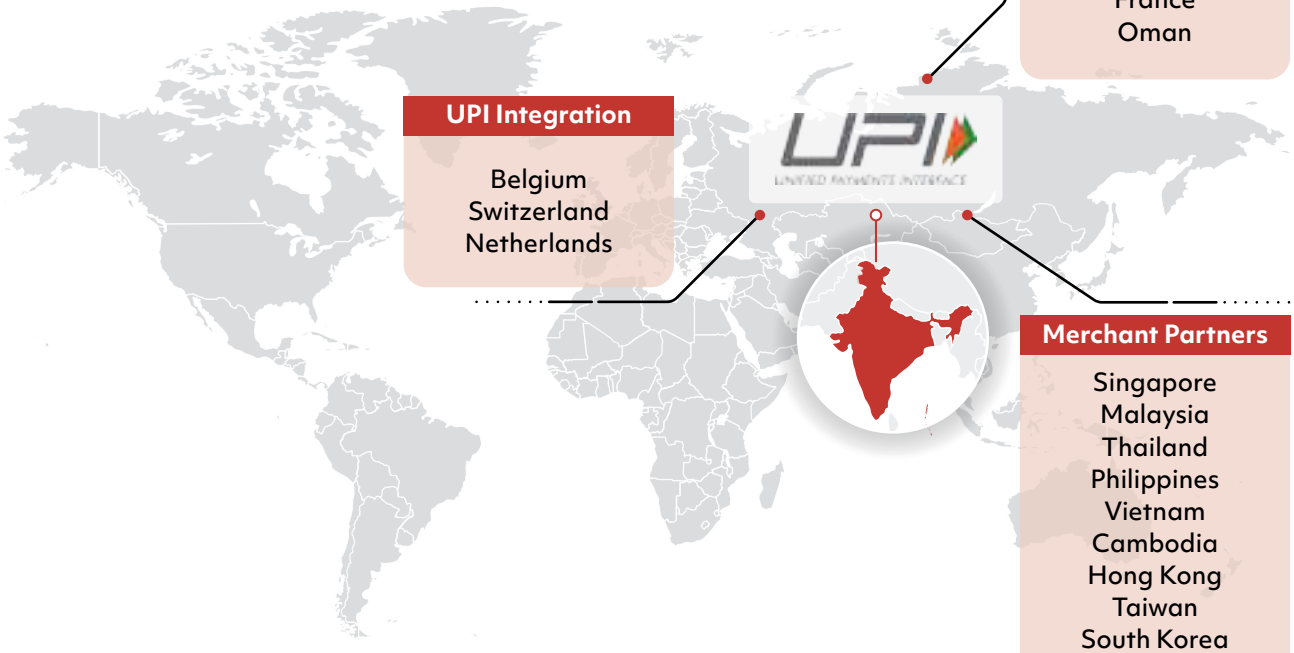
**219 cr** vaccines as on Dec 2022

*FPII ranks various payments systems on a scale of 1-5. Level 1 and 2 reflect fast payments, level 3 denotes highly desirable features while 4 and 5 stand for optional features maximising customer value such as remittance information, fast settlement, batch and individual payments and push and pull payment capability.

Source: TRAI, UIDAI, NPCI, CoWin, Aarogya Setu

# India Stack Getting Global Attention

## India's United Payment Interface (UPI) Going Global




## Other Indian Tech Stacks Ready for Global Adoption

*Illustrative*

### CoWIN

**50+ countries** showing interest for adoption

### UMANG

International app version launched for select countries including **US, UK, Canada, Australia, UAE, Netherlands, Singapore, Australia** and **New Zealand**

### Aadhaar

### Aarogya Setu

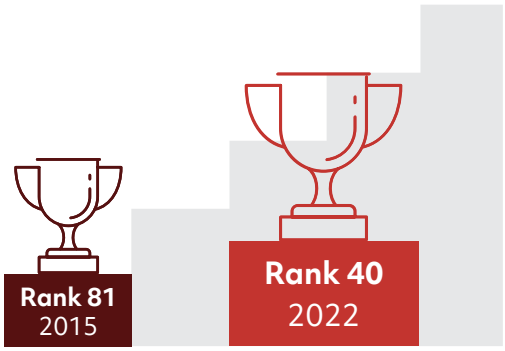
**Aadhaar** and **Aarogya Setu,** are two more well-known components of the India stack that other governments are planning to adopt.

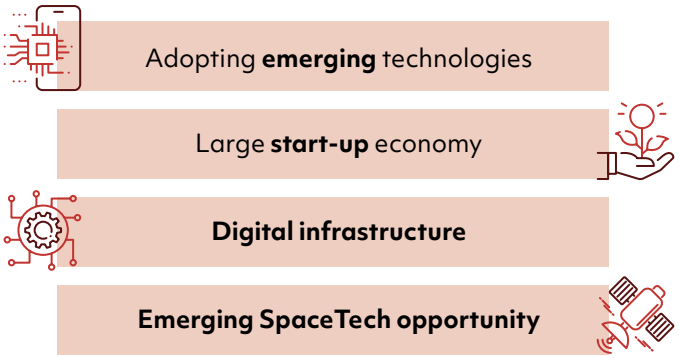
Source: Indiastack.global, News Articles

# Rapidly Emerging as a Global Innovation Hub

## Continuous Improvement in Global Innovation Index

### India GII Ranking: Faster movement compared to China and Philippines




## Demonstrating Innovation through Intellectual Property*

266K Tech Patents filed in India between 2010 and 2022, with over 60% filed across emerging technologies.

### Share of emerging technology patents in total tech patents


## Indian Academia Demonstrates its Worth

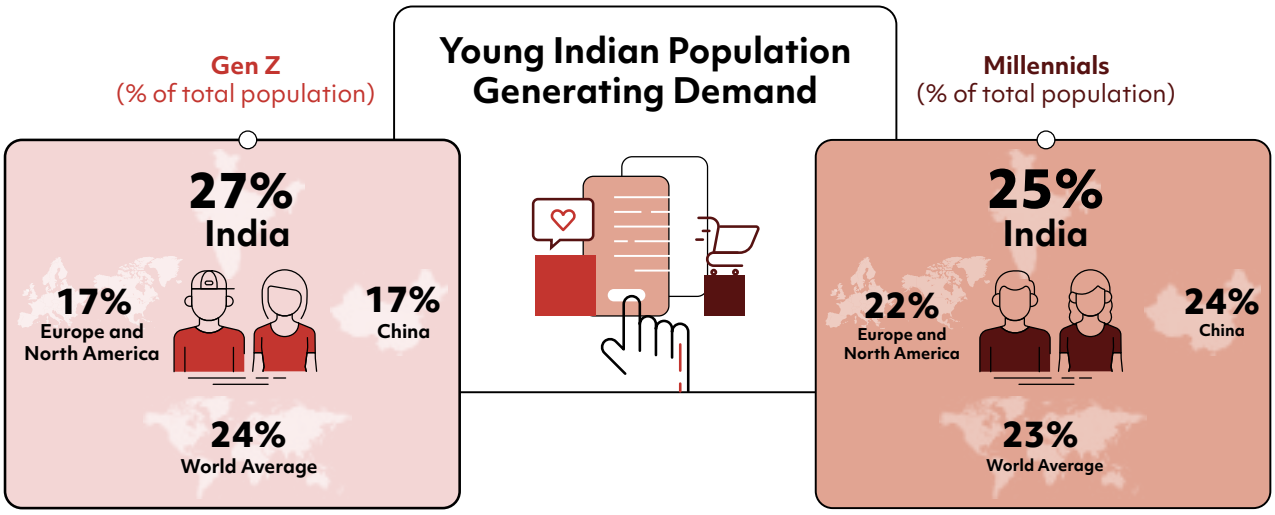
India is the **6th most represented country** in the world university rankings

No. of qualified Indian universities in world university ranking


*The analysis is based on data from Patseer database. Data for 2022 is provisional as it takes a maximum of 18 months after a patent is filed to reflect in the database

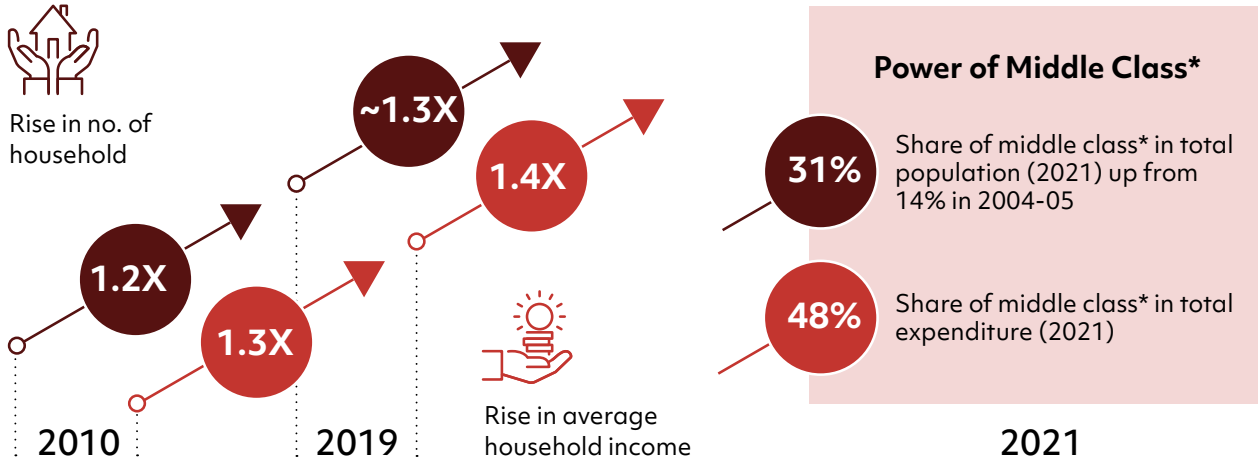
Source: Global Innovation Index Report 2022, QS World Ranking, Patseer, nasscom Analysis

# Young and Growing Consumer Market



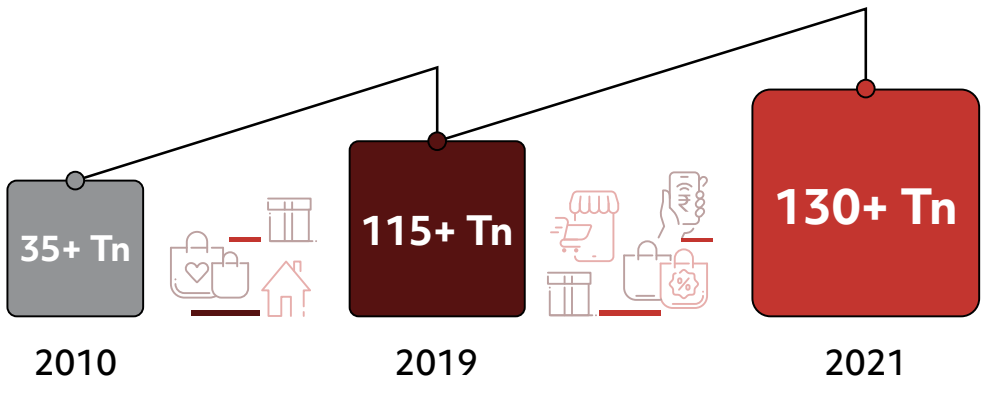

## Increasing Income Level and Middle Class Population

(% Share)




## Spending Growth Resulting in Higher Private Household Consumption

(₹)




* Middle Class: annual household income of Rs 5-30 lakh

Source: World Population Prospects 2022, nasscom, CCI proprietary income database, BCG Analysis, PRICE, News Articles, CMIE Data

#4

# 2023-24 Indian Technology Industry Outlook

# 2023-24 Annual Outlook

## Global Economic Growth Outlook CY2023

**Volatility and Business Resilience to Co-exist as Global Growth Flip-Flop Continues into CY2023**

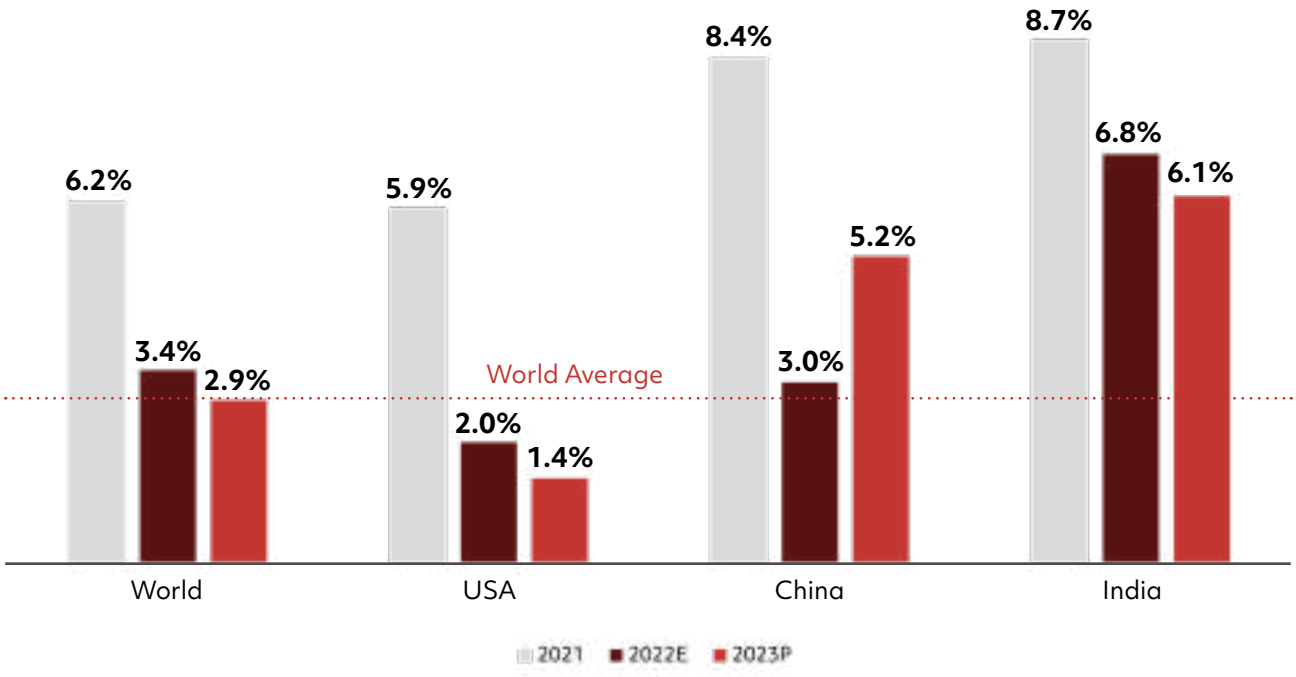
Despite a high-octane, multi-crisis closing of CY2022, CY2023 has started with hopes of moderation – moderate and localized recession for a couple of quarters, slower but reasonable growth in key emerging markets, India growing the fastest, and hopes of trade normalization by the end of CY2023 with the reopening of China. Retail consumption has taken a hit worldwide and is expected to stay relatively dovish in CY2023, against a revenge consumption trend seen in CY2021. Public sector expenditure allocations are expected to drive growth – India's FY2023-24 public capex allocation is the highest ever. The slow, but steady deployment of private capital, particularly in technology procurement, is expected to bring back growth momentum towards H2CY2023.

India continues to hold the growth baton driven by the resilient domestic demand despite external headwinds.

## Global Economic Growth Outlook

Real GDP Growth %

The GoI's Economic Survey 2022-23 predicts India's GDP growth at 6.1 – 6.8% in FY2024

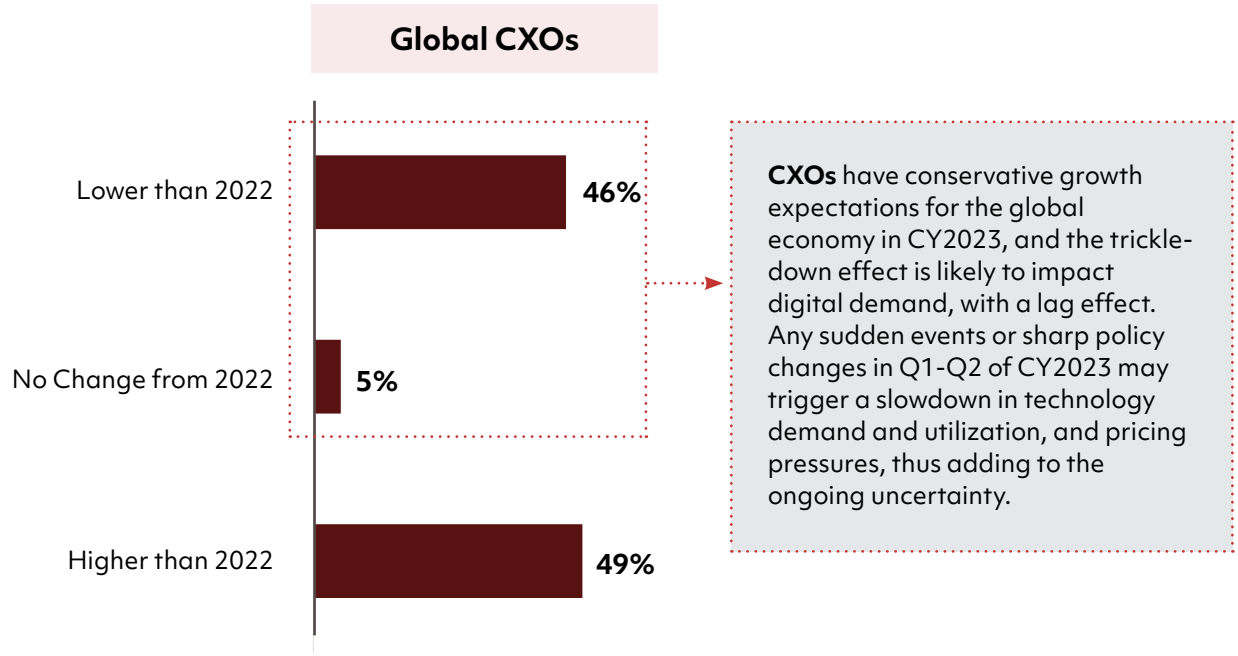



Source: IMF, nasscom Enterprise CXO Survey 2023, nasscom Tech CXO Survey 2023

IMF's January 2023 WEO indicates a slight upward revision to 2023 global growth at 2.9%, from 2.7% estimated in October 2022. Even then, the projections have an ample tone of cautiousness. The same is getting reflected across the global CXO sentiment.

## Global Economic Outlook: Cautious, with a Keen Watch on Macro Factors

% Respondents




Source: nasscom Enterprise CXO Survey 2023, nasscom Technology Industry Outlook 2023

## CXO Business Priorities CY2023

| Technology Buyers | Technology Providers |
|---|---|
| 01 Digital Transformation | 01 Improving operational efficiencies/ competitiveness |
| 02 Risk Management | 02 Identifying new revenue opportunities |
| 03 Sustainability/ESG | 03 Talent skilling/reskilling/upskilling |
| 04 Talent Management | 04 Employee engagement (retaining critical talent) |
| 05 Cost Mitigation | 05 Exploring new strategic partnerships & alliances |

Source: nasscom Enterprise CXO Survey 2023, nasscom Tech CXO Survey 2023

In its strategic priorities for CY2023, the demand side is definitively focused on digital transformation as its core priority, outranking all other priorities by a significant margin. As more technology deployment generates higher volumes of operational data, enterprises aim to build better visibility into predicting and effectively managing business risks, and the impact of their operations on society and environment at large. These priorities augur well with the tech providers, as they consolidate and strengthen current expertise, while making early moves into new business opportunities that the demand side is set to offer. CXOs across the board see talent as a critical success imperative in CY2023.

## CXO Business Challenges CY2023

| Technology Buyers | Technology Providers |
|---|---|
| 01 Inflationary Pressures | 01 Increasing Costs/Maintaining Operational Efficiencies |
| 02 Slow Economic Growth | 02 Talent Shortage |
| 03 Technological Shifts | 03 Increasing and Changing Preferences of Customers |
| 04 Availability and Access to Technology Talent | 04 Demand Contraction |
| 05 Hybrid Working Setup | 05 Global Competition |

Source: nasscom Enterprise CXO Survey 2023, nasscom Tech CXO Survey 2023

CY2023 is expected to bring forth unique challenges as businesses across the board – regions and sectors – unanimously indicate having to do more, and disruptive, with less.

- **Inflationary pressures** may remain for H1CY2023, with trickle-down effect on demand realization and pricing power
- **Talent conundrum** may further exacerbate with likely-to-continue tightening on one hand, and a shortage of relevant tech expertise on the other
- **Fundamental shifts in customer preferences** are likely to impact both buyers and providers, despite best efforts to adopt a data-led predictive demand forecasting approach
- **More socially and environmentally conscious consumers,** majority of Gen Z and Millennials, are likely to push technology buyers to revisit their current offerings for more sustainable alternatives, thereby creating a window for brownfield/greenfield tech-led innovation and automation, and more zero-debt tech investments
- **More digital in technology contracts will gradually change established contracting models,** in favor of more outcome-based contracts, over fixed-price or T&M models. For tech providers, this presents a dichotomy of putting skin in the game, while simultaneously rebalancing the portfolio mix of established services vis-à-vis emerging tech demand
- **Consistent rise of near-shoring** as an effective hedge against global supply chain disruptions, will present a multi-front competitive environment for global tech providers, from local digital-natives, or vertically-focused counterparts

The dynamics of volatile macro-economics meeting pandemic-tested business resilience will guide the technology outlook and priorities of tech buyers and providers in CY2023.

# Enterprise Outlook CY2023

nasscom conducted its annual survey of 400+ global CXOs – the nasscom Enterprise CXO Survey 2023 - to capture Tech Buyer inputs on business sentiment, economic outlook, technology spending and priorities in mainstream and emerging technologies.

Pandemic-tested business resilience is driving enterprises to embrace the "now normal" volatility, and think beyond surviving to thriving. Technology is the primary focus to hone the organizational muscle, and enterprises are likely to spend robustly on digital transformation.

## Ten Technology Spending Priorities for Technology Buyers in CY2023

| | | | |
|---|---|---|---|
| 01 | Tech spending similar to 2022 | 06 | Shorter deployment cycles |
| 02 | Top spending verticals - Transport leads | 07 | Shorter average deal duration |
| 03 | APAC rising | 08 | Lower average deal value |
| 04 | Size matters | 09 | Talent is strategic |
| 05 | Scale efficiencies, as well as, cutting-edge | 10 | Outsourcing will grow |

Source: nasscom Enterprise CXO Survey 2023, nasscom Tech CXO Survey 2023

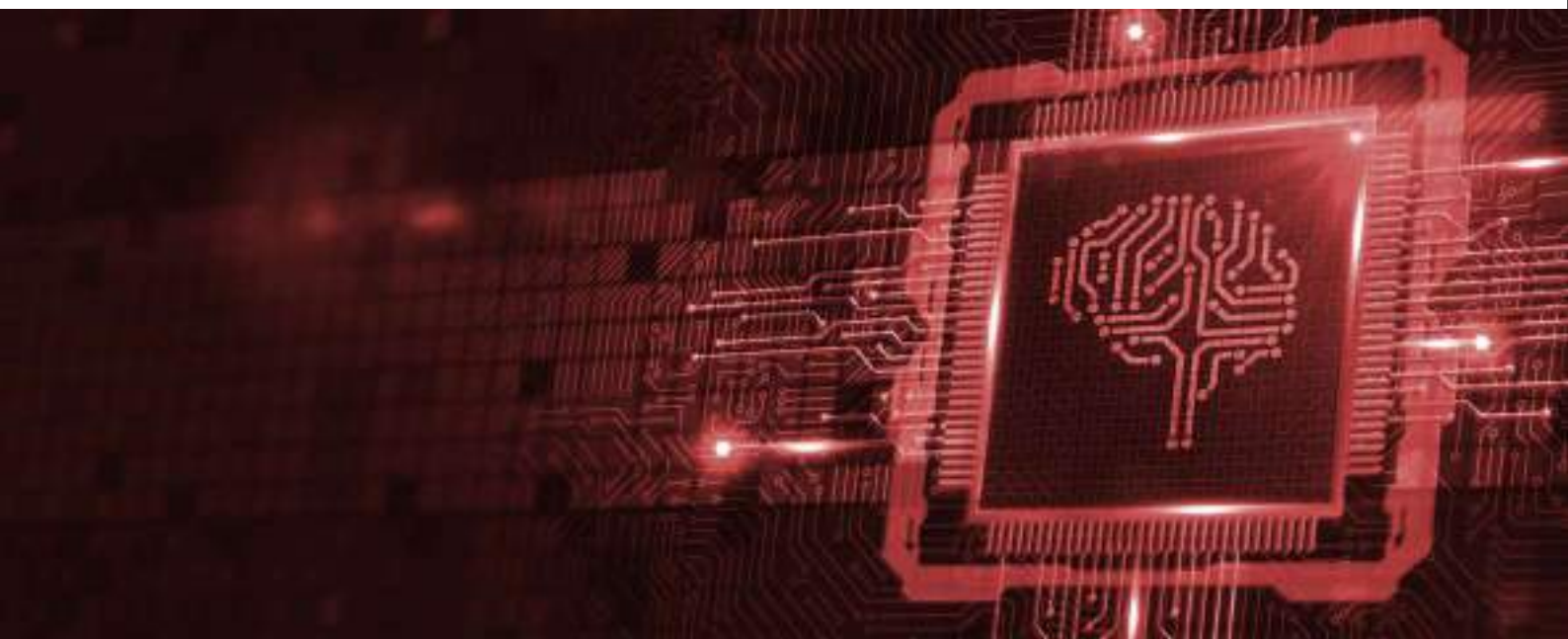
- **Higher digital spend –** More companies appear amenable to allocate a higher percent of their technology budget to ongoing and new digital transformation projects
- **Top spending verticals –** Within respective sectors, travel and transportation expected to be the top spender followed by BFSI, manufacturing, retail and CPG, and hi-tech
- **APAC rising –** Amongst the three major regions, APAC is expected to be the highest spender, followed by North America and Europe (incl. UK)
- **Size matters –** 70%+ of medium & large enterprises and 62% of small-sized enterprises indicate an above average spend on technology in CY2023
- **Scale efficiencies, as well as, cutting-edge –** In CY2023, the mainstream digital focus continues to be more of the CY2022 themes – Cybersecurity, Cloud, AI and Analytics – but towards more integrated use cases and higher value realization. Automation and virtual experiences are new themes, driving optimization and new business growth
- **Shorter deployment cycles –** 31% enterprises expect technology implementation cycles to reduce
- **Shorter average deal duration –** 75% enterprises indicate signing up for deals less than or up to 3 years; nearly 50% likely to go for 2-3 years duration. However, a third of hi-tech and discrete manufacturing companies plan deals of 3+ years
- **Lower average deal value –** 80%+ companies plan to spend less than $100 Mn per deal, with a well-split spread across brackets. 55%+ of the large enterprises, however, plan to spend $100 Mn or more per deal, but on shorter deals, indicating a strong risk appetite but a clearer focus on time-to-value

- **Talent is strategic –** Enterprises plan to retain current hiring plans across multiple sources of fresh hiring, laterals, acquihiring and internal reskilling, with reskilling meeting nearly a third of the digital talent need. Majority companies are likely to spend anywhere between 18-20% of their digital budget on talent sourcing, training, and retention.
- **Outsourcing will grow –** Outsourcing continues to be the dominant tech services sourcing model and India continues to be the #1 outsourcing destination for enterprises; even more so, for companies planning to change their sourcing destination in CY2023

## Cybersecurity, Cloud, and AI to be Mainstream Digital Focus in CY2023

| | CY2022 | CY2023 | Top Priority Use Cases |
|---|---|---|---|
| **01.** | Cybersecurity | Cybersecurity | • Threat detection and remediation<br>• Identity and access management |
| **02.** | Cloud Computing | Cloud Computing | • Data backup and recovery<br>• Data management and analytics |
| **03.** | Big Data Analytics and AI/ML/NLP | Big Data Analytics and AI/ML/NLP | • Consumer insights analysis<br>• Workforce optimization |
| **04.** | IoT/Edge Computing | RPA and Robotics | • Automated application testing and management and straighthrough processing<br>• Supply chain monitoring and security and surveillance |
| **05.** | Mobility /5G | AR/VR/XR | • Remote training and collaboration<br>• Virtual product design and try-on |

Source: nasscom Enterprise CXO Survey 2023



## Emerging Technology Priorities

| CY2022 | CY2023 |
|---|---|
| 01 Advanced networking technologies (5G/6G, Wi-Fi 6/7) | 01 Advanced networking technologies (5G/6G, Wi-Fi 6/7) |
| 02 Connected Wearable Technology | 02 Web 3.0 |
| 03 Digital Twins | 03 Verse of Things (VoT) |
| 04 Verse of Things (VoT) | 04 Digital Twins |
| 05 Web 3.0 | 05 Connected Wearable Technology |

Source: nasscom Enterprise CXO Survey 2023

## Technology Sector Outlook FY2024

Every year nasscom conducts a CEO survey among its members in December-January to understand the pulse of what the CEOs are planning for the next year. This year we analysed 100+ responses, which re-iterated a moderate approach for FY2024. The next year is expected to be a year of rationalization, as growth expectations and workforce growth, etc. remain muted in the wake of global disturbances, inflation fears, strengthening of dollar among others.

Majority of the CXOs have a relatively muted growth outlook for FY2024. Delayed decision making, and demand volatility will be key to watch out for. Most of them feel growth will be similar or lower than last year.

## The next year can be outlined across the following themes -

**Theme-1**
**Growth Areas**

**Theme-2**
**Talent**

## Theme 1: Growth Areas for Indian Technology Companies in FY2024

The growth areas of top segments for FY2024 continue to focus on digitalization, digital CX, cloudification, building world class products from India, with Indian start-ups taking over the world as well as rising demand from tier II/III cities and emergence of newer business models.

USA, India, and UK are expected to continue to be the leading geographies of growth in FY2024. India continues to be a favourable destination due to availability of talent at scale at a reasonable cost, and ready to add value and undertake end-to-end transformation. Europe, while reeling from war, is expected to continue to increase offshoring to Indian service providers, while their Indian GCCs are also expected to inherit larger pie in the overall projects.

# Focus Areas by Segment - FY2024

## IT Services

Application modernization, cloud migration, platformization, and cybersecurity

## BPM Services

Digital CX, data driven transformation, and being an orchestrator of capabilities and a strategic partner

## ER&D Services

Cloudification, increasing digital component, and focus on strategic longer-term engagements

## Software Products

Building world class products and solutions from India, SaaS- based products, and rise of deep-tech start-ups

## eCommerce

Emergence of online + offline 2.0, using technology for growth of retail industry, as well as deeper penetration into tier II/III cities

## Focus Areas by Vertical - FY2024

The leading growth verticals are expected to be BFSI, Healthcare, Hi-Tech, Manufacturing, and Retail with continued focus on using mainstream and emerging tech to facilitate growth.

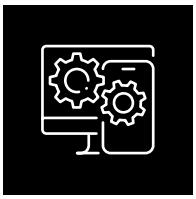
In addition, over 65% of the survey respondents believe that digital services in FY2024 are expected to increase due to increasing cloudification of activities, increasing digital component in every project and deals.

### BFSI

- Intelligent middleware for middle and back-office services
- Next gen touchless banking using AI, speech and image recognition
- Digital marketplace including zero paper loan disbursement, robo advisors
- Hardware including tracking telemetry data, use of drones for property estimations

### Healthcare

- Medical manufacturing including additive manufacturing of surgical arms, devices, bioprinted organs
- Hospitals of the future including wearables, remote home monitoring devices, etc.
- Connected health including connected pharmacies, digital prescriptions



### Hi-Tech

- Robotic Process Automation
- Use of AI and emerging technologies in aerospace and defence
- Smarter, connected devices through custom-made semiconductor chips

### Manufacturing

- Industry 4.0, Additive manufacturing
- IoT, Predictive maintenance, error predictions
- Production planning, supply chain planning
- Connected systems

### Retail

- Supply chain planning and demand prediction
- Industry 4.0 including error predictions, predictive maintenance, reduce material wastage
- Customer experience enhancement including utilising AR/VR for hyper-personalization

## Theme 2: Hiring Growth to be Muted, while Skilling Remains the Key Priority

Hiring growth is likely to hold steady, however it will be muted compared to FY2023 as companies have started to rationalize new hiring amidst a declining attrition rate.

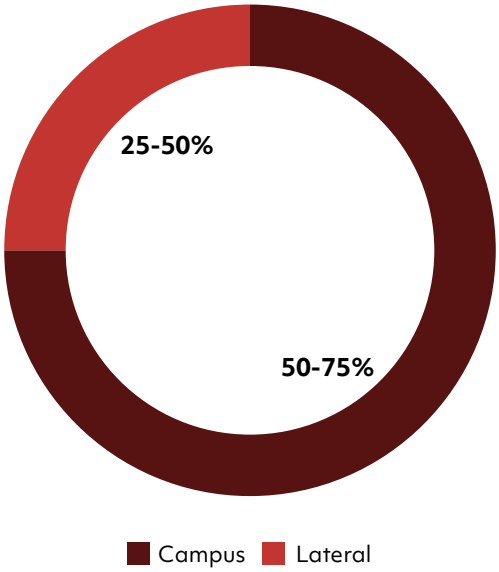
Campus hiring will continue to be a major strategy to meet the new talent demands, and will drive volume hiring across companies. On the other side lateral hiring is expected to remain strong with demand for experienced hands across digital skills being the key driver.

Campus hiring will continue to account for majority of the new hiring specifically for large companies, which highlights more traditional skills being onboarded initially and will be followed by various training programs for digital skills.

Though, companies remain open to hiring part-time workforce and gig, FTEs will continue to remain the main focus and are expected to account for over 75% of the new hires.

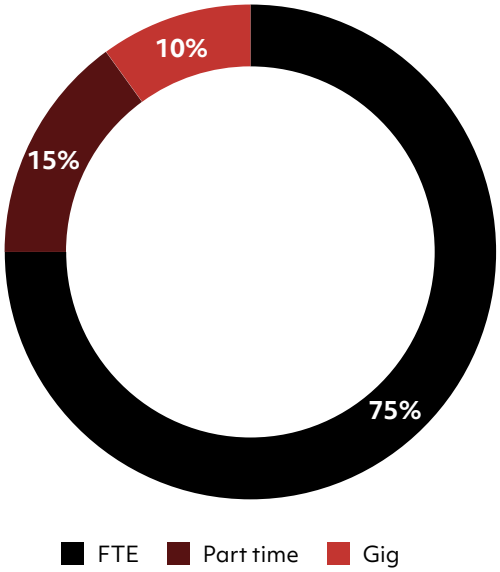
## FY2024 Hiring Sources

(% Share)




## FY2024 Hiring Composition

(% Share)




Source: nasscom Tech CXO Survey 2023

## Key Priorities for HR - FY2024

| HR Priorities | Skilling Priorities |
|---|---|
| 01 Employee Engagement and Culture | 01 Cloud |
| 02 Upskilling and Reskilling | 02 AI/ ML/ NLP |
| 03 Employee Health and Wellness | 03 Web and Application Development |
| 04 Improving DEI | 04 Cybersecurity |
| 05 Location Agnostic Performance | 05 Big Data Analytics |

Source: nasscom Tech CXO Survey 2023

Majority of the respondents have indicated focus on building capabilities primarily in the areas of Cloud, and AI/ML/NLP and web and application development. With increasing digitalization, cloudification, and work from anywhere, firms continue to seek employees who have prowess in these technologies. While the top two remain the same, web and application development has replaced big data analytics compared to last year. Moreover, these top skills are a common ask from IT services and Integrated firms; though Cloud remains a priority across all sub-segments, ER&D and BPM firms are also prioritising Intelligent Automation and Big Data Analytics.

Employee engagement continues to remain the top priority for the next year, more so as the industry witnessed massive employee turnover this year, which showed signs of cooling down in the last two quarters. Employee health and wellness which was the second most highlighted focus area was replaced by skilling in this year's survey as Covid concerns cooled down.

- **Employee Engagement and Organisational Culture –** With many companies still following a hybrid way of working, employee engagement through appreciation, recognition and virtual and physical engagement sessions is expected to continue.
- **Upskilling and Reskilling -** Building key capabilities among the existing as well as new employees is expected to remain a key focus area to cover the demand-supply gap.
- **Ensuring Employee Health and Wellness –** Since the pandemic, organisations have realised the value of mental health and wellness – which continues to remain a key priority for HR.

# Strategic Imperatives for the Industry Ecosystem

India's technology industry is at yet another inflection point as the global economy emerges from multi-crisis slowdown and enterprises seek rapid digitalization through ready-to-experiment and production-grade accelerators. For the industry to capitalize on this opportunity, several imperatives must converge and stakeholders across the board must collaborate and strategize together to make this a reality.

## Strategic Imperatives to Empower Indian Tech Industry's Techade Leap


From technology-led transformation to transformative technology development, the techade upon us offers a lifetime chance to rethink and reengineer the way we live, interact, transact, assess, and experience by using technologies in the right context. Digital transformation will be the most critical transformation journey that enterprises will embrace to evolve into adaptive entities capable of absorbing volatility and building sustainable growth models. In CY2023, the immediate focus may be on wins in cost control; however, the coming 6-7 years will test organizational agility to take on bolder risks and report practical gains. Used responsibly, technology will prove to be a business' best friend.

# #5 Appendix

# Glossary

**Business Process Management (BPM)**
Erstwhile BPO/ITeS - includes processes that may be IT-enabled, do not necessitate on-shore presence and are hence, offshoreable.

**Custom Application Development (CAD)**
CAD services focus on delivering customized (to client requirements) development of software applications and interfaces as well as enhancements to existing packaged applications or pre-engineered templates and support and provision of custom applications.

**Customer Interaction & Support (CIS)**
CIS includes all forms of IT-enabled customer contact; inbound or outbound, voice or non-voice based support used to provide customer services, sales and marketing, technical support and help desk services.

**eCommerce**
Commercial transactions conducted electronically on the Internet by businesses and consumers is called eCommerce. eCommerce is divided into Business to Business (B2B), Business to Consumer (B2C) and Consumer to Consumer (C2C).

**Engineering Services and Research & Development (ER&D)**
Engineering services are those that augment or manage processes that are associated with the creation of a product or service, as well as those associated with maximizing the life span and optimizing the yield associated with a product or asset. This not only includes design elements of the product or service itself, but also encompasses the infrastructure, equipment and processes engaged in manufacturing/delivering them.

R&D services involve providing research and development for hardware and software technologies, as well as development of software running on embedded systems. This includes computer-aided design (CAD).

**Product Engineering Services (PES)/Offshore Software Product Development (OSPD)**
Outsourced development of the customer's product, thereby taking up the responsibility of all aspects of the product lifecycle - R&D, prototyping, development, testing, maintenance, support and development of next generation of the products. The development can be outsourced to either a GCC (global capability centre) or to a third-party vendor. This segment is clubbed with ER&D and referred to as Product Engineering Services (PES).

**Finance & Accounting (F&A)**
F&A includes activities such as general accounting, transaction management (account receivables and payables management), corporate finance (e.g. treasury and risk management, and tax management); compliance management and statutory reporting, etc.

**Global Capability Centers/Captive Units**
Captive units include both MNC-owned units that undertake work for the parents' global operations and the company owned units of domestic firms.

**Global Sourcing**
Services sourced from a country/countries different from the country where the firm receiving the services is located. It includes both offshoring and near-shoring.

**Hardware Deployment and Support**
The hardware deployment and support service pertains to the installation and support of a specific hardware device. The service is focused on the device and its components rather than on software that is running on the device. Installation activities can include hardware staging and configuration, testing and debugging, site preparation, and physical installation of the device.

**Horizontal-specific BPM Services**
Services that are reasonably similar across industries. Horizontal BPM services include Customer Interaction and Support (CIS), Finance and Accounting (F&A) and other related processing services, Knowledge Services, Human Resource Management (HRM), Procurement BPM, etc.

**Human Resources Processing**
HR processing services includes services that support the core HR activities plus talent management activities and associated business processes such as benefits, payroll and talent management.

**IT Consulting**
IT consulting includes IS strategy, IT and network planning, architectural assessments, IS operational analysis, technical system and network designs, product-specific consulting, supplier assessment and maintenance planning.

**IT Services**
IT services involve a full range of engagement types that include consulting, systems integration, IT outsourcing/managed services/hosting services, training, and support/ maintenance.

**Knowledge Services**
It comprises outsourcing of knowledge intensive processes, which includes services such as business research, market research, data management, data analytics, legal and intellectual property services.

**Nearshore/Near-site**
Country near to client country.

**Network Consulting and Integration**
Network consulting and integration services are the activities and skills associated with planning for and building data networks. Network consulting services include activities such as operations assessment, network planning and design, capacity planning, and maintenance planning. Network implementation includes services such as installation, configuration, custom software development, testing and debugging, project management, staging, and security implementation activities.

**Offshore**
The transferring of a complete business process to a different country that is significantly geographically separated from the country or countries where the firm receiving the services is located.

**Outsourced/Offshore Software Product Development (OSPD)**
SEE Engineering Services and Research & Development (ER&D).

**On-site**
Client site

**Outsourcing**
Outsourcing is a type of engagement, such as consulting and integration that can be sourced from any of the lower-cost regions.

**Product Engineering Services (PES)**
SEE Engineering Services and Research & Development (ER&D).

**Software Deployment and Support**
Software deployment and support services are activities, expertise, and systems providing the customer with proper installation and configuration of all packaged software products as well as appropriate ongoing support, access to resources, and distribution of software product releases, updates, and upgrades.

**Software Products**
Packaged software is programs or code sets of any type, commercially available through sale, lease, rental, or as a service. Packaged software revenues typically include fees for initial and continued right-to-use packaged software licenses.

**Systems Integration**
Systems integration (SI) includes the planning, design, implementation, and project management of a solution that addresses a customer's specific technical or business needs. It involves systems and custom application development, as well as implementation and integration of enterprise package software.

**Third-party Units**
Third-party units are essentially service vendors that are mostly independently owned units (i.e. no single client has a controlling stake in the vendor entity).Third-party vendors also include a small section of MNC-owned independent third-party vendors, such as Cognizant, IBM, Convergys, SITEL, Vertex and Sykes, having a significant part of their global operations based out of India.

**Vertical-specific BPM Services**
Vertical-specific BPM services refer to offerings that require a high degree of vertical specific knowledge that is not easily replicable across industries (e.g. insurance claims processing).

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Reserve Bank of India (RBI)
Statista
Strategy&
Tracxn
TRAI
UIDAI
UnearthInsight
UNESCO Institute for Statistics
Venture Intelligence
Visual Capitalist
World Economic Forum
World Intellectual Property Organization (WIPO)
World Population Prospects
YourStory
Zinnov

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**Sandboxing Into The Future –** Decoding Technology's Biggest Bets


**India's DeepTech Start-Ups –** Poised For Impact


**nasscom-Deloitte The Future Growth Sectors In Digital Engineering**


**Digital Enterprise Maturity 3.0 -** Boosting Business Resilience Through Technology


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**Tech Start-up Report 2022 – Rising Above Uncertainty: The 2022 Saga of Indian Tech Start-ups**


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