CareEdge ANALYTICS & ADVISORY

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Research Report on IT / ITeS Industry

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Abbreviation Table

GDP	Gross Domestic Product
CY	Current Year
EAP	East Asia and Pacific
MEA	Middle East & North Africa
CAGR	Compound Annual Growth Rate
TRAI	Telecom Regulatory Authority of India
AI	Artificial Intelligence
IT	Information Technology
IMARC	International Market Analysis Research and Consulting Group
USD	United States Dollars
IoT	Internet of Things
SME	Small and Medium Enterprise
IMF	International Monetary Fund
PPP	Public Private Partnerships
ID	Identification
GVA	Gross Value Added
SAE	Second Advance Estimate
FE	Final Estimate
FAE	First Advance Estimate
MOSPI	Ministry of Statistics and Programme Implementation
FY	Financial Year
Y-o-Y	Year on Year
PMI	Purchasing Managers' Index
RBI	Reserve Bank of India
Q	Quarter
PIB	Press Information Bureau
DPIIT	Department for Promotion of Industry and Internal Trade
UPI	Unified Payment Interface
BPM	Business Process Management
SaaS	Software As A Service
YTD	Year to Date
BHIM	Bharat Interface for Money
COWIN	Covid Vaccine Intelligence Network
PMSBY	Pradhan Mantri Suraksha Bima Yojana
UIDAI	Unique Identification Authority of India
AUA	Authentication User Agencies
ASA	Authentication Service Agencies
CIDR	Central Identities Data Repository
OTP	One Time Password
AePS	Aadhaar Enabled Payment System
DBT	Direct Benefit Transfer
JAM	Jan Dhan-Aadhaar-Mobile

e-KYC	Electronic Know Your Customer
ATM	Automated Teller Machine
IT/ITeS	Information Technology and Information Technology Services
4IR	Fourth Industrial Revolution
VR	Virtual Reality
AR	Augmented Reality
NASSCOM	National Association of Software and Services Companies
MNC	Multi National Company
GCC	Global Capability Centres
BPO	Business Process Outsourcing
IaaS	Infrastructure as a Service
PaaS	Platform as a Service
E	Estimated
P	Projected
SDC	State Data Centres
S.W.A.N	Statewide Area Networks
CSC	Common Services Centres
NSDG	National e-Governance Service Delivery Gateway
SSDG	State e-Governance Service Delivery Gateway
MSDG	Mobile e-Governance Service Delivery Gateway
NCIIPC	National Critical Information Infrastructure Protection Centre
NCCC	National Cyber Coordination Centre
SOC	Security Operations Centres
DPDP	Digital Personal Data Protection
IPR	Intellectual Property Rights
NPSP	National Policy on Software Products
ADPPA	American Data Privacy and Protection Act
FTC	Federal Trade Commission
PII	Personally Identifiable Information
HIPAA	Health Insurance Portability and Accountability Act
GLBA	Gramm-Leach-Bliley Act
COPPA	Children's Online Privacy Protection Act
DPPA	Driver's Privacy Protection Act
VPPA	Video Privacy Protection Act
FCRA	Fair Credit Reporting Act
TCPA	Telephone Consumer Protection Act
FERPA	Family Educational Rights and Privacy Act
LCDP	Low-Code Development Platforms
NCDP	No-code development platforms
LC/NC	Low-code/No-code
EGDI	E-Government Development Index
OSI	Online Service Index
TII	Telecommunication Infrastructure Index

HCI	Human Capital Index
NeGP	National e-Governance Plan
G2G	Government-to-Government
NIEM	National Information Exchange Model
IPAWS	Integrated Public Alert and Warning System
FPDS	Federal Procurement Data System
G2C	Government-to-Citizen
IRS	Indian Revenue Service
G2B	Government-to-Business
FedBizOpps	Federal Business Opportunities
SAM	System for Award Management
G2E	Government-to-Employee
Eopf	Electronic Official Personnel Folder
SVAMITVA	Survey of Villages and Mapping with Improvised Technology in Village Areas
CPGRAMS	Centralized Public Grievance Redress and Monitoring System
GeM	Government e-Marketplace
MCA	Ministry of Company Affairs
iGOT	Integrated Government Online Training
NIN	National Identification Numbers
GRP	Government Resource Planning
NeSDA	National e-Governance Service Delivery Assessment
DARPG	Department of Administrative Reforms & Public Grievances
UT	Union Territories
eUNNAT	Unified, Integrated, Accessible and Transparent
OGD	Open Government Data
DPI	Digital Public Infrastructure
ML	Machine Learning
DIKSHA	Digital Infrastructure for Knowledge Sharing
UMANG	Unified Mobile Application for New-age Governance
NCDP	National Non-communicable Diseases
ABHA	Ayushman Bharat Health Account
SIDH	Skill India Digital Hub
NKN	National Knowledge Network
REN	Research & Education Network
BFSI	Banking, Financial Services, and Insurance
R&D	Research and Development
ICCC	Integrated Command and Control Centres
NDHM	National Digital Health Mission
EHR	Electronic Health Records
WEF	World Economic Forum
DHIS	Digital Health Incentive Scheme
ABDM	Ayushman Bharat Digital Mission
NDHB	National Digital Health Blueprint

NHP	National Health Policy
HFR	Health Facility Registry
HPR	Healthcare Professionals Registry
UHI	Unified Health Interface
MeitY	Ministry of Electronics and Information Technology
e-NAM	National Agriculture Market
ISL	Indian Sign Language
SWAYAM	Study Webs of Active-Learning for Young Aspiring Minds
DAISY	Digitally Accessible Information System
MOU	Memorandum of Understanding
NHA	National Health Authority
MoHFW	Ministry of Health and Family Welfare
HWC	Health and Wellness Centers
ORS	Online Registration System
HMIS	Hospital Management Information System
CMPDI	Central Mine Planning and Design Institute
AGV	Automated Guided Vehicles
CSP	Cloud Service Providers
SSO	Single Sign-On
IIDP	Incredible India Digital Platform
OTA	Online Travel Agency
NUDM	National Urban Digital Mission
GIS	Geographic Information Systems
NCSC	National Cyber Security Coordinator
CERT-In	Indian Computer Emergency Response Team
MHA	Ministry of Home Affairs
SBOM	Software Bill of Materials
CSB	Cyber Surakshit Bharat
CISO	Chief Information Security Officers
NCOE	National Centre of Excellence
FIRST	Forum of Incident Response and Security Teams
Agri-tech	Agriculture technology
Health-tech	Health technology
EPC	Export Promotion Councils
ASEEM	Aatmanirbhar Skilled Employees Employer Mapping
PM - DAKSH	Pradhan Mantri Dakshta Aur Kushalta Sampann Hitgrahi Yojana
IBPS	India Business Process Outsourcing Promotion Scheme
CAPEX	Capital Expenditure
OPEX	Operational Expenditure
NEBPS	Northeast Business Process Outsourcing Promotion Scheme
C-DAC	Centre for Development of Advanced Computing
PRIME	Programme for Re-skilling/Upskilling of IT Manpower for Employability
B2C	Business to Consumer

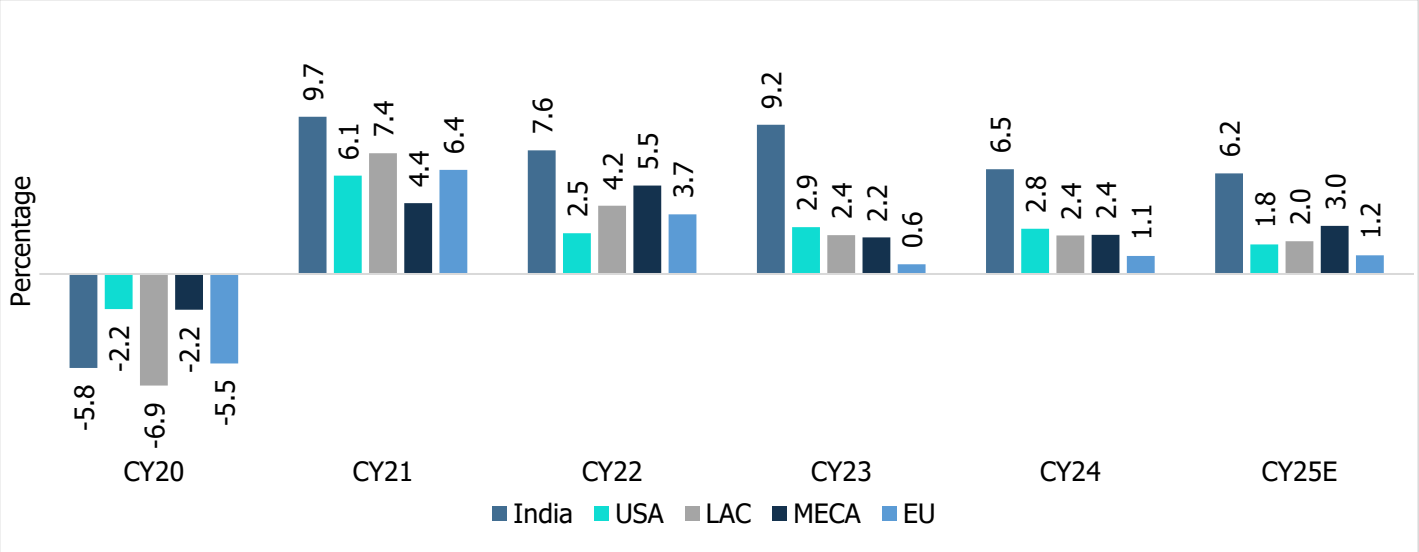
IP	Intellectual Property
EV	Electronic Vehicle
PLI	Production-Linked Incentive
AfCFTA	African Continental Free Trade Area
STEM	Science, Technology, Engineering, and Mathematics
BEAD	Broadband Equity, Access, and Deployment
SR&ED	Scientific Research and Experimental Development
IBM	International Business Machines
CISA	Cybersecurity and Infrastructure Security Agency
Fintech	Financial technology
Edtech	Education Technology

1 Economic Outlook

1.1 Global & Regional Economic Review

1.1.1 Trends in GDP growth across key geographies

Chart 1: Trend in real GDP Growth (%)



Source: IMF

Note: LAC stands for Latin America and the Caribbean region; MECA stands for Middle East and Central Asia region; EU stands for European Union

The World has been undergoing several challenges in the past few years starting with Covid pandemic, inflationary environment, geopolitical instability due to Russia-Ukraine war and Israel-Palestine conflict. Amidst all these challenges, India exhibited the most significant post-pandemic recovery among the sample regions, with GDP growth bouncing back from -5.8% in 2020 to 9.2% in CY23, driven by strong domestic demand, infrastructure investments, and policy support. India recorded the highest GDP growth among all regions with 9.7% in CY21 and 9.2% in CY23, and despite moderating to 6.5% in CY24 and a projected 6.2% in CY25, it remains the fastest-growing economy throughout the period.In contrast, the USA showed a slower and more volatile recovery, contracting by -2.2% in CY20 before rebounding to 6.1% in 2021. However, growth decelerated sharply to 2.5% in 2022 and 2.9% in CY23 due to monetary tightening, high inflation, and reduced fiscal stimulus, reflecting underlying economic uncertainties.

Latin America and the Caribbean (LAC) rebounded from a -6.9% contraction in CY20 to 2.4% in CY23, but growth softened to 2.4% in CY24, with a modest 2.0% projected in CY25. This indicates limited structural recovery post-pandemic. The Middle East and Central Asia (MECA) improved from -2.2% in CY20 to 2.2% in CY23, with stable growth of 2.4% in CY24 and a stronger 3.0% projected in CY25. The European Union (EU) remained the weak performer, with a sharp -5.5% contraction in CY20 and marginal recovery to 0.6% in CY23 and 1.1% in CY24. EU GDP growth is projected at 1.2% in CY25.

1.1.2 Key macroeconomic indicators influencing digital transformation

Secure internet servers:

Table 1: Number of Secure Internet servers (per million people)

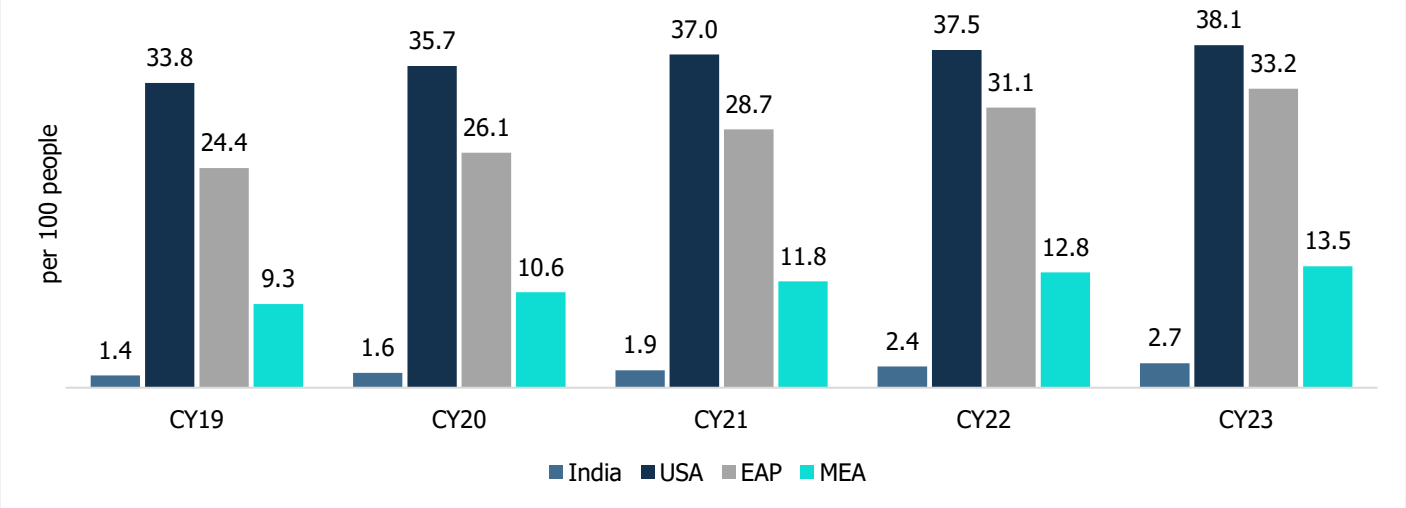
Country/Region	CY19	CY20	CY21	CY22	CY23	CY24	CAGR % (CY19-CY24)
India	383	472	528	730	966	1,212	25.9%
USA	1,23,980	1,40,797	1,56,973	1,80,616	1,87,747	1,96,554	9.7%
EAP	2,995	3,510	4,097	4,752	5,202	5,322	12.2%
MEA	366	540	659	1,064	1,082	1,179	26.4%

Source: World Bank

Between CY19-CY23, major economies have witnessed a consistent increase in the number of secure internet servers per million people, indicating a global push towards enhanced digital security and online infrastructure. The USA maintains a dominant lead with a significantly higher concentration of secure servers, and despite its already high base, recorded a 9.7% CAGR, reaching 1,96,554 secure internet servers per million people in CY24. This strong growth is led by the country's advanced cybersecurity frameworks and digital economy maturity. Similarly, EAP region has exhibited steady growth, reaching 5,322 secure servers per million people in CY24. Indicating a CAGR growth of 12.2%, driven by increasing digital adoption and regulatory advancements in cybersecurity. India's secure internet servers have grown from 383 per million people in CY19 to 1,212 in CY24, growing at a CAGR of 25.9% between CY19-CY24. This consistent increase in the number of secure internet servers reflects ongoing but gradual improvements in India's digital infrastructure.

Fixed Broadband Subscriptions:

Chart 2: Fixed Broadband Subscriptions (per 100 people)



Source: World Bank

India saw the highest increase from 1.4 in CY19 to 2.7 in CY23, growing at a CAGR 18.6% during the period, driven by government initiatives and expanding coverage. MEA region's fixed broadband subscriptions per 100 people grew at a CAGR 9.8% between CY19-CY23, reaching 13.5 fixed broadband subscriptions per 100 people, reflecting infrastructure

investments. East Asia & Pacific grew at a CAGR 8.0% with steady adoption, reaching 33.2 in CY23. USA, an already mature market continued to have the highest fixed broadband subscriptions per 100 people which, increased from 33.8 in CY19 to 38.1 in CY23 indicating a 3.0% CAGR during the period, mainly through service upgrades.

Individuals Using the Internet:

Individuals using the internet is a crucial indicator of digital inclusion and economic modernization. Higher internet penetration enables broader access to e-commerce, digital banking, and online education, fostering greater engagement in the digital economy. It also influences social and economic mobility by providing opportunities for remote work, digital literacy, and entrepreneurship. Countries with higher internet usage rates tend to experience faster adoption of emerging technologies, leading to increased efficiency in governance, business operations, and service delivery. However, disparities in internet access across urban and rural areas can impact the pace of digital transformation, making targeted infrastructure investments essential.

Table 2: Individuals Using Internet as a percentage of population

Country/Region	CY19	CY20	CY21	CY22	CY23
India	54.3	58.5	60.5	62.6	67.0
South Africa	69.7	72.1	75.0	75.5	75.7
China	64.1	70.1	73.1	75.6	77.5
Vietnam	68.7	70.3	74.2	78.6	78.1
Japan	92.7	90.2	82.9	84.9	87.0
United States	89.4	90.3	91.3	92.2	93.1
Singapore	88.9	92.0	96.9	96.0	94.3

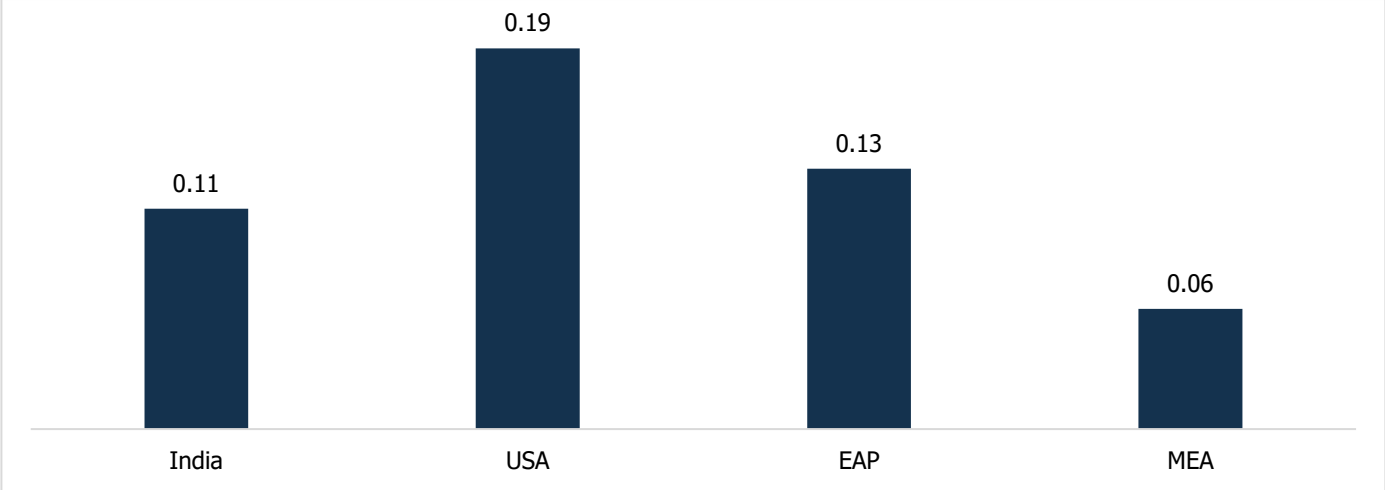
Source: TRAI, World Bank

Over the years, India's focus towards ramp up in digital infrastructure and ease of internet access has led to significant uptick in percentage of population utilizing the internet. Individuals utilizing the internet as a percentage of the population increased at a CAGR of 5.4% between CY19 and CY23, outpacing all other selected countries. Internet penetration in India is expected to reach ~86% by 2028.

Digital Infrastructure Index:

The digital infrastructure index evaluates the strength of a country's information and communication technology infrastructure, encompassing broadband penetration, data centre capacity, and cloud computing capabilities. A well-developed digital infrastructure is fundamental to enabling high-speed connectivity, secure data storage, and seamless digital interactions across industries. It supports economic resilience by facilitating remote work, e-governance, and automation in key sectors such as manufacturing, healthcare, and finance. Countries with strong digital infrastructure are better positioned to attract investments in technology-driven businesses and foster innovation ecosystems. Gaps in digital infrastructure, however, can limit access to essential digital services, widening economic disparities and slowing overall technological progress.

Chart 3: Region-wise Digital Infrastructure Index in CY23



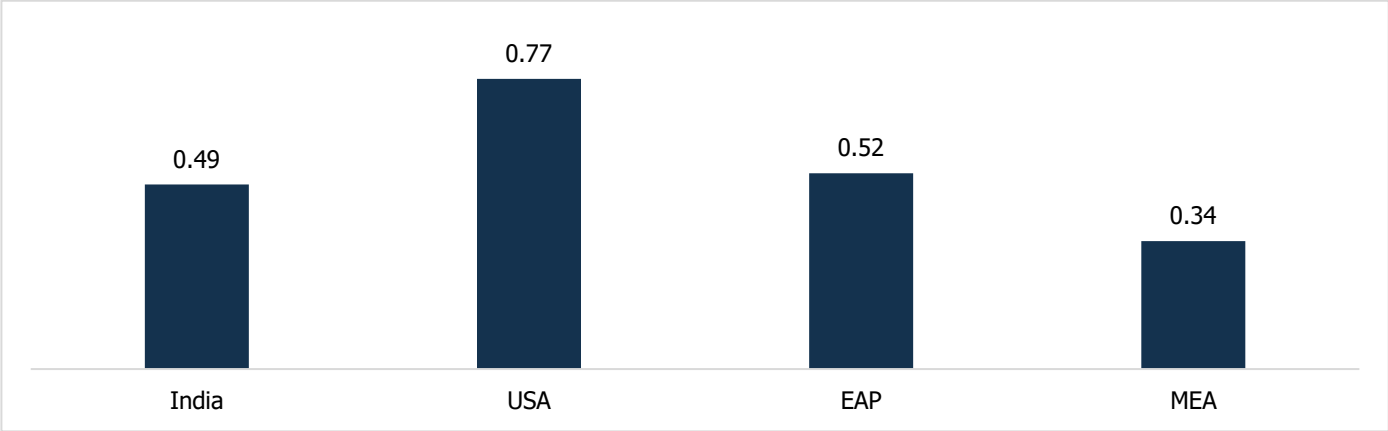
Source: World Bank

In CY23, the Digital Infrastructure Index highlights a clear disparity across regions, with the USA leading at 0.19, followed by EAP at 0.13, India at 0.11, and the MEA trailing at 0.06. India's Digital Infrastructure Index score reflects progress in expanding broadband and digital services, particularly in urban areas.

AI Preparedness Index:

The AI preparedness index measures a country's ability to integrate artificial intelligence into its economy, considering factors such as data availability, computing power, skilled workforce, and regulatory frameworks. Nations with high AI preparedness can leverage automation, machine learning, and advanced analytics to enhance productivity, optimize decision-making, and drive economic competitiveness. AI adoption plays a crucial role in transforming industries such as healthcare, finance, and manufacturing by improving efficiency and reducing operational costs. However, countries with weak AI readiness may struggle to keep pace with global technological advancements, facing challenges related to talent shortages, ethical concerns, and inadequate infrastructure. Policymakers and businesses must collaborate to develop AI strategies that promote responsible innovation while addressing risks associated with bias, privacy, and workforce displacement.

Chart 4: Region-wise AI Preparedness Index in CY23

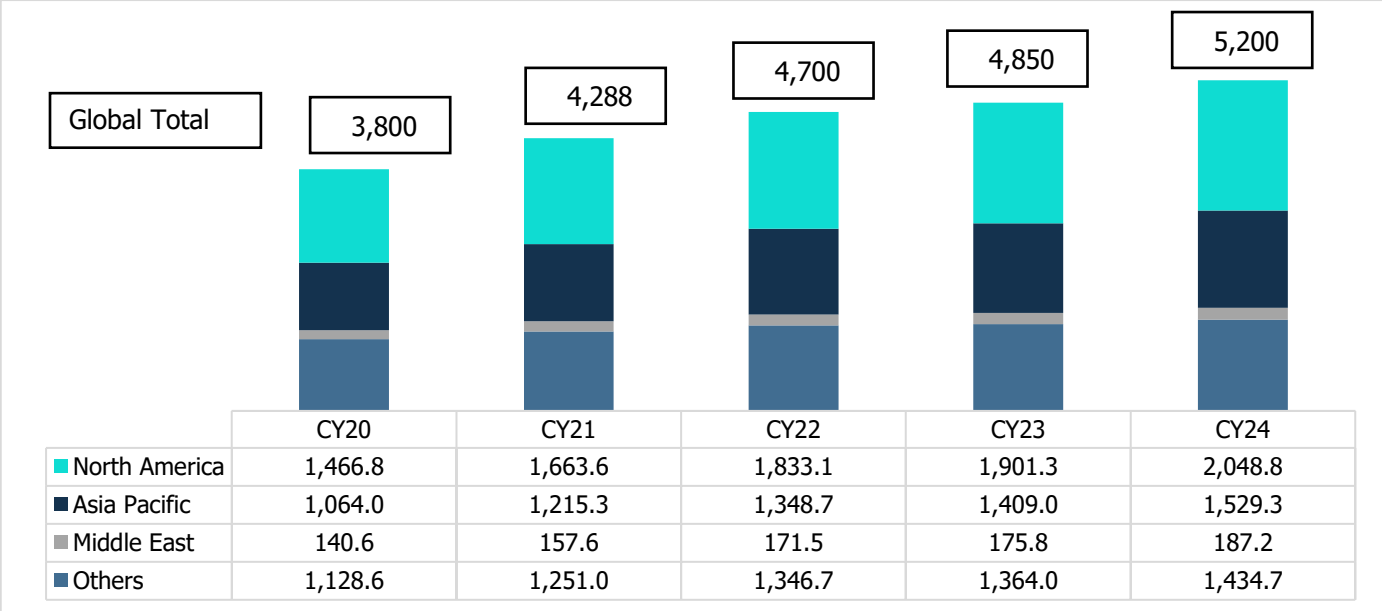


Source: World Bank

India's AI preparedness at 0.49 signals early progress however, challenges persist in institutional capacity, data governance, and ecosystem coordination.

1.2 Global region wise government spending on IT & digital initiatives

Chart 5: Region-wise government spending on IT & digital initiatives



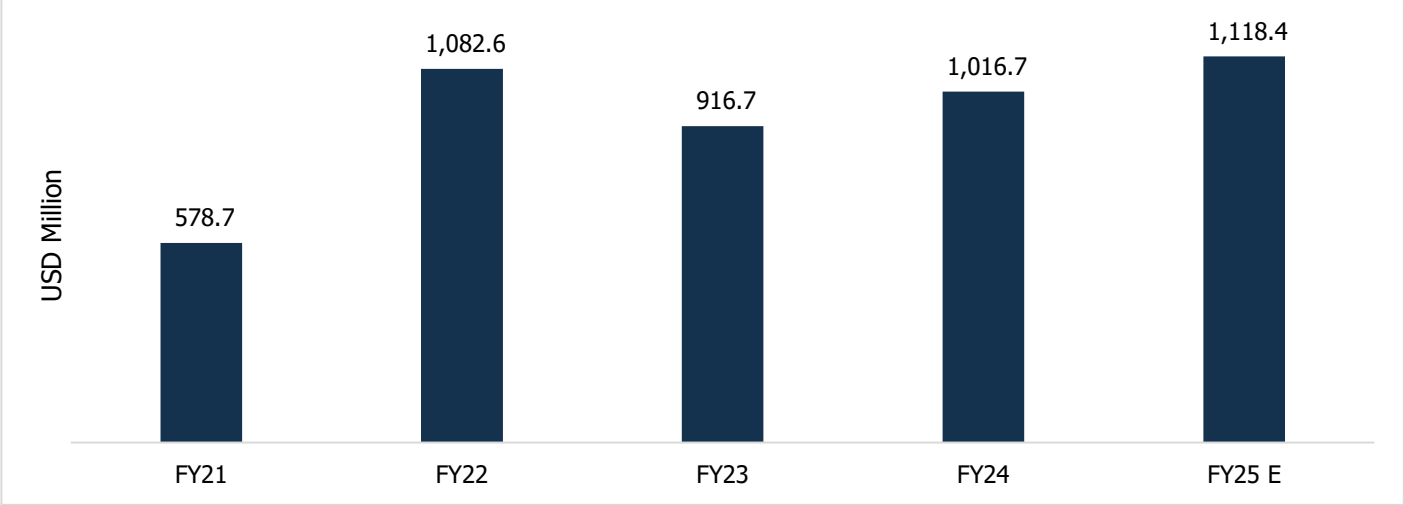
	CY20	CY21	CY22	CY23	CY24
North America	1,466.8	1,663.6	1,833.1	1,901.3	2,048.8
Asia Pacific	1,064.0	1,215.3	1,348.7	1,409.0	1,529.3
Middle East	140.6	157.6	171.5	175.8	187.2
Others	1,128.6	1,251.0	1,346.7	1,364.0	1,434.7

Source: IMARC, CareEdge Research

The global spending on IT and digital initiatives has demonstrated a steady upward trajectory, growing at a CAGR of 7.9% between CY20-CY24, reaching USD 5,200 billion in CY24. This sustained growth is driven by the increasing importance of digital transformation, driven by advancements in cloud computing, AI, and cybersecurity. Across regions, major companies have scaled their IT investments to enhance efficiency, competitiveness, and resilience in an evolving digital landscape.

North America remains the largest contributor, with spending rising from USD 1,466.8 billion in CY20 to USD 2,048.8 billion in CY24, growing at a CAGR of 8.7% followed by Asia pacific region, which grew at a CAGR of 9.5% from CY20 to CY24, Middle East, though smaller in scale, showed a steady rise, reaching USD 124.8 billion and USD 187.2 billion, respectively, growing at CAGR 7.4%, highlighting increasing IT infrastructure investments in emerging markets. Meanwhile, the "Others" category, which includes the African region, has experienced a CAGR of 7.1% between CY20-CY24, indicating growing digitalization.

Chart 6: Indian government's spending on IT & digital initiatives



Source: IMARC, CareEdge Research

The Indian government's spending on IT and digital initiatives continues to grow at an upward trajectory. Government spendings on IT & digital initiative is expected to grow at a CAGR of 18.4% between FY21-FY25E, reaching USD 1,118.4 million in FY25. This consistent growth expected to have been supported by the government's increasing focus on digital transformation, e-governance, and cybersecurity to enhance public service delivery and infrastructure modernization.

1.3 Digital Transformation as an Economic Growth Driver

1.3.1 Role of digitalisation in economic development

Digitalization plays a crucial role in economic development by reshaping industries, enhancing productivity, and fostering innovation across various sectors. Digitalization enables seamless connectivity, enhances supply chain transparency, and empowers organizations to optimize resources effectively. By leveraging digital technologies such as artificial intelligence (AI), cloud computing, big data analytics, and the Internet of Things (IoT), businesses and governments can improve efficiency, reduce operational costs, and create new economic opportunities. The transition towards digital economies has led to increased competitiveness, enabling both developed and emerging economies to harness technology-driven growth.

Digitalization has significantly enhanced productivity and efficiency by automating processes, optimizing resource allocation, and streamlining decision-making. Automation, AI-driven analytics, and cloud computing have transformed business operations, allowing organizations to streamline processes and improve decision-making. In manufacturing, Industry 4.0 innovations such as smart factories, robotic automation, and predictive maintenance have led to minimized downtime and increased output. And in the service sector, digitalization facilitates remote work, enhances customer engagement, and improves the overall speed and quality of service delivery.

Digitalization has also become a key driver of employment generation and workforce evolution. While it may displace certain traditional jobs, it simultaneously creates new employment opportunities in technology-driven industries. The demand for skilled professionals in fields such as AI, cybersecurity, and software development while also driving the gig economy's expansion.

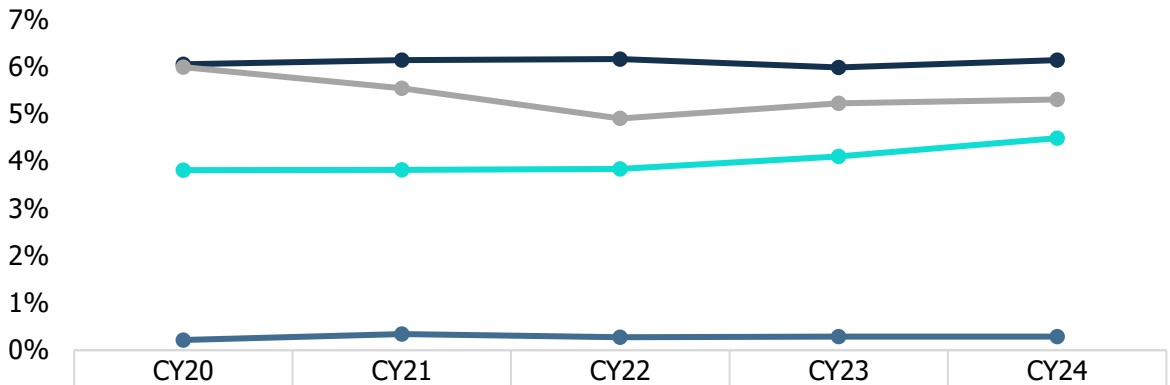
Additionally, digital trade and e-commerce are accelerating economic globalization, enabling SMEs to reach wider markets through fintech and digital payment solutions. E-commerce has not only boosted business growth but has also enhanced consumer convenience, fostering greater inclusion and revenue generation for both businesses and governments. Digitalization has enabled financial inclusion through ease of access to banking through digital payments, mobile platforms, and peer-to-peer lending, particularly in untapped and under-served regions.

Governments play a pivotal role in ensuring that digitalization translates into sustainable economic growth by implementing robust policies, regulations, and infrastructure investments. Digital transformation strategies, such as smart cities, digital public services, and cybersecurity frameworks, help create a conducive environment for technological adoption. Investments in broadband connectivity, 5G networks, and data protection measures are essential in fostering a resilient and innovative digital economy. Additionally, regulatory policies that promote fair competition, consumer data protection, and digital literacy contribute to a balanced and inclusive economic landscape.

However, digitalization has its own challenges such as cybersecurity threats, data privacy concerns, and the growing digital divide can impact economic development. Cyberattacks on businesses, financial institutions, and critical infrastructure can have severe economic repercussions, making it imperative for organizations to invest in robust cybersecurity frameworks.

1.3.2 Government digital spending as a percentage of total GDP across key regions

Chart 7: Government digital spending as a percentage of total nominal GDP across key regions



	CY20	CY21	CY22	CY23	CY24
India	0.2%	0.3%	0.3%	0.3%	0.3%
North America	6.1%	6.1%	6.2%	6.0%	6.1%
Africa	3.8%	3.8%	3.8%	4.1%	4.5%
Middle East	6.0%	5.5%	4.9%	5.2%	5.3%

Source: IMF, IMARC, CareEdge Research

Over the years, government digital spending as a percentage of GDP has followed distinct trajectories across key regions. North America maintained a steady commitment, ranging between 6.0%–6.2% of government digital spending as a percentage of GDP, reflecting a consistent investment in digital infrastructure. The Middle East experienced an initial decline from 6.0% in CY20 to 4.9% in CY22, followed by a modest recovery to 5.3% in CY24. Africa remained steady at 3.8% government digital spending as a percentage of GDP between CY20-CY22, before increasing to 4.5% in CY24, indicating a strengthening focus on digital initiatives.

While other regions like Africa, the Middle East, and North America have demonstrated either stability or growth, India's digital spending remains in its nascent stages. India's government digital spending as a percentage of GDP has remained in the range of 0.2%-0.3% between CY20-CY24. India's focus has been more towards infrastructure, subsidies, agriculture, food securities, housing, etc. in terms of budgetary spending. However, in the post-Covid-19 era, India's budgetary spend on IT and digitization has been increasing as the Government is emphasising on creation of Digital Public Infrastructure (DPI), cyber security, and AI policy.

1.3.3 Public-private partnerships in digital transformation

Public-private partnerships (PPPs) play a crucial role in enhancing digital infrastructure and connectivity. PPPs aid in accelerating digital transformation by combining government support with private sector innovation, expertise, and investment. These collaborations help modernize public services through technologies like AI, cloud computing, and blockchain, ensuring scalable and efficient digital infrastructure.

Additionally, PPPs also aid in risk mitigation and innovation. Government can provide regulatory stability, while private entities introduce advanced cybersecurity measures and emerging technologies. This shared responsibility ensures digital initiatives remain adaptable to evolving technological landscapes, reducing risks of obsolescence.

PPPs in digital infrastructure include India's BharatNet project, which aims to provide broadband connectivity to rural areas through a government-private collaboration. Furthermore, PPPs are being explored in Digital ID Infrastructure,

where private entities contribute to the development and management of national digital identity programs while the government retains regulatory oversight.

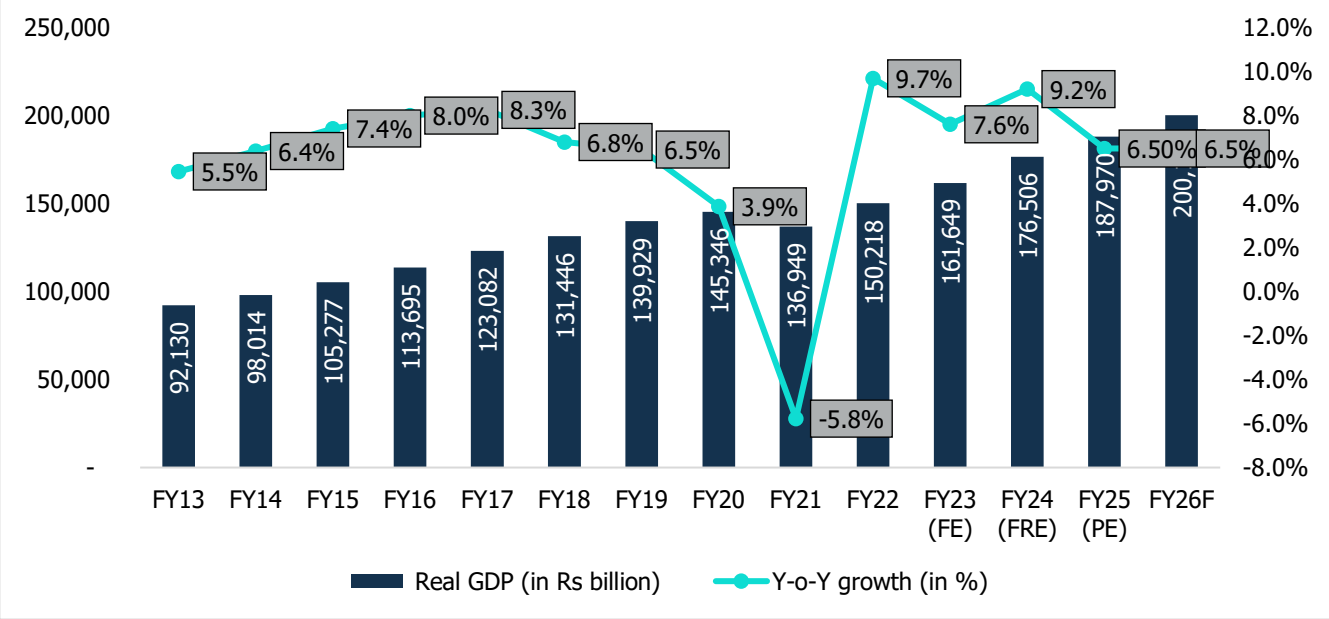
1.4 Indian Economic & Digital Growth Indicators

1.4.1 GDP & GVA trends in India – key drivers for IT sector growth & digital growth levers

1.4.1.1 GDP Trends in India

Resilience to External Shocks remains Critical for Near-Term Outlook

Chart 8: Trend in Real Indian GDP growth rate



Note: SAE – Second Advance Estimates, FE – Final Estimate, FAE- First Advance Estimate; Source: MOSPI

India's real GDP grew by 9.2% in FY24 (Rs. 176,506 billion) which is the highest in the previous 12 years (excluding FY22, on account of end of pandemic) and as per provisional estimates, it grew at 6.5% in FY25 (Rs. 187,970 billion), driven by double digit growth particularly in the Manufacturing sector, Construction sector and Financial, Real Estate & Professional Services. This growth is also led by private consumption increasing by 7.6% and government spending increasing by 3.8% Y-o-Y. Real GDP growth is projected at 6.5% in FY26 as well, driven by strong rural demand, improving employment, and robust business activity.

GDP Growth Outlook (April 2025)

FY26 GDP Outlook: The RBI projects real GDP growth at 6.5% for 2025–26, driven by strong private consumption, steady investment, and resilient rural and urban demand. A favourable monsoon, robust services sector, and improving corporate balance sheets support this outlook.

However, risks from prolonged geopolitical tensions, global trade disruptions, and weather-related uncertainties remain. Taking these into account, the RBI has reaffirmed its growth projections.

Table 3: RBI's GDP Growth Outlook (Y-o-Y %)

FY26P (complete year)	Q1FY26	Q2FY26P	Q3FY26P	Q4FY26P
6.5%	7.8%	6.7%	6.6%	6.3%

Note: P-Projected, Projection numbers based on the RBI; Source: RBI, MOSPI

1.4.1.2 GVA Trends in India

The agriculture and allied sector grew by 4.6% in FY25 (up from 2.7% in FY24), contributing 14.4% to real GVA, supported by a good monsoon, better crop output, and strong allied activities. The industrial sector grew by 5.9% in FY25, down from 9.5% in FY24 due to weaker manufacturing, with FY24 growth driven by strong manufacturing sales, construction (9.4%), utilities, and supportive policies. The services sector grew by 7.2% in FY25, down from 9.0% in FY24, supported by public administration (8.9%), financial services (7.2%), and trade and transport (6.1%), contributing Rs 94.4 trillion to the economy.

Table 4: Sectoral Growth (Y-o-Y % Growth) - at Constant Prices

At constant Prices	FY19	FY20	FY21	FY22	FY23 (FE)	FY24 (FRE)	FY25 (PE)
Agriculture, Forestry & Fishing	**2.1**	**6.2**	**4.1**	**3.5**	**5.1**	**2.7**	**4.6**
Industry	**5.3**	**-1.4**	**-0.9**	**11.6**	**2.0**	**10.8**	**5.9**
Mining & Quarrying	-0.9	-3.0	-8.6	7.1	2.8	3.2	2.7
Manufacturing	5.4	-3.0	2.9	11.1	-3.0	12.3	4.5
Electricity, Gas, Water Supply & Other Utility Services	7.9	2.3	-4.3	9.9	11.5	8.6	5.9
Construction	6.5	1.6	-5.7	14.8	10.0	10.4	9.4
Services	**7.2**	**6.4**	**-8.2**	**8.8**	**11.3**	**9.0**	**7.2**
Trade, Hotels, Transport, Communication & Broadcasting	7.2	6.0	-19.7	13.8	14.4	7.5	6.1
Financial, Real Estate & Professional Services	7.0	6.8	2.1	4.7	10.7	10.3	7.2
Public Administration, Defence and Other Services	7.5	6.6	-7.6	9.7	8.2	8.8	8.9
GVA at Basic Price	**5.8**	**3.9**	**-4.2**	**8.8**	**7.4**	**8.6**	**6.4**

Source: MOSPI; Note: FRE – First Revised Estimates, FE- Final Estimates, PE – Provisional Estimates

1.4.1.3 Key Growth Drivers for IT sector growth & digital growth levers in India

1. **Skilled Workforce Driving Innovation**

   India's vast pool of engineers and IT professionals, coupled with cost competitiveness, has solidified its position as a global technology hub. The demand for expertise in AI, cloud computing, and cybersecurity continues to grow, fuelling sectoral expansion.

2. **Internet User Base**

   India's massive internet user base, exceeding 850 million, is driving demand for digital services across sectors. This widespread connectivity, especially in non-metro areas, fuels growth in IT-led platforms such as e-commerce, fintech, and healthtech. The demographic advantage of a young, tech-savvy population accelerates digital adoption and service scalability.

3. **AI/Data Annotation Expansion**
   India is emerging as a global hub for AI and data annotation services, leveraging its skilled workforce and cost efficiency. Rising demand for AI/ML model training, computer vision, etc positions Indian IT firms as key players in the global data economy.

4. **Affordable Data Costs**
   India's low mobile data tariffs have democratized digital access, boosting consumption of online services and applications. This has enhanced demand for IT infrastructure, cybersecurity, and cloud solutions. Affordable connectivity supports national digitization efforts and drives sustained IT sector growth.

5. **Government-Led Digital Acceleration**
   Initiatives like Digital India, Startup India, and Make in India have accelerated digital transformation, expanding digital services, e-governance, and IT infrastructure. India has emerged as the 3rd largest startup hub in the world. India's startups have leveraged emerging technologies such as artificial intelligence (AI), blockchain, and IoT to solve local and global problems. This culture of innovation, supported by incubators, accelerators, and robust mentoring networks, has fostered a unique ecosystem that bridges grassroots challenges with cutting-edge solutions. Recognizing the transformative potential of startups, the Indian government has introduced several initiatives to support and nurture entrepreneurship. Launched in 2016, the flagship Startup India program, has been a cornerstone in this effort. As per PIB's press release, as on May 07, 2025, 173,051 startups have been recognized by Department for Promotion of Industry and Internal Trade (DPIIT).
   Furthermore, Investments in broadband and 5G networks are further enabling connectivity-driven growth. And the adoption of cloud computing, artificial intelligence, and IoT is modernizing business operations across sectors. AI-driven automation and data analytics are enhancing efficiency in finance, healthcare, and manufacturing.

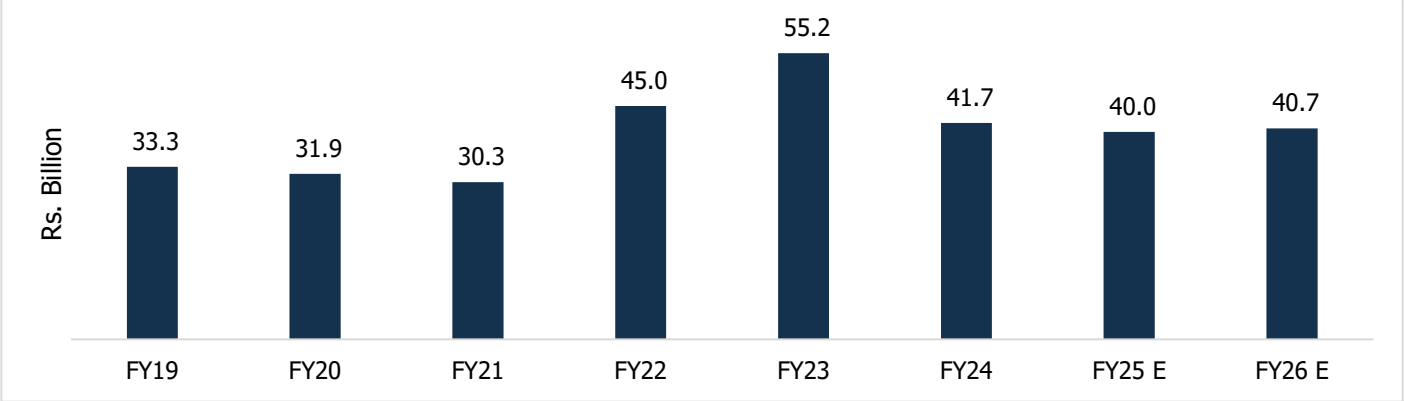
6. **Expanding Digital Economy and Consumer Tech Boom**
   Rising smartphone penetration, digital payments, and e-commerce adoption are transforming India's economic landscape. Platforms like UPI and fintech solutions have boosted financial inclusion and consumer spending in the digital space.

7. **Growing Enterprise Demand and Thriving Startup Ecosystem**
   As a leading provider of IT and business process management (BPM) services, India remains a preferred outsourcing destination. Growing enterprise demand for digital transformation, cloud solutions, and cybersecurity is driving sustained revenue growth. And India's booming startup landscape, backed by venture capital and innovation hubs, is fostering new-age solutions in fintech, edtech, SaaS, and healthtech. The rise of unicorns signals a robust entrepreneurial wave.

1.4.2 Digital India: Impact on government IT spending

The digital India initiative has witnessed significant increase in budget allocations, driven by rising investments in digital infrastructure, cybersecurity, and initiatives such as AI-driven governance, digital payments expansion, and 5G implementation. The digital India initiative budget grew from Rs. 33.3 billion in FY19 to ~Rs. 41.7 billion in FY24, indicating a CAGR of ~4.6%. Organised private players are expected to capture more share in existing budget allocated towards digital India initiatives. With introduction of public-private partnerships, this shared responsibility ensures digital initiatives remain adaptable to evolving technological landscapes, reducing risks of obsolescence.

Chart 9: Digital India Initiative Budget

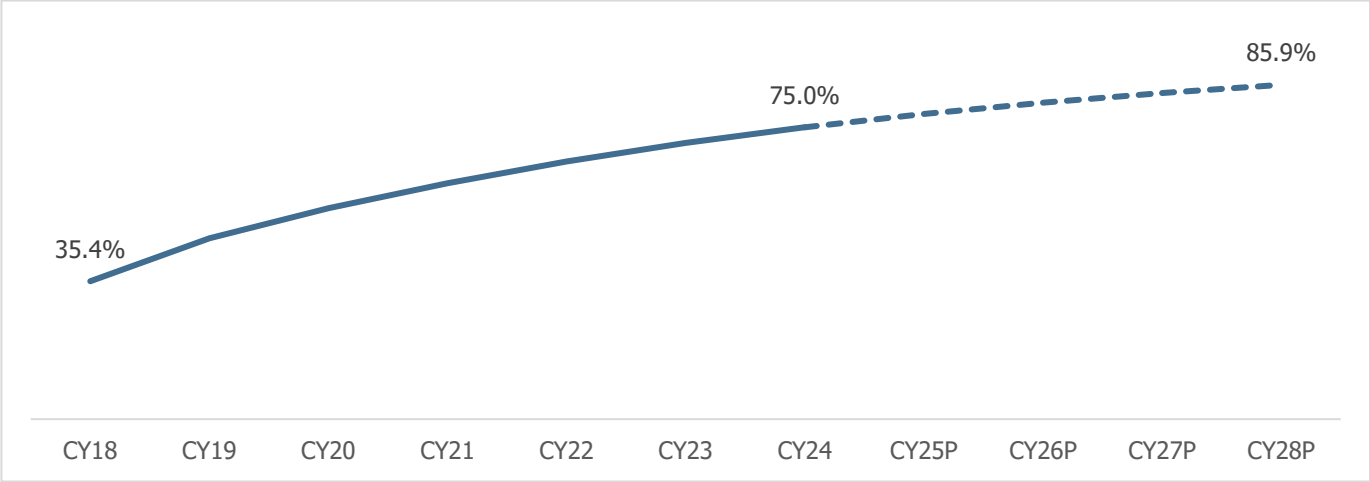


Source: Union Budget
Note: FY25 is estimates and FY26 is budget estimates

1.4.3 Key indicators of digitalization

The Indian economy is witnessing push towards digital economy with and growing internet penetration, rise in smartphone adoption and increased adoption of digital payments have accelerated technology and digital transformation. The smartphone penetration has witnessed an uptick from 35% in CY18 to 75% in CY24 and is expected to reach 86% by CY28.

Chart 10: Smartphone Penetration



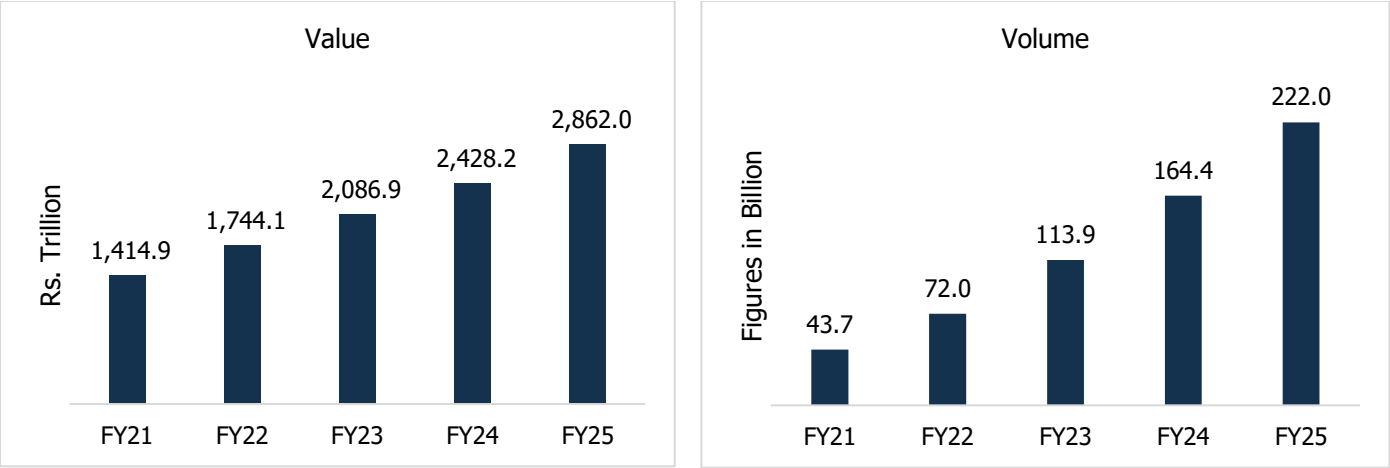
Source: Maia Research, CareEdge Research
Note: P indicates projected

The number of active internet users has also been growing substantially over the years. However, there is still significant potential growth in internet as well as smartphone penetration, especially in rural areas. With video watching and video calling being the top two online activities, smartphone usage is also booming. India is one of the leading consumers of data per day with approximately 5 hours of daily time spend on smartphones. Overall, the growing penetration of internet and smartphones, and high data usage indicates healthy potential telecom services in India.

Digital transactions volumes

Digital payments in India grew in volume from 43.7 billion in FY21 to 222.0 billion in FY25, with a 50.1% CAGR. Digital payments in value grew from Rs 1,415 trillion in FY21 to Rs 2,862 trillion in FY25, with a CAGR of 19.3%.

Chart 11: Digital payment transactions by value and volume

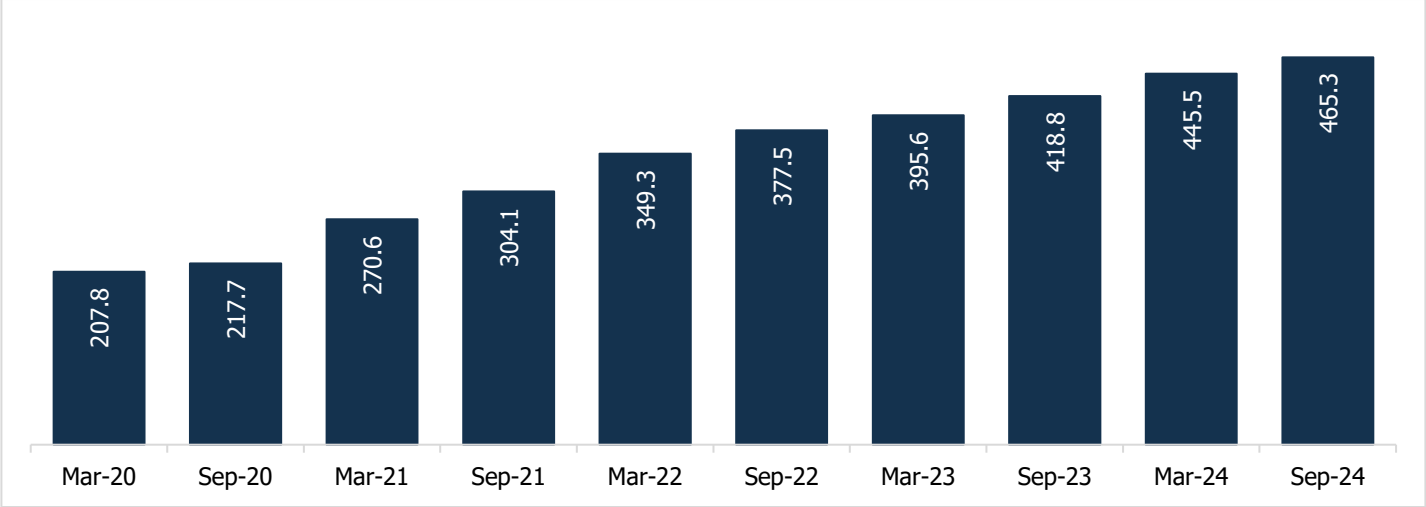


Source: RBI

India's digital transformation is driven by factors like expanding broadband, affordable data, and government initiatives. The launch of UPI revolutionized payments in turn enhancing financial inclusion. With over 647 banks integrated and more than 350 million unique users, UPI has become the country's largest digital payment network BHIM further advanced cashless transactions, while platforms like COWIN showcased digital infrastructure's role in public health. Furthermore, DigiLocker improved paperless governance by securely storing documents and FASTag automated toll payments, supporting the cashless economy. Today, UPI accounts for 85 per cent of all digital transactions in India. Its impact goes beyond national borders, powering nearly 50 per cent of global real-time digital payments.

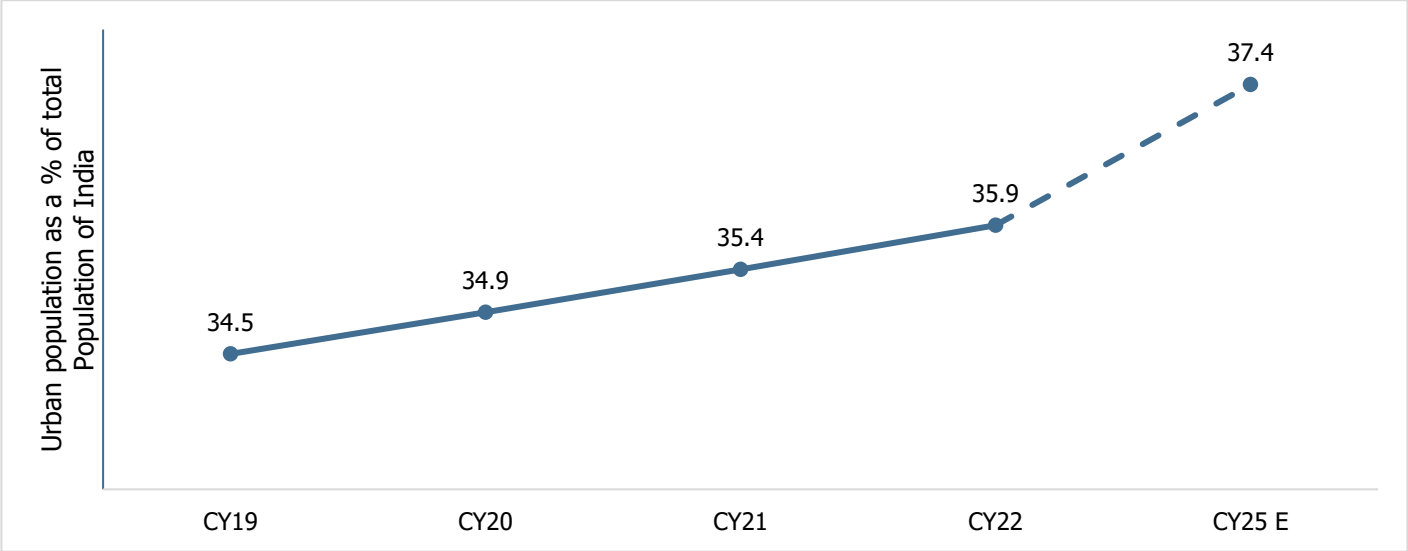
The Digital India initiative, launched in 2015, focuses on digital infrastructure, governance, and empowerment, making services more accessible and promoting financial inclusion. Additionally, this initiative has also made stock market and mutual fund investments more accessible, efficient, and transparent for a wider audience. As of September 2024, the RBI's Digital Payments Index reached 465.3, reflecting a 4.5% y-o-y growth, driven by advancements in payment performance and infrastructure. India has emerged as the global leader in fast payments, according to a recent note by the International Monetary Fund titled Growing Retail Digital Payments: The Value of Interoperability. India's Unified Payments Interface is also now the world's number one real-time payment system. It has surpassed Visa to take the lead in processing daily transactions. UPI handles more than 640 million transactions every day, compared to Visa's 639 million. This scale is extraordinary, especially when you consider that UPI achieved it in just nine years.

Chart 12: Digital Payment Index



Source: RBI

Chart 13: Urbanization trends



Source: World Bank

India's urban population has shown a steady rise, increasing from 34.5% in CY19 to 37.4% in CY25E. This consistent growth is likely to be driven by economic development, infrastructure expansion, and rural-urban migration. The upward trend indicates a shift toward greater urban concentration, highlighting the need for better urban planning and infrastructure development.

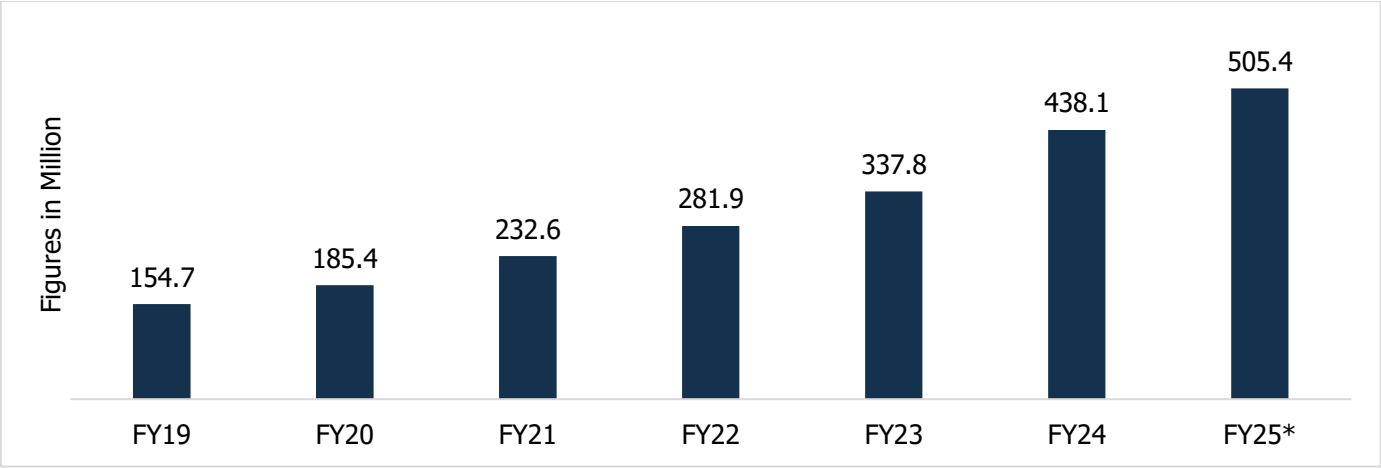
1.4.4 Financial Inclusion & Aadhaar-based Digital Ecosystem

Financial inclusion means to ensure that underserved individuals and businesses access to affordable and essential financial services such as banking, credit, insurance, and digital payments. Financial inclusion fosters economic growth, curbs poverty, and enhances financial resilience by integrating more people into the formal financial system.

To improve financial inclusion, the government has taken several initiatives, such as Pradhan Mantri Suraksha Bima Yojana (PMSBY) was launched on May 09, 2015. PMSBY is an accident insurance scheme covering death and disability.

The scheme has seen a consistent increase in enrolments, indicating rising awareness and penetration of insurance among the underprivileged population.

Chart 14: PMSBY Enrolments



Source: PIB Note: FY25* indicates data as of March 19, 2025

PMSBY enrolments have grown at a CAGR of 21.8% between FY19-FY25*, reaching 505.4 million enrolments as on 19th March 2025 indicating sustained policy adoption and enhanced financial inclusion efforts.

Aadhaar-based Digital Ecosystem

India's Aadhaar system is, managed by the Unique Identification Authority of India (UIDAI). Established in 2009, UIDAI's Aadhaar-based ecosystem enables secure authentication, financial inclusion, and governance. The system is powered by a secure authentication framework that facilitates real-time identity verification through Authentication User Agencies (AUAs) and Authentication Service Agencies (ASAs). AUAs, such as banks and telecom providers, leverage ASAs to connect with UIDAI's Central Identities Data Repository (CIDR) for biometric and OTP-based authentication, ensuring fraud-resistant digital interactions.

Biometric authentication, including fingerprint, iris, and facial recognition, is a cornerstone of the Aadhaar ecosystem, enhancing security across sectors. Biometric devices facilitate financial transactions through the Aadhaar Enabled Payment System (AePS) and ensure targeted welfare distribution, reducing leakages in government subsidies. The integration of Aadhaar with bank accounts and mobile numbers has strengthened initiatives like Direct Benefit Transfer (DBT) and the JAM Trinity (Jan Dhan-Aadhaar-Mobile), driving financial inclusion, efficient public service delivery.

A crucial pillar of the UIDAI ecosystem is the Aadhaar-based Electronic Know Your Customer (e-KYC) mechanism. This mechanism has revolutionized identity verification by enabling instant, paperless customer onboarding. As entities like banks, insurance firms, and telecom operators can digitally verify a customer's credentials in real time, this mechanism aids in reducing operational costs and risk of fraud.

Aadhaar Enabled Payment System (AePS) is a digital banking framework in India that allows users to perform financial transactions using their Aadhaar credentials and biometric authentication. It enables interbank transactions such as cash withdrawals, deposits, balance inquiries, and fund transfers, primarily through Micro ATMs and banking correspondents. As by leveraging Aadhaar-based authentication, e-Sign provides legally valid digital signatures that can be used for contracts, agreements, this improves compliance expedites workflows, eliminates paperwork, and enhances security in business and government digital transactions. AePS is significant in rural and semi-urban areas where traditional banking infrastructure is limited, driving financial inclusion and digital payments adoption.

2 Global & Indian IT & ITeS Industry Overview

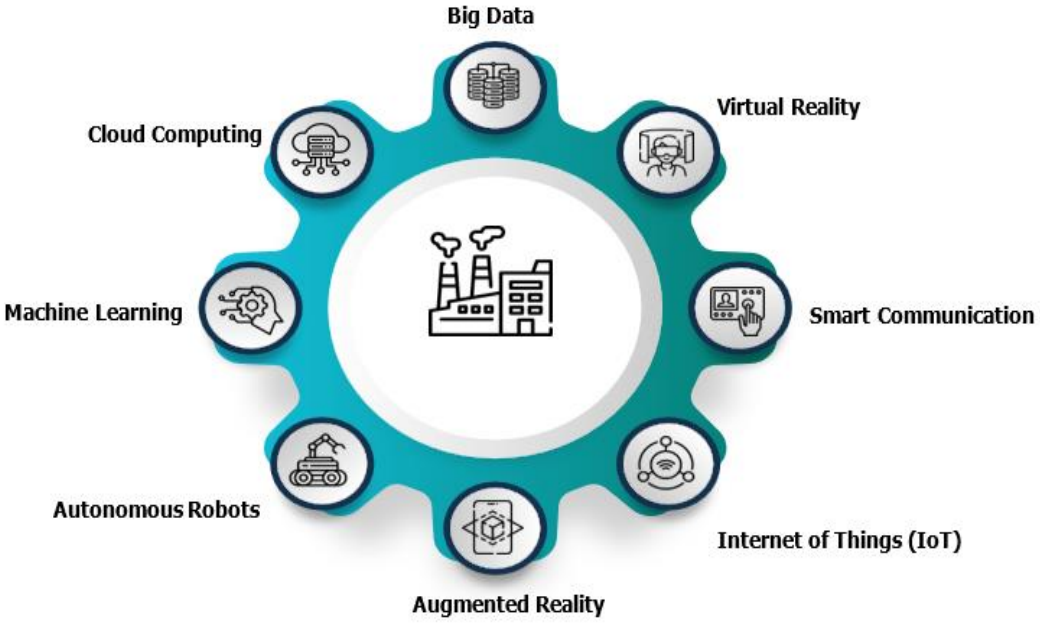
Information Technology and Information Technology Services (IT/ITeS) industry plays a key role in positioning India as a preferred investment destination for global investors. The industry also creates large scale employment and generates significant export revenues. Emerging technologies and rise in demand for collaborative applications, application platforms, security software, system & service management software, and content workflow & management applications now offers an entire gamut of opportunities for IT firms through cost-effectiveness, speedy deliveries, high reliability, exceptional quality. Increasing digitisation and rise in demand for emerging technologies like 5G, Advanced Data Analytics, Artificial Intelligence, Cloud Computing, Cyber-Security, Robotics and Blockchain provide growth opportunities for Indian IT/ITeS firms.

The Indian IT sector is at the forefront of adopting Industry 4.0, utilizing cutting-edge technologies to enhance innovation and efficiency. By incorporating AI, IoT, big data analytics, and robotics, Indian firms are revolutionizing conventional processes into intelligent, automated systems. Programs like "Digital India" and "Make in India" are also driving this transformation, helping Indian businesses secure a strong position in global markets.

Industry 4.0, also known as the Fourth Industrial Revolution (4IR), marks a transformative phase in digitization. It is characterized by disruptive advancements in data and connectivity, sophisticated analytics, seamless human-machine interaction, and considerable progress in robotics. Industry 4.0 propels innovation by leveraging four key categories of disruptive technologies across the value chain:

1. **Connectivity, Data, and Computational Power**: Cloud technology, blockchain, sensors, and the Internet enhance data flow and processing capabilities.
2. **Analytics and Intelligence**: Advanced analytics, machine learning, and artificial intelligence drive smarter decision-making and predictive insights.
3. **Human–Machine Interaction**: Virtual reality (VR), augmented reality (AR), robotics, automation, and autonomous guided vehicles transform collaborative processes.
4. **Advanced Engineering**: Technologies like additive manufacturing (3D printing), renewable energy, and nanoparticles revolutionize production and material science.

These breakthroughs redefine possibilities, fostering efficiency and innovation across industries.

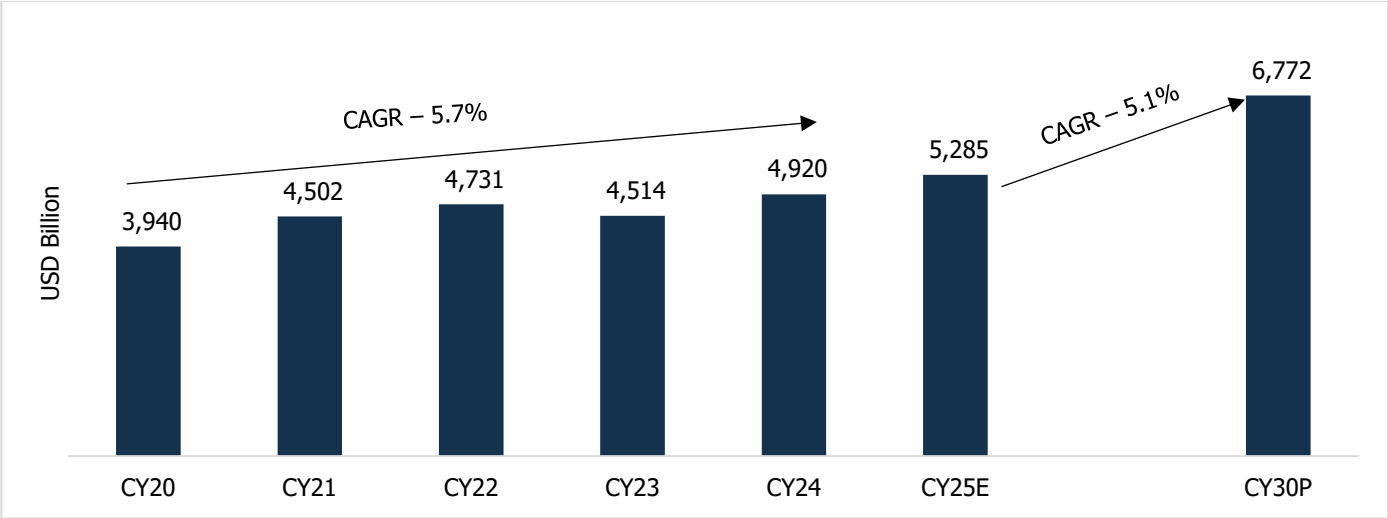


2.1 Global & Indian IT-ITeS Market Landscape

Digital transformation is driving businesses to utilize digital technologies to improve efficiency, enhance customer experiences, and promote innovation. Additionally, the increasing adoption of cloud computing is offering businesses scalable and cost-effective IT solutions. The growing importance of big data and analytics highlights the necessity for advanced IT services to manage and extract insights from data.

The advancement of technologies such as 5G, Blockchain, Augmented Reality (AR), and Artificial Intelligence (AI) is expected to positively influence the range of IT services available.

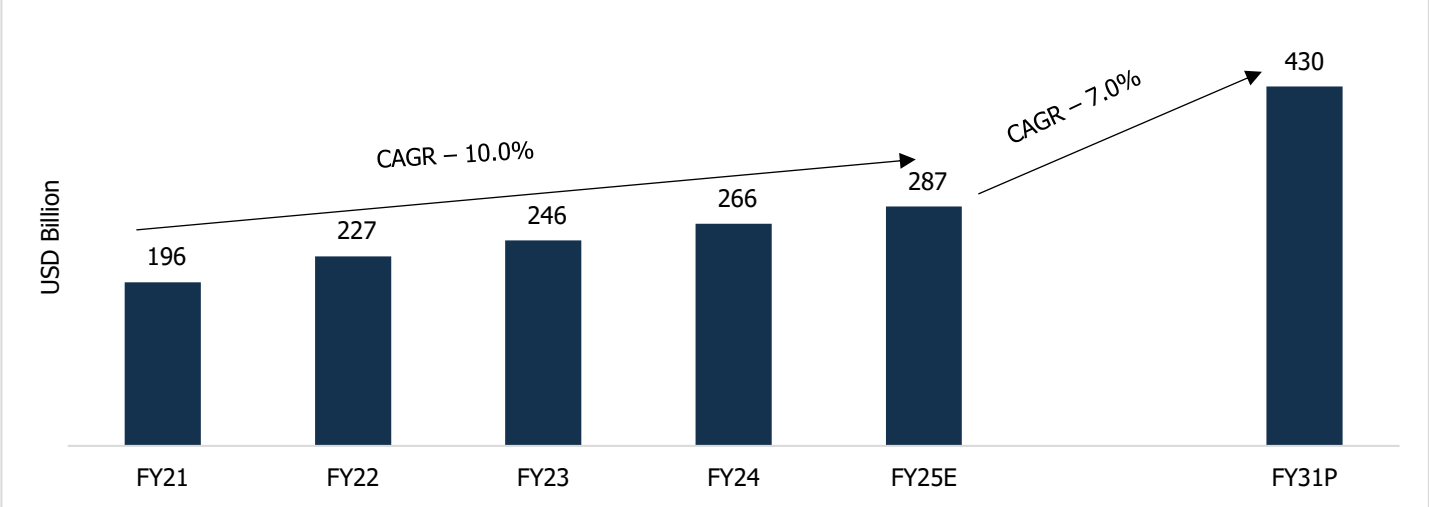
Chart 15: Global IT-ITeS Market Size



Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

The Global IT-ITeS market has increased at a CAGR of 5.7% from CY20 to CY24 and is worth USD 4,920 billion as of CY24 and is expected to grow at a CAGR of 5.1% from CY25 to CY30.

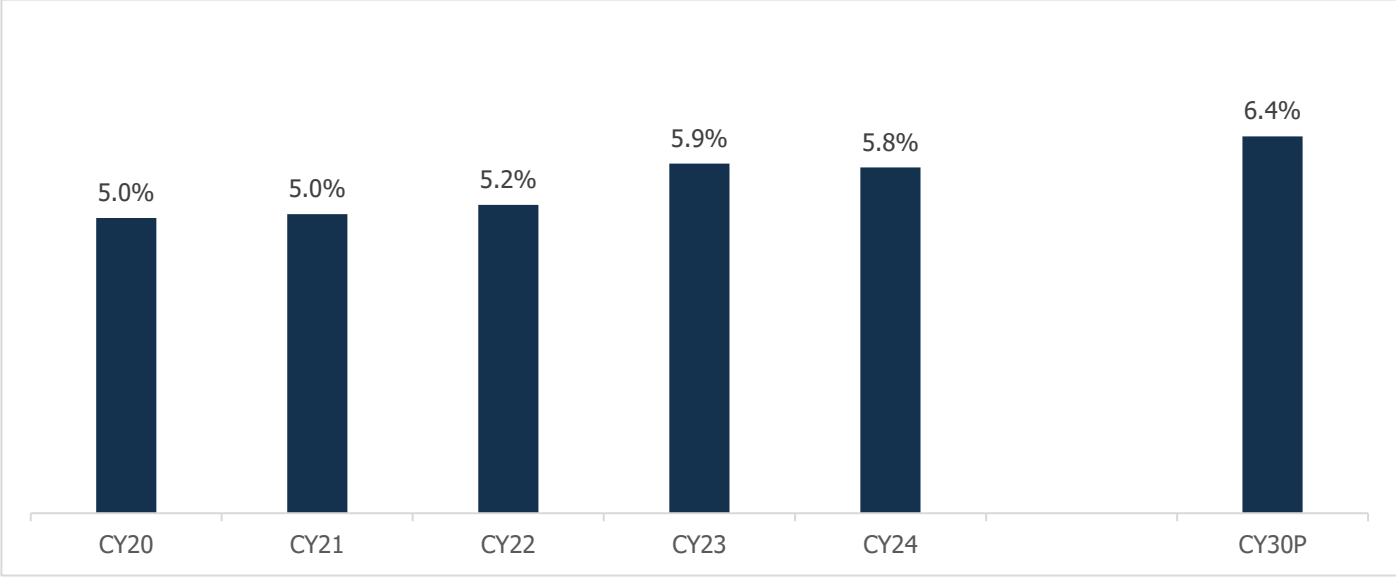
Chart 16: Indian IT-ITeS Market Size



Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

The Indian IT-ITeS market grew at a CAGR of 10% from FY21 to FY25 and is expected to be worth USD 287 billion as of FY25 and is expected to grow at a CAGR of 7% from FY25 to FY31.

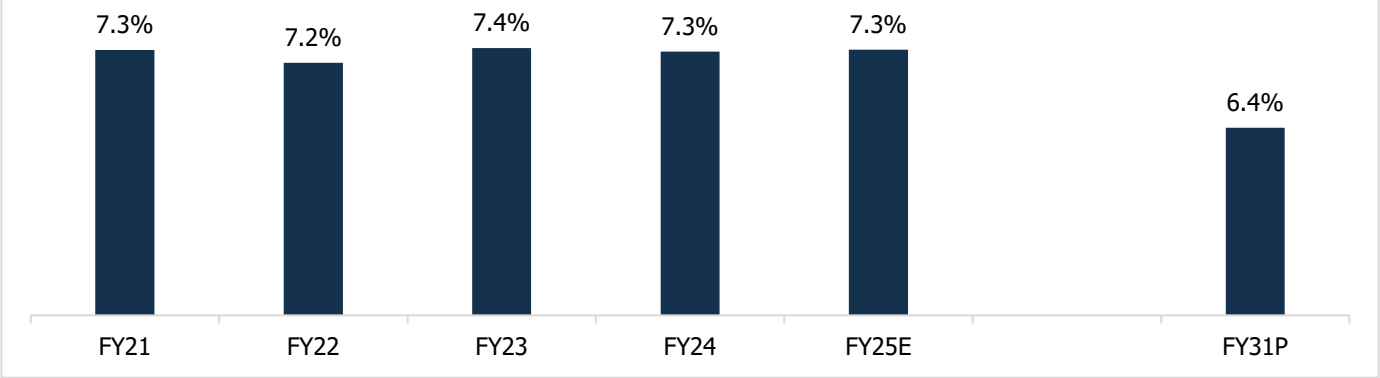
Chart 17: India IT market size as a percentage of global IT market size



Source: IMARC, CareEdge Research
Note: P indicates Projected

India's Information Technology (IT) market has demonstrated a steady increase in its share of the global IT market over the years, rising from 5.0% in CY20 and CY21 to a projected 6.4% by CY30. While the share remained stagnant in the initial two years, there was a noticeable increase beginning in CY22, reaching 5.2%, and further climbing to 5.9% in CY23. The projected rise to 6.4% by CY30 indicates a positive long-term outlook.

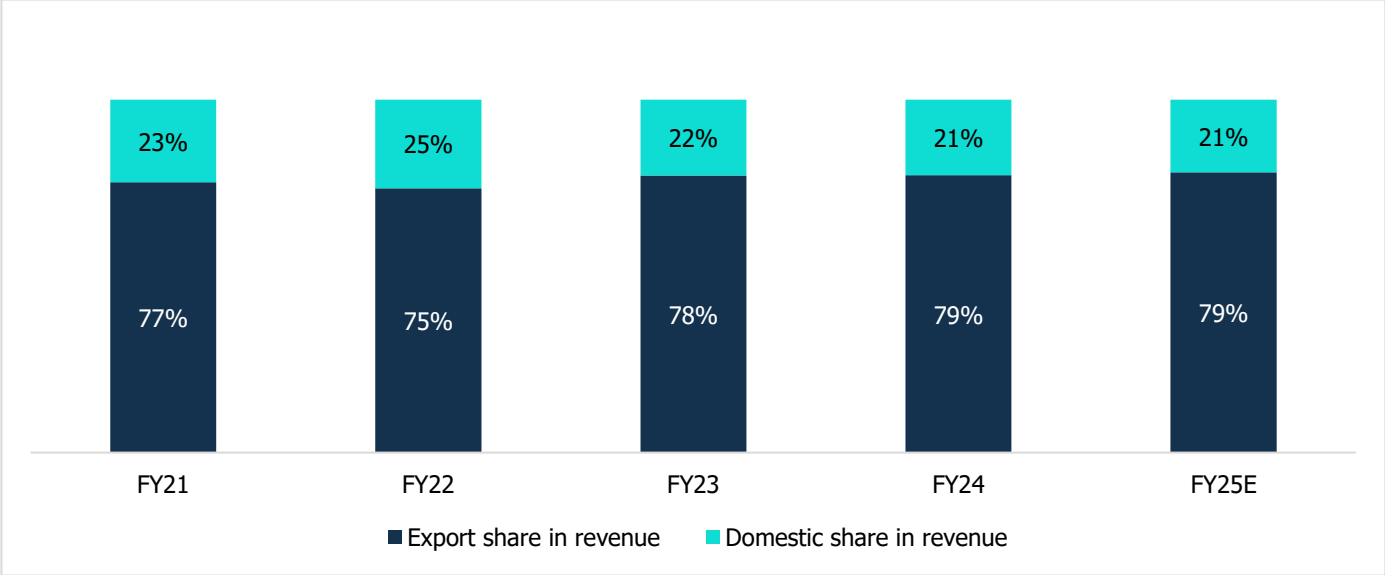
Chart 18: Market size of Indian IT-ITeS as percentage of Indian GDP (Current price)



Source: IMF, IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

The IT & ITeS sector's share of GDP remains strong at around 7.3% from FY21 to FY25E and is projected to be a healthy 6.4% in FY31P, reflecting India's dynamic economic diversification. While India's IT industry continues to expand in absolute terms, the slight shift in its GDP share highlights the rapid expansion and strengthening of other sectors, showcasing India's diversified economic progress.

Chart 19: Trend in Revenue Breakup



Source: NASSCOM, CareEdge Research
Note: E indicates Estimated

Exports are expected to witness a growth of 12.5 % in FY25 compared to 3.4% growth in FY24, owing to the increased reliance of businesses on technology, the roll-out of cost-reducing deals and the use of core operations. Growth in exports was seen across all the major markets, with the USA, Europe (excl. UK), and the UK continues to be the major markets. Many firms are now focusing on new markets, more prominently the Middle East and Latin America leading to market diversification which will increase the IT sector's resilience in the coming years. The share of exports in total revenue is rising and has increased from 75% in FY19 and is expected to contribute to approx. 79%. In 2024, the industry houses over 1750+ GCCs reflecting a growing emphasis on high-value services and product engineering. The

industry exports revenue now indicates an equal revenue split between Global MNCs (including GCCs) and Indian service providers.

2.1.1 Market Segmentation wise outlook

The IT market can be segmented into four key categories:

1. **Services**: This includes consulting, system integration, managed services, cloud services, cybersecurity, application development, and outsourcing. These services aim to optimize business operations and enhance efficiency. The IT service market size is projected to grow at a CAGR of 6.7% from FY25 to FY31 reaching at USD 163 billion.
2. **Hardware**: Covers physical components such as servers, storage devices, networking equipment, and end-user devices. Hardware support services like maintenance and repair also fall under this category. The Hardware market size is projected to grow at a CAGR of 5.1% from FY25 to FY31 reaching at USD 103 billion.
3. **Software**: Encompasses software development, business process outsourcing (BPO), software testing, quality assurance, and cloud-based software solutions like SaaS (Software as a Service). The Software market size is projected to grow at a CAGR of 9.1% from FY25 to FY31 reaching at USD 109 billion.
4. **Licensing:** Involves the sale and management of software licenses, including subscription-based models, perpetual licenses, and enterprise agreements, ensuring compliance and access to necessary tools. The Licensing market size is projected to grow at a CAGR of 7.9% from FY25 to FY31 reaching at USD 55 billion.

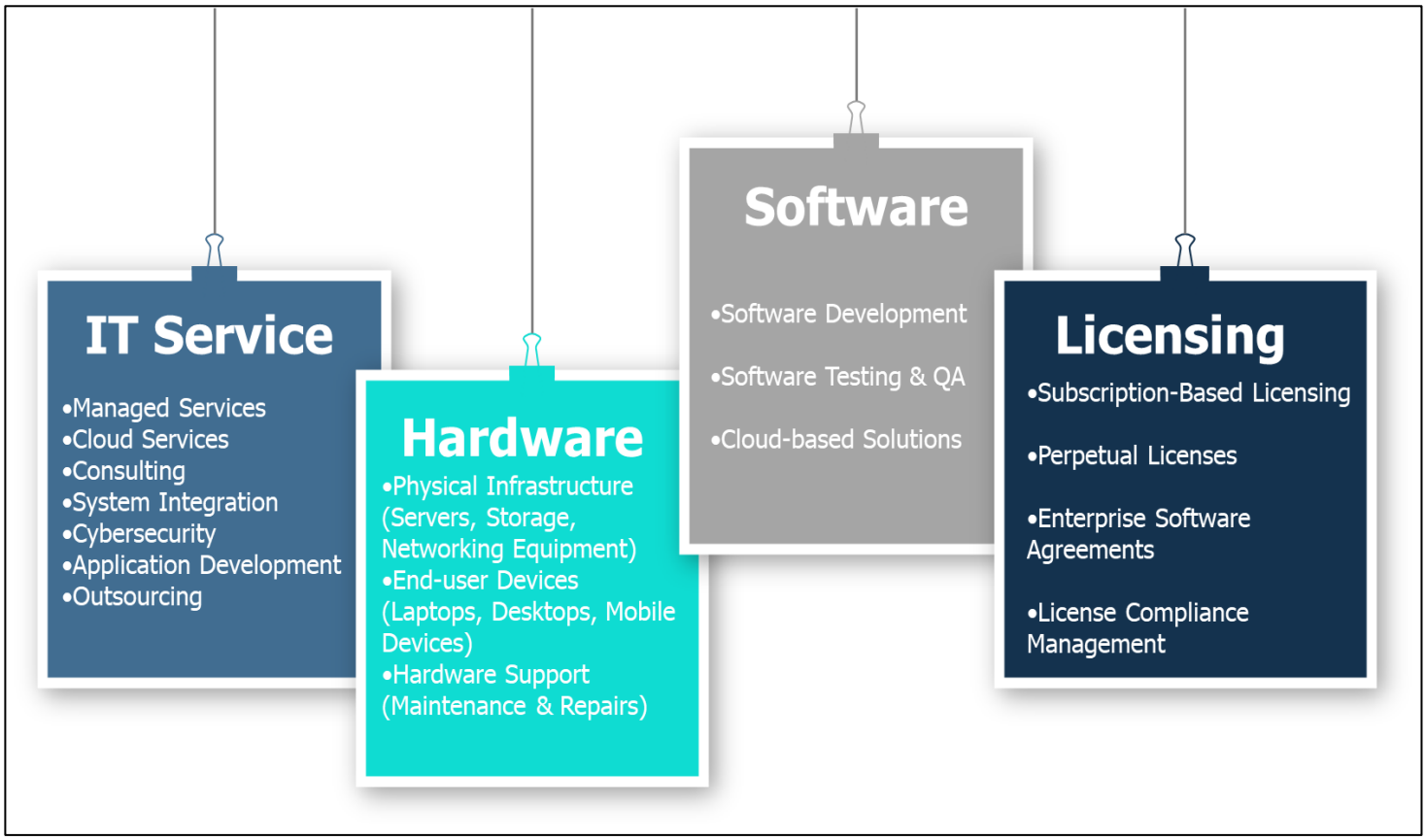
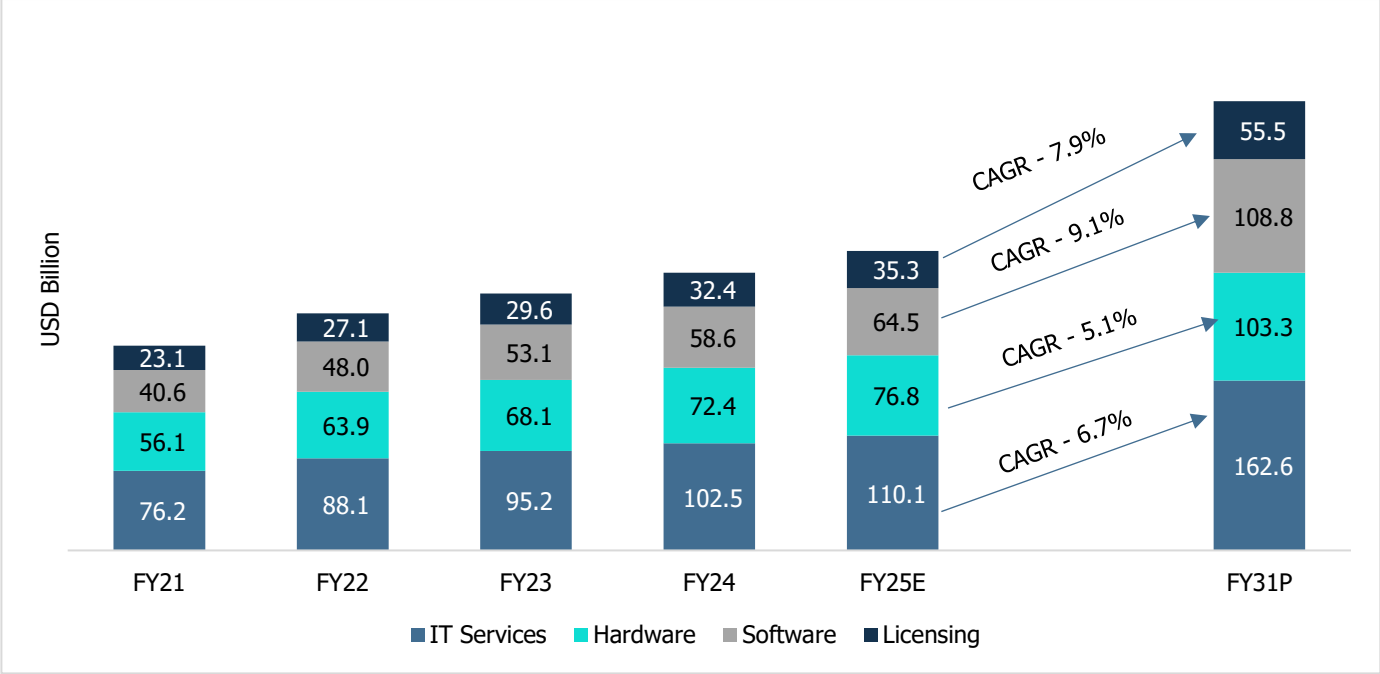


Chart 20: Trend in Market Segmentation



Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

IT service account for a major portion of revenue, followed by hardware. As of FY25, IT service is expected to account for 38% of the total revenue followed by hardware at 27%, software at 23% and lastly licensing at 12%.

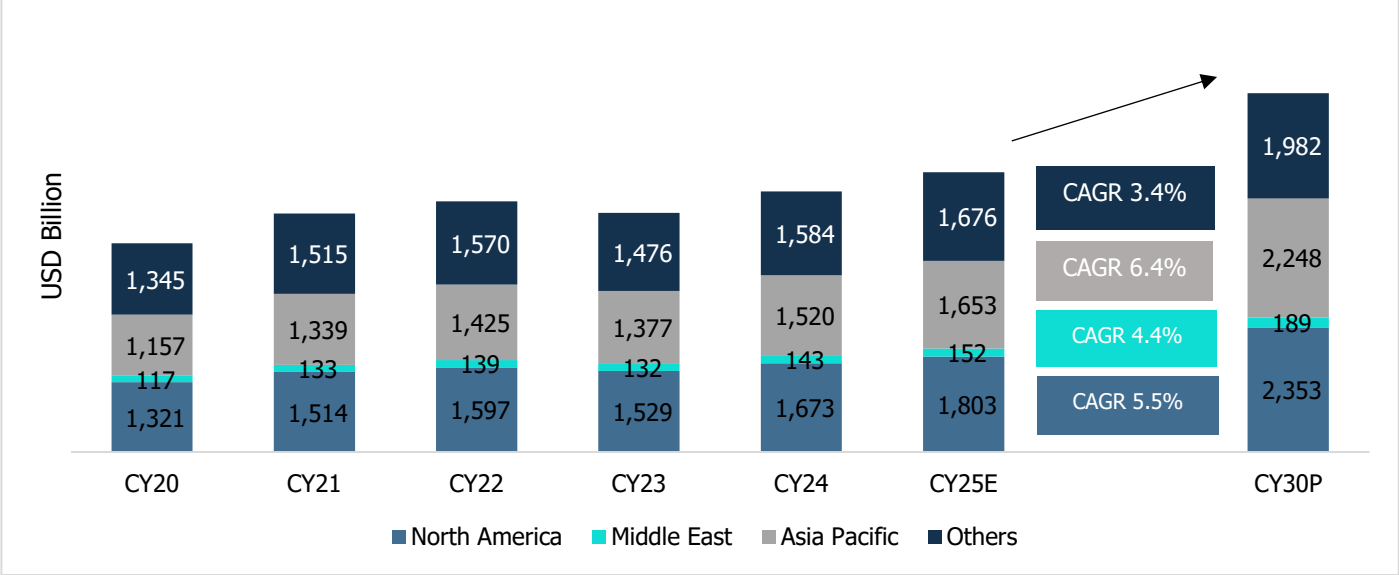
2.1.2 Breakdown of global Market Size

North America: Leading the IT sector with advanced technology adoption, robust infrastructure, and substantial investments, North America drives innovation and sets industry benchmarks in IT services and solutions. The market size of North America is projected to grow at a CAGR of 5.5% from CY25 to CY30 reaching USD 2,353 billion.

Middle East: The region is experiencing decent growth as governments focus on digital transformation initiatives, invest in IT infrastructure, and encourage innovation in sectors like oil and gas, finance, and smart city development. The market size of Middle East is projected to grow at a CAGR of 4.4% from CY25 to CY30 reaching USD 189 billion.

Asia Pacific: Asia Pacific region includes China, Japan, India, South Korea, Australia, Indonesia and the rest of APAC. Emerging as a dynamic hub for IT growth, Asia Pacific is driven by rapid digital adoption, expanding tech-enabled economies and strong government support for digital infrastructure and innovation. The region benefits from a large talent pool, rising enterprise IT spending and growing demand across sectors like manufacturing, BFSI and retail. The market size of Asia Pacific is projected to grow at a CAGR of 6.4% from CY25 to CY30 reaching USD 2,248 billion.

Chart 21: Market Segmentation by Geographies



Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

As of CY24, North America alone accounts for a major portion of global market, accounting for 34%, followed by Asia pacific accounting for 30% share, whereas Middle East account for 3% only. Others which include Africa region, Europe and rest of the world is projected to grow at a CAGR of 3.4% from CY25 to CY30, whereas India is projected to grow at CAGR of 7.0% from FY25 to FY31.

2.1.3 Breakdown of Indian IT spending by various categories

Enterprise IT: Investment in this sector is largely driven by the need to modernize legacy systems, enhance operational efficiency, and adopt cloud-based enterprise solutions. These measures aim to improve scalability and ensure seamless business continuity.

Government IT: Spending in this domain reflects the strategic push towards digital transformation through e-governance initiatives, infrastructure modernization, and smart city projects. These efforts are geared towards fostering transparency, accessibility, and public service efficiency.

Cloud: The rapid adoption of cloud technologies, encompassing IaaS, PaaS, and SaaS, underscores the prioritization of scalable, cost-effective, and resilient IT frameworks. This shift supports organizations in managing dynamic workloads and accelerating innovation.

Artificial Intelligence (AI): Expenditure in AI technologies is sharply rising, with a focus on machine learning, natural language processing, and generative AI. These investments enable automation, predictive analytics, and hyper-personalized user experiences across sectors.

Cybersecurity: Growing threats to data security and regulatory pressures drive substantial spending on advanced security measures. These include endpoint protection, cloud security, and AI-driven threat detection systems to ensure robust protection and compliance.

Analytics: Increased spending on advanced analytics solutions reflects their critical role in data-driven decision-making. Organizations leverage analytics tools to extract actionable insights, enhance operational strategies, and deliver superior customer experiences.

Table 5: Market Breakup by Spending in USD Billion

Type	FY21	FY22	FY23	FY24	FY25E	FY31P	CAGR (FY25 – FY31)
Enterprise IT	83.4	94.9	101.0	107.0	112.9	145.0	4.3%
Government IT	29.2	33.5	35.9	38.4	41.0	56.4	5.4%
Cloud	16.7	20.2	22.9	25.9	29.2	57.2	11.8%
Artificial Intelligence	6.4	7.9	9.1	10.5	12.0	26.2	13.9%
Cybersecurity	11.7	14.0	15.7	17.5	19.5	35.3	10.4%
Analytics	14.0	16.5	18.1	19.9	21.8	35.7	8.6%
Others	34.7	40.0	43.3	46.6	50.2	74.4	6.8%
Total	**196.0**	**227.0**	**246.0**	**265.9**	**286.7**	**430.2**	**7.0%**

Source: IMARC, CareEdge Research

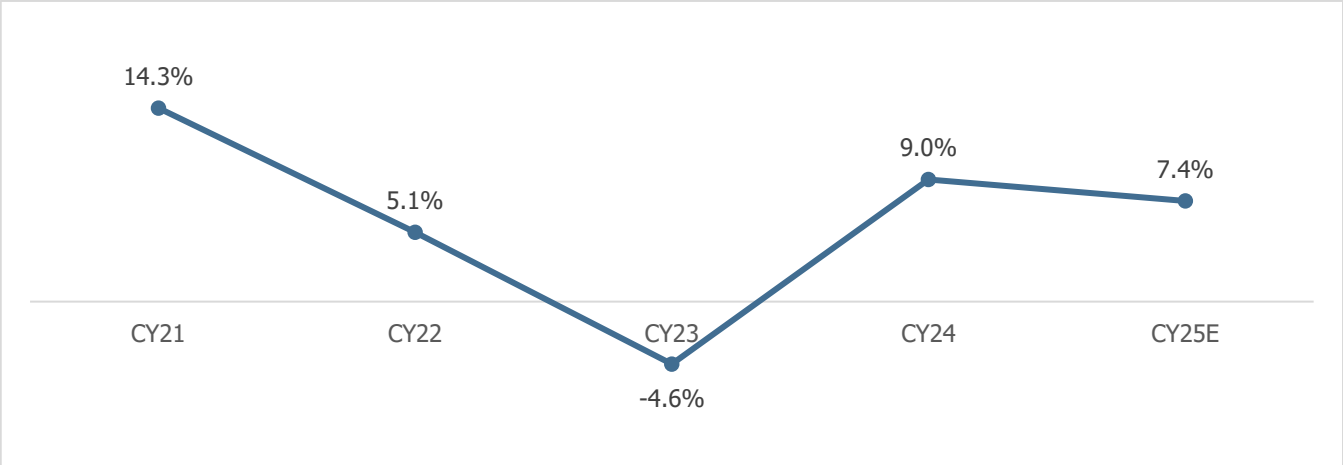
Note: E indicates Estimated; P indicates Projected

2.1.4 Comparative analysis of India vs. global IT-ITeS industry growth

Global IT-ITeS Industry:

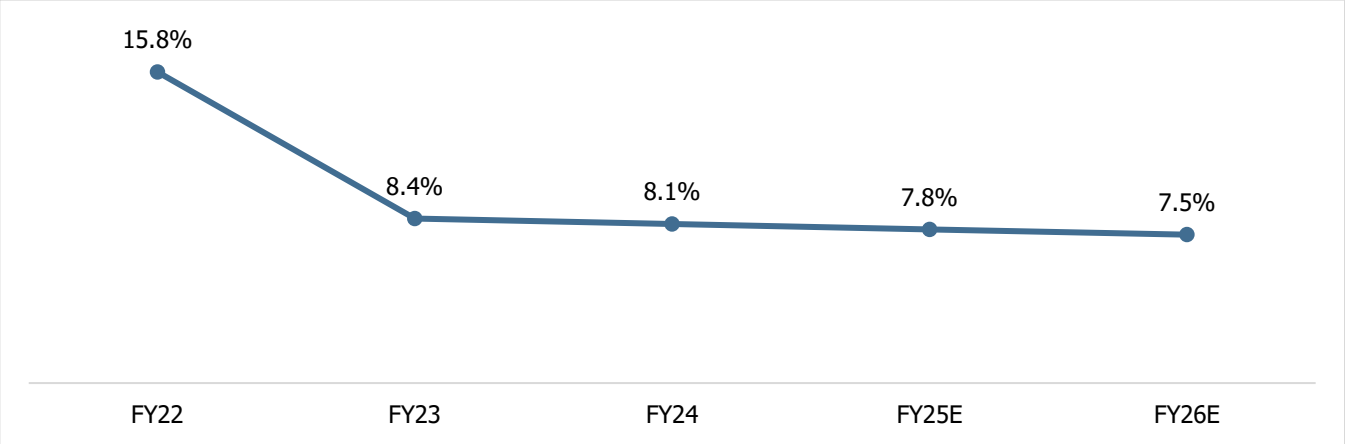
- In CY21, the global market experienced robust growth at 14.3%, driven by the accelerated adoption of digital solutions during the pandemic.
- However, growth slowed significantly to 5.1% in CY22 and declined further to -4.6% in CY23, reflecting post-pandemic adjustments, macroeconomic challenges, geopolitical risks and weakening demand from key markets.
- CY24 saw a recovery with a growth rate of 9.0%, indicating a rebound in investments and demand for IT services.
- Growth in CY25 is estimated at 7.4%, suggesting continued expansion, albeit at a slightly moderated pace.

Chart 22: Trend in Global y-o-y growth rate of IT-ITeS Industry



Source: IMARC, CareEdge Research
Note: E indicates Estimated

Chart 23: Trend in Indian y-o-y growth rate of IT-ITeS Industry



Source: IMARC, CareEdge Research
Note: E indicates Estimated

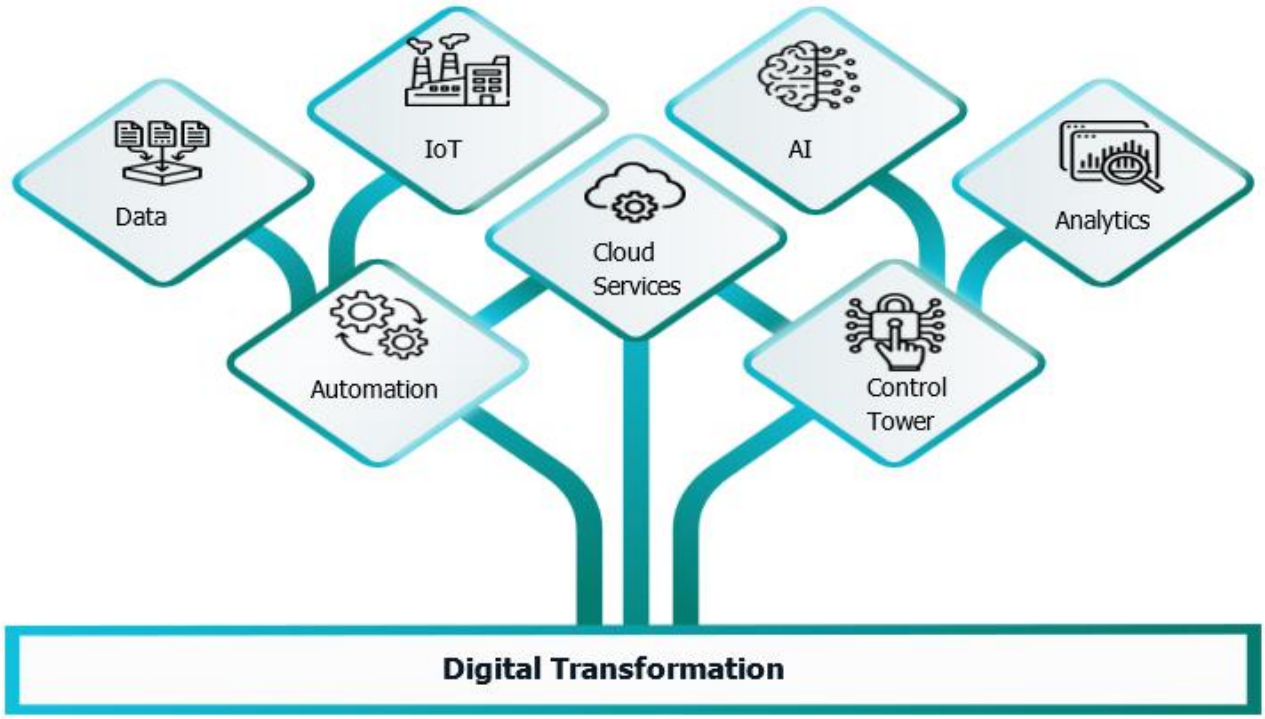
Indian IT-ITeS Industry:

- India's IT-ITeS sector has consistently showcased impressive performance, with growth at 15.8% in FY22, underpinned by increased demand for outsourcing and digital services.
- While growth slowed to 8.4% in FY23 and 8.1% in FY24, it remained steady and resilient compared to global trends, reflecting the strength of India's IT services exports and talent pool.
- FY25E and FY26P growth rates are projected at 7.8% and 7.5%, respectively, indicating stable performance, despite global uncertainties.

India's IT-ITeS industry consistently outpaced global growth rates, reflecting its competitive advantages in cost efficiency, talent availability, and a robust outsourcing ecosystem. While the global IT market has shown volatility, India’s growth remained relatively stable, underscoring its importance as a key player in the global IT landscape.

2.2 Trends Driving IT & Digitalization

The IT and digitalization landscape is evolving rapidly, driven by several key trends that are reshaping industries and business operations. These trends are driving innovation, efficiency, and competitiveness across sectors. Some of the recent trends in IT are as below:



2.2.1 AI, Cloud, Blockchain, and IoT adoption

AI is revolutionizing the IT industry. AI technologies enhance operational efficiency, drive productivity, and facilitate the development of previously inconceivable solutions. AI-driven automation of repetitive tasks lets professionals prioritize strategic initiatives, improving accuracy and reducing human error. Moreover, machine learning algorithms swiftly analyse massive datasets, revealing insights that improve decision-making and optimize business operations.

AI revolutionizes cloud computing by enhancing scalability, efficiency, and adaptability. It optimizes resources, predicts failures, automates maintenance, and dynamically manages workloads for cost-effectiveness. AI-driven analytics inform decisions, while natural language processing enriches user experiences with chatbots and virtual assistants. It also strengthens security by detecting threats in real time, driving innovation and agility for businesses.

Blockchain is a secure, decentralized ledger that records encrypted transactions in sequential, tamper-proof blocks, eliminating the need for intermediaries. The combination of AI and blockchain creates innovative solutions by combining AI's analytical power with blockchain's security and transparency, driving efficiency and trust across industries.

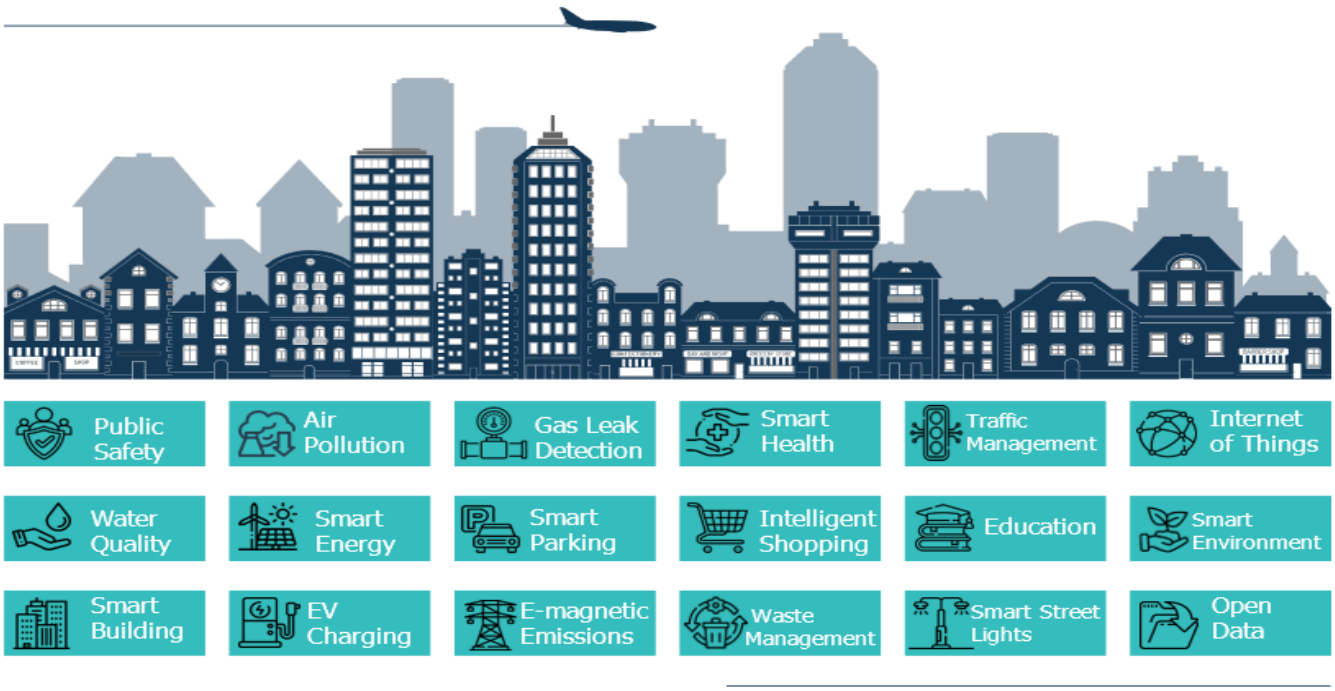
IoT is a network of sensors, electronic, network connectivity and software working together to enable smart devices to gather and exchange data. As IoT grows, sensors play an increasingly significant role in measuring the quality of objects and enumerating them into values, which are readable by other devices and users. More and more smart devices can now communicate with each other through embedded IoT sensors, actuators, and tags.

The Internet of Things (IoT) collects massive amounts of data through interconnected devices equipped with sensors. Artificial Intelligence (AI) processes this data, analysing patterns and trends to produce actionable insights. These insights guide IoT devices to perform tasks efficiently and autonomously, enabling smarter systems and streamlined operations across various domains like healthcare, manufacturing, and smart homes. Together, AI and IoT create intelligent ecosystems that learn, adapt, and improve over time.

2.2.2 Smart Cities, Digital Revolution & Digital Governance Initiatives

Smart cities are urban ecosystems that seamlessly integrate advanced technologies and data-driven solutions to create sustainable, efficient, and citizen-centric environments, enhancing overall quality of life. Smart cities and digital transformation fuel IT sector expansion by increasing the need for cutting-edge technologies such as IoT, AI, and cloud computing, and upgrading infrastructure with 5G and high-speed internet. They open new markets for IT services in areas like smart grids and public safety, promote automation and digital tools across industries, and create a surge in IT-related job opportunities. This synergy accelerates innovation, efficiency, and technological adoption, cementing the IT sector's pivotal role in shaping the future.

Smart Cities: Innovating Urban Living for a Sustainable Future



In India, as per Ministry of Housing & Urban Affairs' update as on May 09, 2025, 8,067 multi-sectoral projects are being developed by these 100 cities, amounting to approximately Rs 1.6 trillion. More than 95% of the total projects (7,555 projects amounting to Rs 1,513.61 billion) undertaken under the Smart Cities Mission have been completed. Additionally, 512 projects worth Rs 130.43 billion are in the advanced stages of implementation. This amounts to overall 8,067 multi-sectoral projects valued at Rs 1.64 trillion.

Digital Governance in India has steadily evolved from computerization of Government Departments to initiatives that encapsulate the finer points of Governance, such as citizen centricity, service orientation and transparency. In order to

promote e-Governance in a holistic manner, various policy initiatives and projects have been undertaken to develop core and support infrastructure. The major core infrastructure components are State Data Centres (SDCs), Statewide Area Networks (S.W.A.N), Common Services Centres (CSCs) and middleware gateways i.e. National e-Governance Service Delivery Gateway (NSDG), State e-Governance Service Delivery Gateway (SSDG), and Mobile e-Governance Service Delivery Gateway (MSDG). E-Pramaan and G-I cloud, an initiative which will ensure benefits of cloud computing for e-Governance projects. Examples of e-governance also include Digital India initiative, National Portal of India, Prime Minister of India portal.

E-governance is driving demand for the IT sector by leveraging technology to streamline and digitize public services. It requires robust IT solutions for managing databases, ensuring cybersecurity, and maintaining digital communication channels. IT systems enable online services like tax filing, license applications, and grievance redressal, requiring advancements in software development, cloud computing, and data analytics. The shift toward paperless and transparent governance further fuels demand for IT infrastructure, fostering growth in both innovation and employment within the IT industry.

2.2.3 Cybersecurity and Data Privacy Regulations

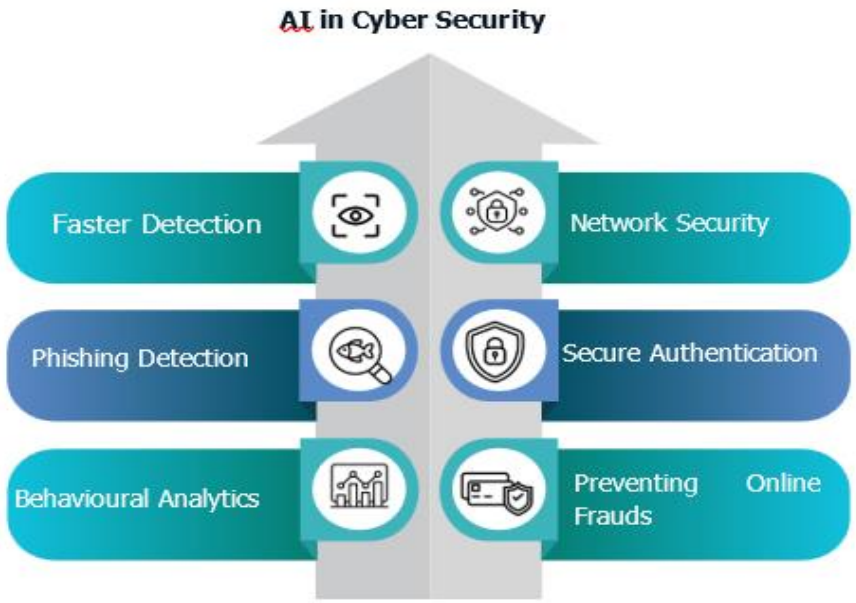
- **Cybersecurity**

Cybersecurity is the practice of protecting electronic information from unauthorized access or theft. It includes the prevention of, detection of, and response to attacks on networks, systems, and data. Cybersecurity strategies are designed to protect against a variety of threats, including viruses, malware, phishing attacks, and cyber-attacks.

In India, cybersecurity has become a top priority in recent years due to the growing number of cyber-attacks on Indian businesses and government institutions. The Indian government has taken several steps to improve the country's cybersecurity posture, including establishing a **National Critical Information Infrastructure Protection Centre (NCIIPC)** and creating a **National Cyber Coordination Centre (NCCC).** In addition, the government has launched various awareness campaigns to educate citizens about cybersecurity threats and how to protect themselves.

The private sector has also been active in improving India's cybersecurity posture. Several companies have set up their own security operations centres (SOCs) in India to monitor and respond to cyber-attacks. In addition, many companies have implemented robust cybersecurity solutions and technologies to protect their networks and data. AI drives cybersecurity beyond individual capabilities by forming powerful partnerships between humans and machines. AI

monitors user and network behaviour to detect unusual activities, such as unauthorized access or insider threats, enhancing security protocols. AI can identify sophisticated phishing attempts by analysing email content, sender behaviour, and other indicators. AI continuously learns from new threats, improving its ability to counter emerging cyberattacks effectively.



➢ **Data Privacy Regulations in India**

- **The Digital Personal Data Protection Act (DPDP Act):** The government of India has passed The Digital Personal Data Protection Act (DPDP Act), in August 2023, which aims to regulate the processing of digital personal data in India, empowering individuals with rights over their data while ensuring lawful processing for specific purposes. The DPDP Act aims to safeguard citizens' rights for the protection of their personal data. These rules seek to operationalize the Digital Personal Data Protection Act, 2023 (DPDP Act), in line with India's commitment to create a robust framework for protecting digital personal data.

  The rules place citizens at the heart of the data protection framework. Data Fiduciaries must provide clear and accessible information about how personal data is processed, enabling informed consent. Citizens are empowered with rights to demand data erasure, appoint digital nominees, and access user-friendly mechanisms to manage their data. The rules empower citizens by giving them greater control over their data. Provisions for informed consent, the right to erasure and grievance redressal enhance trust in digital platforms. Parents and guardians are empowered to ensure online safety for their children.

- **Intellectual Property Rights (IPR) Protection**
  India has implemented regulations and measures to protect intellectual property rights, which is crucial for outsourcing companies involved in software development and technology-related services. Strong IPR protection encourages innovation, provides legal recourse in case of infringements, and boosts investor confidence.
- **National Policy on Software Products (NPSP)**

The government launched the NPSP in 2019 to boost the software product industry, which includes outsourcing services. The policy focuses on enabling innovation, promoting research and development, creating a conducive ecosystem for software product startups, and enhancing the global competitiveness of Indian software products.

U.S. Data Privacy Initiatives

- **American Data Privacy and Protection Act (ADPPA)**: Introduced during the 117th Congress (2021-2022), this act aims to establish requirements for how companies handle personal data. Although it has not received a vote yet, its provisions could become law if included in another bill.
- **Executive Order on Protecting Americans' Sensitive Personal Data**: Issued by President Joe Biden on February 28, 2024, this order authorizes the U.S. attorney general to prevent the large-scale transfer of sensitive American data to countries of concern.
- **Federal Trade Commission (FTC):** The FTC is a key enforcer of data privacy laws, protecting consumers from unfair or deceptive practices and enforcing federal privacy and data protection regulations.
- **Additional Agencies:** Other agencies involved in privacy issues include the Office of the Comptroller of the Currency, Department of Health and Human Services, Federal Communications Commission, Securities and Exchange Commission, Consumer Financial Protection Bureau, and Department of Commerce.

Key U.S. Privacy Statutes

- **Privacy Act of 1974**: Governs the collection, processing, management, dissemination, and destruction of personally identifiable information (PII).
- **Health Insurance Portability and Accountability Act (HIPAA)**: Enacted in 1996, it includes the Security Rule and Privacy Rule, which protect health information.
- **Gramm-Leach-Bliley Act (GLBA)**: Enacted in 1999, it requires financial institutions to explain their information-sharing practices and safeguard sensitive data.
- **Children's Online Privacy Protection Act (COPPA)**: Protects the privacy of children under 13 who use online services.
- **Driver's Privacy Protection Act (DPPA)**: Governs the privacy and disclosure of personal information gathered by state motor vehicle departments.
- **Video Privacy Protection Act (VPPA)**: Restricts the disclosure of rental or sale records of videos or similar audiovisual materials.
- **Cable Communications Policy Act of 1984**: Includes provisions for the protection of subscriber privacy.
- **Fair Credit Reporting Act (FCRA)**: Restricts the use of information related to an individual's creditworthiness.
- **Telephone Consumer Protection Act (TCPA)**: Regulates marketing calls and text messages to mobile and residential phones.
- **CAN-SPAM Act of 2003**: Sets rules for sending commercial emails, including opt-out provisions.
- **Family Educational Rights and Privacy Act (FERPA)**: Allows students to inspect and revise their records and prohibits disclosure without consent.
- **State-Level Privacy Legislation:** At least 15 states have enacted their own data privacy laws, including California, Colorado, Connecticut, Delaware, Florida, Indiana, Iowa, Montana, New Hampshire, New Jersey, Oregon, Tennessee, Texas, Utah, and Virginia.

2.2.4 Rise of Low-Code/No-Code platforms and Automation

Low-code development leverages intuitive graphical tools and embedded functionalities to design and develop applications, significantly reducing the need for traditional coding. While some coding (pro-code) is still necessary, low-code platforms streamline and enhance the development process, allowing users to quickly initiate application creation.

In contrast, no-code development offers a similar user-friendly experience but goes a step further by enabling non-technical business users to develop applications without writing any code. The primary distinction between low-code and no-code platforms lies in the required coding knowledge. Low-code development platforms (LCDPs) require basic coding skills for developing and integrating complex applications, whereas no-code development platforms (NCDPs) require no programming knowledge at all.

➢ **Key Benefits of Low-Code/No-Code Development**

- **Increased Efficiency**

Low-code/no-code (LCNC) platforms simplify and accelerate software development. With built-in elements and an intuitive interface, even non-programmers can create apps. This reduces development time and allows users to focus on more complex tasks instead of minor ones.

- **Reduced Development Costs**

Hiring skilled developers can be costly. LCNC platforms help reduce these expenses by providing built-in functionality and user-friendly interfaces, leading to significant savings on recruitment, training, and ongoing development costs.

- **Accessibility for All**

Traditional software development requires specialized technical skills, making it difficult for non-technical individuals to contribute. LCNC platforms change this by enabling people from various backgrounds to share ideas, design, and create software without extensive coding knowledge.

- **Enhanced Collaboration**

Teamwork is crucial in software development, and LCNC platforms facilitate collaboration among different groups within a company, such as developers, designers, and new team members. This improved communication helps refine the software, ensuring everyone can contribute effectively.

- **Faster Time to Market**

LCNC platforms expedite the software development process, allowing companies to quickly deliver apps to the market. With pre-built templates and a simplified interface, even non-programmers can develop applications much faster. Additionally, LCNC development supports easy experimentation with ideas and implementation of changes.

➢ **Key Challenges of Low-Code/No-Code Development**

- **Limited Customisation**

  - Pre-Built Templates: Low-code platforms often use pre-built templates and components, which can limit how much you can customize your application. This can be restrictive for businesses with specific needs.
  - Complex Requirements: These platforms may struggle to meet highly complex and specific requirements, as they are designed for speed and simplicity.

- **Security Concerns**

  - Third-Party Vulnerabilities: Dependence on third-party components may introduce security risks. It is essential to thoroughly assess and mitigate these risks.
  - Data Breaches: The risk of data breaches is higher if security protocols are not strictly followed. Ensuring robust data protection measures is crucial.

- **Lack of Control**

  - Platform Dependency: Businesses may become dependent on the policies and decisions of their chosen low-code platform provider, which can affect control and ownership of the developed applications.

- Code Access: Many low-code platforms restrict access to the underlying code, limiting the ability to implement detailed modifications. This constraint can be problematic when switching platforms or adapting to significant platform changes.
  - **Learning Curve**
- Platform Understanding: Developers need to understand the intricacies and limitations of the low-code platform, which can require a learning curve.
- Skill Gap: There may be a gap in skills when handling specialized functionalities, necessitating additional training or reverting to traditional coding methods. Handling specialised functionalities may require additional training or a return to traditional coding methods to bridge the skill gap

2.3 Integrated Enterprise IT Solutions

As organizations undergo digital transformation, the demand for integrated enterprise IT solutions has grown significantly. Businesses are increasingly adopting unified platforms that combine cloud services, managed infrastructure, cybersecurity, and analytics to achieve greater efficiency, agility, and resilience. These solutions not only enable seamless operations across diverse functions but also support scalability, strengthen security frameworks, and foster data-driven decision-making in a highly competitive environment.

- **Cloud services**

Cloud services enable businesses to migrate from legacy IT systems to flexible, scalable environments. Enterprises adopt IaaS, PaaS, and SaaS to optimize costs, accelerate innovation, and improve accessibility across geographies. Cloud adoption also supports disaster recovery, business continuity, and seamless remote collaboration.

- **Managed Infrastructure**

Managed infrastructure services provide organizations with 24/7 monitoring, maintenance, and optimization of their IT environments. This includes data centers, networks, and enterprise applications. By outsourcing infrastructure management, businesses can reduce downtime, improve performance, and focus on core operations while ensuring predictable costs.

- **Comprehensive Cybersecurity Solutions**

With increasing cyber threats, enterprises prioritize robust security frameworks. Comprehensive cybersecurity solutions include threat detection and response, identity and access management, data encryption, vulnerability management, and compliance monitoring. Integrated security ensures the protection of critical business data, reduces risk exposure, and maintains stakeholder trust.

- **Analytics Platform**

Analytics platforms help enterprises transform raw data into actionable insights. Leveraging artificial intelligence (AI), machine learning (ML), and business intelligence (BI) tools, organizations can enhance decision-making, predict trends, and improve customer engagement. Integrated analytics also supports operational efficiency and fosters innovation through data-driven strategies

2.4 Custom Software Solutions and Security Operations

In the current digital environment, organizations face the dual challenge of maintaining uninterrupted operations while ensuring the security of their systems and data. Central to addressing this challenge is the establishment of Network Operations Centers (NOCs) and Security Operations Centers (SOCs). NOCs function as the nerve centre for monitoring the health, performance, and availability of network systems, enabling technical teams to identify and resolve issues promptly. SOCs, meanwhile, focus on protecting the organization by detecting, analysing, and responding to potential security threats in real time, thereby reducing risks before they can affect operations.

Remote monitoring complements these centers by providing continuous oversight of IT systems and applications from centralized platforms. This allows teams to detect irregularities, performance bottlenecks, or system failures early, ensuring minimal operational disruption. The approach not only enhances efficiency but also provides flexibility in managing complex networks without requiring on-site presence at all times.

Cybersecurity management forms the core of this operational framework. It involves establishing and enforcing policies, controls, and procedures to safeguard sensitive information, address vulnerabilities, and ensure compliance with regulatory requirements. Activities such as vulnerability assessments, patch management, access controls, and incident response planning are integral to maintaining a strong security posture.

Security analytics further strengthens this ecosystem by systematically examining system activity, network traffic, and operational logs to identify unusual patterns or potential threats. By recognizing risks early and informing preventive measures, security analytics supports informed decision-making and ensures that organizational resources are both protected and optimized. Collectively, NOC/SOC operations, remote monitoring, cybersecurity management, and security analytics create a cohesive, resilient framework that enables organizations to operate efficiently while maintaining robust security standards.

2.5 Key growth Drivers

○ Accelerating Global Digital Transformation

Global enterprises are undergoing large-scale digital transformation, driven by the need for enhanced agility, operational efficiency, and customer experience. This has created sustained demand for:

- Cloud migration & modernization
- AI/ML, data analytics, and cybersecurity
- IoT, automation, and edge computing

Indian IT firms are playing a pivotal role by delivering end-to-end digital solutions and domain-specific platforms, especially across BFSI, healthcare, manufacturing, and retail verticals.

○ Generative AI & Automation Adoption

Generative AI, intelligent automation, and low-code/no-code tools are transforming enterprise IT landscapes. Indian companies are:

- Investing in AI platforms and cloud partnerships
- Reskilling talent in GenAI and data engineering
- Offering outcome-based, AI-led services

○ Sector-Specific Demand

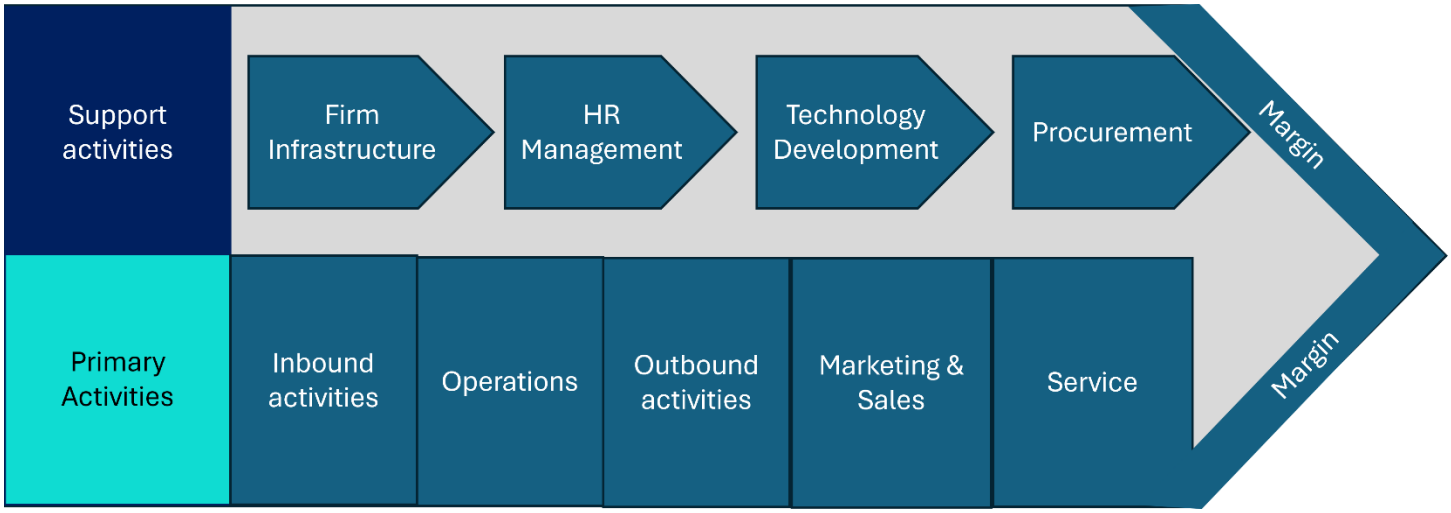
Key industries are fuelling demand for tailored AIT/ITeS Solutions:

BFSI: Digital banking, fintech innovations and regulatory compliance drive IT demand for IT services in core banking systems, fraud detection and customer analytics.

Healthcare: Telemedicine, electronic health records and AI-driven diagnostics are creating opportunities for IT firms. Indian IT firms are capitalizing on demand for cloud-based patient platforms, pharma supply chain solutions, and AI-led clinical trial support.

Telecom & Media: Demand for 5G infrastructure support, network virtualization, OTT platforms, and customer experience (CX) analytics. Indian IT players are delivering end-to-end network transformation and AI-led subscriber intelligence for global telecom operators.

2.6 Illustrative Value Chain Analysis for companies into IT products and services sector



- **Primary Activities**

Inbound activities

- Talent Acquisition & Onboarding: Recruiting skilled software engineers, data scientists, BPO/KPO professionals, and domain experts.
- Training & Reskilling: Continuous investment in training (AI, cloud, cybersecurity, analytics).
- Technology Procurement: Tools, software platforms (ERP, AI/ML frameworks, cybersecurity tools, cloud infrastructure).
- Alliances & Vendor Networks: Partnerships with cloud providers, SaaS vendors, and hardware suppliers.

Operations

- Software Development & IT Services: Application development, maintenance, system integration.
- ITES Operations: BPO, KPO, shared services, customer support, back-office operations.
- Digital Services: AI/ML, IoT, cloud migration, data analytics, cybersecurity, automation (RPA).
- Delivery Models: Onshore, offshore, nearshore, and global delivery centers.
- Quality Assurance: Process certifications (CMMI, ISO), agile/DevOps methodologies.

Outbound activities

- Service delivery via cloud, and remote monitoring.
- Value: Scalable global delivery; secure client access to deliverables.
- Opportunities: Standardize deployments, use hybrid cloud.

Marketing & Sales

- Digital marketing, RFPs, trade shows, client demos.
- Value: Strong presence in BFSI, government, telecom; repeat client business.
- Opportunities: Leverage LinkedIn/forums, reusable demo templates, GeM platform.

Service

- Customer Support: Technical support, IT helpdesks, process troubleshooting.
- Service-Level Agreements (SLAs): Ensuring uptime, performance, and compliance.
- Continuous Upgrades: Patches, updates, and migration support.
- Client Relationship Management: Dedicated account managers, long-term engagement.

➢ **Support Activities**

Firm Infrastructure

- Financial planning, compliance, security.
- Opportunities: Cloud infra to reduce costs, automation for compliance.

Human Resource Management

- Hiring & upskilling in AI, cloud, cybersecurity and industry specific domains.
- Opportunities: Partner with government skilling programs, flexible work models.

Technology Development

- R&D in AI, IoT, cloud; proprietary platforms (Synergy, X-ERP, IIP, X-Sign).
- Opportunities: Open-source frameworks, co-innovation with global tech firms.

Procurement

- Software & Hardware Sourcing: Licensing, cloud infrastructure.
- Third-Party Vendors: Collaboration with specialized startups and consultants.
- Automation Tools: RPA and AI-based procurement systems for efficiency.

3 E-Governance & Public Sector Digitalization – A Key Growth Segment

3.1 Global and Indian e-governance Market

E-Governance represents the strategic deployment of information technology to restructure government interactions with citizens, businesses, and internal agencies. This approach enhances service delivery efficiency, optimizes communication with industries, empowers citizens through accessible information, and streamlines governmental operations. By leveraging IT systems, E-Governance facilitates data-driven decision-making, improves transparency, and promotes greater accountability across public administrative frameworks. Countries worldwide are embracing e-Governance due to the growing complexity and diversity of governance in recent decades. Moreover, citizens' expectations of their governments have risen significantly, driving the need for more efficient, transparent and responsive administrative systems.

Globally, e-governance has witnessed notable growth, primarily driven by advancements in telecommunications infrastructure and the enhancement of human capital. African nations, have also made remarkable strides in improving their telecommunications networks, laying a strong groundwork for a faster shift toward digital governance.

The United Nations uses the E-Government Development Index (EGDI) as a multifaceted metric to evaluate e-government progress among its member countries. It focuses on three major aspects: online service delivery, telecommunication infrastructure, and human capital. Rather than providing an absolute score, the EGDI offers a relative comparison of national governments, emphasizing areas needing development in digital governance. The E-Government Development Index (EGDI) is a composite measure used to assess the development of e-government across United Nations Member States. It is calculated based on three key dimensions:

1. **Online Service Index (OSI)**: Evaluates the scope and quality of online services provided by governments.
2. **Telecommunication Infrastructure Index (TII)**: Measures the development status of telecommunication infrastructure, which supports e-government initiatives.
3. **Human Capital Index (HCI)**: Assesses the inherent human capacity, including education levels, to participate in the information society.

Each of these indices is normalized using Z-score standardization to ensure equal importance in the overall calculation. The EGDI is then derived as the weighted average of these three normalized scores. The standard Z-score calculation for each component indicator follows this formula: $Z = x - \mu / \sigma$

where:

Z represents the standard Z-score for the component indicator

x is the raw score that needs to be standardized

μ denotes the mean (average) of the population

σ signifies the standard deviation of the population

In the 2024 United Nations EGDI, India ranked 97th out of 193 countries, with a score of 0.66776, showing improvement from its 2022 ranking of 105th with a score of 0.58830.

		2024	2022	2020
India	EGDI Rank	97	105	100
	Composite score	0.6678	0.5883	0.5964
United States of America	EGDI Rank	19	10	9
	Composite score	0.9194	0.9151	0.9297

United Arab Emirates	EGDI Rank	11	13	21
	Composite score	0.9533	0.901	0.8555
Kenya	EGDI Rank	109	113	116
	Composite score	0.6314	0.5589	0.5326
Ethiopia	EGDI Rank	169	179	178
	Composite score	0.3111	0.2865	0.274
Rwanda	EGDI Rank	118	119	130
	Composite score	0.5799	0.5489	0.4789
Gambia	EGDI Rank	181	174	181
	Composite score	0.2552	0.3088	0.263
United Republic of Tanzania	EGDI Rank	153	153	152
	Composite score	0.4327	0.4169	0.4206
Mozambique	EGDI Rank	177	173	163
	Composite score	0.2848	0.313	0.3564

India's e-governance initiatives began in the mid-1990s, focusing on citizen-centric services like railway and land record computerization. Despite progress, challenges such as limited features and isolated systems hindered widespread adoption. The National e-Governance Plan (NeGP) launched in 2006 aimed to bridge these gaps with 31 mission mode projects; 24 of them have been implemented. Recognizing the need for improvements, the e-Kranti program (NeGP 2.0) was introduced to enhance integration, infrastructure, and the use of emerging technologies like mobile and cloud to transform governance. Launched in 2015, Digital India aims to transform India into a digitally empowered society and a knowledge-driven economy by enhancing citizens' quality of life, boosting the digital economy, creating investment and employment opportunities, and highlighting India's digital technology expertise globally.

The global and Indian e-governance market demonstrates robust growth, propelled by governments' increasing prioritization of digital transformation strategies, a rising demand among citizens for seamless access to online services, and continuous innovations in communication technologies. These factors collectively underscore a shift towards more integrated and efficient public service delivery systems, reflecting the evolving interplay between technological advancement and governance structures.

➢ **Emerging trends and types of E-governance services in USA**

1. **Government-to-Government (G2G)**

- **National Information Exchange Model (NIEM):** Facilitates data sharing between federal, state, and local government agencies as a part of their current or intended business practices to improve coordination and efficiency.
- **Integrated Public Alert and Warning System (IPAWS):** Allows government agencies to share emergency alerts and warnings across jurisdictions and public through mobile phones using Wireless Emergency Alerts, to radio and television via the Emergency Alert System, and on the National Oceanic and Atmospheric Administration's Weather Radio.
- **Federal Procurement Data System (FPDS):** Enables inter-agency collaboration by providing a centralized database of government procurement activities.

2. **Government-to-Citizen (G2C)**

- **Benefits.gov:** A portal that helps citizens identify and apply for government benefits and assistance programs.

- **Healthcare.gov:** Provides a platform for citizens to explore and enroll in health insurance plans under the Affordable Care Act.
- **IRS e-File**: Allows citizens to file their taxes online, streamlining the tax submission process.

3. **Government-to-Business (G2B)**

- **SAM.gov (System for Award Management):** A platform where businesses can register to work with the federal government and access contracting opportunities.
- **FedBizOpps (Federal Business Opportunities):** Provides businesses with information on federal procurement opportunities.
- **Export.gov:** Offers resources and tools to help businesses expand into international markets.

4. **Government-to-Employee (G2E)**

- **Employee Express:** A self-service portal for federal employees to manage payroll, benefits, and personal information.
- **USA Staffing:** A platform for federal agencies to manage recruitment and hiring processes efficiently.
- **eOPF (Electronic Official Personnel Folder):** Provides federal employees with secure access to their personnel records.

➢ **Emerging trends and types of E-governance services in India**

E-governance facilitates interactions among four primary stakeholders – Government, Citizens, Business and Employees.

1. **Government to Government (G2G):** These services are aimed to strengthen inter-departmental collaboration and expedite decision-making process thereby boosting internal efficiency. Some of the initiatives taken by the Government of India are:
   - **PARIVESH**: A platform for managing environmental and wildlife clearances.
   - **PRAGATI**: Tracks key government projects and resolves inter-governmental issues.

2. **Government to Citizens (G2C):** These services are aimed to enhance service delivery and citizen engagement. These are designed to provide quicker services to citizens and ensure transparency for citizens. Some of the initiatives taken by the Government of India are:
   - **SVAMITVA Scheme**: Utilizes drones for rural property documentation, fostering economic empowerment.
   - **Shram Suvidha Portal**: Facilitates labor law enforcement with an online inspection system.
   - **Jan Soochna Portal** (Rajasthan): Promotes transparency by offering easy access to government information.
   - **CPGRAMS**: A 24×7 online grievance redressal system for citizens.
   - **e-Mitra (Rajasthan):** Delivers public and private services through a PPP model.

3. **Government to Business (G2B):** These services are aimed to streamline regulatory compliance and business operations. These foster a business-friendly environment. Some of the initiatives taken by the Government of India are:
   - **SPICe+**: Provides a streamlined process for company incorporation with real-time validation.

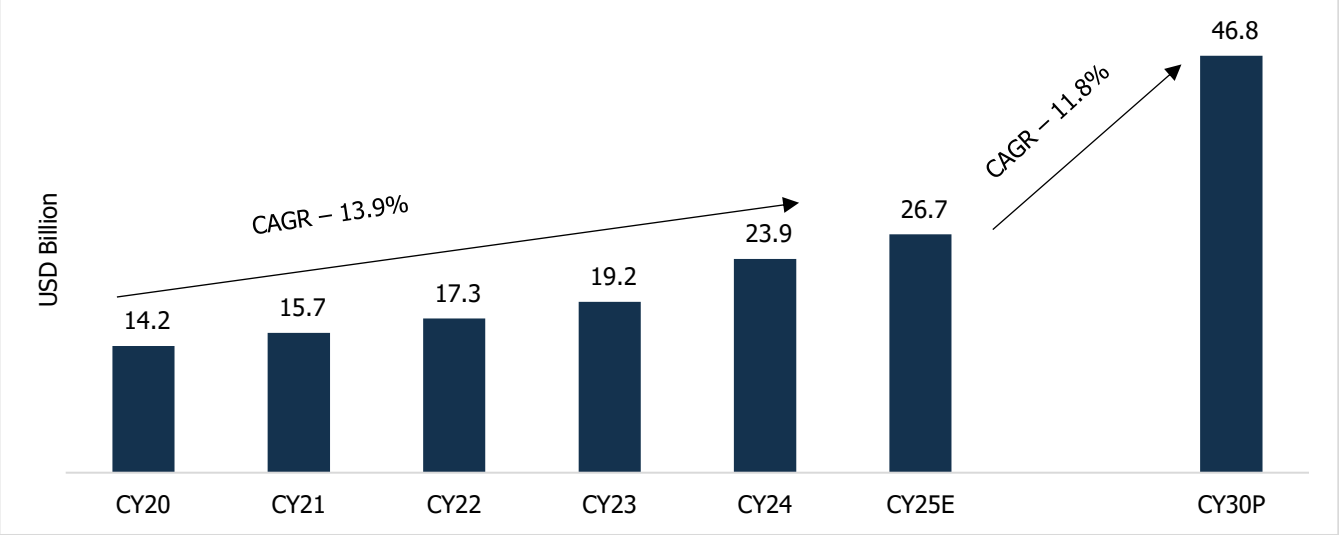
- **MCA21**: Enhances transparency and efficiency in registry-related services. It is the first Mission Mode e-Governance Project under NeGP. During the recent period from April 01, 2024, to January 27, 2025, a total of 80.26 lakh forms have been filed on the MCA21 portal.
- **GeM (Government e-Marketplace)**: Facilitates procurement of goods and services by government departments from businesses.

4. **Government to Employees (G2E):** These services are aimed to improve employee satisfaction and operational efficiency. These are designed to enhance employee engagement. Some of the initiatives taken by the Government of India are:
   - **iGOT Karmayogi**: An online learning platform for professional development. It is a solutioning space that combines five functional hubs for online learning, competency management, career management, discussions, and networking.
   - **e-Postal Ballot**: Facilitates electronic voting for inclusivity.

➢ **Government Digital Transformation – Global Market Size**

Global e-governance has emerged as a transformative force in modern public administration, leveraging technology to enhance transparency, efficiency and citizen engagement.

Chart 24: Global E-Governance Market Size



Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

The global e-governance market has witnessed good growth and is expected to grow significantly, driven by the increasing adoption of digital technologies to enhance public service delivery and administrative efficiency. In CY24, the market was valued at USD 23.9 Billion and is expected to reach USD 46.8 Billion in CY30, indicating a CAGR of 11.8% from CY25 to CY30.

- **Government Digital Transformation – Geographical Bifurcation**

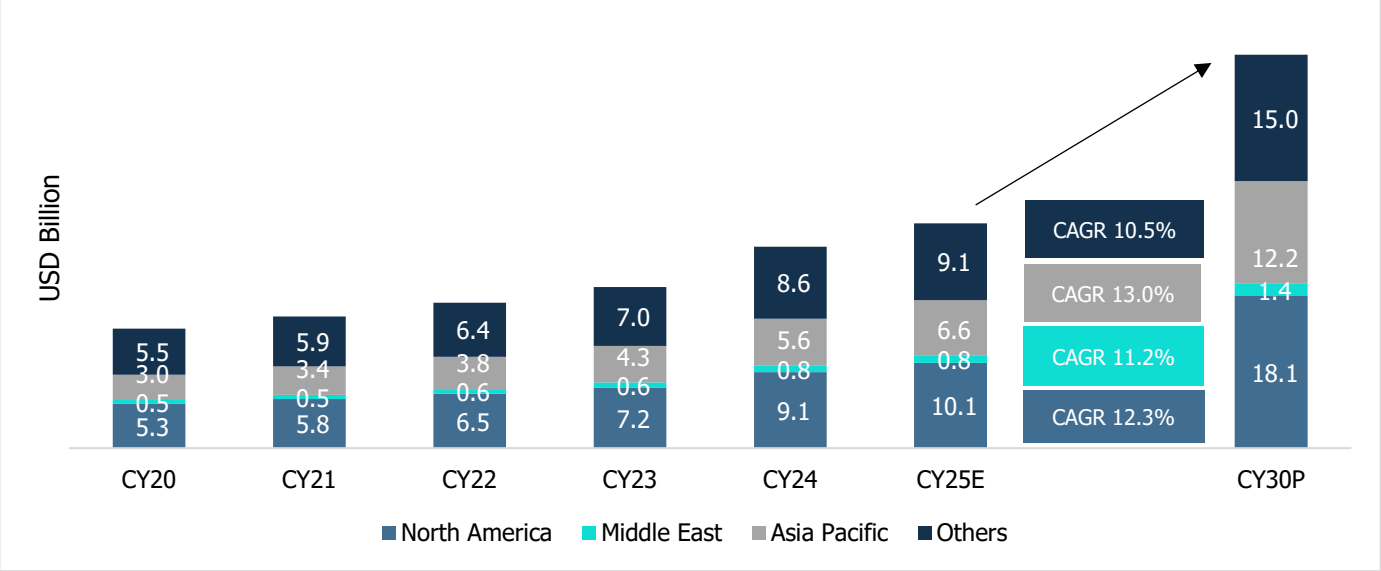
Digital Transformation across the globe is fundamentally altering governance worldwide, employing advanced technologies to strategically address regional challenges, optimize processes, and redefine administrative priorities.

North America: Governments are leading with investments in artificial intelligence, cloud computing, and data analytics, focusing on citizen-centric services and robust cybersecurity frameworks. The region emphasizes the modernization of legacy systems and digital accessibility. The market size of e-governance for North America is projected to grow at a CAGR of 12.3% from CY25 to CY30 reaching USD 18.1 billion.

Middle East: Governments in the Middle East are investing in smart city projects, cloud adoption, and advanced analytics to diversify their economies. Digital transformation efforts prioritize high-tech solutions to improve administrative efficiency and citizen engagement. The market size of e-governance for Middle East is projected to grow at a CAGR of 11.2% from CY25 to CY30 reaching USD 1.4 billion.

Asia Pacific: Countries in Asia pacific region are witnessing growth in e-governance through expanded internet penetration and investments in telecommunications infrastructure. Governments across Asia Pacific are accelerating e-governance initiatives through increased investments in digital infrastructure, cloud platforms, and AI-driven services. The market size of e-governance for Asia Pacific is projected to grow at a CAGR of 13.0% from CY25 to CY30 reaching USD 12.2 billion.

Chart 25: Market Segmentation by Geographies



Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

As of CY24, North America alone accounts for a major portion of global market, accounting for 38%, whereas Middle East and Africa account for 3% and 2% respectively. Others which include African region, Europe and rest of the world is projected to grow at a CAGR of 10.5% from CY25 to CY30.

- **Government Digital Transformation – Investments**

Significant investments are concentrated on technology-driven business solutions such as Document Management Systems, Integrated Solutions, Digital Signature Solutions, and Government Resource Planning (GRP), reflecting a focus on enhancing efficiency, security, and transparency in organizational and governmental processes.
Document Management Systems: Investment trends indicate a focus on enhancing operational efficiency and compliance by integrating AI-driven indexing, automation, and cloud-based platforms. These advancements aim to optimize workflows while ensuring data security and regulatory adherence.

Integrated Solutions: The allocation of funds toward unified platforms highlights the strategic shift toward operational consolidation. By linking functions such as financial management, human resources, and project monitoring, these systems deliver cost reductions and streamlined processes.

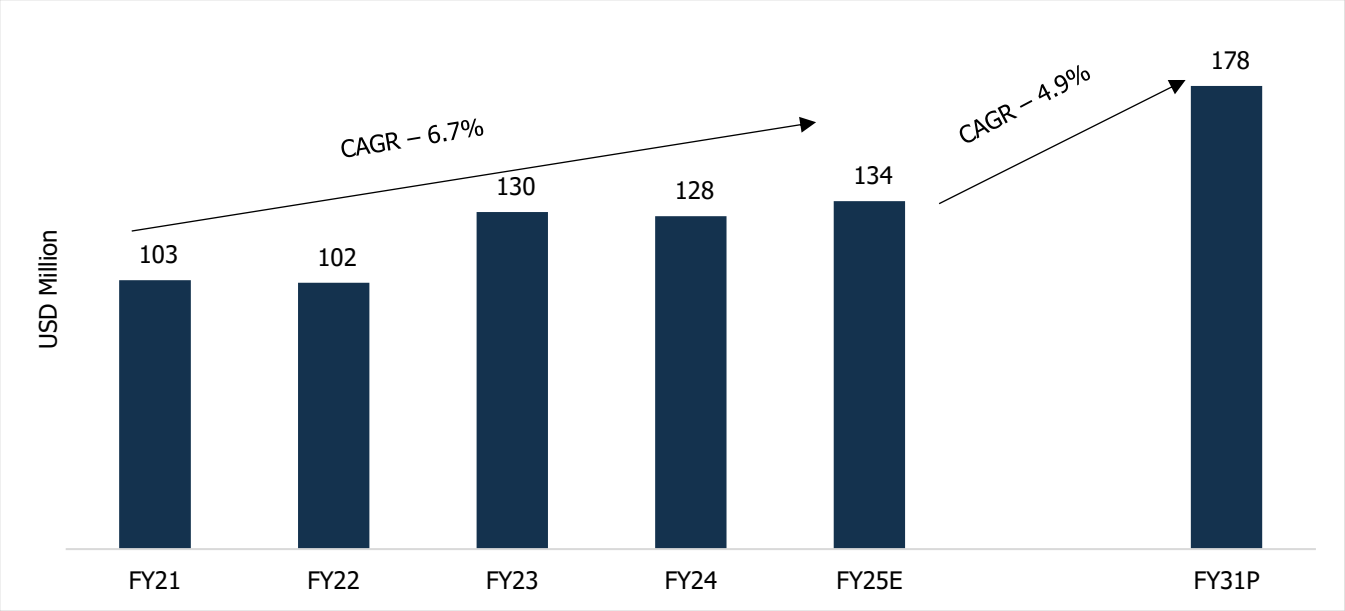
Digital Signature Solutions: The increasing reliance on technologies like blockchain and biometric authentication demonstrates a commitment to improving transaction security, ensuring legal compliance, and fostering sustainable business practices.

Government Resource Planning (GRP): Investments in GRP systems reflect an emphasis on promoting fiscal responsibility, transparency, and accountability. These solutions are designed to facilitate efficient budget management, execution, and comprehensive performance tracking.

- **Government Digital Transformation – India Market Size**

The effective implementation of e-governance depends heavily on technology solutions. The IT sector plays a central role in enabling e-governance by providing the infrastructure, software, services, and expertise required for digital transformation in government operations. E-governance in India heavily relies on the IT sector to build the technological backbone needed for digital transformation in government services. As India continues its journey toward a digital society, the relationship between e-governance and the IT sector will only grow more critical, driving innovation and improving public sector efficiency. In FY24, the market was valued at USD 128 Million and is projected to reach USD 178 Million in FY31, indicating a CAGR of 4.9% from FY25 to FY31.

Chart 26: Indian E-Governance Market Size

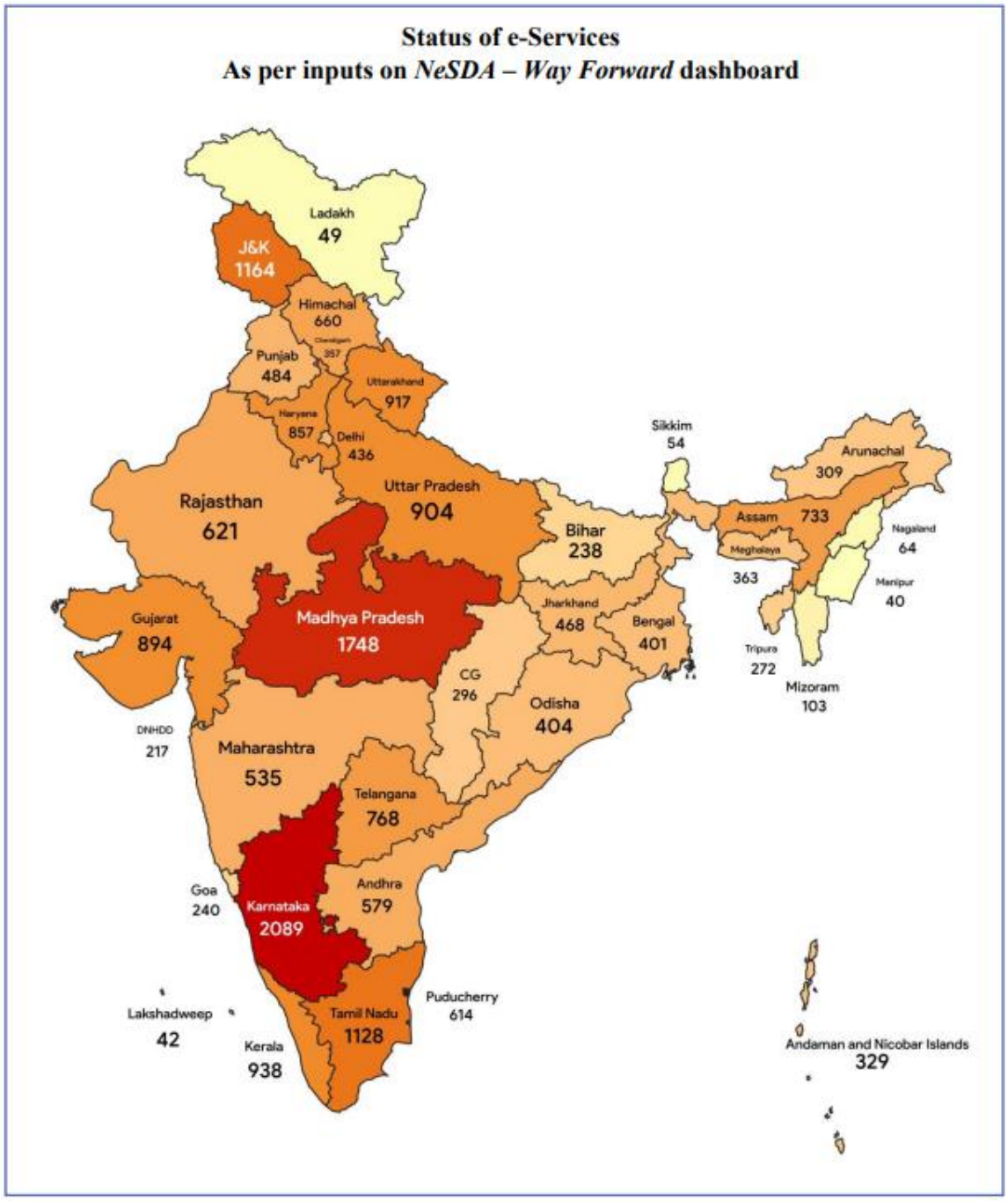


Source: IMARC, CareEdge Research
Note: E indicates Estimated; P indicates Projected

- **National e-Governance Service Delivery Assessment (NeSDA)**

Department of Administrative Reforms & Public Grievances (DARPG) had formulated the National e-Governance Service Delivery Assessment (NeSDA) in 2019 as part of its mandate to boost the e-governance endeavours and drive digital government excellence. The biennial study assesses States, Union Territories (UTs), and focus Central Ministries on the effectiveness of e-governance service delivery. NeSDA helps the respective governments improve their delivery of citizen centric services and shares best practices across the country for all States, UTs and Central Ministries to emulate.

Status of e-services in states and UTs



Source: NeSDA report – March 2025

Key Highlights

Status of Implementation

• 20,315 e-services are provided across States/UTs. Karnataka provides maximum e-services (2,089). Maximum e-services (6,796) lie in the sector – Local Governance & Utility Services followed by Social Welfare including Health,

Agriculture, Home & Security which has 4,721 e-services, while environment (738) has the minimum number of e-services.

• 1,584 out of 2,016 mandatory e-services (56*36 States/UTs) are available, making saturation over 78%

• Himachal Pradesh, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, Kerala, Gujarat and Karnataka have achieved 100% saturation of 56 mandatory e-services.

The table 6 shows the level of implementation of 56 compulsory e-services required under the NeSDA framework.

Sikkim, Mizoram, Manipur and Ladakh are some of the lowest performing states regarding implementing the 56 compulsory e-services under the NeSDA framework

Table 6: Status of 56 Mandatory e-Services

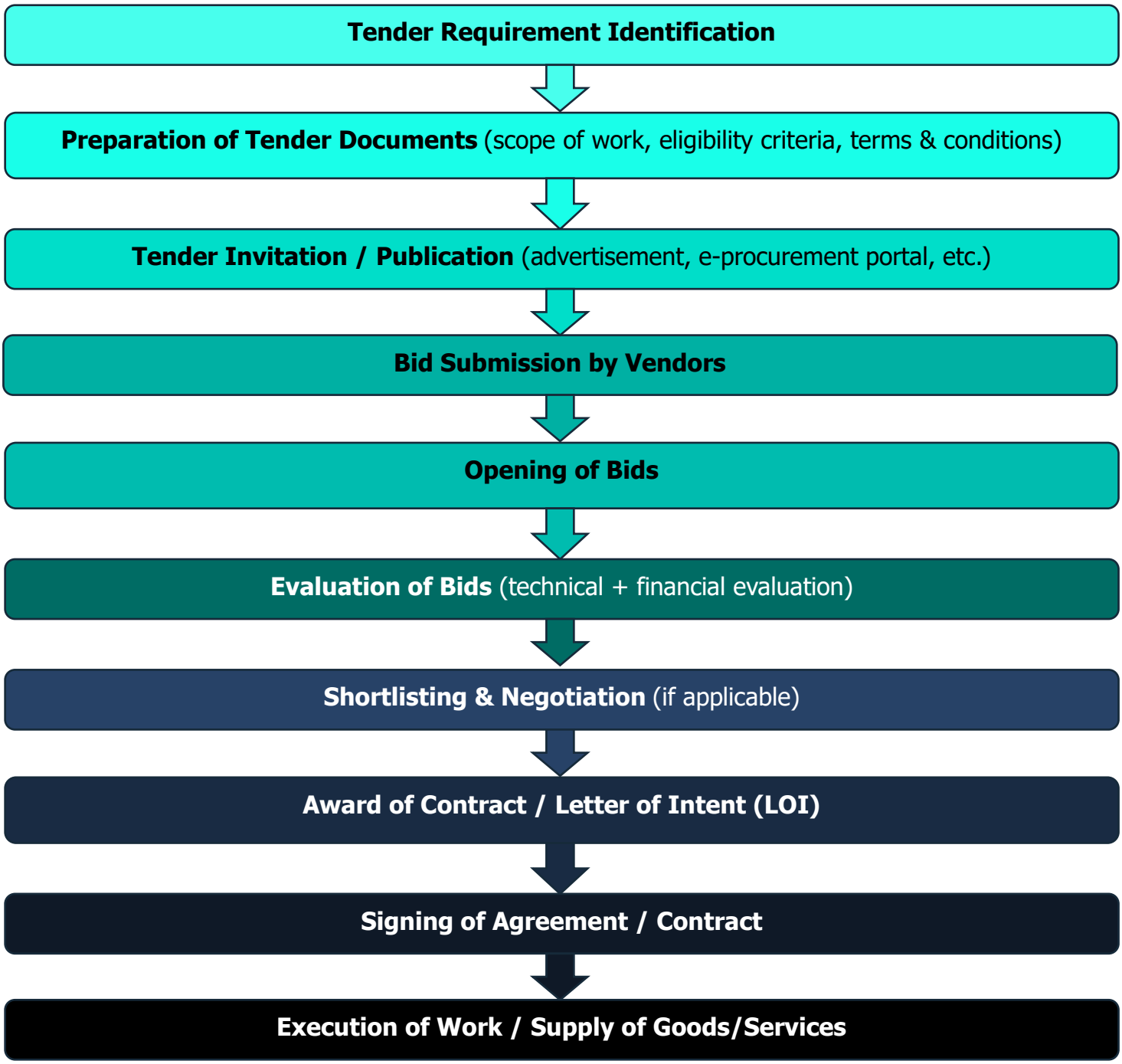
States	Total e-services being provided	Number of mandatory e-services being provided	% of total mandatory e-services
Karnataka	2,089	56	100.0%
Kerala	938	56	100.0%
Uttarakhand	917	56	100.0%
Rajasthan	621	56	100.0%
Uttar Pradesh	904	56	100.0%
Gujarat	894	56	100.0%
Madhya Pradesh	1748	56	100.0%
Punjab	484	56	100.0%
Himachal Pradesh	660	56	100.0%
Tamil Nadu	1128	56	100.0%
Maharashtra	535	56	100.0%
Telangana	768	55	98.2%
Andhra Pradesh	579	55	98.2%
Chhattisgarh	296	54	96.4%
Jammu and Kashmir	1164	54	95.8%
Chandigarh	357	53	94.7%
Haryana	857	52	92.9%
West Bengal	401	51	91.1%
Tripura	272	50	89.3%
Puducherry	614	49	87.5%
Dadra and Nagar Haveli and Daman and Diu	217	48	85.7%
Andaman and Nicobar Islands	329	48	85.7%
Assam	733	47	83.9%
Jharkhand	468	47	83.9%
Meghalaya	363	43	76.8%
Goa	240	40	71.4%
Delhi	436	36	64.3%
Nagaland	64	29	51.8%
Bihar	238	28	50.0%
Odisha	404	25	44.7%

Arunachal Pradesh	309	24	42.9%
Lakshadweep	42	23	41.1%
Sikkim	54	19	33.9%
Mizoram	103	17	30.4%
Manipur	40	15	26.8%
Ladakh	49	7	12.5%

Source: NeSDA report – March 2025

Tender process of awarding contracts

Flow chart of the process



The tender awarding process is a structured and transparent method through which government departments invite bids from eligible contractors. There are certain technical and financial criteria to be met such as experience in similar works and minimum annual turnover, etc.

In specific sectors like E-Governance, financial eligibility is often determined using a multiplier-based approach, where the bidder's annual turnover should be more than or equal to 'X' times estimated tender value. Multiplier number can vary for different tenders.

Bidders need to meet certain technical and financial eligibility criteria, among which past experience and financial stability are crucial characteristics for selection. This ensures that the bidder has the technical expertise and project management capabilities.

Collaborations between multiple IT firms and developing and delivering products or solutions jointly is a common business practice. Through these alliances, the firms can make use of the technical knowledge, innovative skills, and domain expertise of their counterparts and provide more integrated and technologically sound products.

Bidders are scored based on their technical expertise and commercials which they have quoted for tenders and accordingly, the tender is awarded based on the score. The bidder must fulfil all terms and conditions specified in the tender document, not just quote the lowest price. The contractor needs to submit EMD (Earnest Money Deposit) and agree to sign an agreement and begin work within a specified number of days after issuance of the work order. The Bidder shall bear all costs associated with the preparation and submission of the Bid including but not limited to Bank charges all courier charges including taxes & duties etc. The competent authority reserves the right to reject bids that do not align with the prescribed norms.

With the adoption of technology, the tendering process has become more streamlined, transparent, and accessible through online platforms, enhancing efficiency and accountability. The digital shift not only streamlines documentation and submission but also enhances the overall integrity and accountability of public procurement.

Various bidding portals in India

Category	Portal Name	Coverage / Description	Links
Central Portals	Central Public Procurement Portal (CPPP)	Main portal for Government of India e-tenders across ministries, departments, and organizations.	https://eprocure.gov.in/cppp/
	Government e-Marketplace (GeM)	Unified online platform for procurement of goods and services by government buyers.	https://gem.gov.in/
	eProcurement System of India	Electronic tendering platform covering central ministries, departments, and PSUs.	https://etenders.gov.in/eprocure/app
State-Level Portals	Maharashtra e-Tender	State government procurement portal for Maharashtra.	https://mahatenders.gov.in/nicgep/app
	Karnataka e-Procurement	State government procurement portal for Karnataka.	https://eproc.karnataka.gov.in/eprocurement/common/eproc_tenders_list.seam

	Andhra Pradesh e-Procurement	State government procurement portal for Andhra Pradesh.	https://tender.apeprocurement.gov.in/login.html
	Tamil Nadu Tenders	State government procurement portal for Tamil Nadu.	https://tntenders.gov.in/nicgep/app
PSU Portals	NTPC	Tenders related to power generation and infrastructure.	https://eprocurentpc.nic.in/nicgep/app
	ONGC	Tenders for oil & gas exploration and related services.	https://tenders.ongc.co.in/web/tendersweb
	BHEL	Tenders for heavy electrical equipment and engineering projects.	https://eprocurebhel.co.in/nicgep/app
	IOCL	Tenders for petroleum, oil, and lubricants.	https://iocletenders.nic.in/nicgep/app
	SAIL	Tenders for steel manufacturing and related services.	https://sailtenders.co.in/
	Coal India	Tenders for coal mining and associated services.	https://coalindiatenders.nic.in/nicgep/app

Eligibility Criteria

The eligibility requirements for bidders are generally set by the tendering authority and can vary depending on the nature, size, and scope of the project. However, in most cases, bidders are expected to meet the following broad criteria:

1. General / Legal Criteria

- Legal Entity: The bidder must be a registered company, partnership firm, LLP, or sole proprietorship (as specified in tender).
- Registration Certificates: PAN, GST, MSME/SSI registration (if applicable), Udyam certificate, etc.
- No Blacklisting: Declaration that the bidder has not been blacklisted by any government authority/PSU.
- Compliance with Laws: Must adhere to labor laws, environmental regulations, and statutory obligations.

2. Technical Criteria

- Experience:
  - Proven track record in executing similar projects of comparable size and nature.
  - Completion certificates/work orders from past clients.
- Technical Capability:
  - Adequate infrastructure, machinery, software, or technology (as required).
  - Qualified and experienced workforce.
- Quality Certifications (if applicable): ISO 9001, ISO 27001, CMMI, etc.

3. Financial Criteria

- Turnover Requirement: Minimum annual turnover in the last 3–5 years (often specified as a % of estimated tender value).

- Net Worth: Positive net worth or minimum threshold as per tender conditions.
- Profitability: Sometimes, bidders must have reported profits in at least 2 out of last 3 years.
- Bank Solvency Certificate: Proof of financial health issued by a bank.
- Earnest Money Deposit (EMD): Payment of bid security (unless exempted for MSMEs).

4. Other Criteria

- Past Performance: No record of poor performance or termination of contract by any government/PSU.
- Joint Ventures / Consortiums: Allowed only if tender specifies, with clear role allocation.
- Statutory Compliance: Valid PF, ESIC, Professional Tax, and other registrations where applicable.

3.2 India's Digital Public Infrastructure (DPI) & e-Governance Roadmap

India's digital infrastructure has evolved rapidly, positioning the country as a global leader in digital adoption. Innovations in cloud computing, artificial intelligence (AI), machine learning (ML), and digital governance are driving this transformation. Government initiatives are strengthening the digital backbone, ensuring accessibility, scalability, and security in public and private sector services to foster economic growth and improve citizens' lives.

Digital Public Infrastructure (DPI) refers to secure, interoperable systems that enable essential public services. In India, DPI has been pivotal in transforming the digital economy, much like traditional infrastructure supports industrial growth. Key achievements include Aadhaar and the Unified Payments Interface (UPI).

Aadhaar, the world's largest digital identity programme, provides a unique ID based on biometric and demographic data, enabling seamless authentication while preventing fraud. As of 29th March 2025, 1.42 billion Aadhaar numbers have been issued.

Table 7: M-o-M growth of UPI transactions (Volume in Lakhs)

Month	FY24	FY25	M-o-M growth
April	88,632.6	1,33,039.9	50.1%
May	94,151.9	1,40,358.4	49.1%
June	93,350.6	1,38,851.4	48.7%
July	99,642.6	1,44,355.5	44.9%
August	1,05,860.2	1,49,630.5	41.3%
September	1,05,556.9	1,50,417.5	42.5%
October	1,14,087.9	1,65,849.7	45.4%
November	1,12,352.9	1,54,820.2	37.8%
December	1,20,202.3	1,67,300.1	39.2%
January	1,22,030.2	1,69,960.0	39.3%
February	1,21,026.7	1,61,061.9	33.1%
March	1,34,400.0	1,83,015.1	36.2%
Total	**13,11,294.8**	**18,58,660.2**	**41.7%**

Source: RBI

UPI has shown strong year-over-year growth in all months of FY25 over FY24. The values of transactions have continued to rise, a sign of the increasing penetration and extensive usage of digital payments throughout the nation. Growth, which was more than 48% in the first quarter (April to June), fell to 36.2% in March. Volume of UPI transactions grew by 41.7% Y-o-Y in FY25.

Digi-Locker, a platform for digital document verification. It has facilitated more than 370.46 million users and made available 7.76 billion issued documents.

As on 22nd July 2024, 5,563.7 million learning sessions have been imparted using Digital Infrastructure for Knowledge Sharing (DIKSHA), the world's largest education platform. It has achieved 179.5 million course enrolments and 143.7 million course completions.

Other significant platforms include Government e-Marketplace (GeM) for government procurement, UMANG (providing access to government services), and API SETU (for open APIs). Co-WIN and Aarogya Setu have been pivotal in health services, including vaccination tracking and contact tracing during Covid pandemic. Further, India's digital health infrastructure includes eSanjeevani (telemedicine service), e-Hospital (hospital management system), and e-Courts (for judicial processes), transforming healthcare and justice delivery. The Poshan Tracker monitors nutritional services for women and children, while e-Office digitizes government workflows. The NCD (National Non-communicable Diseases) platform aids in managing non-communicable diseases and is integrated with the Ayushman Bharat Digital Mission and 746.8 million Ayushman Bharat Health Account (ABHA) numbers have been created as on March 29, 2025.

Skill development is supported by SIDH (Skill India Digital Hub), a platform for skilling and livelihood. Additionally, India Stack Local showcases digital solutions developed by State Governments and UTs, with 493 solutions listed. These initiatives, part of India's Techade, have positioned India as a leader in digital services, benefiting both citizens and other nations, especially in the Global South.

The National Knowledge Network (NKN), approved in March 2010, is a high-speed data communication network designed to connect National and State Data Centres, State-Wide Area Networks, and various Digital India initiatives. It supports Government-to-Government (G2G) and Government-to-Citizen (G2C) services, district connectivity, and interconnects knowledge institutions across India to promote resource sharing and collaborative research. NKN serves both the National Government Network (NGN) and the Research & Education Network (REN). The network has successfully established 1,803 links with institutions and 637 links with district centres, enabling digital governance and the efficient delivery of e-Government services.

- **Digital India, Smart Cities, National Digital Health Mission, and other flagship initiatives**

  - **Digital India**

The Indian economy has been digitalising at a remarkable pace over the last decade. As per press release from Ministry of Electronic & IT, according to the State of India's Digital Economy Report 2025, India is the third largest digitalised country in the world in terms of economy-wide digitalization and emerges as the eighth most digitalised nation among the G32 for CHIPS Combined. India's digital economy is expected to grow almost twice as fast as the overall economy, contributing to nearly one-fifth of national income by 2029-30. The Connect–Harness–Innovate–Protect– Sustain (CHIPS) Combined is a metric introduced in the State of India's Digital Economy (SIDE) reports to provide a comprehensive measure of digitalisation in a country. It merges two indices—CHIPS Economy and CHIPS User—in equal proportion

India's digital economy has emerged as a significant contributor to its economic growth, accounting for 11.74% of the GDP (Rs 31.64 lakh crore or USD 402 billion) in FY23. India's digital economy is expected to grow almost twice as fast as the overall economy, contributing to nearly one-fifth of national income by FY30. Employing 14.67 million workers (2.55% of the workforce), the digital economy is nearly five times more productive than the rest of the economy. The digitally enabling industries such as ICT services and manufacturing of electronic components, computers, and communication equipment, which form the core, contributed 7.83% of GVA (Gross Value Added), while digital platforms and intermediaries added another 2% of GVA. Furthermore, digitalisation in traditional sectors like BFSI, retail, and education added 2% of GVA, highlighting the pervasive impact of digital transformation. Projections indicate the digital economy's share will grow to 20% of GVA by FY30, outpacing agriculture and manufacturing. Key growth drivers include the rapid adoption of AI, cloud services, and the rise of global capability centres (GCCs), with India hosting 55% of the

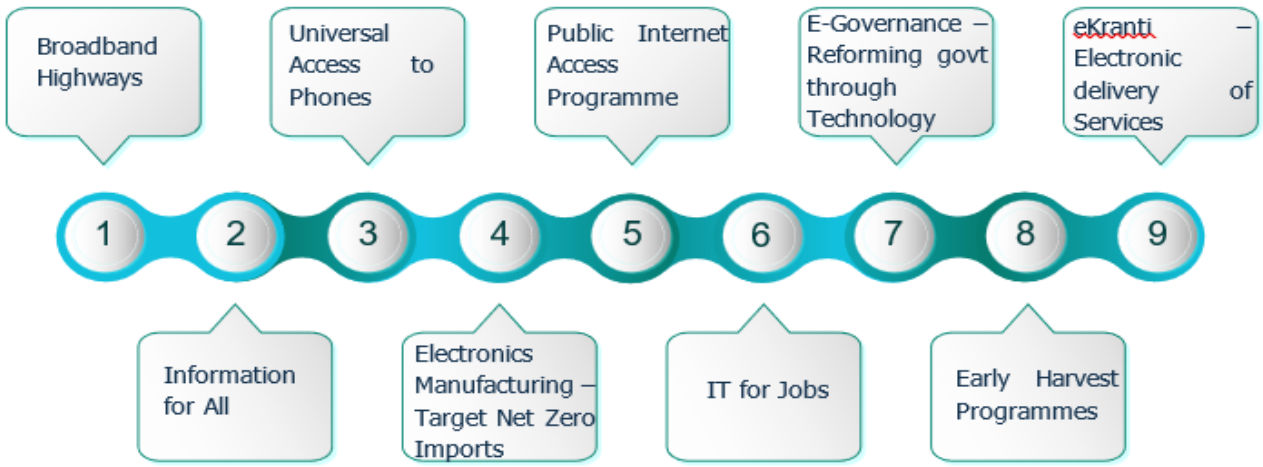
world's GCCs. GCCs are offshore centres established by multinational corporations to provide a variety of services to their parent organisations, including R&D, IT support, and business process management.

Digitalisation of traditional sectors

The press release further mentions that the primary survey and stakeholder discussions highlighted interesting facts about how different sectors are digitalising and their contribution to the revenue generated by firms. Not all aspects of businesses are digitalising uniformly. For example, retail sales are digitalising much more than wholesale sales. Firms are also investing in digital methods for customer acquisition and business development. Chatbots and AI applications are commonplace.

- In the **BFSI** sector, **over 95%** of banking payment transactions are digital, but revenue-generating activities like loans and investments remain largely offline, with financial services less digitalised overall.
- **Retail** is shifting to omni-channel models, with e-tailers adding physical stores, while AI chatbots and digital inventory tools enhance efficiency.
- **Education** has begun adopting offline, online, and hybrid models, with most institutions favoring hybrid approaches
- **Hospitality and logistics** are embracing AI, metaverse, and digital tools, with large firms fully digitalising operations, while smaller players lag behind.

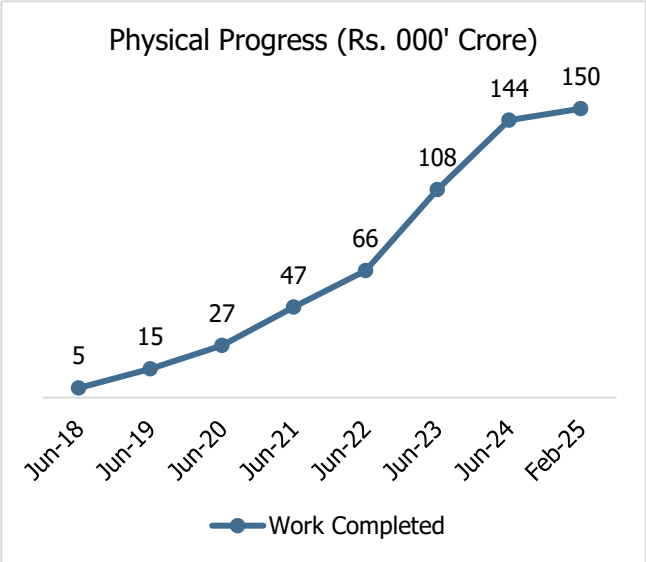
Pillars of digital India

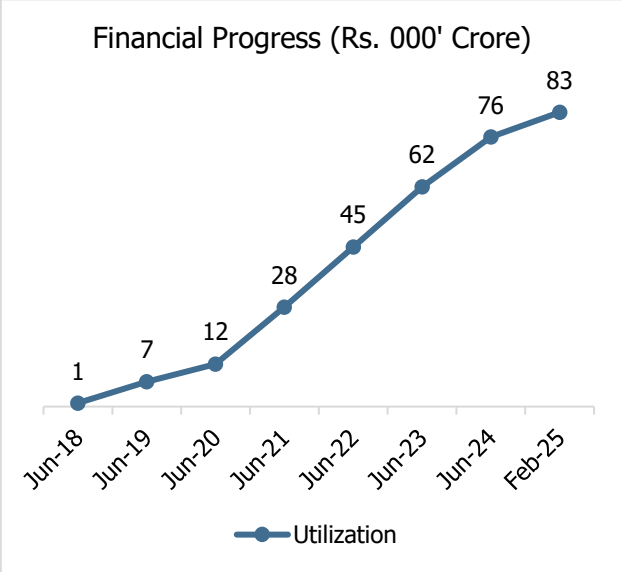


➢ **Smart Cities**

The smart city mission of Government of India focuses on promoting the 100 cities that provide core institutional, physical, social and economic infrastructure; provide decent quality of life to city dwellers; sustainable environment and smart solutions. The core infrastructure elements of the Smart City Mission encompass reliable water and electricity supply, effective sanitation and waste management, efficient public transport and urban mobility, affordable housing for the underprivileged, advanced IT connectivity and digitalization, and good governance through e-governance and citizen

involvement. Additionally, it focuses on creating a sustainable environment, ensuring the safety and security of citizens—especially women, children, and the elderly—and improving access to health and education services.

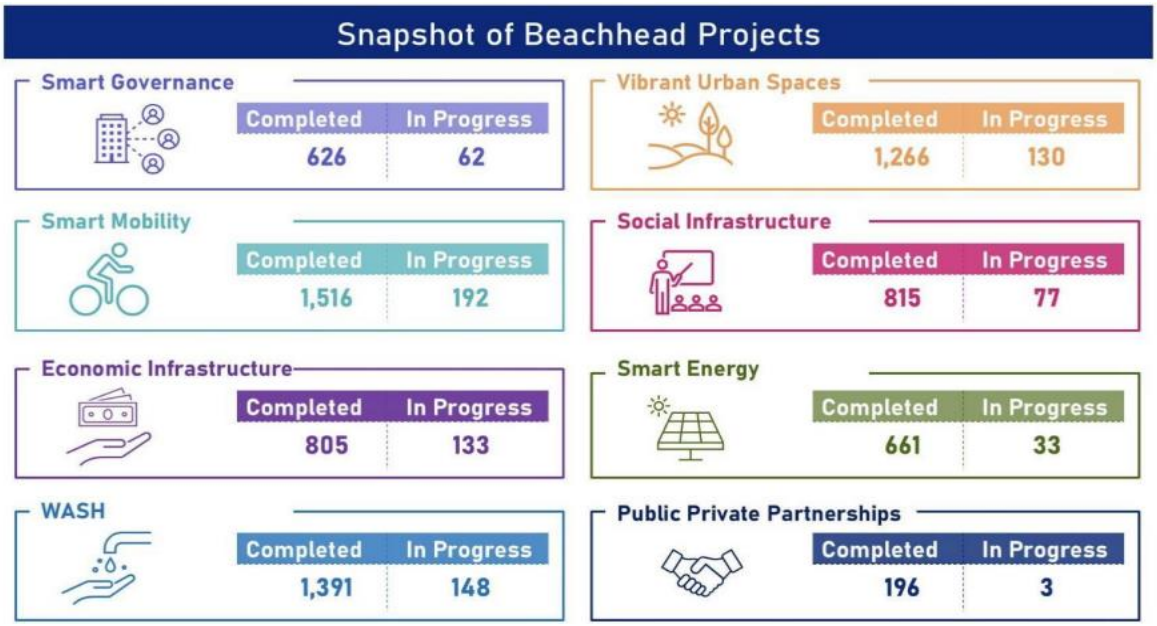




Source: Smartcities dashboard

The Smart Cities Mission aims to drive economic growth and improve the quality of life by fostering local area development and leveraging technology for smart outcomes. The strategy includes transforming existing areas (through retrofitting and redevelopment), developing new areas (greenfield development), and applying smart solutions city-wide (Pan-city initiatives).

Major Projects under the Smart City Mission as per Ministry of Housing and Urban Affairs



Source: PIB dated September 02, 2024

Some of the Key Achievements of the Mission

Integrated Command and Control Centres (ICCC): All 100 Smart Cities have operational ICCCs, which utilize data for making informed decisions. These ICCCs functioned as COVID war rooms during the pandemic and have significantly improved city operations such as transport, water supply, and solid waste management by integrating emerging technologies like AI, IoT, and Data Analytics.

Education: 7,654 smart classrooms and 40 digital libraries have been developed.

Health: 172 e-health centers and clinics (without dedicated beds) have been developed, and 155 health ATMs also have been installed.

Economic Hubs: 21 incubation centers/skill development centers have been developed, and over 56 market redevelopment projects have been completed.

PPP: More than 50 cities have successfully developed or are developing 199 projects through Public-Private Partnerships (PPP) worth Rs. 92 billion.

- **National Digital Health Mission (NDHM)**

India's healthcare landscape is undergoing a digital transformation, driven by government initiatives, policy reforms, and technological advancements. With a rapidly growing population and increasing demand for quality healthcare, digital health solutions are playing a crucial role in enhancing accessibility, affordability, and efficiency. Digital healthcare infrastructure in India is evolving to bridge the gap between urban and rural healthcare services, leveraging telemedicine, electronic health records (EHRs), and artificial intelligence (AI)-driven diagnostics.

An article by World Economic Forum (WEF) highlights India's potential to become a **global leader** in digital health by building a resilient digital health ecosystem. It also emphasizes the role of public-private partnerships, the importance of interoperability, and the need for robust data governance frameworks. It underscores how India's initiatives, such as the **Ayushman Bharat Digital Mission (ABDM)** and the **Digital Health Incentive Scheme (DHIS),** can set a global benchmark for digital healthcare transformation. NDHM aims to offer universal health coverage.

The Ayushman Bharat Digital Mission (ABDM), formerly the National Digital Health Mission (NDHM), aims to make India self-reliant in providing universal health coverage. It aligns with the objectives of the National Health Policy (NHP) 2017

and the National Digital Health Blueprint (NDHB) to establish a comprehensive digital infrastructure for healthcare services nationwide.

The NDHB serves as a strategic roadmap for integrating digital health services, ensuring interoperability, cybersecurity, and secure data exchange. By creating a robust digital healthcare ecosystem, it facilitates efficient, accessible, inclusive, affordable, timely, and safe healthcare services.

ABDM envisions a national digital health ecosystem that manages vast amounts of health-related data and standardised digital services while upholding strict confidentiality and security of personal information.

The ABDM aims to create a nationwide digital health ecosystem by integrating healthcare service providers and patients through unique health IDs. The objective of the scheme is to fill critical gaps in health infrastructure, surveillance and health research – spanning both the urban and rural areas so that the communities are Atma Nirbhar in managing such pandemic/ health crisis. As on March 26, 2025, more than 76 crore Ayushman Bharat Health Accounts (ABHA) have been created successfully and there are more than 5 lakh health professionals registered. Uttar Pradesh, Rajasthan, Maharashtra, Madhya Pradesh and Gujarat are the top 5 states with Ayushman Bharat account holders. 49.15% of the total number of beneficiaries are women. Key features of ABDM include:

- **Health ID**: A unique identifier for individuals to store and share medical records.
- **Healthcare Professionals Registry (HPR)**: A comprehensive database of registered healthcare professionals.
- **Health Facility Registry (HFR):** A digital repository of healthcare facilities across India.
- **Unified Health Interface (UHI):** An open network facilitating digital health services.

Introduced under ABDM, the **DHIS** encourages healthcare providers to adopt digital health solutions by offering financial incentives for integrating digital health records and services. The scheme incentivizes hospitals, clinics, and healthcare startups to embrace digital technologies, accelerating the transition to a paperless healthcare system.

- **The rise of Aadhaar, UPI, and DBT and impact on IT service providers**

  - **The rise of Aadhaar**

Aadhaar is the foundational Digital Public Infrastructure (DPI) of the India stack. Aadhaar has become a cornerstone of India's digital transformation, enabling seamless access to various government services and platforms. Aadhaar plays a critical role in enhancing the efficiency of social welfare schemes by offering a dependable, unified identity verification system that ensures transparency in service delivery. Through Aadhaar-linked Direct Benefit Transfers (DBT), launched in 2013, cash benefits from various welfare schemes are directly transferred into beneficiaries' bank accounts, reducing the need for multiple documents and eliminating duplicate or fake beneficiaries. As of March 29, 2025 UIDAI (Unique Identification Authority of India) has generated 1.42 billion Aadhaar numbers.

Aadhaar is considered as the most trusted digital ID in the world. In the past decade, more than a billion Indians have expressed their trust in Aadhaar by using it to authenticate themselves over 100 billion times. Expansion of the scope of Aadhaar authentication, as envisaged in the amendment, will further improve ease of living and facilitate hassle-free access to newer services of their choice. The Ministry of Electronics and Information Technology (MeitY) has launched Aadhaar Good Governance portal to streamline approval process for Aadhaar authentication requests. This is coordinated with an effort to make Aadhaar more people-friendly, enable ease of living, and enable better access to services for people.

Over the years, Aadhaar authentication has witnessed exponential growth, with the annual authentication transactions growing at a CAGR of 150%, from 2.4 million transactions in FY 2012-13 to 22 billion annual transactions in 2023-24. The authentication and e-KYC transactions also grew sharply to 130 billion and 20.5 billion, respectively.

In June 2025, Aadhaar holders conducted more than 2.3 billion authentication transactions, highlighting the continued expansion of the digital economy in India. This significant number demonstrates the growth of digital economy in the country. The authentication transactions in June 2025 have recorded a growth of over 7.8% when compared with June 2024. On an average over nine crore authentications are taking place every day. This shows the growing adoption and utility of Aadhaar in the daily lives of people. Nearly 550 entities are using Aadhaar authentication service. The AI/ML based face authentication solution, developed in house by the UIDAI, is being used across diverse sectors including finance, insurance, fintech, health and telecommunications. Several Government departments both at the centre and states are using it for smooth delivery of benefits to targeted beneficiaries.

- **Unified Payments Interface (UPI)**

UPI is a system that powers multiple bank accounts into a single mobile application (of any participating bank), merging several banking features, seamless fund routing & merchant payments into one hood. It also caters to the "Peer to Peer" collect request which can be scheduled and paid as per requirement and convenience. As of June 2025, 675 banks were operating on UPI, marking a 12.1% increase from June 2024, when the count stood at 602.

Table 8: UPI Payment Statistics

Year	Volume (in Bn)	Value (in Rs. Tn)
FY25	185.8	260.6
FY24	131.1	200.0
FY23	83.7	139.1
FY22	46.0	84.2
FY21	22.3	41.0

Source: RBI, NPCI, CareEdge Research

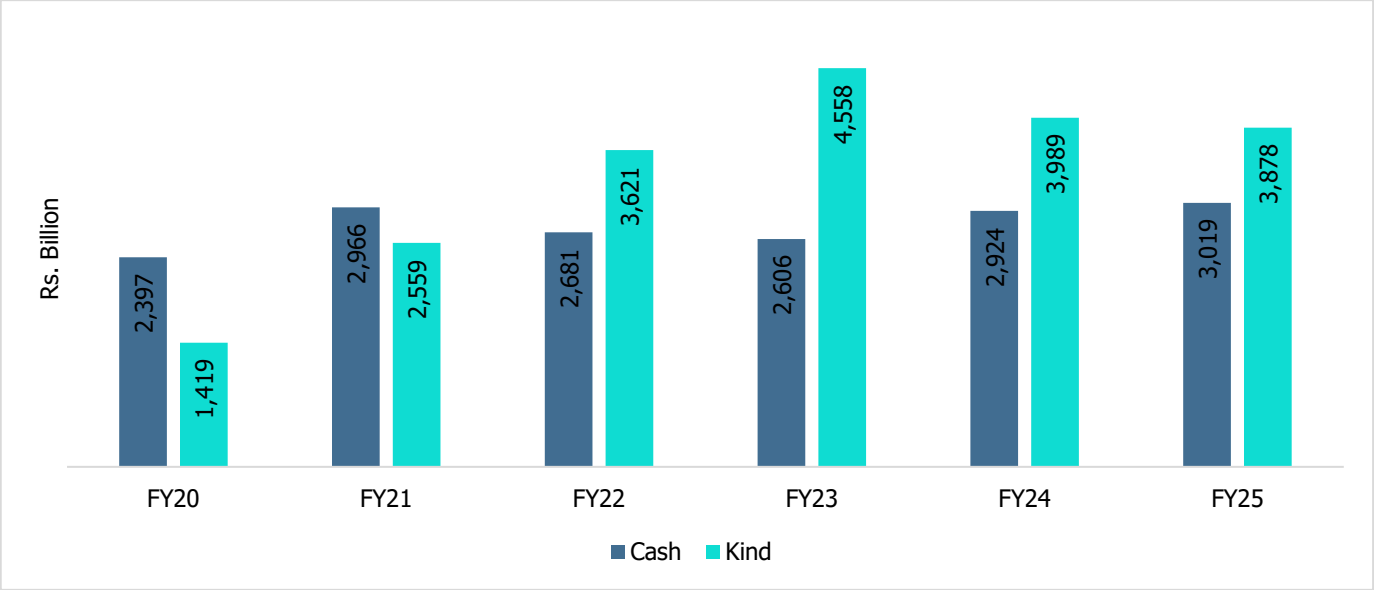
The UPI has significantly influenced IT service providers by driving innovation and creating new opportunities in the digital payments ecosystem. Key impacts include:

1. **Increased Demand for Payment Solutions**: IT service providers are tasked with developing and maintaining secure, scalable, and efficient UPI-based payment platforms for banks and fintech companies.
2. **Focus on Cybersecurity**: With the rise in digital transactions, IT firms are investing heavily in advanced cybersecurity measures to protect against fraud and ensure data privacy.
3. **Integration and Interoperability**: IT providers are working on integrating UPI with various applications and systems, ensuring seamless interoperability across platforms.
4. **Data Analytics and AI**: The surge in UPI transactions has created a demand for analytics tools to derive insights from transaction data, enabling better decision-making and personalized services.
5. **Global Expansion**: As UPI gains international recognition, IT service providers are exploring opportunities to implement similar systems in other countries, expanding their market reach.
6. **Cost Optimization**: UPI's low-cost infrastructure has encouraged IT firms to innovate cost-effective solutions, benefiting both service providers and end-users.

- **Direct Benefit Transfer (DBT)**

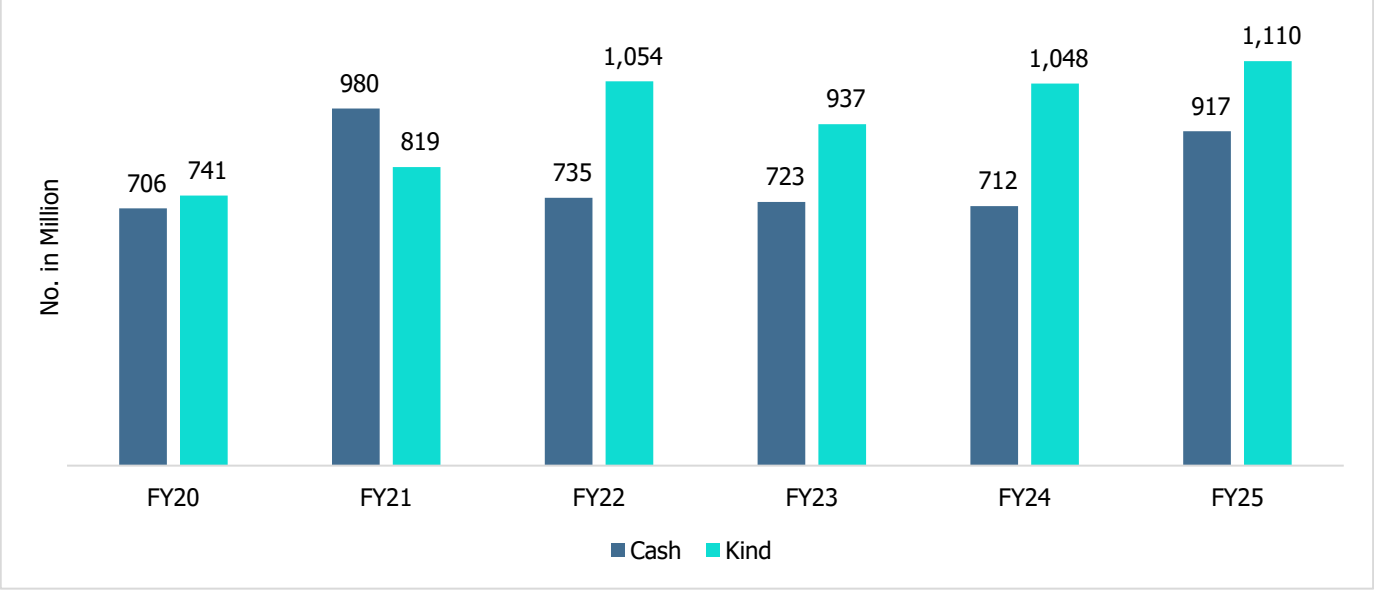
DBT is a transformative initiative by the Government of India aimed at ensuring the efficient delivery of subsidies and benefits directly to the bank account of beneficiaries. Launched on January 1, 2013, DBT seeks to eliminate intermediaries, reduce delays, and curb corruption in the distribution of government funds. DBT will bring efficiency, effectiveness, transparency and accountability in the Government system and infuse confidence of citizen in the governance. Use of modern technology and IT tools will realize the dream of MAXIMUM GOVERNANCE MINIMUM GOVERNMENT. JAM i.e. Jan Dhan, Aadhaar and Mobile are DBT enablers.

Chart 27: Trend in Year wise Fund Transfer



Source: DBT, CareEdge Research
Note: The Data from DBT is taken as on 23rd August 2025

Chart 28: Trend in Year wise DBT Beneficiaries (Non-Unique)



Source: DBT, CareEdge Research
Note: The Data from DBT is taken as on 23rd August 2025

3.3 Market Opportunities & Government schemes in Key Industry Segments for IT Solutions

In India, the government has launched various schemes to promote the adoption of IT solutions across key industries. These initiatives focus on improving infrastructure, promoting digital literacy, fostering economic growth, and improving efficiency in government services. IT is playing an integral role in driving India's development in sectors such as agriculture, healthcare, education, tourism, mining, governance and many more thereby contributing to national growth.

- **Banking, Financial Services, and Insurance (BFSI):** This sector presents significant market opportunities for IT solution providers, driven by increasing digital adoption, evolving customer expectations, and strong government support. The ongoing push for modernization of core banking systems, enhanced cybersecurity frameworks, and the integration of digital channels has created a growing demand for advanced IT infrastructure and services. Technologies like AI, data analytics, API-based digital payments, and secure cloud platforms are being actively adopted by banks, NBFCs, and insurance firms to streamline operations and improve customer experience. Government schemes such as Digital India, Jan Dhan Yojana, and initiatives by NPCI (like UPI, e-RUPI, and Bharat BillPay) have accelerated the digital transformation journey across both urban and rural financial ecosystems. Additionally, policy reforms such as increased FDI in insurance and RBI's digital lending guidelines are further catalyzing investment in robust IT frameworks. As the BFSI sector continues to digitize, it offers long-term, scalable opportunities for IT companies to provide customized, secure, and compliance-oriented solutions.

- **Agritech**: The Government has launched several key schemes to upgrade agricultural technology to improve productivity, sustainability, and farmers' income. The Digital Agriculture Mission is a major initiative that leverages technologies like AI, Big Data, and geospatial data for better crop monitoring, soil management, and weather forecasting. The Government has introduced many initiatives to enhance agricultural marketing such as e-NAM, Kisan Rail and Kisan Udan for improved logistics. Additionally, agri-tech startups and online platforms like AGRI-Bazaar help farmers to connect directly with buyers, ensuring better pricing and increased income.

- **Edtech & E-Learning:** The National Education Policy 2020 calls for investment in digital infrastructure, online teaching platforms and tools, virtual labs, digital repositories, online assessments, technology and pedagogy for online teaching-learning etc., with the promotion of multilingualism and the power of language in teaching and learning through innovative and experiential methods. A comprehensive initiative called PM e-VIDYA was initiated as part of Atma Nirbhar Bharat Abhiyaan, which unifies all efforts related to digital/online/on-air education to enable multi-mode access to education. The PM eVidya initiative are available to all the students across all the states free of cost. On 6 December 2024, the Government of India launched Channel 31 on DTH, dedicated to Indian Sign Language (ISL) training for hearing-impaired students, special educators, interpreters, and relevant organizations.

- **Health-tech**: As mentioned in section 3.2, India's initiatives, such as the ABDM and DHIS, can set a global benchmark for digital healthcare transformation. The ABDM aims to create a nationwide digital health ecosystem by integrating healthcare service providers and patients through unique health IDs. Recently, in September 2024, the National Health Authority (NHA) and IIT Kanpur signed a Memorandum of Understanding (MoU), under which a federated learning platform across a variety of machine learning model pipelines, a quality-preserving database, an open benchmarking platform for comparing & validating AI models, and a consent management system for research under ABDM would be developed by IIT Kanpur. The platform will subsequently be operated and governed by NHA, thereby unlocking the immense potential of AI for improving health outcomes. under ABDM, the DHIS encourages healthcare providers to adopt digital health solutions by offering financial incentives for integrating digital health records and services.
  The e-Sanjeevani platform, launched by the Ministry of Health and Family Welfare (MoHFW), enables remote consultations, reducing the burden on physical healthcare facilities. The platform consists of two modules:

- e-Sanjeevani OPD: Facilitating doctor-to-patient consultations remotely.
- e-Sanjeevani AB-HWC: Connecting Health and Wellness Centers (HWCs) with specialist doctors for better healthcare accessibility in remote areas.

Aarogya Setu has been transformed into a National Health App, bringing a whole plethora of digital health services powered by the ABDM. As part of the Digital India initiative of the Ministry of Electronics and Information Technology, e-Hospital, e-Blood Bank and Online Registration System (ORS) applications were developed. The e-Hospital application is a Hospital Management Information System (HMIS) for internal workflows and processes of hospitals. This one-stop solution helps in connecting patients, hospitals and doctors on a single digital platform. e-Hospital is made available to Central Government/ State Government/ Autonomous/ Cooperative hospitals on the cloud through the SaaS (Software as a Service) model. The e-Blood Bank application facilitates the implementation of a complete blood bank management system. Online Registration System (ORS) is a Digital India initiative that aims to provide online access to hospital services for patients, integrated with the Ayushman Bharat Health Account.

- **Mining & Industrial IT:** Digital transformation is accelerating across the mining and metals sector, and companies have an unprecedented opportunity to capitalize on this momentum. In India, Mining companies are creating an enterprise-level digital strategy that outlines the value that the business will receive from the digital activities. A broad range of digital capabilities are being used to automate core mining value chain operations. IoT and machine learning are employed, for instance, to automate and enhance the dependability of mining equipment and trucks, sensors to gather data in real-time, drones for data collecting, inspection, and stock control, and wearables for field maintenance and operator safety. By using the IoT, mines can enjoy benefits such as Develop safer working conditions, minimize downtime after a blast, reduce the amount of machinery downtime, limit the time needed for evacuation drills, optimize labour and energy costs.

- **Cloud Services:** India's cloud ecosystem is key to its digital transformation. The NIC National Cloud Services project enhances e-Governance service delivery. Over 300 government departments use cloud services. The GI Cloud (MeghRaj) initiative aims to provide ICT services via Cloud to all Government Departments at the Centre and States/UTs, promoting the Cloud ecosystem nationwide. It ensures optimal use of IT infrastructure and accelerates the development and deployment of e-Gov applications such as digital payments, identity verification, and consent-based data sharing. MeitY has initiated the empanelment of Cloud Service Providers (CSPs) to address the evolving Cloud needs of Government Departments.

  In line with the government's vision of paperless governance, Digi Locker has become a revolutionary platform for the issuance and verification of documents. With over 37 Crore registered users, Digi Locker has transformed the way citizens access and authenticate their documents.

  - **Collab Files** is a centralized platform for government officials to create, manage, and share office documents such as spreadsheets and text files. It integrates with platforms like e-Office and NIC email and ensures secure access via government-issued email IDs and maintains records of document sharing.
  - **Gov Drive** is a cloud-based, multi-tenant platform offering storage as a service for Government of India officials. It enables secure storage, sharing, synchronization, and management of documents across devices, allowing officials to store, access, modify, or delete files and folders online through the GovDrive application.
  - The **Gov Intranet Platform** is a modern, secure portal for government officials, streamlining workflow management with Single Sign-On (SSO) via Parichay. It provides access to applications like eMail, eOffice, and the Ministry Performance Dashboard while enabling efficient calendar management, task assignment, event planning, and secure

- **Tourism Market:** The Ministry has launched the revamped version of Incredible India Digital Platform (IIDP) as a comprehensive resource for travellers and stakeholders interested in exploring the country's rich cultural heritage, natural beauty, and diverse attractions of the country. The IIDP personalizes visitor experiences by offering real-time weather updates, city exploration, and essential travel services. The portal has also partnered with several OTAs (Online Travel Agents) and Stakeholders for seamless booking of flights, hotels, cabs, and buses and tickets for ASI monuments. Ministry of Tourism has launched the Incredible India Content Hub on the revamped Incredible India digital portal, which is a comprehensive digital repository, featuring a rich collection of high-quality images, films, brochures, and newsletters related to tourism in India. This repository is intended for the use of a diverse range of stakeholders, including tour operators, journalists, students, researchers, film makers, authors, influencers, content creators, government officials and ambassadors.

  IT plays a pivotal role in the digitization of the tourism market, transforming the way the industry operates and interacts with consumers.

  1. **Online Booking Platforms:** IT enables the creation of user-friendly platforms for booking flights, hotels, and tours, making travel planning seamless and accessible.
  2. **Personalized Experiences:** Through data analytics and AI, IT helps tailor travel recommendations and offers based on individual preferences and behaviour.
  3. **Virtual and Augmented Reality:** IT facilitates immersive experiences, allowing travellers to explore destinations virtually before making decisions.
  4. **Smart Destinations:** IT supports the development of smart cities and destinations, integrating IoT for real-time updates on traffic, weather, and local attractions.
  5. **Digital Marketing:** IT empowers tourism businesses to reach global audiences through targeted digital campaigns and social media engagement.
  6. **Sustainability:** IT aids in tracking and reducing the environmental impact of tourism through efficient resource management and eco-friendly practices.
  7. **Enhanced Customer Service:** Chatbots and automated systems provide 24/7 support, improving customer satisfaction and engagement.

- **Urban Governance:** The National Urban Digital Mission (NUDM) has been launched with the vision of improving ease of living by creating a national urban digital ecosystem that delivers accessible, inclusive, efficient and citizen centric governance in India's towns and cities. Extensive consultations have been held with all stakeholders including, inter alia, state governments industry, academia and civil society representatives. IT in urban governance is revolutionizing the way cities are managed, creating smarter, more efficient, and more sustainable urban environments. By integrating technologies like IoT, AI, data analytics, and cloud computing, cities can improve the delivery of services, enhance safety and sustainability, and promote citizen engagement. The future of urban governance lies in the adoption of these digital tools to create smart cities that are more connected, responsive, and liveable for everyone.

  Smart Cities: IT enables cities to develop interconnected systems for energy, water, waste management, and traffic, using IoT sensors and smart grids to optimize resources.

  E-Governance and Citizen Engagement: IT allows online service delivery (e.g., permits, payments), public grievance systems, and platforms for citizen participation, making governance more transparent and accessible.
  Data-Driven Decision Making: Cities use big data analytics and GIS (Geographic Information Systems) to make informed decisions about urban planning, traffic management, and resource allocation.

Smart Transport and Traffic Management: IT improves traffic flow and public transport using intelligent traffic systems, real-time GPS tracking, and smart parking solutions.
Waste Management and Resource Optimization: IT helps manage waste collection, water, and energy more efficiently through smart bins and metering systems, reducing waste and improving sustainability.
Urban Safety and Security: Surveillance systems, AI-powered monitoring, and integrated emergency response platforms enhance public safety and quick responses to emergencies.
Sustainability and Environmental Monitoring: IT tracks air quality, energy consumption, and water usage to help manage environmental impacts and promote sustainable practices in urban areas.
Urban Planning and Land Use Management: IT tools like 3D modelling and smart zoning help plan better land use and infrastructure projects, ensuring sustainable urban growth.
Digital Infrastructure and Connectivity: IT provides Wi-Fi, broadband networks, and cloud computing to improve connectivity, enable smart city services, and promote digital inclusion.
Blockchain for Transparent Governance: Blockchain can create secure, transparent records for public services like property transactions, improving accountability and reducing corruption.

- **Cybersecurity:** The Government has taken following initiatives to enhance cybersecurity preparedness in the country which, inter alia, includes:

i. National Cyber Security Coordinator (NCSC) under the National Security Council Secretariat (NSCS) to ensure coordination amongst different agencies.

ii. National Cyber Coordination Centre (NCCC) implemented by the CERT-In serves as the control room to scan the cyberspace in the country and detect cyber security threats. NCCC facilitates coordination among different agencies by sharing with them the metadata from cyberspace for taking actions to mitigate cyber security threats.

iii. Cyber Swachhta Kendra (CSK) is a citizen-centric service provided by CERT-In, which extends the vision of Swachh Bharat to the Cyber Space. Cyber Swachhta Kendra is the Botnet Cleaning and Malware Analysis Centre and helps to detect malicious programs and provides free tools to remove the same. It also provides cyber security tips and best practices for citizens and organisations.

iv. Ministry of Home Affairs (MHA) has created Indian Cybercrime Coordination Centre (I4C) to deal with cybercrimes in a coordinated and effective manner.

v. CERT-In operates an automated cyber threat intelligence exchange platform for proactively collecting, analysing and sharing tailored alerts with organisations across sectors for proactive threat mitigation actions by them.

vi. CERT-In has formulated a Cyber Crisis Management Plan for countering cyber-attacks and cyber terrorism for implementation by all Ministries/ Departments of Central Government, State Governments and their organizations and critical sectors.

vii. Cyber security mock drills are conducted regularly to enable assessment of cyber security posture and preparedness of organisations and enhance resilience in Government and critical sectors. 109 such drills have so far been conducted by CERT-In where 1438 organizations from different States and sectors participated.

viii. CERT-In issues alerts and advisories regarding latest cyber threats/vulnerabilities and countermeasures to protect computers, mobile phones, networks and data on an ongoing basis.

ix. CERT-In has empanelled 200 security auditing organisations to support and audit implementation of Information Security Best Practices.

x. CERT-In issued guidelines on information security practices for government entities in June 2023 covering domains such as data security, network security, identity and access management, application security, third-party outsourcing, hardening procedures, security monitoring, incident management and security auditing.

xi. CERT-In issued Guidelines for Secure Application Design, Development, and Implementation & Operations in September 2023. CERT-In has also released the Software Bill of Materials (SBOM) guidelines for entities, particularly those in the public sector, government, essential services, organizations involved in software export and software services industry in October 2024 to help organizations know exactly what components are in their software or assets, making it easier to identify and fix vulnerabilities.

xii. CERT-In conducts regular training programmes for network and system administrators and Chief Information Security Officers of government and critical sector organisations regarding securing information technology infrastructure and mitigating cyber-attacks. A total of 12,014 officials have been trained in 23 training programs in 2024.

xiii. CERT-In regularly conducts various activities for awareness and citizen sensitization with respect to cyber-attacks and cyber frauds.

The Ministry of Electronics and Information Technology conducts programmes to generate information security awareness. Awareness material in the form of handbooks, short videos, posters, brochures, cartoon stories for children, advisories, etc. on various aspects of cyber hygiene & cyber security including deepfakes are disseminated through portals such as www.staysafeonline.in,www.infosecawareness.in and www.csk.gov.in.

Government has taken following measures to strengthen cooperation with private sector companies and international partners and stakeholders to combat cyber threats, which, inter-alia, includes:

i. The Ministry of Electronics and Information Technology (MeitY) initiated Cyber Surakshit Bharat (CSB) programme in Public Private Partnership (PPP) mode to educate & enable the Chief Information Security Officers (CISOs) & broader IT community of Central/State Governments, Banks and PSUs to address the challenges of cyber security.

ii. MeitY has set up National Centre of Excellence (NCoE) in Cyber Security in collaboration with Data Security Council of India. NCoE's primary objective is to make coordinated efforts to catalyse and accelerate cybersecurity technology development and entrepreneurship in the country.

iii. CERT-In collaborates with product and cyber security companies for cyber threat information exchange, development of best practices and capacity building. CERT-In conducts joint cyber security training programs in collaboration with Industry partners to upskill the cyber security workforce in Government, Public and private organizations with the latest skills.

iv. CERT-In co-operates, works and coordinates incident response measures with international CERTs and service providers including private sector companies.

v. CERT-In is an accredited member of Task Force for Computer Security Incident Response Teams / Trusted Introducer. CERT-In is an operational member of Asia Pacific Computer Emergency Response Teams, a regional

forum for Internet security in the Asia-Pacific region. CERT-In is a member of Forum of Incident Response and Security Teams (FIRST), a global forum for cyber security teams.

vi. CERT-In has entered into cooperation arrangements in the form of Memorandum of Understanding (MoU) with its overseas counterpart agencies for collaborating in the area of cyber security. At present such Memorandum of Understandings (MoU) have been signed with Bangladesh, Egypt, Estonia, Japan, Maldives, Russia, United Kingdom and Vietnam.

Table 9: Market Opportunities in Key Industry Segments for IT Solutions in India

Key segments	FY24 (USD Billion)	CAGR FY24-FY31
Agritech	18.8	28.3%
Edtech & E-Learning	26.2	17.9%
Healthtech	9.9	28.5%
Mining & Industrial IT	23.3	8.4%
Cloud Services	12.9	21.8%
Tourism Market	22.8	7.0%
Urban Governance	24.8	32.4%
Cybersecurity	8.7	21.1%

Source: IMARC, CareEdge Research

- Urban Governance: Leads among the industries mentioned with the highest projected CAGR (32.4%), showcasing growing investments in smart cities and e-governance platforms.
- Health-tech: Exhibits a strong CAGR of 28.5%, reflecting increasing reliance on digital health solutions and telemedicine.
- Agri-tech: With a CAGR of 28.3%, innovations in precision farming, supply chain digitization, and agri-tech solutions are gaining momentum.
- Cloud Services: Growing at a steady 21.8% CAGR, emphasizing the expanding adoption of cloud computing in businesses.
- Cybersecurity: Demonstrates a robust 21.1% CAGR, driven by the critical need for data protection and cybersecurity infrastructure.
- Edtech & E-Learning: Shows consistent growth with an 17.9% CAGR, fuelled by the demand for digital education solutions.
- Tourism Market: While growing slower at 7.0% CAGR as compared to other segments, the sector is undergoing transformation through digital platforms and IT services.
- Mining & Industrial IT: Growing at a modest 8.4% CAGR, focusing on automation and IT applications in industrial processes.

3.4 Key policies and regulations affecting the industry

- **Export Promotion Councils**

The government has established Export Promotion Councils (EPCs) for IT and BPO services, which work towards promoting exports, enhancing market access, and providing support to outsourcing companies. EPCs facilitate industry representation, policy advocacy, networking, and market development activities.

The government has been supporting the Indian outsourcing industry with its favourable policies. IT is regarded as one of the top 5 priority industries in India, and the government has framed policies to obtain maximum benefit from IT

outsourcing to India. The government has offered its support to the IT industry by providing various tax-related benefits and by enacting the Information Technology Act which recognizes electronic contracts, bars cybercrime, and supports e-filing of documents. Some of the major initiatives taken by the Government to promote IT & BPM sector in India are:

1. The government has made various efforts for Skill development aiming to remove the disconnect between demand and supply of skilled manpower, building the vocational and technical training framework, skill up-gradation, building of new skills and innovative thinking not only for existing jobs but also jobs that are to be created. Some of the government initiatives on skill development and on the job, training is: -

a. National Education Policy 2020.
b. Skill India Mission - Aatmanirbhar Skilled Employees Employer Mapping (ASEEM) portal
c. India International Skill Centre (IISC) Network
d. Pradhan Mantri Dakshta Aur Kushalta Sampann Hitgrahi Yojana (PM-DAKSH)

2. The India BPO Promotion Scheme (IBPS), envisaged under Digital India Programme, seeks to incentivize establishment of 48,300 seats in respect of BPO/ITES operations across the country. These schemes would encourage setting-up of the Smart Digital Enterprises across the country and create employment opportunities for youth by promoting investments in BPO / ITES Sector. It is distributed among each State in proportion of State's population with an outlay of Rs. 493 Crore. This would help in capacity building in smaller cities in terms of infra & manpower and would become basis for next wave of IT/ITES led growth.

Salient Features:

Financial Support: Up to 50% of expenditure incurred on BPO/ITES operations towards capital expenditure (CAPEX) and/or operational expenditure (OPEX) on admissible items, subject to an upper ceiling of Rs. 1 Lakh/Seat.

a. Special incentives toward employment of women & specially enabled persons.
b. Incentive for generating employment beyond target & wider dispersal within state including rural areas.
c. Encouragement for local entrepreneurs.
d. Special consideration for Hilly states of HP, J&K and UK.

This scheme has potential to create employment opportunities of around 1.5 lakh direct jobs considering three shift operations. It may also create good number of indirect jobs.

3. The Northeast BPO Promotion Scheme (NEBPS), envisaged under Digital India Programme, seeks to incentivize establishment of 5000 seats in respect of BPO/ITES operations in Northeastern Region. The budget outlay for the scheme is of Rs. 50 Crore. This would help in capacity building in the region in terms of infra & manpower and would become basis for next wave of IT/ITES led growth.

Salient Features:

Financial support: [Capital Expenditure (CAPEX) and/or Operational Expenditure (OPEX)] of up to 50% of expenditure per seat, with upper limit Rs 1 Lakh/seat. Special incentives for:

a. Women and specially enabled person employment
b. Generating employment beyond target
c. Local entrepreneur
d. Training incentive

This scheme has potential to create employment opportunities of around 15000 direct jobs considering three shift operations. It may also create good number of indirect jobs.

4. The Centre for Development of Advanced Computing (C-DAC) had announced three new technology solutions aimed to tackle cybersecurity and supercomputing needs in India. The three technologies include a new cyber security facility that will be offered as a service to other organizations, and two software solutions that will help developers adapt code for newer hardware.

5. MeitY and NASSCOM have jointly taken an initiative, "Future Skills PRIME (Programme for Re-skilling/Upskilling of IT Manpower for Employability)", with an aim to create a re-skilling/up-skilling ecosystem for B2C in emerging and futuristic technologies (i.e. Artificial Intelligence, Internet of things, Big Data Analytics, Robotic Process Automation, Additive Manufacturing/3D Printing, Cloud Computing, Social & Mobile, Cyber Security, Virtual Reality and Blockchain etc.). The Future Skills PRIME has been approved with a target to cover 4.12 lakh beneficiaries (4 lakh Professionals, 10,000 Government Officials and 2,000 Trainers).

- **Regulatory Framework for Outsourcing Companies**

Outsourcing companies in India are subject to various regulatory requirements. These include compliance with tax regulations, labour laws, corporate governance standards, and other applicable laws and regulations. Adhering to these regulations ensures transparency, legal compliance, and ethical business practices in the outsourcing industry.

3.5 Headwinds & Tailwinds in E-Governance Sector

- **Infrastructure and Connectivity Challenges**: Ensuring reliable internet access and establishing a robust IT infrastructure are essential for the success of e-governance, particularly in rural and underdeveloped regions. In the absence of these foundational elements, delivering online government services becomes challenging, and citizens may face difficulties in accessing them.
- **Cybersecurity and Data Privacy Concerns**: The digitalization of government services significantly heightens the risk of cyber threats and data breaches. Safeguarding sensitive information demands substantial investment in advanced cybersecurity measures, encryption technologies, and continuous monitoring to protect citizen data and maintain the integrity of government databases.
- **Digital Literacy and Training:** The lack of digital literacy, particularly in rural and developing regions, poses a significant barrier to effective utilization of e-governance platforms. To bridge this digital divide, governments must implement comprehensive digital literacy initiatives, especially targeting marginalized communities, to ensure equitable access to online services.
- **Integration of Legacy Systems:** A major challenge in e-governance implementation lies in integrating outdated legacy systems with modern digital solutions. This process is often complex and resource intensive. Governments must strategize and execute systematic infrastructure modernization to achieve seamless interoperability and efficient data exchange.
- **Interoperability Issues**: Without standardized protocols, different government departments often use incompatible systems, making data sharing and coordination difficult. This can result in duplication of efforts, inefficiencies, and delays in service delivery, hindering the smooth integration of e-governance platforms.
- **Resistance to Change**: Bureaucratic inertia is a significant barrier, as some officials are reluctant to adopt new technologies due to unfamiliarity, fear of errors, or attachment to traditional methods. This slows the transition to digital governance and limits the effectiveness of e-governance initiatives.

- **Public Trust and Adoption**: Mistrust toward digital platforms often stems from concerns about past failures, data breaches, fraud, or misinformation. Citizens may hesitate to embrace e-governance services, which diminishes the overall impact and reach of these programs.
- **Funding and Budget Constraints**: Developing, maintaining, and upgrading digital infrastructure requires substantial financial resources. Limited budgets can restrict the scope and scale of e-governance projects, especially in areas requiring advanced technology and continuous updates.
- **Exclusion of Vulnerable Populations**: Accessibility barriers disproportionately affect elderly citizens, people with disabilities, and economically disadvantaged groups. They may struggle to navigate digital platforms due to affordability issues, lack of digital literacy, or inadequacies in user-friendly design.

4 Enterprise Resource Planning

Enterprise Resource Planning (ERP) refers to an integrated software system that enables organizations to manage and streamline their core business processes across departments such as finance, human resources, supply chain, sales, and operations. By consolidating data and workflows into a unified platform, ERP enhances efficiency, reduces duplication of efforts, and supports informed decision-making.

The implementation of ERP involves a systematic process through which the software is planned, configured, tested, and deployed within an organization. A structured approach ensures that the system aligns with business requirements, facilitates smooth data migration, and provides adequate support for end-users. Successful implementation not only optimizes operational performance but also allows organizations to adapt to changing business environments with greater agility.

4.1 Key phases of ERP implementation

Requirement Analysis	The process begins with a detailed assessment of organisational needs, existing workflows, and business objectives. This step ensures that the ERP aligns with operationsal requirements and provides a clear roadmap for implementation
ERP Selection and Design	Based on the requirements identified, the appropriate ERP solution is selected. The system is then designed to meet the organisation's specific processes, ensuring scalability, funcionality and alignment with industry practices
Configuration and customisation	The ERP software is configured to suit the company's workflows, and necessary customisations are made to address unique business processes. This step ensures that the system reflects the organisation's operational environment.
Data Migration and Integration	Existing data from legacy systems is migrated into the ERP, ensuring accuracy and consistency. Integration with other applications and systems is also performed to create a seamless flow of information across the enterprise.
Deployment and training	Once the system is ready, it is deployed across the organisation. Employees are trained to use the ERP effectively, enabling smooth adoption and minimising disruptions during the transition phase.
Support and maintenance	Post deployment, ongoing support and maintenance are provided to address technical issues, implement updates and ensure continuous system optimisation. This step is essential for the ong term success of the ERP system

4.2 Types of ERP deployment models

- **On-Premise ERP** - On-premise ERP is installed and maintained within the organization's own IT infrastructure. It provides full control over data, customization, and system security but requires significant upfront investment, dedicated IT staff, and ongoing maintenance. It is generally suitable for large organizations with complex operations and strict data governance requirements.
- **Cloud ERP** - Cloud ERP is hosted on the vendor's infrastructure and delivered over the internet on a subscription basis. It offers scalability, lower initial costs, faster implementation, and accessibility across locations. This model is widely adopted by small and medium-sized enterprises seeking cost efficiency and flexibility, though it may involve limited customization and reliance on the vendor for uptime and data security.
- **Hosted ERP** - Hosted ERP refers to a deployment model where the ERP software is owned by the organization but hosted on third-party servers, often managed by a data centre or service provider. It combines some benefits of on-premise and cloud models by reducing the need for in-house infrastructure while retaining ownership of the software. Hosted ERP is often seen as a transitional model for companies moving from on-premise systems toward cloud adoption.
- **Hybrid ERP** - Hybrid ERP integrates both on-premise and cloud elements, allowing organizations to keep critical or sensitive processes in-house while shifting other functions to the cloud. This approach offers flexibility, cost optimization, and a gradual transition to modern ERP environments, making it suitable for organizations with diverse operational needs.

4.3 Challenges in ERP implementation

High Implementation Costs	ERP systems require significant investment not only in software licenses but also in hardware infrastructure, consulting, training, and ongoing maintenance. Many projects encounter budget overruns due to underestimated costs or unplanned customization needs.
Resistance to change	Employees accustomed to legacy systems and established workflows may resist adopting new processes introduced by ERP. This resistance often arises from fear of job displacement, lack of confidence in using new technology, or discomfort with altered workflows. Without strong change management, resistance can limit system adoption.
Data Migration Issues	Moving data from existing systems into the ERP platform is often one of the most difficult tasks. Legacy data may be inconsistent, incomplete, or stored in incompatible formats. Ensuring accuracy, cleansing data, and validating migration are time-consuming and resource-heavy, but critical to success.
Customization Complexity	Although ERP systems are designed to be comprehensive, organizations often require specific customizations to align with unique business processes. However, heavy customization increases system complexity,

	implementation time, and cost. It may also create challenges for future upgrades and vendor support.
Training and Skill Gaps	ERP systems involve multiple modules and advanced features. Without adequate training, employees may not fully utilize the system, reducing the return on investment. Organizations must allocate sufficient resources to user training and skill development to ensure smooth adoption.
Implementation Delays	ERP projects are prone to delays due to evolving business requirements, integration issues with legacy systems, or vendor-related factors. Extended project timelines can increase costs and reduce organizational confidence in the system.

4.4 Growth Drivers

Digital Transformation Initiatives: Organizations across industries are adopting digital technologies to enhance efficiency and competitiveness. ERP systems serve as the backbone of these initiatives by integrating processes, enabling automation, and providing real-time insights.

Rising Need for Data-Driven Decision-Making: Businesses are increasingly relying on data analytics for strategic planning and operations. ERP solutions consolidate data from multiple functions, providing a single source of truth and enabling informed decision-making.

Scalability and Flexibility of Modern ERP: Modern ERP systems, particularly cloud-based models, offer flexibility and scalability to support business expansion. This allows organizations to adapt quickly to changing market conditions and regulatory environments.

Cost Efficiency and Process Optimization: ERP streamlines operations by reducing redundancies, automating manual tasks, and improving resource allocation. The resulting cost savings and efficiency gains make ERP a strong value proposition for enterprises.

Increasing Adoption of Cloud-Based Solutions: The growing preference for cloud ERP is driving market growth, as it reduces infrastructure costs, ensures remote accessibility, and supports continuous updates and innovations.

5 Data Centers

5.1 Changing Digital Landscape in India

India's progress in Digital Transformation is fuelled by major technological advances and government initiatives. The Indian economy is greatly benefitted by the IT and Start-up sectors, which also foster innovation in a variety of other industries. Millions of people now have greater access to various financial services, better efficiency and transparency mainly supported by digital applications in the financial sector. According to Ministry of Electronics and Information Technology, India is expected to become a $1 trillion digital economy by FY29. According to NASSCOM, Indian SaaS ecosystem stood at over $5 billion in FY22 and is expected to reach $13-15 billion by FY25. New business models are emerging within the SaaS landscape, leading to further diversification and potential growth opportunities.

The pandemic has increased demand for cloud services globally, contributing to the acceleration of digital transformation across industries. Additionally, people now rely heavily on the internet for both work and leisure. India has been a desirable location for investment in Data Centres (DC) because of growing digital infrastructure, increasing technology penetration and regulatory push.

Table 10: Major DC investment deals in CY24

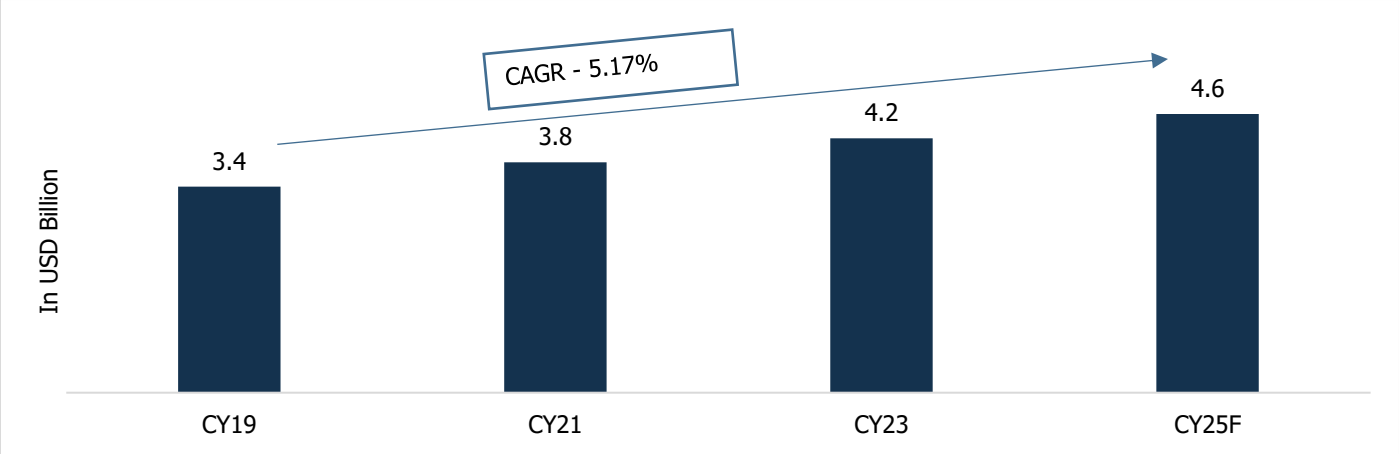
Investor	Investment (USD Million)
Adani	4,000
STT GDC	3,200
Amazon Web Services	2,000
Colt DCS and RMZ	1,700
CapitaLand	1,150
CtrlS	1,000
Sify	1,100
Princeton Digital Group	1,000
Equinix Inc	65

Source: Industry reports, CareEdge Research

5.2 India – a data centre hub

The investments in data centres in India is estimated to reach USD 5 billion by 2025, indicating a CAGR of 5% between 2019-2025, which is 2x faster than the global average. With respect to development as well as operating expenses, India enjoys a significant cost advantage over developed nations.

Chart 29: Trend in Indian Data Centre Market Investment (USD Billion)



Source: NASSCOM, CareEdge Research

5.3 Power Capacity Addition to Support Digital Revolution for the future

The digital revolution is driving an unprecedented increase in data generation, processing, and storage needs, which in turn is pushing the data centre industry to expand its power capacity significantly.

1. Increased Power Capacity

Data centres are rapidly increasing their power capacity to keep up with the growing demand. The companies are investing in new facilities with higher power capacities to meet future needs, while the existing data centres are upgrading their infrastructure to support higher power densities and capacities. This often includes enhanced cooling systems, power distribution units, and backup power solutions.

2. Energy Efficiency and Sustainability

Power cost accounts for 65% of the total operating cost of data centre. Data Centres are increasingly powered by renewable energy like solar, wind and hydroelectric power. Giant companies have committed to having carbon neutrality and are investing heavily in renewable energy projects. Green Data Centres have emerged as a result of stakeholders' demand for sustainable business practices and lower carbon footprint.

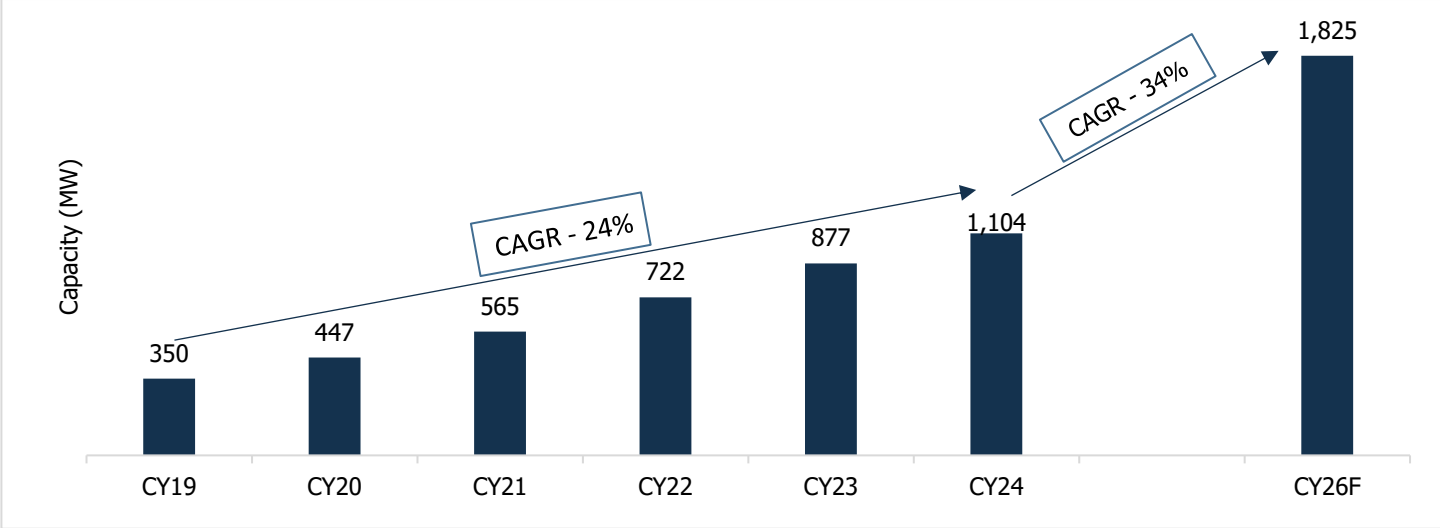
3. Geographical Distribution and Edge Computing

Regions with favourable climate, land availability and renewable energy resources are particularly attractive for companies to build data centres. Edge Data centres are smaller, localized data centres at the edge of the network, which reduces latency and bandwidth usage by processing data closer to where it is generated.

5.4 Review and Outlook of the data centre industry in India in Capacity terms

India's first commercial data centre was established in 2000. Initially, the industry's growth was sluggish, with total capacity reaching only 122 MW by 2010, an average increase of just 12 MW per year. However, from 2010 onwards, the sector experienced a significant acceleration, tripling its capacity by 2020, with an average annual increase of 32 MW. This rapid growth was spurred by the e-commerce boom, broadband policy, and the introduction of 2G, 3G and 4G networks. The most substantial growth occurred following the launch of JIO, a new telecommunications provider offering extensive network coverage at affordable prices, and the implementation of the Unified Payment Interface (UPI) in 2016.

Chart 30: Data Centre Capacity in India



Source: CareEdge Research, Industry Reports

The industry witnessed annual capacity addition of 100 MW-150 MW during the period of CY20-CY24 to reach total capacity of 1,014 MW by end of CY24. The growth in the data centre industry was complemented by increasing utilization, which increased from 82% in 2019 to 93% in CY23.

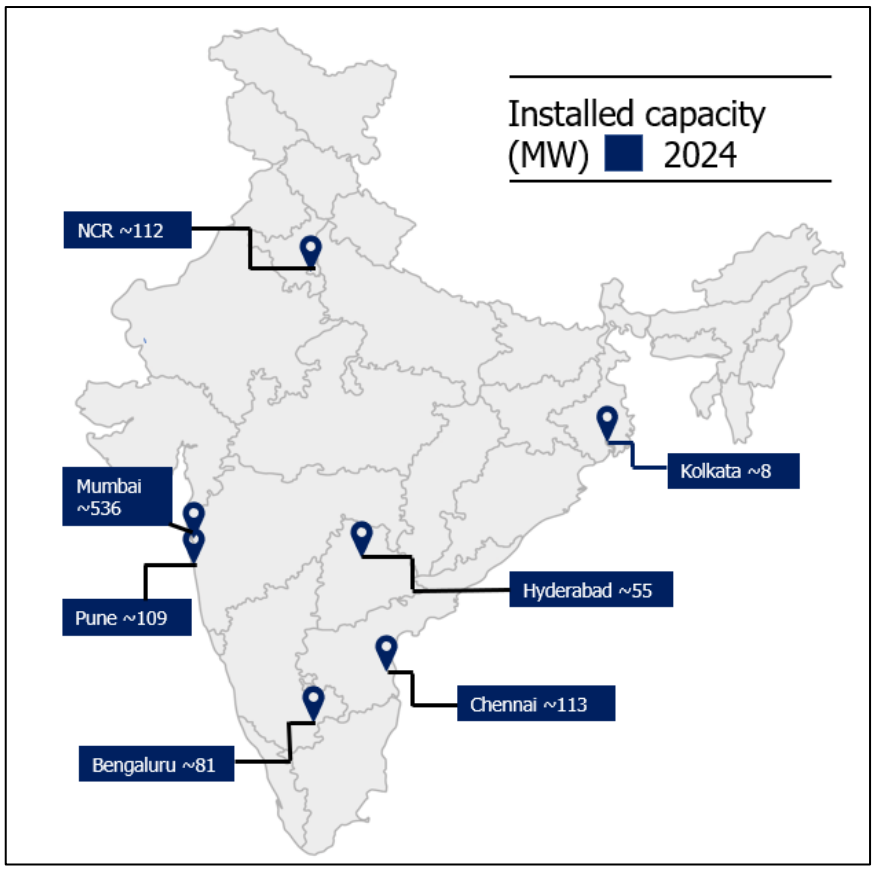
The industry has entered a growth phase and CareEdge Research estimates that capacity is expected to double to more than 1,800 MW by CY26. The growth plans have also created substantial investment prospects and CareEdge Research estimates a capex of Rs 50,000 crores in this space till CY26.

5.5 Current Installed DC Capacity (MW) in selected key cities in India

Mumbai – major data centre hub in India

In India, data centres are flourishing in key cities like Mumbai, Chennai, Bengaluru, Hyderabad, Pune, and Delhi. Mumbai contributes to more than 50% of the total installed capacity. As the capacity is expanding, Mumbai and Chennai will need real estate space to support the increasing demand, while Hyderabad and NCR are emerging Data Centres cities, so they will require both real estate as well as investments to support the existing supply.

Chart 31: Current Installed Capacity in Key Cities



Source: CareEdge Research

Mumbai, a large data centre hub with a capacity of 536 MW, is situated on India's west coast and benefits from excellent fibre connection via multiple submarine cables, which facilitates effective data transfer. The city is home to most of the India's banking and financial institution headquarters which are top contributor to data centre demand. Furthermore, the city benefits from availability of reliable power, cable landing stations, telecom hub, and no significant natural hazards.

Chennai, with a data centre capacity of 113 MW, is rapidly emerging as a key data centre hub in India. The city's appeal is enhanced by the state data centre policy, which provides financial incentives such as tax benefits and power subsidies, as well as the presence of undersea cables and a surplus power supply. The demand for data centres in Chennai is primarily driven by IT firms and the BFSI sector.

Bengaluru has a data centre capacity of 81 MW, with continuous demand fuelled by the technology, fintech, and e-commerce industries. The state's data centre policy aims to position Karnataka as the preferred location for data centres, offering incentives such as capital and land subsidies, tax exemptions, and tariff reductions, thus creating a conducive business climate. Moreover, Bengaluru's location in an area with low vulnerability to natural disasters and low seismic risk is expected to drive further demand. Future growth is anticipated from the rising needs of generative AI and start-ups.

With 112 MW of capacity, investments in Delhi NCR are largely driven by government policies. The city witnessed large-scale investments in the recent past with the anticipated demand from government digital initiatives. The city also has good fibre connectivity, proximity to customers, availability of skilled workforce.

Pune is an upcoming IT hub preferred by MNCs. The demand is driven by digital transformation initiatives by government, improvement in terrestrial network connectivity. The installed capacity is 109 MW.

Hyderabad, which is the headquarters of global cloud providers, hosts 55 MW of capacity. Tax incentives introduced by the government to attract hyperscale data centres, are boosting investments in the city.

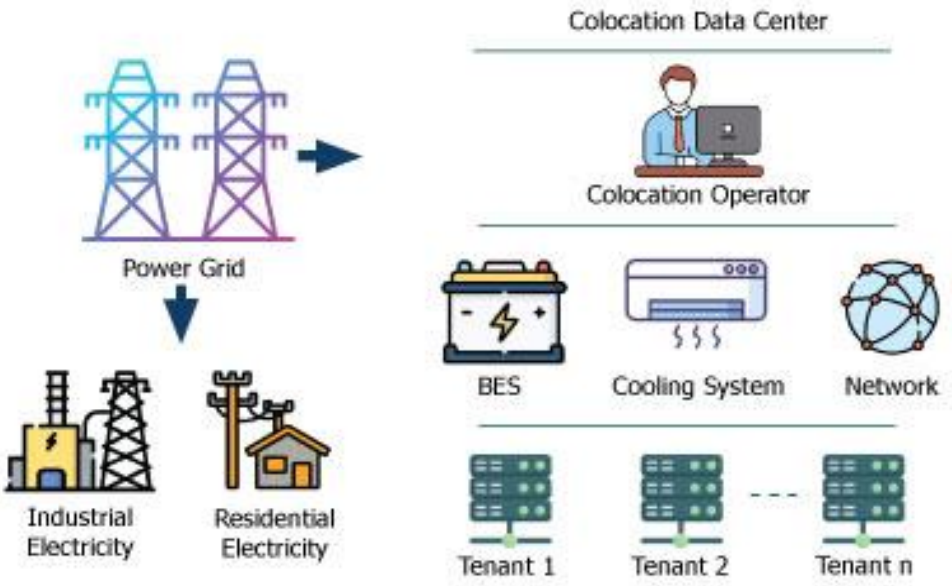
5.6 Qualitative Overview of Key business Models in the Data Centre industry in India

Table 11: Key Business Models

Business Models		
Captive	**Co-location**	**Hosting**
Description		
Captive data centres are privately owned and operated by a single organization to meet its internal data processing and storage needs.	Co-location facilities lease space, power, and cooling to multiple customers, who install and manage their own IT hardware within the data centre.	Hosting data centres provide comprehensive IT services, including space, power, and fully managed IT infrastructure. These services can include web hosting, application hosting, and managed cloud services.
Key Features		
➢ Dedicated Resources ➢ Customization ➢ High Security ➢ Significant Investment	➢ Shared Infrastructure ➢ Scalability ➢ Cost Efficiency ➢ Flexibility	➢ Managed Services ➢ Subscription based ➢ Technical Expertise ➢ Resilient
Advantages		
➢ Complete control over the data centre environment and infrastructure. ➢ Tailored Security Protocol Infrastructure can be optimized for the organization's specific applications and workloads.	➢ Lower capital and operational expenses as compared to owning a data centre. ➢ Access to high-availability infrastructure and redundant systems provided by the co-location provider.	➢ Comprehensive IT management allowing businesses to focus on their core activities. ➢ Easily scalable solutions to accommodate growth and changing demands. Subscription models provide predictable and manageable costs.
Challenges		
➢ High Costs ➢ Resource Intensity ➢ Scalability Issues	➢ Dependency on Provider ➢ High Initial Setup Cost ➢ Shared Environment	➢ Less Direct Control ➢ Dependency on hosting providers services and pricing Security Concerns

Source: CareEdge Research

5.7 Co-location – A widely used business model



The co-location business model in the data centre industry involves data centre providers offering space, power, cooling, and security infrastructure to companies that bring their own IT hardware and expertise. This model allows businesses to rent space within a data centre facility, enabling them to benefit from the data centre's infrastructure without the need to build and maintain their own data centre. Co-location services are popular among businesses looking for a cost-effective and scalable solution to meet their data storage and processing needs.

This model allows organizations to retain ownership and control over their server hardware while benefiting from the professional hosting environment and services provided by the colocation facility.

Co-location is favoured for its scalability, security, compliance with regulatory requirements, and the ability to focus on core business operations while the provider manages the infrastructure.

Customers are charged based on the space they occupy and the power they consume, similar to renting an apartment and paying rent and utility bills. This model is advantageous for businesses that require reliable data centre services but prefer not to invest in building and managing their own data centre infrastructure.

The co-location business model is widely adopted in the data centre industry, with a significant percentage of data centre service providers worldwide operating in the co-location space. In India, new entrants in the data centre market have adopted the co-location business model, reflecting its popularity and effectiveness in meeting the diverse needs of businesses for data storage, processing, and management.

5.8 Key growth drivers and trends for data centre industry in India

1. Increasing Internet Users

The internet user penetration rate in India is the lowest amongst the countries such as China, the USA, and the European Union. However, India has the highest mobile data consumption as compared to these other nations.

In terms of data centre capacity per million internet users, India lags significantly behind other major economies. In India, the data centre capacity per million users is just 1 MW. In contrast, China has a much higher capacity of 4 MW

per million users. Furthermore, the data centre capacity per million internet users in the USA and the European Union is even greater than China's, and substantially higher than India's.

As per Department of Telecom, there were 969.10 million internet subscribers in India as on 31st March 2025 and internet subscribers per 100 persons stood at 68.63, the rising number of internet users and online transactions in India is fuelling the demand for robust data centre infrastructure to support digital services and e-commerce platforms.

2. Technological Advancements

Technological advancements include cloud computing, Internet of things (IoT), Artificial Intelligence (AI) and Big Data Analytics. Technological advancements play a pivotal role in shaping the data centre industry, driving the need for advanced solutions to meet the evolving demands of businesses and organizations.

Data centres play a crucial role in supporting cloud services by providing the necessary infrastructure to host cloud-based applications and store vast amounts of data securely.

Data centres equipped with IoT capabilities can process and analyse data from interconnected devices, enabling businesses to derive valuable insights for decision-making and operational efficiency.

Data centres with high-performance computing capabilities are essential for running AI algorithms efficiently. These data centres provide the computational power and storage capacity required to train AI models, process complex algorithms, and deliver real-time AI-driven insights across various industries, from healthcare to finance.

Data centres equipped with advanced analytics capabilities can process, analyse, and visualize big data to uncover patterns, trends, and correlations that drive business decisions. By leveraging big data analytics within data centres, organizations can optimize operations, enhance customer experiences, and gain a competitive edge in the market.

3. 5G Roll-Out

There is a notable surge in demand for computation and storage capacity in data centres due to the deployment of 5G networks. Massive numbers of connected devices are supported by 5G networks, producing enormous volumes of data that must be handled and stored. Data centres are moving toward a cloud-native design built on virtualization and containerization technologies to effectively serve 5G networks. Disaggregating hardware and software facilitate flexibility, scalability, and compatibility among several vendors.

The deployment of 5G networks is driving a significant increase in the demand for data centres with enhanced computing capabilities, low latency, cloud-native architecture, and advanced automation and orchestration capabilities. This trend is shaping the evolution of the data centre industry to support the growing demands of 5G networks and the applications they enable.

5.9 Government Policies and digitalization are leading growth drivers for data centres

India is in the process of transitioning towards an advanced market economy, where technology is expected to play a pivotal role in this transformation. The digital revolution is accelerating economic growth and resulting in a significant amount of data generation. This surge in digitalization, propelled by the expansion of online commerce, financial technology platforms, internet-based video streaming, and gaming services, is predicted to raise the number of internet users and enhance internet penetration (proportion of the population using the internet) from approximately 87% by FY29.

The adoption of technologies such as 5G, IoT, and Artificial Intelligence is also anticipated to substantially increase the demand for data and consequently for data centres. Collectively, these factors are projected to triple data consumption in India.

Considering the growing significance of this industry, the Central Government has taken steps to entice capital and facilitate the expansion of data centres. The data centre market is projected to expand from $4.5 billion in 2023 to $11.6 billion by 2032," according to the Economic Survey 2024-25. The state of the infrastructure makes it simpler to obtain institutional credit, obtain long-term financing at favourable rates, and present refinancing options.

State governments have also started offering incentives in this approach, such as single window clearing, power subsidies, stamp duty exemptions, and property tax refunds. The drive from regulations for data localization would also lead to an increase in DC capacity.

The Government's Digital India initiative, which aims to transform India into a digitally empowered society and knowledge economy, has led to the creation of sizeable data centres and cloud infrastructure. The Indian government's focus on data localization and data protection policies requires businesses to store and process certain types of data within the country's borders, which promotes the establishment of data centres in India and creates opportunities for data centre providers to offer compliant solutions.

As part of strengthening India's digital infrastructure, the government has focused on expanding and modernising its data centre ecosystem. The National Informatics Centre (NIC) has established advanced National Data Centres (NDCs) in Delhi, Pune, Bhubaneswar, and Hyderabad to support the growing demand for cloud computing, data storage, and AI/ML applications. These centres provide secure and scalable cloud services to central ministries, state governments, and PSUs, along with disaster recovery and hosting support.

Current infrastructure includes approximately 100 PB of storage—comprising All Flash, Object, and Unified Storage—and around 5,000 servers deployed for cloud workloads. A new Tier-III NDC with a capacity of 200 racks (expandable to 400) is under development in Guwahati, Assam.

To specifically serve the Northeastern region, the NDC–Northeast Region (NDC-NER) was inaugurated in September 2020. This initiative aims to bridge the regional digital divide and enhance public service delivery through reliable, high-performance data infrastructure.

Draft Rules under the Digital Personal Data Protection Act 2023

In 2025, India's Ministry of Electronics and Information Technology introduced a new draft, the Digital Personal Data Protection Rule which seeks to operationalize the Digital Personal Data Protection Act, 2023 (DPDP Act). These rules aim to protect citizens rights while supporting innovation and the growth of the digital economy.

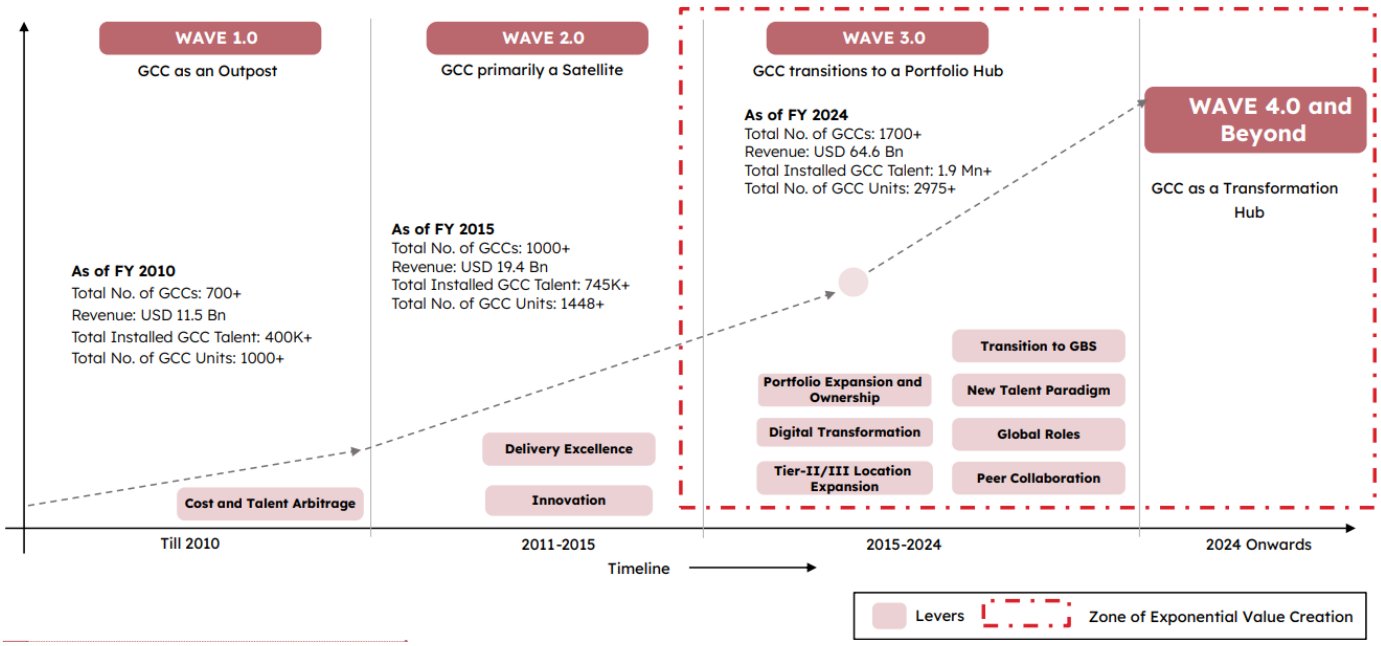
The rules require data centres and other data handlers (Data Fiduciaries) to provide clear information about how personal data is used, take consent from users, and allow users to erase their data if they choose. Citizens can also appoint digital nominees and raise complaints through simple online systems.

The rules follow a "digital by design" approach, with digital processes for consent, complaint handling, and the working of the Data Protection Board. This ensures faster service, more transparency, and better protection of personal data stored and processed in data centres.

5.10 Overview on India's Global Capacity Centres Landscape

India's Global Capability Centers (GCCs) are at a transformative juncture, evolving into strategic hubs that are not only redefining the Indian corporate landscape but also influencing global business dynamics. The last 5 years has seen rapid expansion in the GCC ecosystem and India remains well-positioned for future growth through prioritization on skills development, cybersecurity, and progressive policy frameworks.

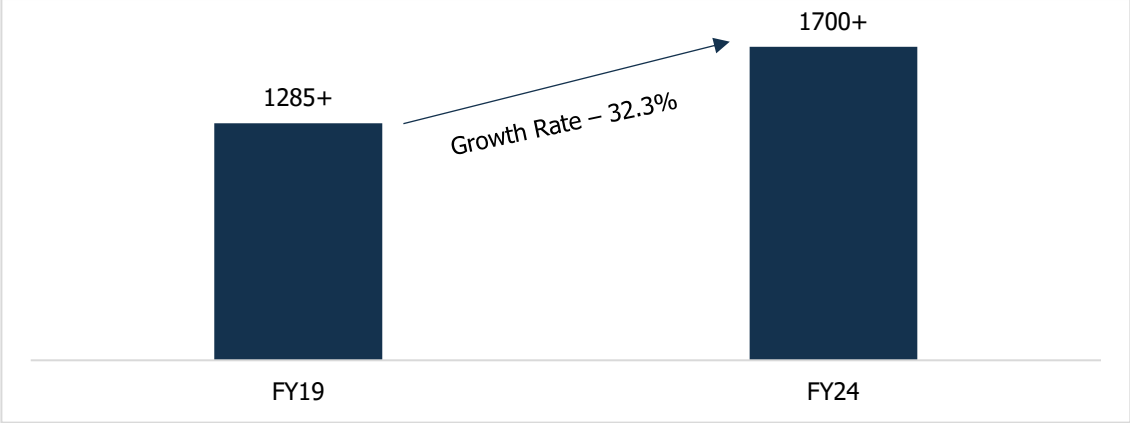
The country's emphasis on high-end engineering roles and strategic partnerships also enables it to meet the evolving needs of global companies, fostering sustainable practices and driving innovation. More than 50% of GCCs have moved up to portfolio and transformation hubs, with 40% CAGR increase in global roles and women leadership roles in the last 5 years. Almost 90% of the GCCs operate as multi-functional centers, supporting technology, operations and product engineering.



Source: NASSCOM

India has emerged as the "GCC Capital of the World," with over 2,975 centers and a rapidly maturing ecosystem driven by six key impact pillars. These include the country's global leadership in GCC presence, strong symbiotic partnerships between GCCs and service providers, and a transition of 44% of GCCs into strategic portfolio hubs managing global functions. India also boasts a significant expansion in global roles, over 6,500, especially in engineering, and a deep pool of high-end tech talent. Furthermore, Indian GCCs are at the forefront of AI-led transformation, supported by more than 1,20,000 AI professionals and 185+ Centers of Excellence for AI/ML, cementing India's position as a hub for innovation and digital leadership.

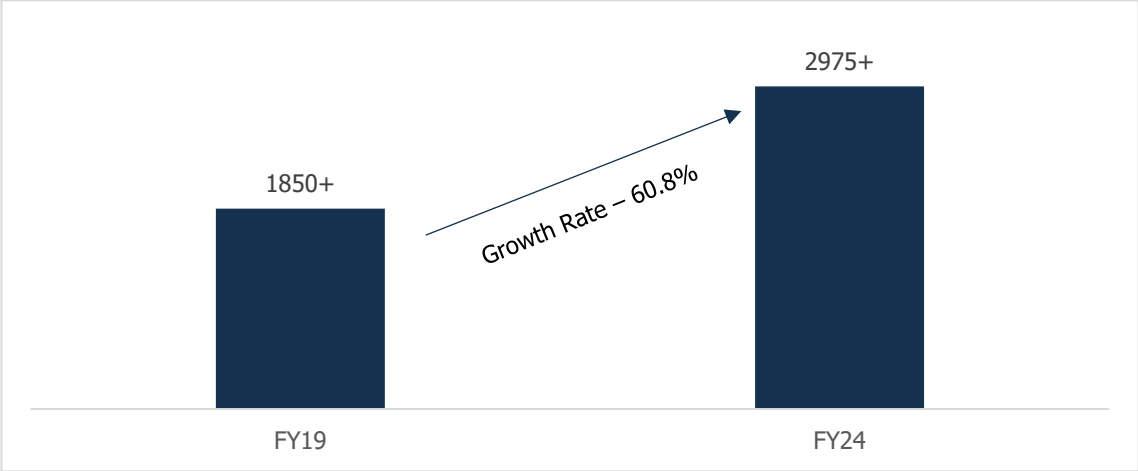
Chart 32: India has witnessed 400+ new GCCs established in just the last 5 years



Source: NASSCOM, CareEdge Research

The key cities known for their prominence as hubs for Global Capacity Centers (GCCs), IT/ITeS, business services, and innovation are Bengaluru, Delhi/NCR, Mumbai, Pune, Hyderabad and Chennai. Bengaluru hosts the largest number of GCC units, with over 875 centers, followed by Delhi with more than 465, and Mumbai with upwards of 365. A GCC is the entire facility or office set up by a company to handle global operations like IT, finance, or customer service. GCC units are the specific teams or departments within that center focused on particular functions, such as finance or IT support. Cloud adoption, widespread proliferation of digitalization and strategic long-term deals primarily drove the ER&D market in India. Increased demand around automation, application modernization, platformization and cybersecurity drove the IT market in India.

Chart 33: India has added over 1100 new centers in just the past 5 years



Source: NASSCOM, CareEdge Research

The outlook for GCCs in India is highly optimistic, with projections indicating significant growth across all key dimensions by 2030. As per the NASSCOM report, the total GCC revenue is expected to increase from USD 64.6 billion in FY24 to USD 99–105 billion in FY30, while the GCC workforce is projected to grow from 1.9 million to 2.5–2.8 million professionals. The number of GCC entities is set to rise from 1,710+ to 2,100–2,200, and total GCC units from 2,970+ to 4,300–4,400. This growth reflects India's strategic importance as a global innovation and operational hub, driven by digital transformation, high-end R&D, and a robust talent ecosystem.

6 Indian Outsourcing Industry

6.1 Overview on Indian Outsourcing Industry

India has emerged as a software destination, offering many advantages as a global sourcing hub, especially for IT Enabled Services (ITES) and Business Process Outsourcing (BPO). Outsourcing allows a company to invest more time, money and human assets in core items maintaining the quality & brand name. The global sourcing market in India continues to grow at a higher pace. The Indian IT Business Process Management (IT-BPM) industry has been a key contributor to India's exports.

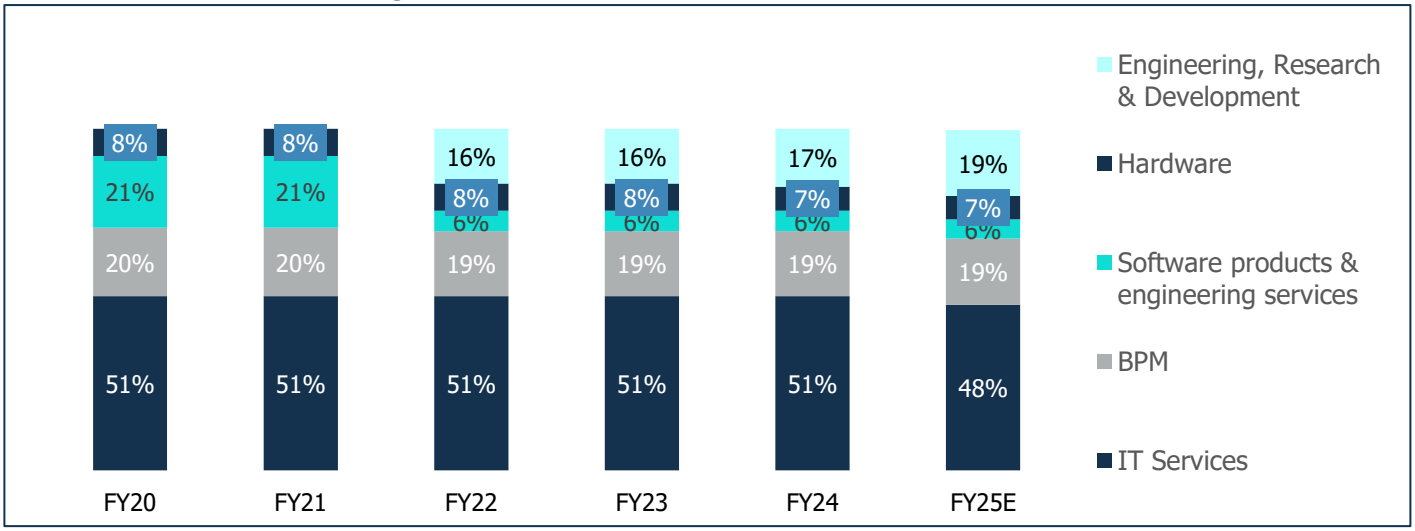
The outsourcing sector in India has been a significant contributor to the country's economy for several decades. India has emerged as a leading global destination for outsourcing services, particularly in the fields of information technology (IT) and BPO. Here are some key points about the outsourcing sector in India:

- India is known for its expertise in providing IT services to clients worldwide. Indian companies offer software development, application maintenance, infrastructure management, system integration, and other IT-related services. Many global technology giants have established their presence in India and outsource their IT projects to Indian firms.
- Business process outsourcing is another major segment of the Indian outsourcing industry. Companies outsource various business processes such as customer support, technical support, back-office operations, data entry, finance and accounting, HR services, and more to Indian BPO service providers. The availability of a large English-speaking workforce at competitive costs has made India an attractive destination for BPO services.
- India has a vast pool of highly skilled professionals in the fields of IT, engineering, finance, and other domains. The country produces a significant number of graduates and postgraduates in technical and managerial disciplines every year. This availability of talent has been a key factor in attracting outsourcing projects to India.
- One of the primary reasons why companies outsource to India is the cost advantage. Labor costs in India are significantly lower compared to developed countries, enabling businesses to save on operational expenses. This cost-effectiveness has been a major driving force behind the growth of the outsourcing sector in India.
- Over the years, India has developed robust infrastructure and technological capabilities to support outsourcing services. Major cities like Bangalore, Hyderabad, Chennai, and Pune have emerged as IT hubs with world-class infrastructure, technology parks, and a favourable business environment. The government has also implemented policies to encourage and support the growth of the outsourcing industry.
- Indian outsourcing companies have a strong global presence, serving clients from various industries across the world. They have established delivery centers and offices in multiple countries to provide localized services and support. This global footprint has further strengthened India's position in the outsourcing sector.
- The Indian outsourcing sector has evolved beyond traditional IT and BPO services. It now includes specialized services like research and development (R&D), engineering design, product development, analytics, digital marketing, and more. Indian firms are increasingly focusing on providing value-added services and innovative solutions to meet the changing demands of global clients.
- Despite its significant growth, the Indian outsourcing sector faces challenges such as increasing competition from other countries, rising wages, and the need to adapt to emerging technologies. However, the industry continues to thrive and contribute to India's economic growth, providing employment opportunities and fostering innovation.

6.2 Segment wise breakup of Revenues of Indian IT-BPM Industry

Amid shifting global economic patterns and evolving market dynamics, FY2025 has been a year of strategic resilience, with segments such as Engineering R&D and GCC driving growth for the technology industry in India.

Chart 34: Trend in Market Segmentation



Source: NASSCOM, CareEdge Research

Note: Since FY22, software products and engineering services has been further bifurcated into new classification named Engineering, Research & Development, E: Estimated

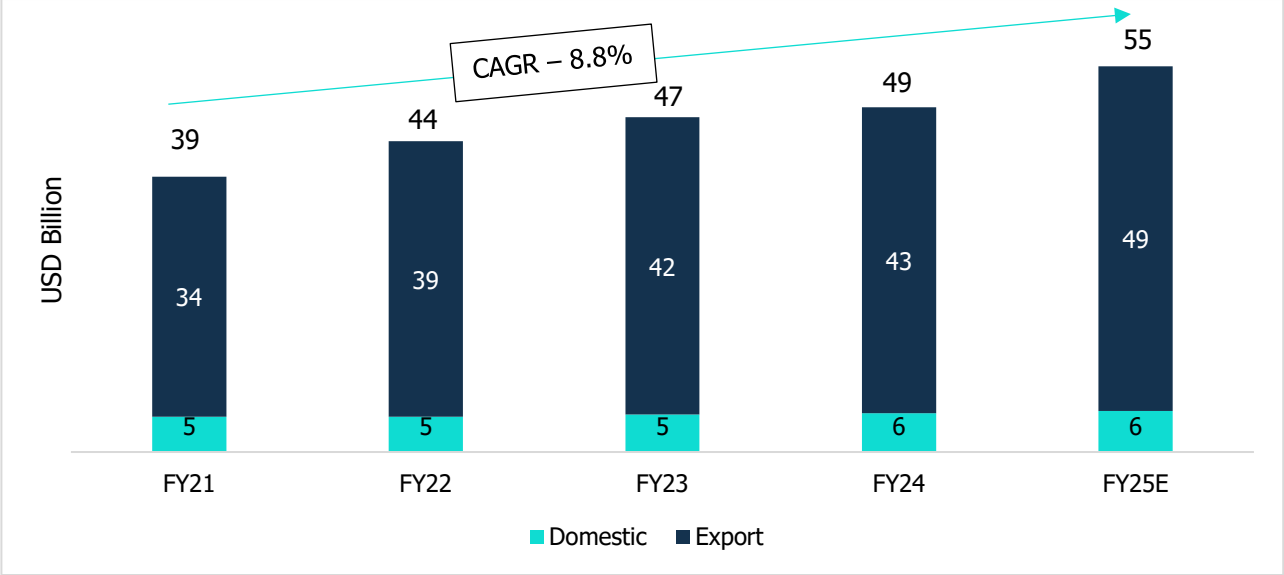
Within the IT-BPM sector, IT services constitute the majority share. Its share has been consistent over the last many years however it is expected to decline to 48% in FY25. IT-BPM revenues registered YoY growth of 11.8% in FY25 as compared to 8.4% during FY23 and 15.5% growth in FY22, with all sub-sectors showing significant revenue growth, however the y-o-y growth is declined to 3.8% in FY24. Sub-sectors like Engineering R&D, with GCCs spanning across Services and BPM, have emerged as key growth hotspots. Digital Engineering is expanding into sectors like BFSI, Healthcare, and Retail, with nearly two-thirds of large deals centered on this shift.

6.3 Trend in IT-BPM Industry Size

India has become a support system for most of the software companies in the western world. The Government undertook a major reform of removing telecom regulations in the IT-BPO sector. As per a report by NASSCOM, The BPM industry's revenue is expected to be USD 54.6 billion in FY25 as compared to 48.8 billion for FY24, which is estimated to have grown at a CAGR of 7.5% from FY21 to FY25. India accounts for approximately 42% to 45% of global BPM export share while, export market continues to dominate the Indian BPM industry constituting nearly 90% of market size. North America and EU are the key regions where Indian BPM players operate.

3 out of 4 BPM organizations view increased adoption of technology as fuelling the growth of the BPM industry. Other tailwinds include growth of GCC in India, deep tech adoption, strong DPI and government support, increasing demand in domestic market. Almost 4 out of 5 BPM organizations believe gap between the demand for skilled professionals and available talent is widening. Other headwinds include economic fluctuations, cybersecurity, customer expectations for more strategic value-added services and need to adapt to rapid pace of technological changes.

Chart 35: Trend in Indian BPM Industry size



Source: NASSCOM Report, CareEdge Research
Note: E: Estimated

6.4 India BPO Services

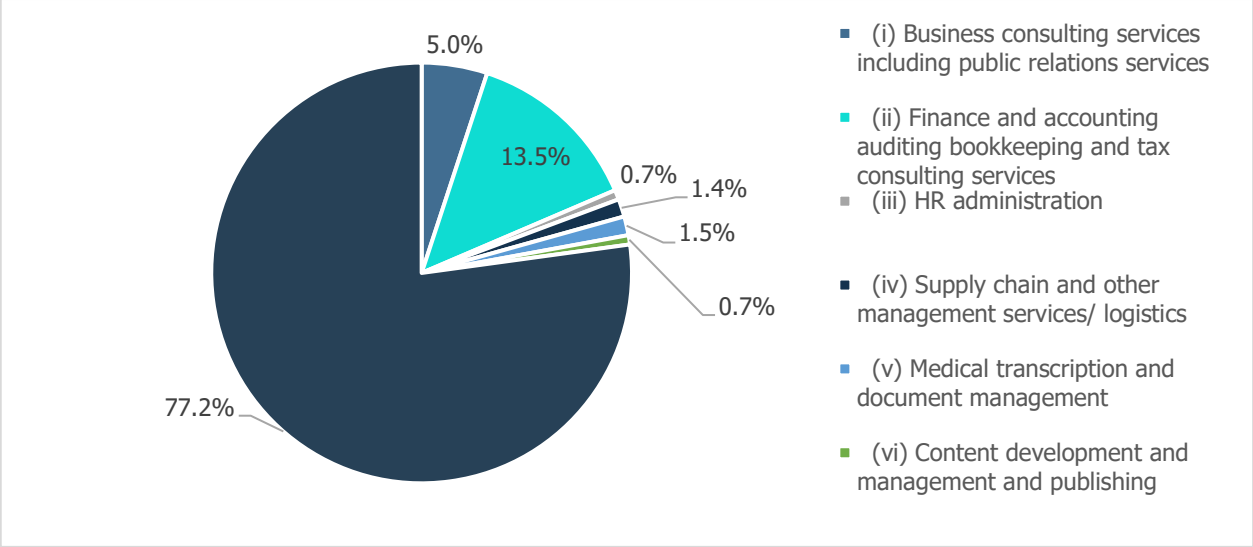
The BPO sector has been a key beneficiary in India's growth, with the cost of international connectivity declining rapidly and quality of service improving significantly. NASSCOM has played a critical role in outsourcing by acting as a coordinating body for the industry. It conducts surveys and conferences which help in the dissemination of knowledge and research in the outsourcing industry. As per NASSCOM, "While India's low-cost talent pool has helped its businesses grow, global incumbents have also recognized India's inherent advantage and have mastered this capability by off shoring more work out of India." India's competitive advantage lies in its ability to provide huge cost savings and thus enabling productivity gains.

According to NASSCOM, the major reasons behind India's success in ITES/ BPO industry are:

- Abundant, skilled, English-speaking manpower, which is being harnessed even by ITES hubs such as Singapore and Ireland.
- High-end telecom facilities and infrastructure which are on par with global standards.
- Better focus on maintaining quality and performance standards.
- Fast turnaround times, and the ability to offer 24x7 services based on the country's unique geographic locations that allow for leveraging time zone differences.
- A friendly tax structure, which places the ITES/BPO industry on par with IT services companies.
- Proactive and positive policy environment which encourages ITES/BPO investments and simplifies rules and procedures.

The break-up of BPO services exports is depicted below:

Chart 36: Break-up of BPO services exports from India for FY24



Source: RBI Survey

The BPO services have been helpful in providing varied offerings to numerous organizations. The extensive variety of enterprise domain names wherein the BPO industry serves include:

IT/ITES: Software development, IT staffing, Helpdesk services, Infrastructure Management Services

Financial Services: Bookkeeping, Payroll Processing, Financial Analysis Services

Healthcare Services: Teleradiology Services, Medical Transcription Services, Healthcare Claims Adjudication

Call Center Services: Inbound and outbound call centers, telemarketing, email support, technical support services, etc.

E-commerce Websites: Online ordering, Refund Processing

Travel Industry: Bookings, Cancellations

Retail Services: Ordering, Status checking

Educational Institutions: Course information, Fees Processing

Manufacturing: Component information, Ordering, Help services

Telecom sector: Service information, Complaint processing

Source: Industry Sources, CareEdge Research

6.5 Key growth drivers and challenges

- **Growth Drivers**

a. Low-Cost Skilled Labour

India has a large pool of skilled English-speaking workers who are available at a fraction of the cost of workers in developed countries. This is a major factor in India's success as an outsourcing destination. India’s young demographic

profile is an inherent advantage complemented by an academic infrastructure that generates a large pool of English-speaking talent. There are various initiatives for recognizing talents that are suitable, which includes national rollout of skill certification through NAC (NASSCOM Assessment of Competence), setting up finishing schools in association with MHRD to supplement graduate education with training in specific technology areas & soft skills and MoU's with education agencies such as UGC and AICTE to facilitate industry inputs on curriculum, teaching and develop faculty development programme.

b. Sustained cost competitiveness

India has a strong track record of delivering services at a significant cost advantage. The ability to achieve such high levels of cost advantage by sourcing services from India is driven primarily by the ability to access highly skilled talent at significantly lower wage costs and the resultant productivity gains derived from having a very competent employee base.

c. Continued focus on quality

Demonstrated process quality and expertise in service delivery has been a key factor driving India's sustained leadership in global service delivery. Most of the players have been focusing on quality initiatives to align themselves with the international standards. There has been robust processes and procedures to offer world-class IT software and technology related services.

d. Information security environment

Indian BPO industry recognizes security as an indispensable element of global service delivery. Individual firm-level efforts are complemented by a comprehensive policy framework established by Indian authorities, which has built a strong foundation for an 'info-secure' environment in the country. These include strengthening the regulatory framework through proposed amendments to further strengthen the IT Act 2000, scaling up the cyber lab initiative, scaling up the National Skills Registry (NSR), and establishing a self-regulatory organization.

e. Rapid growth in key business infrastructure

India has a well-developed technology infrastructure, which makes it easy for businesses to outsource their IT and other operations. This includes a reliable telecommunications network, a large pool of IT professionals, and a growing number of software development companies. Rapid growth in key business infrastructure has ensured unhindered growth and expansion of this sector. The BPO sector has been a key beneficiary with the cost of international connectivity declining rapidly and service levels improving significantly. India is in a different time zone than many Western countries, which can make it easier to collaborate with outsourced providers. This is especially beneficial for customer service and IT support services. The growth is taking place not only in existing urban centers but increasingly in satellite towns and smaller cities. Critical business infrastructure such as telecom and commercial real estate is well in place; improving other supporting infrastructure is a key priority for the government.

f. Enabling Business policy and Regulatory environment

The Indian government is supportive of the outsourcing industry and has taken steps to make it more attractive to foreign investors. This includes providing tax breaks and other incentives for companies that outsource to India. The enabling policy environment in India was instrumental in catalysing the early phases of growth in this sector. Policymakers in India have laid special emphasis on encouraging foreign participation in most sectors of the economy, recognizing its importance not only as a source of financial capital but also as a facilitator of knowledge and technology transfer. The Indian ITES-BPO sector has benefited from this approach, with participating firms enjoying minimal regulatory and policy restrictions along with a broad range of fiscal and procedural incentives.

- **Challenges**

Although India has marked its spot as the world's center stage for BPO services, there are several challenges that the industry is currently facing and must overcome to go forward. Some of the challenges faced by India's BPO industry are:

1. Geopolitical Risks

Concerns about global economic and financial fragmentation have intensified in recent years amid rising geopolitical tensions, strained ties between the United States and China, and the ongoing war across various geographies. Fears of geopolitical instability may impact the global offshore services market, as sourcing, procurement and vendor management executives review their options to mitigate risk. The offshore outsourcing market has been relatively stable in recent years, with organizations using a mix of onshore, nearshore and offshore resources with relatively stable demand and supply patterns.

2. Security Risks

There is security risks associated with outsourcing work to India. These risks include data breaches, intellectual property theft, and cyber-attacks. Businesses need to take steps to mitigate these risks, such as using encryption and security software. Data security and privacy are critical concerns for outsourcing clients. Companies outsourcing their services to India often share sensitive and confidential data with service providers. Ensuring robust data protection measures, adherence to global data privacy regulations (such as GDPR), and maintaining client trust in data security practices are constant challenges that need to be addressed.

Poor internet and call traffic management, political instability (shutdowns and strikes), and frequent power outages have all taken their toll on BPO firms. Since BPO firms have to operate on a 24/7 basis, there should be no room for any disruptions. Over the past few years, Indian BPO firms have been trying their best to lobby the Indian government to obtain the essential services tag, so that their operations can be carried out smoothly.

3. Rise in Un-employability

The rising un-employability of the BPO workforce is yet another challenge that Indian BPOs must overcome. India does have a million graduates passing out year after year. But this is not enough, as we need to check the employment ability of these graduates.

To address this challenge, companies in the BPO sector are now trying to partner with technology and management colleges. NASSCOM has also stepped in to improve the skill set of graduates and make India's young graduates better equipped to handle all BPO related work.

4. High Attrition Rates

The Indian outsourcing industry is facing high attrition rates, as employees move to other companies or start their own businesses. This is a challenge that is facing all outsourcing industries, but it is particularly acute in India, where the job market is very competitive. Attrition results not only in the loss of talent, but also means significant costs have to be incurred in the training of new employees. In the Indian BPO industry, the attrition rate has been around 25%-30%. Some of the major factors that have led to the high attrition rates in India are - high-stress levels, the monotonous nature of the job, lack of career growth potential and change in lifestyle.

5. Time-Zone Difference

Most entrepreneurs consider it as the biggest challenge while outsourcing to India. With more than 9 hours of the time difference between the USA and India, it is difficult to overlap hours and communicate. To mitigate this challenge, Indian outsourcing companies work in specific work hours that allow their team to overlap 2-3 hours of time with their US client, providing enough time to communicate and discuss project progress.

6. Increased competition

India faces intense competition from other countries in the outsourcing market. Emerging outsourcing destinations such as the Philippines, Vietnam, China, and Eastern European countries have been gaining prominence. These countries offer competitive services, lower costs, and specialized expertise, posing a challenge to India's market share. These countries are also offering low-cost skilled labour, and they are making investments in their technology infrastructure.

6.6 Government Initiatives

The Indian government has implemented various initiatives and regulations to support and regulate the outsourcing industry. These initiatives aim to create a favourable business environment, promote growth, protect client interests, and enhance the competitiveness of the outsourcing sector.

- **The India BPO Promotion Scheme (IBPS)**

The IBPS is a government program that provides financial assistance to eligible BPO companies. The program aims to promote the growth of the BPO industry in India, particularly in smaller cities and towns. The IBPS envisaged under Digital India Programme, seeks to incentivize establishment of 48,300 seats in respect of BPO/ITES operations across the country. It is distributed among each State in proportion of State's population with an outlay of Rs. 493 Crore. The schemes have successfully established 246 BPO units across 27 States and Union Territories, strategically distributing operations across 104 small cities and towns. This widespread distribution not only generates local employment but also significantly contributes to the economic development of these areas, fostering a more inclusive digital ecosystem across India.

- **The North-East BPO Promotion Scheme (NEBPS)**

The NEBPS is a government program that provides financial assistance to eligible BPO companies in the North-East region of India. The program aims to promote the growth of the BPO industry in the North-East region, which is a less developed region of India.

- **The National Policy on Electronics (NPE)**

The NPE is a government policy that aims to promote the growth of the electronics industry in India. The policy includes a number of provisions that are designed to support the outsourcing industry, such as the promotion of cloud computing and the development of a skilled workforce.

- **The Data Protection Bill**

The Digital Personal Data Protection Act, 2023 has been enacted on 11th August, 2023 which casts obligations on Data Fiduciaries to safeguard digital personal data, holding them accountable, while also ensuring the rights and duties of Data Principals. The rules empower citizens by giving them greater control over their data. Provisions for informed consent, the right to erasure and grievance redressal enhance trust in digital platforms. Parents and guardians are empowered to ensure online safety for their children.

- **National Policy on Software Products (NPSP)**

The government launched the NPSP in 2019 to boost the software product industry, which includes outsourcing services. The policy focuses on enabling innovation, promoting research and development, creating a conducive ecosystem for software product startups, and enhancing the global competitiveness of Indian software products.

- **Digital India Initiative**

Launched in 2015, the Digital India initiative aims to transform India into a digitally empowered society and knowledge economy. The initiative includes various programs and policies to promote the use of digital technologies, improve connectivity and infrastructure, and enhance e-governance. These efforts provide a solid foundation for the outsourcing industry by enabling digital service delivery and expanding the digital infrastructure.

- **Skill Development Initiatives**

The government has initiated several skill development programs to enhance the employability of the workforce in the outsourcing sector. Skill India, launched in 2015, focuses on providing vocational training and skill upgradation across various sectors, including IT and BPO services. These initiatives help address the skill gap and ensure the availability of a qualified workforce. MeitY and NASSCOM have jointly taken an initiative, "Future Skills PRIME (Programme for Re-skilling/Upskilling of IT Manpower for Employability)", with an aim to create a re-skilling/up-skilling ecosystem for B2C

in emerging and futuristic technologies (i.e. Artificial Intelligence, Internet of things, Big Data Analytics, Robotic Process Automation, Additive Manufacturing/3D Printing, Cloud Computing, Social & Mobile, Cyber Security, Virtual Reality and Blockchain etc.). The Future Skills PRIME has been approved with a target to cover 4.12 lakh beneficiaries (4 lakh Professionals, 10,000 Government Officials and 2,000 Trainers).

- **Intellectual Property Rights (IPR) Protection**

India has implemented regulations and measures to protect intellectual property rights, which is crucial for outsourcing companies involved in software development and technology-related services. Strong IPR protection encourages innovation, provides legal recourse in case of infringements, and boosts investor confidence.

- **Regulatory Framework for Outsourcing Companies**

Outsourcing companies in India are subject to various regulatory requirements. These include compliance with tax regulations, labour laws, corporate governance standards, and other applicable laws and regulations. Adhering to these regulations ensures transparency, legal compliance, and ethical business practices in the outsourcing industry. Outsourcing companies in India operate under a robust regulatory framework covering company registration, taxation, labour, and data protection. They must comply with the Companies Act, GST, and Import-Export Code for legal operations. Labor laws such as EPFO, ESIC, and the Shops & Establishments Act ensure workforce compliance, while POSH guidelines address workplace safety. Tax and transfer pricing norms apply, particularly for GCCs. State IT policies, like Maharashtra's, offer incentives such as subsidies, SEZ benefits, and simplified approvals. Contracts must address IP rights and data confidentiality, with RBI and MeitY overseeing financial and digital regulations.

7 Digital Signature

A digital signature is a cryptographic technique used to verify the authenticity and integrity of a digital message, document, or software. It's like a handwritten signature or a stamped seal but much more secure. When a user digitally signs a document, they use their private key to create a unique digital signature that authenticates the document's origin and ensures its integrity. To verify this digital signature, the recipient needs access to the user's public key. This is where the Digital Signature Certificate (DSC) plays a crucial role. It provides the recipient with the user's public key along with verified identity information, confirming that the public key truly belongs to the claimed signer. The recipient then verifies the authenticity of the DSC itself by checking the digital signature of the Certifying Authority (CA) that issued the certificate. Once the DSC is trusted, the recipient can confidently use the public key from the certificate to verify the digital signature on the document, ensuring that the signature is valid and the document has not been tampered with.

Digital Signature Certificates (DSC) are the digital equivalent i.e.in electronic format of physical or paper certificates. Certificates serve as proof of identity of an individual for a certain purpose; A digital certificate can be presented electronically to prove one's identity, to access information or services on the Internet or to sign certain documents digitally. The Digital Signatures created using the Public Key infrastructure (PKI) ensure data integrity, data authentication and nonrepudiation. Digital Signatures are legally admissible in a Court of Law, as provided under the provisions of IT Act, 2000. The Office of Controller of Certifying Authorities (CCA), issues Certificate only to Certifying Authorities (CAs). CAs issue Digital Signature Certificates to end-entities. Below is the list of licensed CAs.

Vendor	Signature Class
(n)Code Solutions	Class III or II
Safe Scrypt	Class III or II
e mudhra	Class III or II
Capricorn	Class III or II
Verasys	Class III or II
Pantasign	Class III or II
IDSign	Class III or II
XtraTrust	Class III or II
SignX	Class III or II
ProDigiSign	Class III or II
Care4Sign	Class III or II
Speed Sign	Class III or II
C-DAC Sign	Class III or II
IDRBT Sign	Class III or II
NSDL Protean	Class III or II

CSC Sign	Class III or II
RISL Sign	Class III or II
JPSL	Class III or II
IGCAR	Class III or II
CDSL	Class III or II

7.1 Overview on government initiatives as a part of Digital India Program

The Digital India program, launched in 2015 by the Government of India, is a transformative initiative aimed at building a digitally empowered society and knowledge-based economy. It focuses on enhancing digital infrastructure, delivering services electronically, and promoting digital literacy. The program focuses on three key vision areas: digital infrastructure as a utility to every citizen, governance and services on demand, and digital empowerment of citizens.

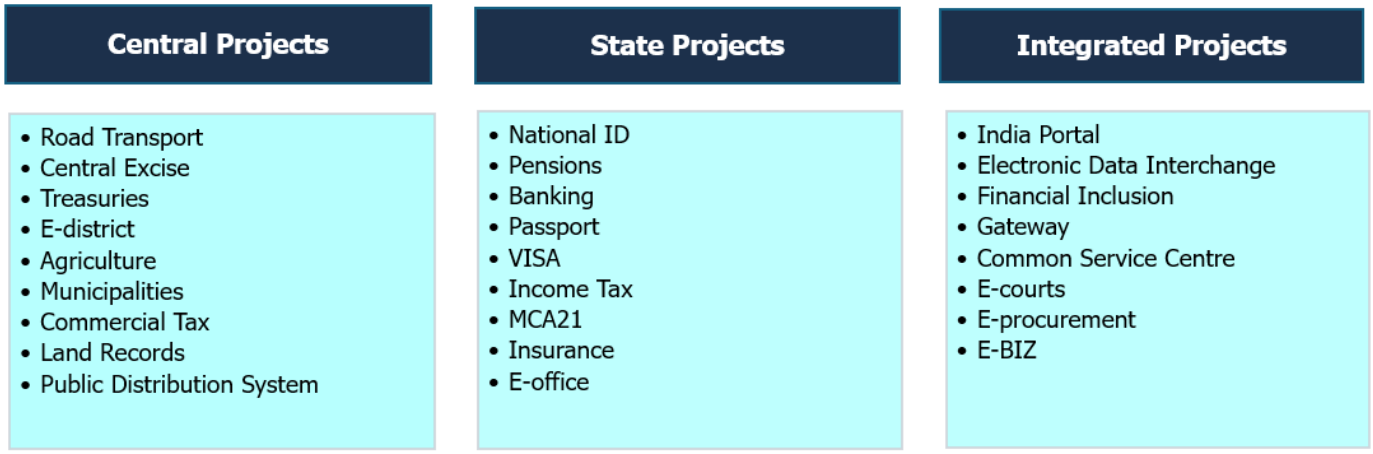
On 1st July 2025, India celebrates 10 years of the Digital India journey. The digital economy is also growing fast, contributing 11.74% to the national income in 2022–23 and expected to reach 13.42% by 2024–25. According to the State of India's Digital Economy Report 2024, released by ICRIER, India now ranks third in the world for digitalisation of the economy. By 2030, India's digital economy is projected to contribute nearly one-fifth of the country's overall economy, outpacing the growth of traditional sectors.

To achieve these goals, the government has introduced several initiatives and projects across various sectors, including:

- **BharatNet:** A nationwide optical fiber network to provide high-speed internet connectivity to rural and remote areas, bridging the digital divide.
- **Digital Locker (DigiLocker):** A secure cloud-based platform that allows citizens to store, access, and share official documents and certificates digitally, eliminating the need for physical documents.
- **e-Governance Services:** Initiatives like e-Office, e-Hospital, and digital payments aim to make government services more accessible, transparent, and efficient through online platforms.
- **Common Services Centers (CSCs):** Set up in rural areas to provide digital access points for delivery of government and private sector services.
- **UMANG** (Unified Mobile Application for New-age Governance): A single mobile app providing access to multiple government services across various departments.
- **MyGov**: A citizen engagement platform to encourage public participation in governance through ideas, feedback, and discussions.
- **Smart Cities Mission:** Leveraging digital technologies to improve urban infrastructure, governance, and quality of life.
- **Aadhaar:** The world's largest biometric ID system providing a unique identity to residents, facilitating direct benefit transfers and reducing fraud.
- **eSign:** It is a framework that allows individuals to digitally sign documents online using Aadhaar-based authentication or other verified credentials such as PAN or bank KYC. This enables quick, secure, and legally recognized digital signatures without the need for physical presence, supporting paperless transactions in governance and business.

- **eInvoicing:** It is an initiative under the GST framework that aims to digitize invoice generation and reporting. By bringing standardization and automation to invoicing, it helps reduce errors, prevent tax evasion, and streamline compliance for businesses, making the tax ecosystem more transparent and efficient.
- **e-Kranti:** plays a vital role in bridging the digital divide and ensuring inclusive digital access across urban and rural India. It promotes accountability, efficiency, and transparency in public service delivery while reducing physical interface, paperwork, and delays. By aligning digital services with citizen needs, e-Kranti lays the foundation for good governance in the digital era.

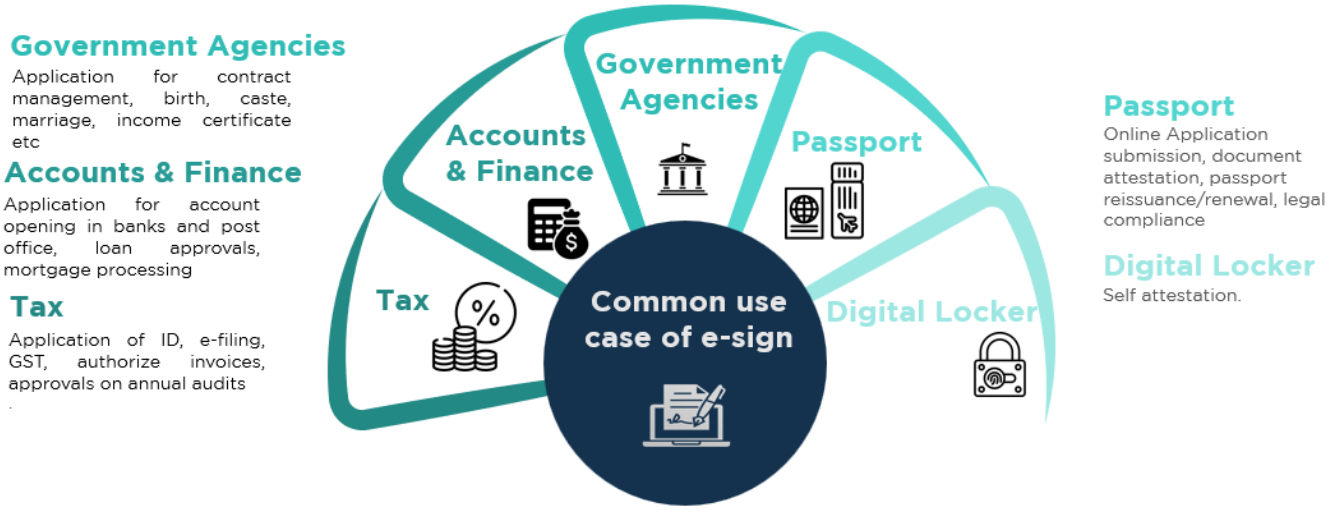
  The Government of India, under the e-Kranti initiative, has undertaken 44 Mission Mode Projects in collaboration with state governments to transform e-Governance. The objective is to ensure the presenceless, paperless, and cashless delivery of public services through efficient and integrated digital platforms.



7.2 Role of Digital Solutions in current scenario

The COVID-19 pandemic served as a catalyst for the rapid adoption of digital solutions across various sectors. With the enforcement of lockdowns and social distancing measures, organizations were compelled to transition to remote work environments. This shift significantly increased the reliance on digital platforms to ensure business continuity and minimize physical interactions. As a result, individuals and institutions began utilizing online applications for payments, form submissions, and other transactions, thereby reducing the need for cash handling and in-person visits. The demand for paperless solutions, particularly for digital document signing, witnessed a substantial rise and is expected to remain strong as digital transformation continues to shape the future of work and governance.

Among the impactful innovations in this domain is eSign, it is a digital signature service that enables users to electronically sign documents using Aadhaar-based eKYC authentication. As part of the Government of India's Digital India initiative, eSign offers a secure, efficient, and scalable alternative to traditional physical signature methods. Unlike conventional digital signatures that require a physical dongle, eSign allows users to sign documents remotely without any hardware. Application Service Providers (ASPs) can integrate the eSign API into their platforms, enabling seamless digital signing capabilities. The service is widely adopted by government agencies, banks, financial institutions, and educational institutions, underscoring its versatility and critical role in promoting a secure and paperless digital ecosystem.



7.2.1 Trend in Aadhar Authentication

Aadhaar is the foundational Digital Public Infrastructure (DPI) of the India stack. Aadhaar has become a cornerstone of India's digital transformation, enabling seamless access to various government services and platforms. Aadhaar plays a critical role in enhancing the efficiency of social welfare schemes by offering a dependable, unified identity verification system that ensures transparency in service delivery. Through Aadhaar-linked Direct Benefit Transfers (DBT), launched in 2013, cash benefits from various welfare schemes are directly transferred into beneficiaries' bank accounts, reducing the need for multiple documents and eliminating duplicate or fake beneficiaries. As of July 15, 2025 UIDAI (Unique Identification Authority of India) has generated 1.42 billion Aadhaar numbers.

Aadhaar is considered as the most trusted digital ID in the world. In the past decade, more than a billion Indians have expressed their trust in Aadhaar by using it to authenticate themselves over 100 billion times. Expansion of the scope of Aadhaar authentication, as envisaged in the amendment, will further improve ease of living and facilitate hassle-free access to newer services of their choice. The Ministry of Electronics and Information Technology (MeitY) has launched Aadhaar Good Governance portal to streamline approval process for Aadhaar authentication requests. This is coordinated with an effort to make Aadhaar more people-friendly, enable ease of living, and enable better access to services for people.

Over the years, Aadhaar authentication has witnessed exponential growth, with the annual authentication transactions growing at a CAGR of 150%, from 2.4 million transactions in 2012-13 to 22 billion annual transactions in 2023-24. The authentication and e-KYC transactions also grew sharply to 138 billion and 24.0 billion, respectively as of July 15, 2025.

In January 2025, Aadhaar holders conducted more than 2.84 billion authentication transactions, highlighting the continued expansion of the digital economy in India. This significant number demonstrates the growth of digital economy in the country. The authentication transactions in January 2025 have recorded a growth of over 32% when compared with January 2024, when 2.15 billion such transactions were carried out. On an average over nine crore authentications are taking place every day. This shows the growing adoption and utility of Aadhaar in the daily lives of people. Nearly 550 entities are using Aadhaar authentication service. The AI/ML based face authentication solution, developed in house by the UIDAI, is being used across diverse sectors including finance, insurance, fintech, health and telecommunications.

Several Government departments both at the centre and states are using it for smooth delivery of benefits to targeted beneficiaries.

7.3 Digital Payments and Transactions

Digital payments are financial transactions conducted through electronic or online means, wherein both the payer and the payee utilize digital platforms to facilitate the exchange of funds. Essentially, they involve the transfer of money between payment accounts via digital devices or channels, eliminating the need for physical cash.

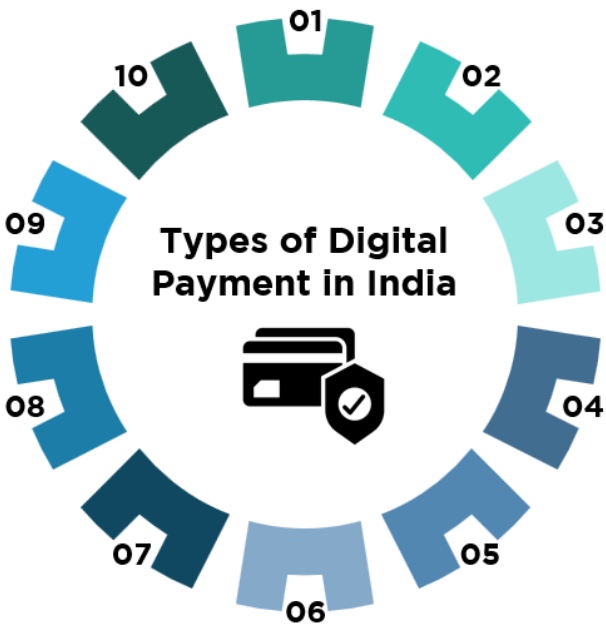
Micro ATMs
Micro ATMs, operated by agents, offer basic services like withdrawals and balance checks using Aadhaar-based authentication, promoting financial inclusion.

Mobile Banking
IMobile apps provide complete banking services on smartphones, enabling fund transfers, payments, and account tracking on the go..

Internet Banking
Internet banking lets users conduct transactions via the bank's website, offering services like NEFT, RTGS, and IMPS, along with account management.

Point of Sale (PoS) Terminals
PoS devices enable in-store card payments. Contactless options allow small-value transactions without PINs, streamlining checkouts.

Bank Prepaid Cards
Prepaid cards are preloaded for single or multiple uses. Commonly used for gifting, corporate rewards, or travel, they aren't necessarily linked to a bank account.



Banking Cards (Credit, Debit & Prepaid Cards)
Debit, credit, and prepaid cards are widely used for both online and offline transactions due to their convenience, security, and portability.

USSD (Unstructured Supplementary Service Data)
USSD enables basic banking on feature phones without internet by dialing *99#. It supports services like balance enquiry and fund transfer, especially in rural areas.

Aadhaar Enabled Payment System (AePS)
AePS allows banking through Aadhaar authentication at micro-ATMs, helping users perform transactions without visiting a branch or using cards.

Unified Payments Interface (UPI)
UPI links multiple bank accounts in one app for instant, secure money transfers. It's the most popular method, widely used through apps like Google Pay and PhonePe.

Mobile Wallets
Mobile wallets function as digital storage for money and offer a convenient way to make payments without directly accessing a bank account. These wallets are commonly used for utility payments, e-commerce, and peer-to-peer transfers.

The digital payments transactions including transactions through Unified Payment Interface (UPI) have increased consistently during the last five financial years.

Table 12: Digital Payment statistics

Financial Year	Total Digital Payments Transactions	
	Volume (in Crore)	Value (in Lakh Crore)
FY21	4,370.68	1,414.58
FY22	7,197.68	1,744.01
FY23	11,393.82	2,086.85
FY24	16,443.02	2,428.24
FY25	22,198.14	2,862.00

Source: RBI, CareEdge Research

7.4 Enabling Digital Trust, Digital Signature and Paperless Transformation

Digital identity is a critical foundation for business growth and security in the digital age, acting as a modern security perimeter. With the rise of connected devices, remote work, and complex IT environments, the need for a robust identity platform is growing rapidly. Key trends driving this need include IoT security, where each device must have a verifiable identity; remote signing, which enables secure and legally valid digital signatures; and certificate discovery, which helps organizations manage and track digital certificates to avoid security risks.

Digital Trust Services support this ecosystem by issuing digital certificates or identities to individuals, organizations, websites, and IoT devices. These services are provided by Certifying Authorities or Trust Service Providers, who follow global standards to ensure secure and trusted digital interactions.

- **SSL/TLS Certificates**

To ensure the protection of both enterprise and customer data, it is essential to establish a secure encryption layer for all data transmitted between a web server and a browser. This is achieved through the use of SSL/TLS certificates. SSL (Secure Socket Layer) is a protocol designed to encrypt data exchanged between a user's browser and a web server, ensuring that any information sent or received remains confidential and protected from unauthorized access. TLS (Transport Layer Security) is the modern, more secure successor to SSL, although the term "SSL" is still widely used and often used interchangeably with TLS**.**

SSL/TLS certificates typically utilize the SHA-256 hashing algorithm in combination with the RSA 2048-bit encryption algorithm to secure communications. As an alternative to RSA, the ECC (Elliptic Curve Cryptography) 256-bit algorithm can be employed. ECC offers the same level of security as RSA 2048-bit but with a significantly shorter key length, making it more efficient while maintaining strong encryption standards.

There are three primary categories of SSL/TLS certificates, each offering varying levels of validation:

- **Domain Validated (DV) Certificates**: These certificates confirm that the applicant has control over the domain name. The validation process is minimal and largely automated, requiring no manual verification by the Certifying Authority (CA). DV certificates are suitable for basic websites where identity assurance is not a critical requirement.
- **Organization Validated (OV) Certificates**: OV certificates necessitate that the CA verify not only domain ownership but also the legitimacy of the requesting organization. This includes validation of the organization's name, domain, and administrative contact information. OV certificates provide a higher level of trust and are commonly adopted by businesses and institutions.
- **Extended Validation (EV) Certificates**: EV certificates involve the most comprehensive validation process. The CA must verify the organization's legally registered name, registration number, physical business address, and any associated trade names. Upon issuance, EV certificates activate a visual indicator in the browser, such as a green address bar or a padlock icon, signifying to users that the website is secure and operated by a verified legal entity. This level of validation is particularly suited for e-commerce, banking, and other high-trust environments.

- **Digital Signature Certificate (DSC)**

A DSC is a secure digital credential issued by licensed Certifying Authorities (CAs) to validate the identity of an individual or organization in electronic transactions. It serves as the digital equivalent of a handwritten signature or a stamped seal, offering a high level of security for online communications and document exchanges.

- **Types and Classes of DSC**

Types of Certificates:

- **Sign Certificate**: Used to digitally sign documents, ensuring the authenticity and integrity of the content.
- **Encrypt Certificate**: Used to encrypt sensitive data, protecting it from unauthorized access during transmission.
- **Sign & Encrypt Certificate**: Combines both functionalities for comprehensive digital security.

Classes of Certificates:

- **Class 1**: Provides basic validation of name and email; suitable for low-risk environments.
- **Class 2**: Previously used for moderate-risk transactions; discontinued from January 1, 2021.
- **Class 3**: Offers the highest level of assurance; required for secure government filings, e-tendering, and legal documentation.

DSCs are typically stored in secure USB tokens and protected using advanced cryptographic algorithms such as **SHA-256** for hashing and **RSA 2048-bit** or **ECC 256-bit** for encryption.

- **Importance of DSC**

The Digital Signature Certificate plays a pivotal role in the digital transformation of businesses and government services. Its importance is underscored by the following factors:

1. **Legal Validity**: Under the Information Technology Act, 2000, digital signatures are legally recognized in India, making DSCs essential for compliance in electronic filings.
2. **Authentication**: DSCs verify the identity of the signer, ensuring that the document originates from a trusted source.
3. **Data Integrity**: They guarantee that the content of the document has not been altered after signing.
4. **Non-repudiation**: Once a document is signed with a DSC, the signer cannot deny having signed it, providing legal accountability.
5. **Mandatory for Regulatory Filings**: DSCs are required for filing income tax returns, GST submissions, MCA forms, and participating in government tenders.

- **Advantages of Using DSC**

1. **Enhanced Security**: DSCs use robust encryption to protect sensitive data and ensure secure communication.
2. **Time and Cost Efficiency**: They eliminate the need for physical signatures and paperwork, streamlining workflows and reducing operational costs.
3. **Convenience**: Documents can be signed and submitted electronically from anywhere, facilitating remote operations.
4. **Trust and Credibility**: DSCs build trust among stakeholders by ensuring that digital transactions are secure and authenticated.
5. **Environmental Benefits**: By promoting paperless processes, DSCs contribute to sustainability and environmental conservation.

➢ Paperless Transformation

Organizations are rapidly transitioning toward paperless operations to enhance efficiency and sustainability. However, many still face a critical bottleneck—the need for physical signatures on documents. eSignature workflow solutions effectively address this final hurdle by enabling users to digitally sign documents in a manner that is both legally valid and compliant with regulatory standards. Unlike traditional scanning methods, these solutions facilitate a complete shift to paperless environments.

Adopting a paperless approach offers numerous benefits, including improved customer experience, enhanced convenience, stronger compliance, and significant cost savings. It supports presence-less and paperless transactions, contributing to environmental sustainability. Additionally, paperless processes promote greater flexibility, faster turnaround times, and improved operational manageability, all without compromising data security.

To successfully embark on a paperless transformation journey, it is essential for enterprises to select the right solution. Poorly designed workflows can lead to inefficiencies and hinder adoption. Therefore, a robust Paperless Transformation Solution should include the following key features:

- Support for legally compliant eSignatures
- Flexibility to adapt to evolving business needs
- Utilization of advanced technologies to optimize performance
- Availability in both on-premises and cloud-based deployment models
- Compliance with global and local industry regulations
- Seamless integration with third-party systems such as ERP and CRM
- Implementation of best-in-class security protocols

➢ Public Key Infrastructure (PKI)

PKI is a structured framework that enables secure digital communication and identity verification. It plays a central role in building trust in an environment where individuals, businesses, and governments interact online on a daily basis. By combining cryptographic technology with a trusted system of digital certificates, PKI ensures that data remains confidential, authentic, and tamper-proof during transmission. Unlike traditional security methods that rely on passwords or private systems, PKI uses asymmetric cryptography, a system that employs two mathematically related keys, a public key and a private key.

The public key is openly shared and is used to encrypt information or verify a digital signature, while the private key remains confidential to its owner and is used to decrypt data or generate signatures. This approach ensures that sensitive information can be exchanged securely between parties without requiring them to share secret codes or rely on pre-established trust.

Equally important to PKI is the role of Certificate Authorities (CAs), trusted entities that verify identities and issue digital certificates. These certificates act like a digital passport, assuring others that the entity they are dealing with is genuine. This is what allows people to trust secure websites, sign documents digitally with legal validity, and log into corporate systems with confidence.

In essence, PKI serves as the backbone of secure digital interactions. From online banking and e-commerce to e-governance and enterprise IT systems, PKI underpins many of the services people rely on daily, making digital life not only more efficient but also more trustworthy.

Components of PKI

Certificate Authority (CA): A trusted entity that issues and manages digital certificates, confirming the authenticity of the certificate holder.

Registration Authority (RA): Acts as a verifier of user identities before certificates are issued by the CA.

Digital Certificates: Electronic credentials that link an entity's identity with its public key, enabling trust in communications.

Key Pairs (Public and Private Keys): Asymmetric cryptography is used, where the public key encrypts data and the private key decrypts it, ensuring secure exchanges.

Certificate Revocation List (CRL): A list maintained to identify and revoke certificates that are compromised or no longer valid.

7.5 Key Growth Drivers

- **Rising Need for Secure & Tamper-Proof Transactions**

As businesses move operations online, the need for authenticated, non-repudiable digital communication has increased significantly. Digital signatures ensure:

- Data integrity and identity verification
- Protection against document tampering and fraud
- Legal admissibility of electronic records

- **Regulatory and Legal Mandates**

Governments and regulatory bodies globally are pushing for compliance with digital signature standards to promote secure electronic governance and commercial transactions. Key enablers include:

- IT Act (India), eIDAS (EU), ESIGN Act (US)
- Sector-specific compliance like HIPAA (healthcare), SOX (finance), and GST e-invoicing (India)

- **Remote Work & Paperless Transformation**

The post-COVID shift to **remote and hybrid work models** has made physical document signing impractical. Enterprises are investing in:

- Cloud-based eSignature platforms
- Mobile-enabled signing workflows
- API integration with CRMs, ERPs, and document management systems

8 Overview of Platform as a Service

8.1 Overview on cloud service market

The cloud services market has evolved into a critical enabler of digital transformation, offering organizations scalable, flexible, and cost-effective solutions to manage IT infrastructure, applications, and data. Instead of relying on on-premises systems, businesses are leveraging cloud computing to innovate faster, respond to changing customer demands, and optimize operational efficiency.

At its core, cloud computing refers to the delivery of computing services including servers, storage, databases, networking, software, analytics, and intelligence over the internet ("the cloud"). This model allows companies to pay only for what they use, significantly reducing capital expenditure and IT maintenance burdens.

Market Drivers

- **Digital Transformation Initiatives:** Businesses are accelerating cloud adoption to modernize legacy systems and embrace data-driven decision-making.
- **Remote and Hybrid Work Models:** The pandemic normalized flexible working arrangements, increasing demand for cloud-based collaboration and productivity tools.
- **Scalability and Agility:** Cloud enables businesses to quickly scale resources up or down based on demand, supporting innovation and faster time-to-market.
- **Cost Efficiency:** The shift from capital-intensive infrastructure to a pay-as-you-go model helps optimize IT spending.
- **Security and Compliance:** Cloud providers are investing heavily in cybersecurity and compliance frameworks, making cloud solutions more secure and trusted.

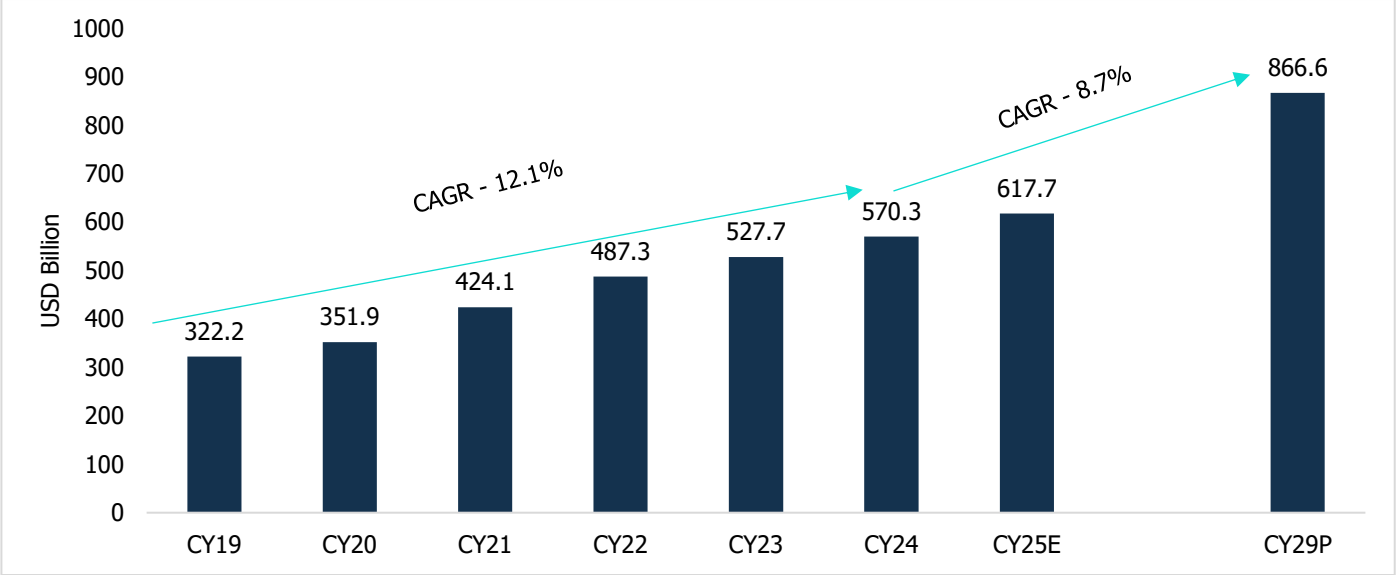
8.2 Trend in global cloud service market size

Cloud services encompass a broad spectrum of on-demand solutions delivered via the internet, enabling businesses and individuals to access applications and computing resources without the need for physical infrastructure or in-house hardware. These services rely on internet-based servers that host software, databases, and other digital tools.

The cloud services market represents the revenue generated by companies offering internet-based IT resources and applications on demand. Providers in this space deliver access to computing infrastructure such as servers, storage systems, databases, and a wide range of managed application services. This market includes the sale of storage servers used to manage, secure, and access digital data and services, as well as offerings across public, private, hybrid, and multi-cloud environments.

Market valuation covers both the services themselves, and any associated goods provided as part of the service package. Only transactions involving inter-entity trade or sales to end-users are included in this valuation. The global cloud services market grew from USD 322.2 billion in CY19 to USD 570.3 billion in CY24 at a CAGR of 12.1% and is projected to reach around USD 870 billion in CY29 at a CAGR of 8.7%

Chart 37: Trend in Global service market size



Source: EMIS, CareEdge Research

The cloud services market is poised for strong growth, fuelled by the increasing adoption of IoT technologies across industries such as manufacturing, transportation, and logistics. IoT, which connects physical objects like devices, vehicles, and infrastructure through embedded sensors, software, and connectivity, enables real-time data collection and exchange, driving demand for scalable cloud infrastructure.

In parallel, the rapid expansion of the e-commerce sector is expected to further support cloud market growth. E-commerce platforms require highly flexible, data-intensive websites that demand significant server capacity and storage. To reduce infrastructure and development costs, these businesses are increasingly relying on cloud service providers for building and maintaining their digital platforms.

Additionally, rising investments in smart city initiatives around the world are boosting demand for cloud services. Smart cities leverage ICT (Information and Communication Technology) to enhance the efficiency of urban operations such as public transport, water management, and public safety. These systems, which heavily rely on IoT networks for data exchange and automation, require robust cloud-based processing and storage solutions, further benefiting cloud service providers.

8.3 Global cloud service split by segment

- **Software as a service (SaaS)**

It is a cloud-based software delivery model that enables users to access applications and data from any internet-connected device via a web browser. In this model, the software provider is responsible for hosting and managing the underlying infrastructure, including servers, databases, and application code.

The SaaS market refers to the revenue generated by companies offering software solutions over the cloud. These services are typically offered on a subscription or pay-per-use basis, allowing organizations to utilize software applications for various business needs without the need for in-house infrastructure. The applications and their associated data are hosted in the service provider's data centers and accessed remotely.

SaaS offers businesses a cost-effective and scalable way to operate essential applications, significantly reducing initial capital expenditure and streamlining operations. The market value encompasses both the software services, and any related goods provided as part of the offering, limited to transactions between entities or direct sales to end users.

- **Infrastructure as a service (IaaS)**

It is a cloud computing model that allows businesses to rent virtualized computing infrastructure such as servers, storage, and networking resources over the internet. It enables enterprises to run computing and storage operations remotely without investing in physical hardware.

The IaaS market encompasses revenue generated by providers offering on-demand access to IT infrastructure via cloud platforms. These providers manage and deliver core components, including servers, data storage, networking capabilities, operating systems, and backup solutions, from centralized data centers. This setup supports scalability, system maintenance, disaster recovery, and business continuity.

The market valuation includes the worth of any associated goods bundled with the infrastructure services, but only accounts for those exchanged between entities or sold directly to end users**.**

- **Platform as a service (PaaS)**

PaaS is a cloud computing model that offers a ready-to-use platform enabling developers to build, deploy, and manage applications over the internet. PaaS providers deliver the infrastructure and development tools needed to create software without the complexity of managing underlying hardware or software layers.

The PaaS market includes revenue generated by companies offering cloud-based platform services, typically through subscriptions or licensing agreements with developers, businesses, and other organizations. This model supports a wide range of development activities, streamlining app creation and deployment.

PaaS offerings generally fall into four categories: computing platforms, web applications, business applications, and social applications. The market value also accounts for any related goods included as part of the service, limited to transactions between entities or direct sales to end consumers.

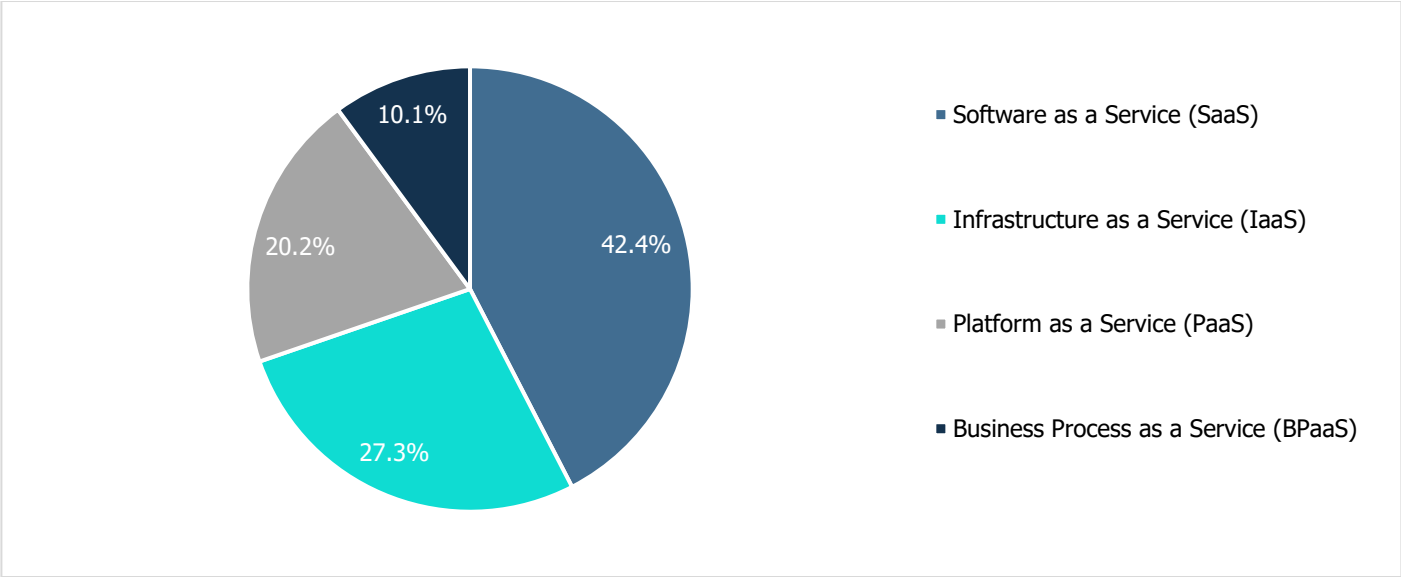
- **Business Process as a service (BPaaS)**

BPaaS is a form of business process outsourcing that leverages cloud technologies to deliver streamlined and cost-effective process management solutions. BPaaS enables organizations to access business process services via cloud-based platforms, helping them achieve operational efficiency and business goals through web-delivered solutions.

The BPaaS market includes revenue generated by companies offering cloud-hosted business process services such as finance and accounting, customer support, marketing, HR, and industry-specific operations. By combining Business Process Management (BPM) with cloud service models like SaaS, PaaS, and IaaS, BPaaS automates workflows and reduces operational costs.

These services are commonly used across sectors such as banking, advertising, and customer service, among others. The market valuation also includes the worth of related goods provided within the service package, limited to transactions between businesses or direct sales to end consumers.

Chart 38: Global Cloud Service Split by Segment for CY24



Source: EMIS, CareEdge Research

The SaaS segment dominates the cloud services market, accounting for 42.4% of the total share with a market value of approximately USD 242 billion, it shows signs of maturity, with a relatively modest growth outlook (CAGR of 5.0% from CY24–CY29), followed by IaaS with a 27.3% share and USD 156 billion in market value. PaaS holds a 20.2% market share, valued at USD 115 billion, demonstrating strong historical growth at 16.2%, tapering slightly to a 10.9% CAGR in the forecast period as the market matures. PaaS remains essential for modern app development, especially in AI/ML and agile environments. Lastly, BPaaS represents 10.1% of the market with USD 57.6 billion in value.

Segment	Historic CAGR (CY19–CY24)	Forecast CAGR (CY24–CY29)
Infrastructure as a Service (IaaS)	19.9%	13.5%
Platform as a Service (PaaS)	16.2%	10.9%
Software as a Service (SaaS)	8.1%	5.0%
Business Process as a Service (BPaaS)	6.9%	4.2%

Source: EMIS, CareEdge Research

Overall, the cloud services market remains robust, with each segment contributing to enterprise digital transformation through unique and complementary capabilities.

8.4 Global cloud service split by region – 2024

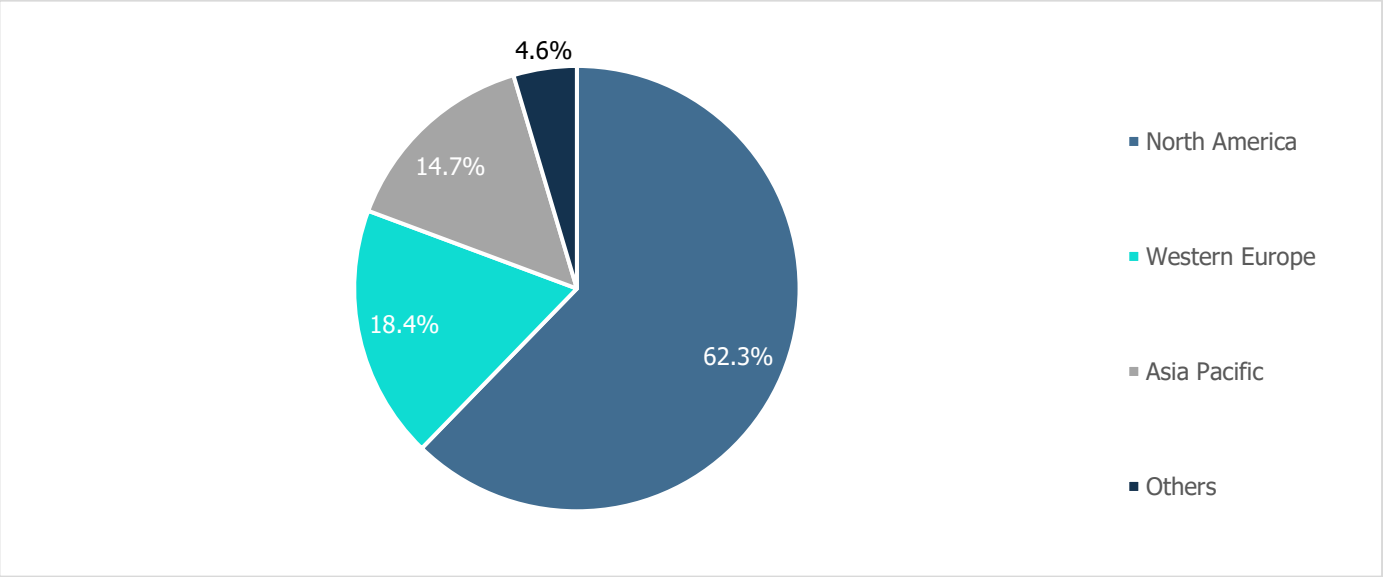
The global cloud services market is led by North America, which holds a dominant 62.3% share, valued at approximately USD 355.1 billion. This leadership is driven by early cloud adoption, enterprise digital maturity, and the strong presence of hyperscalers like Amazon, Microsoft, and Google.

Western Europe follows with an 18.4% share (USD 105.0 billion), reflecting steady demand across regulated industries, robust IT infrastructure, and increasing adoption of hybrid and multi-cloud models.

Asia Pacific, at 14.7% (USD 84.0 billion), is a high-growth emerging market, with rapid digital transformation, increasing cloud adoption by SMEs and governments, and strong cloud expansion in countries like India, China, and Southeast Asia.

The remaining regions Eastern Europe, South America, the Middle East, and Africa collectively account for less than 5% of the global market. These regions are in early adoption stages, constrained by infrastructure and investment gaps but present long-term growth potential as digitalization and connectivity improve.

Chart 39: Global Cloud Service Split by region for CY24



Source: EMIS, CareEdge Research

The regional growth trends in the cloud services market reveal a clear shift toward emerging economies, which are expected to lead future expansion. While North America and Western Europe remain dominant in market size, their forecast CAGR for CY24–CY29 stands at a modest 6.04% and 7.96% respectively, indicating maturity and saturation in these regions. In contrast, Eastern Europe is projected to witness the highest growth at 24.61%, driven by increasing digital transformation efforts and a growing tech ecosystem. Similarly, South America (22.81%), Africa (18.15%), and the Middle East (14.89%) are expected to see rapid cloud adoption, fuelled by improving infrastructure, rising demand from SMEs, and government-led digital initiatives.

Region	Historic CAGR (CY19–CY24)	Forecast CAGR (CY24–CY29)
South America	21.5%	22.8%
Middle East	20.2%	14.9%
Africa	19.2%	18.2%
Eastern Europe	18.8%	24.6%
Asia Pacific	14.1%	14.4%
North America	11.8%	6.0%
Western Europe	10.3%	8.0%

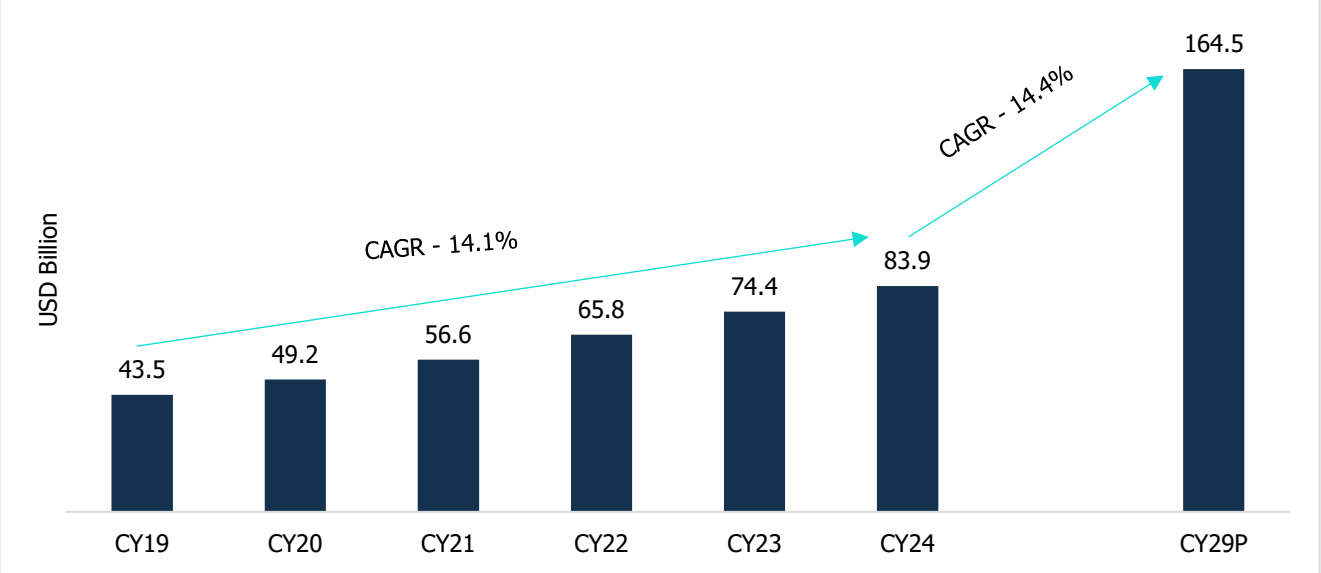
Source: EMIS, CareEdge Research

Meanwhile, Asia Pacific maintains a strong balance between scale and speed, with a forecast CAGR of 14.41%, supported by enterprise cloud adoption, public sector investments, and a thriving startup ecosystem. These trends highlight that while developed regions are focused on optimization and innovation within existing cloud frameworks, the next wave of high growth will likely be driven by digital acceleration in developing markets.

8.5 Asia Pacific cloud service split by region

Asia Pacific was the third largest region in the cloud services market worth $83.9 billion in 2024, accounting for 14.7% of the global cloud services market, preceded and followed by Western Europe at 18.4% and Eastern Europe at 2.4% respectively. The Asia Pacific cloud services market grew from USD 43.48 billion in 2019 to USD 83.95 billion in 2024 at a CAGR of 14.06% and is expected to grow to USD 164.55 billion in 2029 at a CAGR of 14.41%.

Chart 40: Asia Pacific Cloud services market size to grow almost 2x from CY24 to CY29



Source: EMIS, CareEdge Research

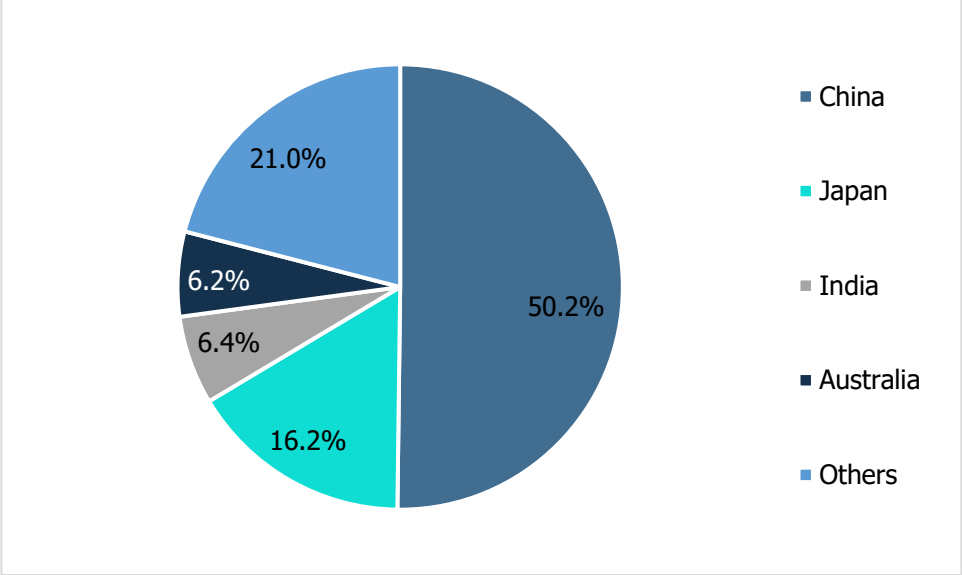
The Asia Pacific cloud services market is heavily dominated by China, which holds over 50% of the regional share, contributing an estimated USD 42.14 billion in revenue. China's leadership is driven by large-scale digital transformation across industries, strong domestic cloud providers, and government-backed infrastructure expansion.

Japan ranks second with a 16.22% share (USD 13.62 billion), supported by enterprise modernization, high IT spending, and advanced infrastructure. India and Australia follow closely, with shares of 6.44% and 6.16%, respectively, reflecting robust demand from enterprises and increasing cloud adoption by SMEs and startups.

Other emerging markets like Indonesia, Philippines, Vietnam, and Bangladesh have smaller shares, but represent high-growth potential due to improving digital infrastructure and increasing cloud investments.

India accounts for 6.44% of the Asia Pacific cloud services market, with estimated revenue of USD 5.41 billion. While smaller than China and Japan in absolute size, India is among the fastest-growing cloud markets in the region. Growth is driven by rapid digital transformation across industries, a thriving startup ecosystem, government initiatives like Digital India, and rising cloud adoption by SMEs. Major hyperscalers are expanding their presence through local data centers, supporting demand for low-latency, scalable infrastructure. With increasing investments in AI, analytics, and 5G, India is poised to become a key cloud growth engine in the region.

Chart 41: Asia Pacific Cloud Service Split by region for CY24



Source: EMIS, CareEdge Research

8.6 Overview of Platform-as-a-service

The PaaS market in India is experiencing rapid growth as businesses increasingly adopt cloud-native technologies to accelerate application development and digital transformation. PaaS provides a cloud-based platform that enables developers to build, deploy, and manage applications without worrying about the underlying infrastructure. This model is particularly valuable in India's dynamic tech landscape, where agility, scalability, and speed to market are crucial.

The growth is driven by a rising demand for faster application development, reduced time-to-market, and scalable solutions among enterprises, startups, and developers. Key users include companies across fintech, edtech, retail, manufacturing, and healthcare sectors. The government's push toward digital infrastructure and initiatives like Digital India further boost adoption.

Compared to the global PaaS landscape, which is more mature and dominated by North America, India is in a high-growth phase. Globally, PaaS adoption is led by large enterprises leveraging advanced technologies like artificial intelligence, machine learning, and serverless computing. These markets prioritize hybrid and multi-cloud strategies to balance flexibility, control, and compliance, especially in regions with strict data protection laws.

In contrast, India's PaaS market is characterized by its dynamic and youthful developer community, strong government backing through programs like Digital India, and increasing cloud adoption across sectors such as banking, healthcare, education, and retail. Indian businesses are embracing cloud-native development and low-code/no-code platforms to accelerate innovation. While public cloud remains the dominant deployment model, hybrid cloud is gaining traction as organizations seek more control over data and infrastructure.

Challenges also differ between the two markets. Globally, enterprises grapple with vendor lock-in, integration complexity, and regulatory compliance. In India, the main hurdles include a shortage of certified cloud professionals, budget constraints among small and medium enterprises, and the need for localized solutions that cater to regional languages and compliance standards.

Overall, while the global PaaS market is focused on refining and expanding existing capabilities, India is in a phase of rapid adoption and experimentation, laying the foundation for long-term cloud innovation. Global players such as AWS,

Microsoft Azure, and Google Cloud, along with Indian IT majors like TCS, Infosys, and HCL, are expanding their PaaS offerings to support low-code/no-code development, DevOps, data integration, and advanced analytics.

Overall, India's PaaS market is expected to grow significantly in the coming years, positioning itself as a core pillar in the country's broader cloud ecosystem, supporting innovation, software delivery, and business agility.

9 Indian Data Analytics and Artificial Intelligence Industry

9.1 Overview of Data Analytics and AI for customer Intelligence

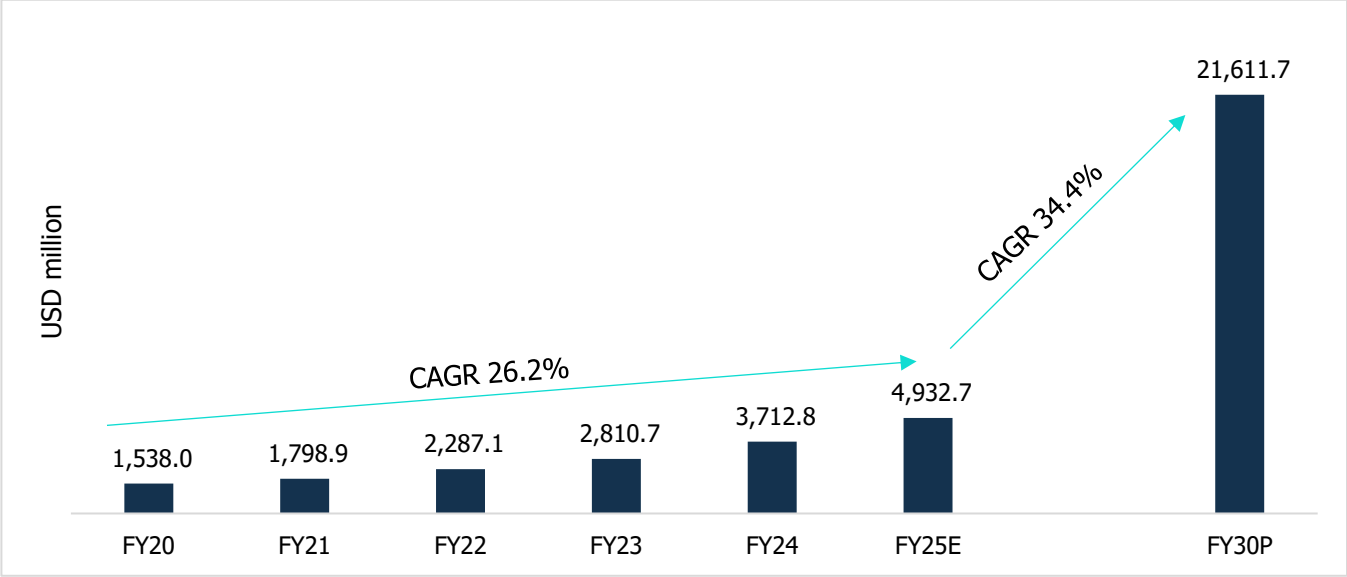
Data analytics and artificial intelligence (AI) are playing an increasingly significant role in shaping customer intelligence across industries. Customer intelligence refers to the process of gathering, analysing, and applying insights about customer behaviour, preferences, and interactions to enhance decision-making and improve customer experiences.

Through advanced data analytics, organizations can systematically examine large volumes of structured and unstructured data to identify patterns, trends, and correlations. This allows businesses to move beyond traditional demographic profiling and gain deeper insights into customer needs, purchasing behaviour, and engagement drivers. Predictive and prescriptive analytics further enable companies to anticipate customer actions and recommend targeted strategies.

AI enhances this process by automating data collection, processing, and interpretation at scale. Machine learning algorithms, natural language processing, and sentiment analysis provide more accurate and real-time insights, helping organizations personalize offerings, optimize marketing campaigns, and improve service delivery. In addition, AI-powered tools support segmentation, churn prediction, and recommendation systems, making customer engagement more proactive and adaptive.

Overall, the integration of data analytics and AI into customer intelligence equips businesses with the ability to make evidence-based decisions, enhance operational efficiency, and strengthen customer relationships. As organizations increasingly compete on customer experience, these technologies serve as critical enablers for understanding and addressing evolving consumer expectations.

Chart 42: Trend in market value of data analytics and AI for customer intelligence in India



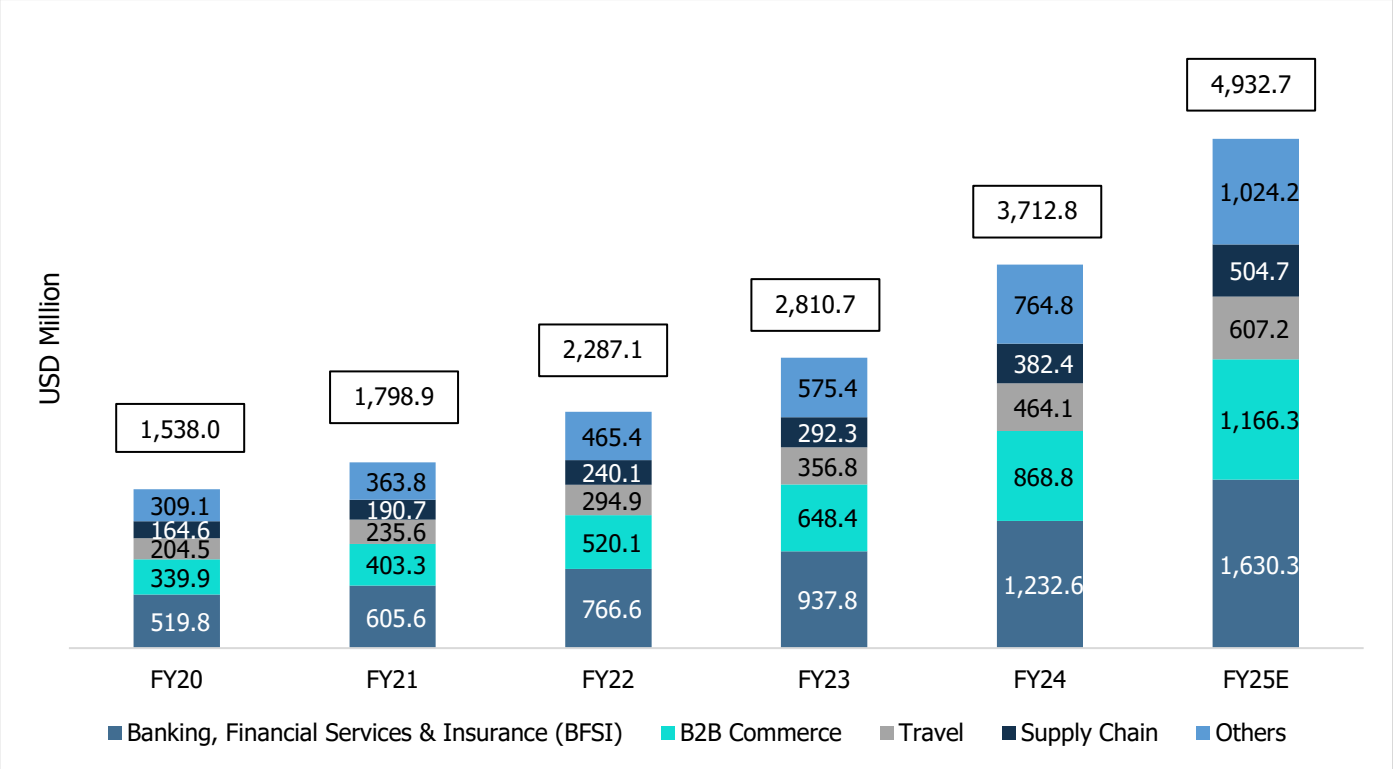
Source: IMARC, CareEdge Research

The India Data Analytics and AI for Customer Intelligence market has witnessed strong growth over the past few years, with sales value rising from USD 1,538.0 million in FY20 to an estimated of USD 4,932.7 million in FY25. This upward trajectory is expected to continue, with the market projected to reach USD 21,611.7 million by FY30 registering CAGR of 34.4% from FY25 to FY30. which highlights the sector's rapid expansion, driven by increasing adoption of advanced analytics and AI solutions to enhance customer engagement, personalization, and decision-making. The sustained growth outlook reflects the growing importance of data-driven intelligence in business strategies across industries in India.

9.2 Overview of Data Analytics and AI value by application type

In BFSI, these technologies support risk management, fraud detection, and personalized services. The travel industry applies them for demand forecasting, pricing, and enhancing customer experience. B2B commerce leverages AI for lead generation and predictive sales insights, while the supply chain benefits from improved demand planning and logistics optimization. Collectively, these applications highlight the rising value of data-driven intelligence in driving efficiency and competitive advantage.

Chart 43: Data Analytics and AI value by application type



Source: IMARC, CareEdge Research

The value of data analytics and AI applications in India has shown consistent growth across sectors between FY20 and FY24. BFSI segment remains the largest contributor, increasing from USD 519.8 million in FY20 to an estimated of USD 1,630.3 million in FY25, driven by demand for fraud detection, risk management, and personalized services. B2B commerce has also expanded significantly, rising from USD 339.9 million to an estimated of USD 1,166.3 million over the same period, supported by predictive sales and customer insights. The travel sector grew from USD 204.5 million to an estimated of USD 607.2million, reflecting investments in customer experience and dynamic pricing. Similarly, the supply chain segment advanced from USD 164.6 million to an estimated of USD 504.7 million, underscoring the role of analytics in demand planning and logistics.

9.3 Key Challenges and demand drivers

Key challenges	
Data Privacy and Security Concerns	With the rising use of personal and transactional data for AI and analytics applications, concerns regarding privacy, security, and misuse are intensifying. The absence of clear regulatory safeguards in the past has created risks of data breaches and non-compliance. Even with the introduction of the Digital Personal Data Protection Act, 2023, organizations must adapt their frameworks to ensure responsible data handling, which often adds to operational complexity and cost.
High Implementation Costs	While large enterprises can allocate budgets for AI-driven transformation, many small and medium-sized businesses (SMEs) face affordability challenges. The high cost of acquiring advanced technologies, investing in cloud infrastructure, and integrating AI solutions with existing systems creates a barrier to entry. Additionally, the return on investment is often long-term, discouraging smaller organizations from pursuing large-scale adoption.
Regulatory Uncertainty	The regulatory framework around AI in India is still evolving, creating uncertainty for organizations looking to invest heavily in AI systems. Businesses must navigate varying standards related to ethics, transparency, and compliance, while also preparing for potential new regulations. This uncertainty can make organizations cautious in adopting AI at scale, especially in sensitive sectors like finance and healthcare.
Limited Awareness Among Traditional Industries	Despite the proven benefits, many traditional sectors in India remain cautious about AI adoption. Lack of awareness, misconceptions about costs, and resistance to change within organizations slow down the pace of adoption. Without adequate training, education, and proven case studies, certain industries continue to underutilize AI and analytics, limiting the overall growth potential of the sector.

Demand Drivers	
Government Initiatives	The Government of India has introduced multiple initiatives such as Digital India, National AI Strategy (NITI Aayog), and the recently announced IndiaAI Mission to support AI adoption. These programs aim to strengthen digital infrastructure, promote indigenous AI innovation, and encourage industry-academia collaboration. Subsidies, policy reforms, and the establishment of AI centers of excellence have created a conducive environment for AI investments, thereby accelerating market growth.
Data Availability and Affordability	India is one of the largest data-generating economies globally, with increasing smartphone penetration, affordable internet services, and expanding digital transactions. This explosion of structured and unstructured data across social media, e-commerce, UPI-based payments, and IoT devices has created opportunities for businesses to apply analytics and AI for real-time insights. The availability of vast datasets strengthens model accuracy and enhances the applicability of AI-driven solutions across industries.
Efficiency and Cost Optimization	In an increasingly competitive environment, businesses are adopting AI and analytics to enhance efficiency and reduce costs. Predictive analytics supports better demand forecasting, while automation minimizes manual intervention in processes such as claims

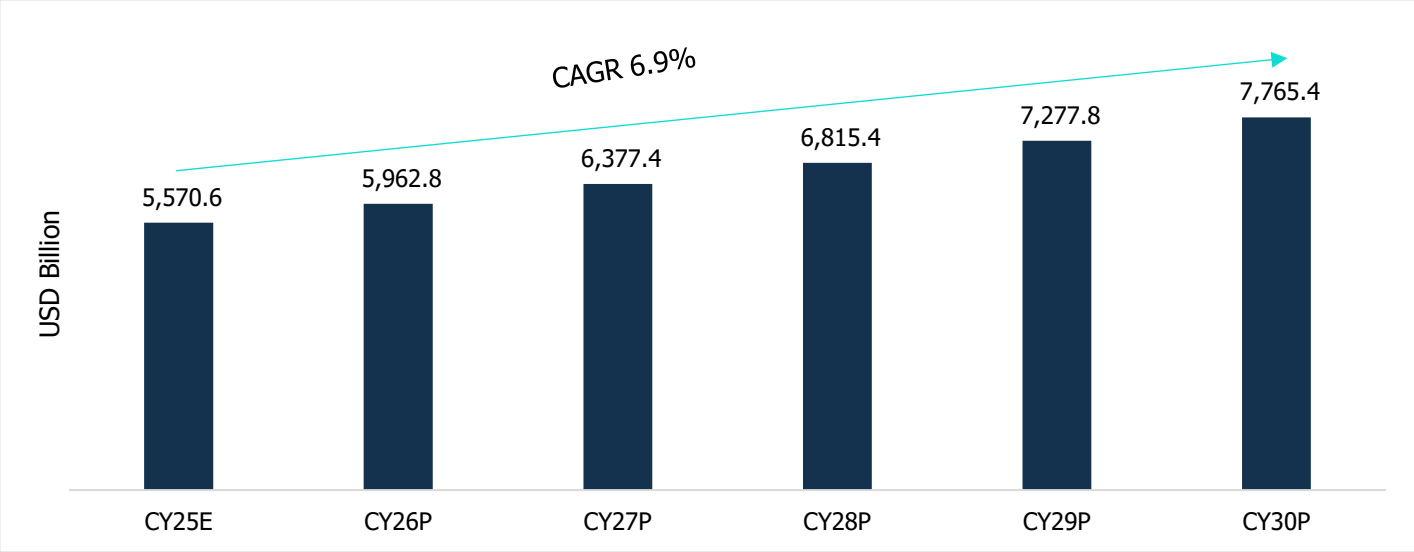
	management, fraud detection, and customer service. Similarly, AI-driven supply chain optimization and predictive maintenance help organizations save significant costs, making adoption a strategic necessity.
Global Outsourcing Opportunities	India's established reputation as an IT outsourcing hub, combined with a large pool of skilled professionals in technology and analytics, positions it as a preferred destination for AI outsourcing. Global enterprises increasingly look to India for AI-driven solutions, ranging from data engineering and model development to large-scale analytics services. This trend strengthens India's role in the global AI value chain, further stimulating domestic adoption and expertise development.

10 Future Market Outlook & Growth Opportunities

10.1 Market Forecasts & Projections

10.1.1 IT Spending Growth in India & Global Markets

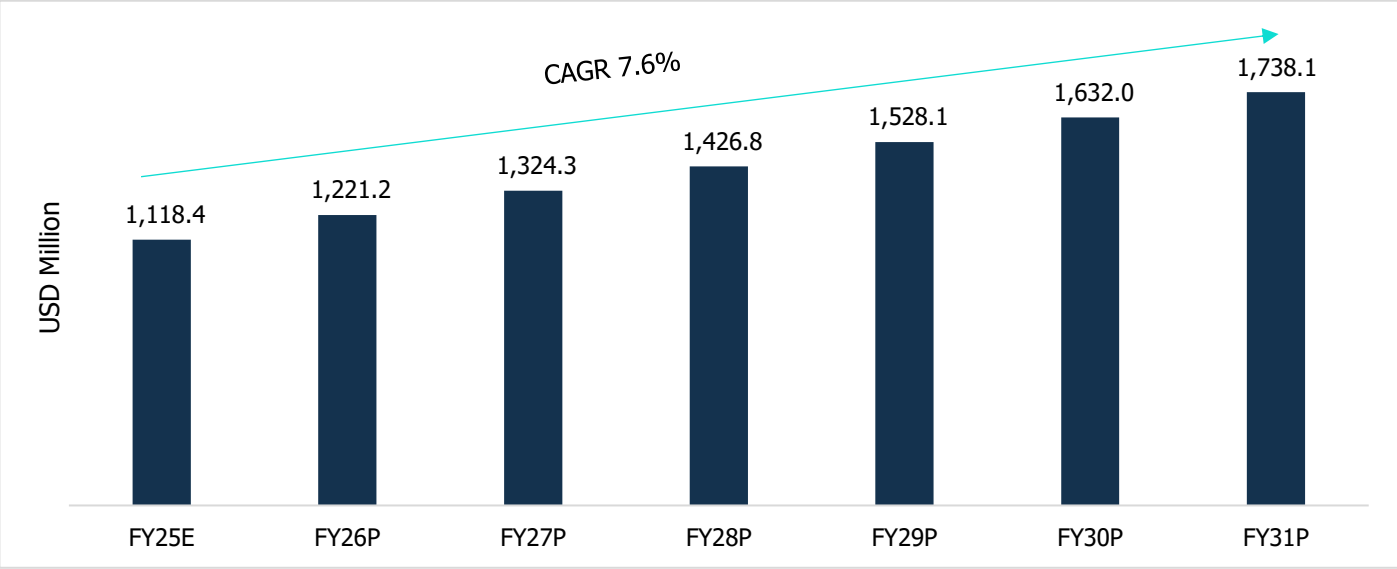
Chart 44: Global Spending on IT & Digital Initiatives



Source: IMARC, CareEdge Research

Between CY25E-CY30P, global spending on IT and digital initiatives is projected to grow at a CAGR of 6.9%, reaching USD 7,765.4 billion in CY30. This steady growth is expected to be supported by growing adoption of emerging technologies such as AI, cloud computing, and cybersecurity to drive digital transformation. This growth in global spending on IT and digital initiatives indicates the critical role of technology in enhancing operational efficiency, competitiveness, and resilience across industries globally.

Chart 45: Indian Government Spending on IT & Digital Initiatives

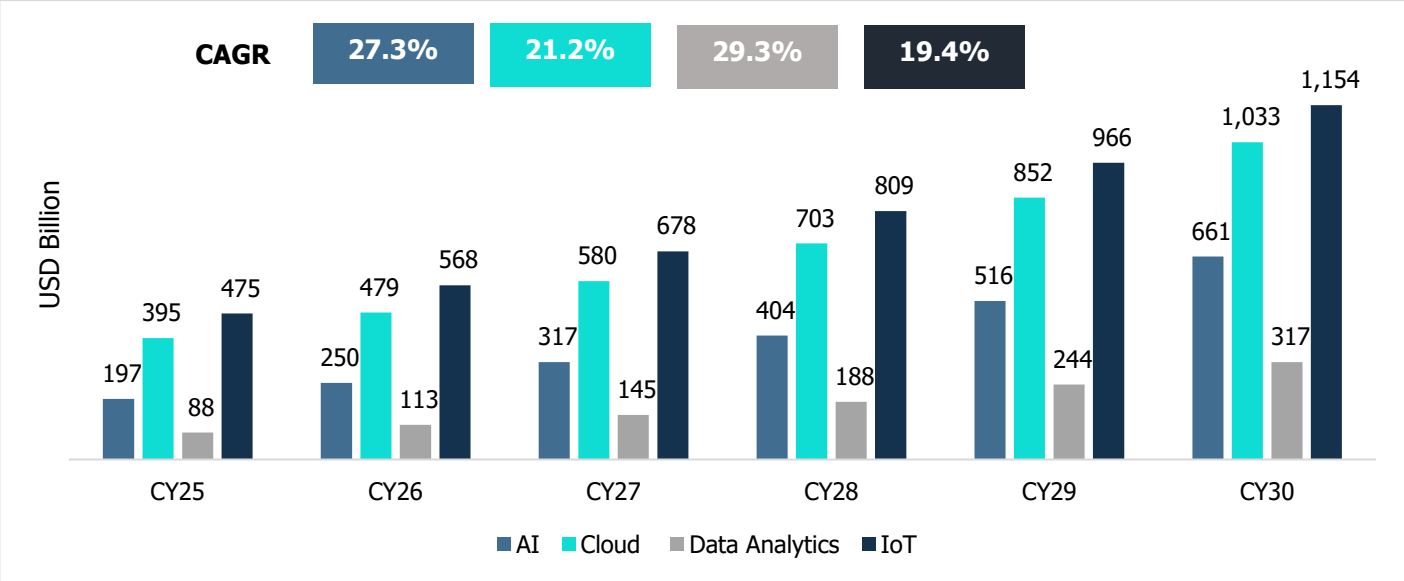


Source: IMARC, CareEdge Research

Going forward, the Indian government's spending on IT and digital initiatives is projected to grow at a CAGR of 7.5% between FY25E-FY31P, reaching USD 1,738.1 million in FY31. This steady increase reflects the government's commitment to enhancing digital infrastructure, cybersecurity, and AI-driven governance. The growth in spending is likely to be driven by continued investments in e-governance, cloud adoption, and smart city initiatives.

10.1.2 Future Investment Trends in Advanced Technologies

Chart 46: Global Investments in Advanced Technologies

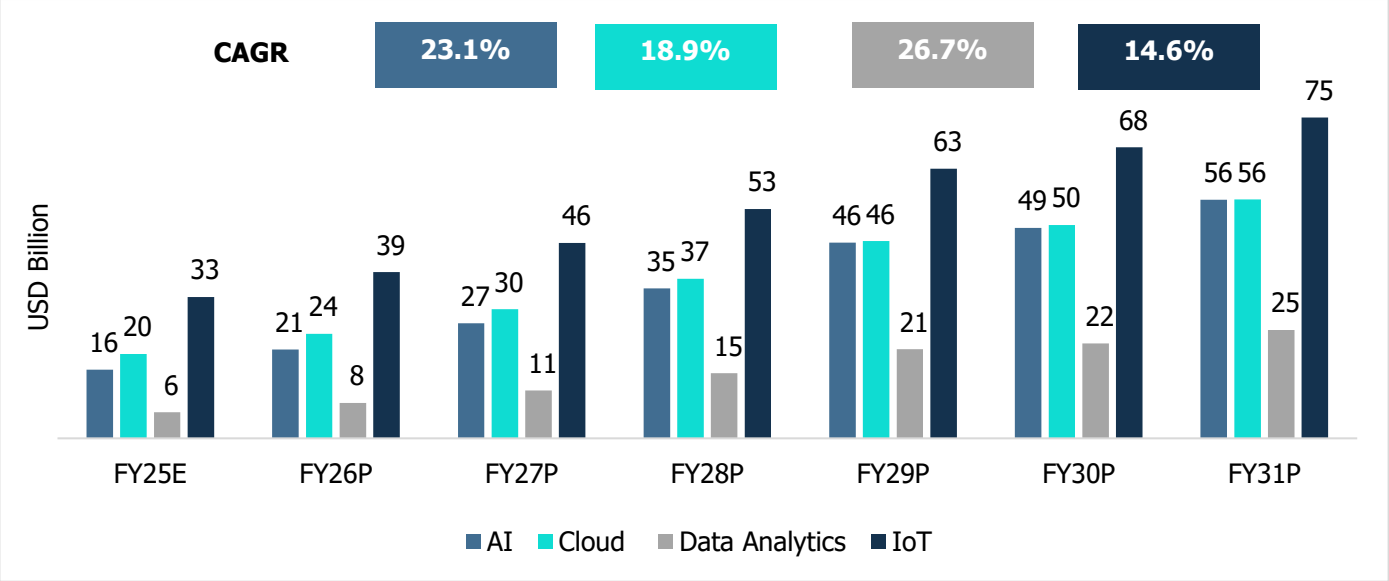


Source: IMARC, CareEdge Research
Note: Figures have been rounded off to the nearest integers

The global investments in advanced technologies, including AI, cloud, data analytics, and IoT, is projected to experience robust growth between CY25-CY30, driven by rapid digital transformation across industries.

AI spending is expected to grow at a CAGR of 27.5%, reaching USD 661 billion in CY30, driven by growing need for automation and intelligent systems. Cloud investments are expected to reach USD 1,033 billion, growing at a CAGR of 20.8% between CY25-CY30. Data analytics is likely to experience see steady growth, reaching USD 317 billion in CY30, indicating a CAGR of 28.7% between CY25-CY30 driven by growing need for businesses to leverage data-driven decisions. IoT will remain the largest segment, expanding from USD 475 billion to USD 1,154 billion, growing at a CAGR of 19.6%, reinforcing its role in enhancing operational efficiency and connectivity across industries. The overall market growth underscores the increasing adoption of next-generation technologies to drive innovation, efficiency, and competitive advantage.

Chart 47: India's Investments in Advanced Technologies



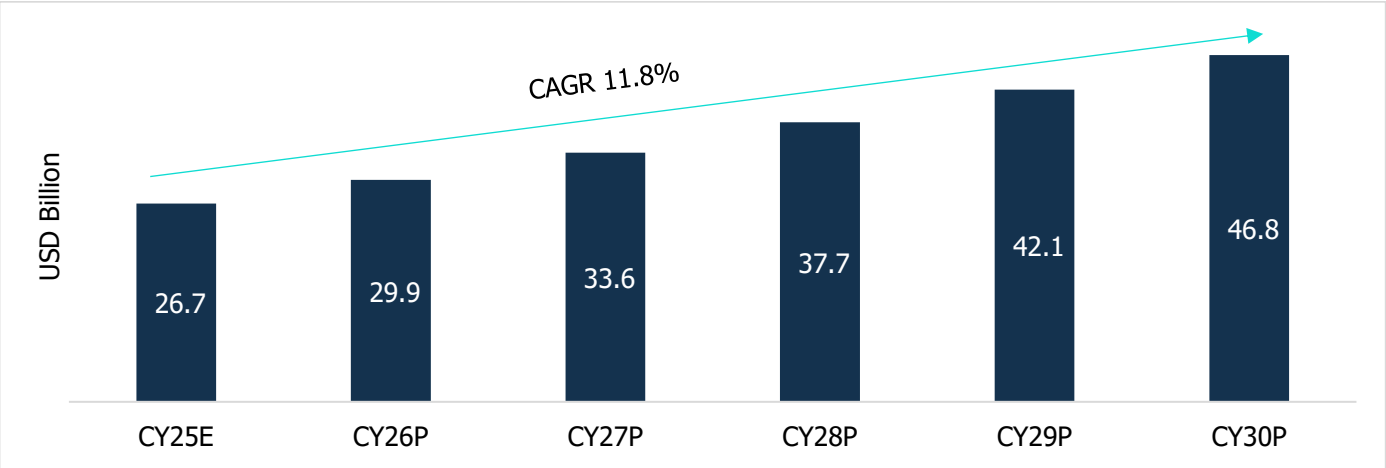
Source: IMARC, CareEdge Research
Note: Figures have been rounded off to the nearest integers

Indian economy is among the fastest growing economies in the world, and in order to continue to grow upwards India needs to ramp up its investments towards technological advancement. AI spending is expected to witness significant growth at a CAGR of 23.1% from FY25-FY31, reaching USD 56 billion by FY31, as AI adoption gains prominence across industries. And as enterprises prioritize scalable and cost-effective digital infrastructure, cloud investments are also expected to grow at an 18.9% CAGR, reaching USD 56 billion by FY31.

Data analytics is projected to grow at the fastest pace compared to other advanced technologies, with a CAGR of 26.7%, reaching USD 25 billion by FY31. This growth is likely to be supported by growing need for data-driven decision-making and predictive insights. And as IoT is the largest segment, the growth is likely to remain moderate at CAGR of 14.6%, reaching USD 75 billion in FY31, driven by smart infrastructure and industrial automation.

10.1.3 E-Governance & Public Sector Digitalization

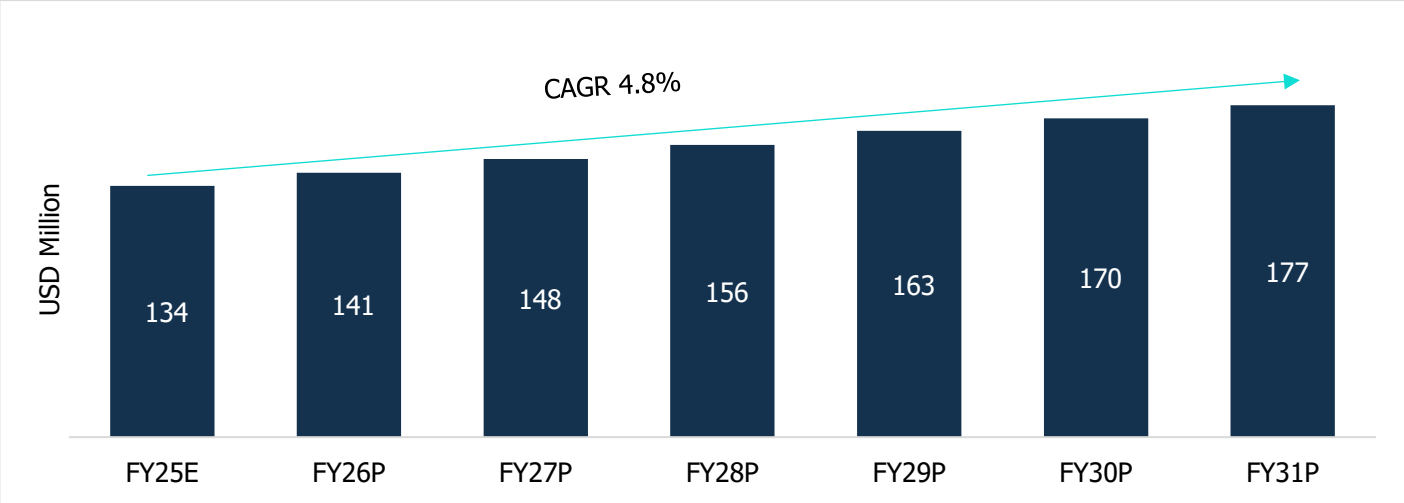
Chart 48: Global E-Governance & Public Sector Digitalization



Source: IMARC, CareEdge Research
Note: Figures have been rounded off to the nearest integers

The global e-governance and public sector digitalization market is projected to grow at a CAGR of 11.8% between CY25-CY30, reaching USD 46.8 billion in CY30. This growth is likely to be driven by government initiatives to enhance digital infrastructure, automation of public services, and improve governance efficiency through advanced technologies.

Chart 49: India's E-Governance & Public Sector Digitalization



Source: IMARC, CareEdge Research
Note: Figures have been rounded off to the nearest integers

India's e-governance and public sector digitalization market is poised for steady growth, growth at a CAGR of 4.8%, reaching ~USD 177 million in FY31. This growth is likely to be supported by government's focus on digital transformation, automation of public services, and improved efficiency through AI, cloud computing, and blockchain technologies.

10.2 Investment & Policy Landscape

10.2.1 Government policies driving IT investments in India & key markets

Government Initiatives driving IT investments in India

The Government of India actively promotes IT investments through various policies and initiatives. The Union Budget 2025–26 underscores technology's role in economic growth, with substantial allocations and reforms to strengthen the IT sector. A Rs 20,000 crore fund has been established to support research, development, and innovation in emerging technologies such as artificial intelligence, quantum computing, and blockchain, complementing private sector efforts and fostering a culture of innovation.

The budget also prioritises digital infrastructure, focusing on expanding broadband connectivity in rural areas under the BharatNet project. This initiative aims to bridge the digital divide and promote inclusive growth by ensuring internet access in underserved regions.

To advance AI education and skill development, the government has proposed Centres of Excellence in Artificial Intelligence, with an outlay of Rs 500 crore. These centres will equip the workforce with advanced technological skills and drive AI innovation.

Under the Make in India initiative, the government has introduced customs duty exemptions on raw materials and components used in manufacturing electronic goods such as mobile devices and EV batteries. This policy reduces import dependency and strengthens India's position as a global manufacturing hub.

The Production-Linked Incentive (PLI) Scheme, launched in 2020, further supports domestic manufacturing in key sectors, including IT hardware, mobile production, and semiconductors. The PLI for IT hardware promotes the local manufacturing of laptops, tablets, servers, and telecom equipment, fostering job creation and foreign investment while enhancing India's role in global supply chains.

These initiatives, combined with the government's commitment to digital transformation and innovation, reinforce its strategic focus on leveraging technology for economic growth and global competitiveness.

Few Government Initiatives driving IT investments in Middle East

1. UAE – National Digital Government Strategy 2025

- Aims to create a 100% digital, paperless government.
- Promotes smart city infrastructure, cloud-first policies, and AI integration in public services.
- Encourages public-private partnerships to drive innovation.

2. Saudi Arabia – Vision 2030 & Digital Government Authority

- Vision 2030 includes large-scale investments in digital infrastructure, e-governance, and tech startups.
- Launched the Digital Government Strategy to ensure interoperable, citizen-centric digital services.
- Major digital initiatives include the NEOM Smart City and SDAIA (Saudi Data & AI Authority).

3. Qatar – Smart Qatar Program (TASMU)

- Integrates emerging technologies like AI and IoT into public services (health, transport, logistics).
- Encourages foreign tech firms to collaborate via a government-supported innovation ecosystem.

4. Oman – e.Oman Strategy

- Comprehensive plan for digital transformation of government and business.
- Focuses on cybersecurity, cloud services, and e-services delivery.

Few Government Initiatives driving IT investments in North America

1. Artificial Intelligence and Emerging Tech Investments

To maintain technological leadership, North America is heavily investing in AI, quantum computing, and blockchain. The U.S. National AI Initiative Act (2020) promotes AI research and ethical AI development, while the AI Bill of Rights (2022) sets guidelines for responsible AI use. In Canada, the Pan-Canadian AI Strategy funds research hubs like the Vector Institute, Mila, and AMII to advance AI-driven innovation.

2. Infrastructure Development and 5G Expansion

North American Governments are actively investing in digital infrastructure to support IT growth. The Broadband Equity, Access, and Deployment (BEAD) Program in the U.S. allocates USD 42 billion to expand high-speed internet, boosting cloud computing, IoT, and AI applications. Canada's Universal Broadband Fund (UBF) aims to provide high-speed internet to underserved communities, enhancing digital connectivity for businesses and startups.

3. Tax Incentives for IT Companies

North American Governments provide substantial tax benefits to encourage IT investments. The U.S. offers the R&D Tax Credit, allowing companies to deduct research expenses, benefiting software developers and tech firms. In Canada, the Scientific Research and Experimental Development (SR&ED) Program offers tax credits to companies investing in technology R&D.

10.2.2 Global trends in public-private partnerships for technology-driven governance

Public-Private Partnerships (PPPs) are transforming governance by leveraging technology to enhance service delivery, infrastructure, and digital inclusion. India, Africa, and North America each exhibit unique approaches shaped by their economic and regulatory landscapes. While India focuses on scalable digital identity, financial inclusion, and AI-driven governance, Africa prioritizes mobile-based digital services, broadband expansion, and agritech. North America, on the other hand, leads in AI integration, cybersecurity, and smart city initiatives.

Following are some of the major trends in PPPs by various regions:

India

India's PPP-driven governance model is built on digital public infrastructure, financial inclusion, and emerging technologies. The Aadhaar identity system and Unified Payments Interface (UPI) have revolutionized citizen authentication and digital transactions, with strong private sector collaboration. Projects like BharatNet are expanding broadband access to rural areas, enabling efficient e-governance services. AI, IoT, and blockchain are increasingly integrated into governance, with partnerships in healthcare, education, and law enforcement. The Smart Cities Mission exemplifies data-driven urban planning through IoT and cloud-based solutions. While India continues to ramp up its technology, challenges such as data privacy concerns and the digital divide can hinder sustainable growth.

Middle East

PPPs in the Middle East are central to digital transformation agendas, especially in countries like the UAE, Saudi Arabia, and Qatar. These governments are collaborating with tech firms to build smart cities, enhance e-governance, and strengthen cybersecurity. Key initiatives include the UAE's Smart Government Strategy, Saudi Arabia's Absher platform, and mega-projects like NEOM and Masdar City, all powered through partnerships with global players to integrate AI, IoT, and clean tech. Cybersecurity is also a focus, with governments engaging private firms to protect critical infrastructure under national strategies. Fintech PPPs are advancing digital payments and identity systems.

North America

While emerging countries try to build and expand their existing technological infrastructure, developed countries such as North America leads in AI-driven public administration, cybersecurity, and smart infrastructure. Governments collaborate with private firms, to deploy AI in predictive policing, digital identity verification, and automated public services. The Cybersecurity and Infrastructure Security Agency (CISA) fosters PPPs to safeguard critical infrastructure.

Smart city initiatives in Toronto and New York integrate IoT, 5G, and cloud-based governance, enhancing traffic management, energy efficiency, and urban planning. However, concerns over data privacy, surveillance, and public-private power dynamics remain key challenges for sustainable PPP governance.

11 Threats and challenges

1. Market and Competitive Threats

The IT Market is highly competitive, with numerous local and global players offering similar solutions. As new entrants innovate or established players expand their offerings, it becomes challenging to maintain a competitive edge. Also, with increasing number of service providers in emerging tech domains like AI, cybersecurity and cloud services, there is often pressured to reduce margins and hence lower profits. The rapid pace of technological advancements, especially in AI, data analytics, poses a risk of companies falling behind if they fail to adopt, learn and implement new technologies quick enough.

2. Regulatory and Compliance Threats

With the rise of cloud services and data analytics, governments are imposing stricter regulations regarding where data can be stored and processed (data localization laws). Companies like XtraNet Technologies Limited, need to ensure they meet local laws, which can vary across borders and industries. Failure to comply could lead to penalties or loss of business. In sectors like AI and software development, intellectual property protection is crucial.

3. Innovation and Customization demand

As emerging technologies like AI and blockchain evolve rapidly, customers expect continuous innovation. IT companies like XtraNet Technologies Limited, need to constantly invest in R&D to provide cutting-edge solutions, which can strain resources. Clients across various industries expect highly tailored solutions. Developing customized solutions that address the unique needs of each industry or client requires significant investment in R&D and client-specific consultations.

4. Economic Uncertainty

Fluctuations in global markets and industry downturns influence demand for IT services. As IT services become more globalised, geopolitical tensions and international trade policies, such as tariffs and sanctions, may hinder IT companies' ability to serve international clients or expand operations.

5. Tender Based Operations

A good portion of the company business comes from government organizations, with contracts awarded through a tender-based process. The company's revenue relies heavily on its ability to secure these tenders successfully. However, the competitive nature of the industry poses challenges, potentially putting pressure on profitability margins. Since contracts are predominantly tender driven by government units, there is an inherent risk of not securing orders in such a competitive environment.

6. Cybersecurity & Data Risk

XtraNet Technologies Limited operates in sensitive areas like digital identity, e-Governance, and ERP implementation, which involve handling critical data. This exposes the company to risks such as data breaches, PKI misuse, and cyberattacks. Non-compliance with regulatory bodies like CERT-IN and MEITY could lead to serious penalties or license issues, making strong cybersecurity practices essential for maintaining trust and operational continuity.

7. Limited Global Reach

XtraNet Technologies Limited global reach remains limited, with its international presence primarily concentrated in the UAE. While the company has expanded into the Middle East, it has yet to establish a significant footprint across other regions or continents. It does not currently compete at scale with large global system integrators or multinational IT

firms. Additionally, the majority of its client base and project success stories are India-focused, particularly within government, Smart City, and public sector domains.

8. Product diversification risk

XtraNet Technologies Limited faces product diversification risk as many of its offerings such as Synergy (Low Code/EDMS), Smart Kiosks, and VISA Management platforms, operate in niche or highly competitive markets. This can result in underutilization of its proprietary platforms and challenges in achieving commercial scalability. Without strong reseller networks or substantial marketing investments, these products may struggle to gain wider market traction, limiting their return on investment and long-term viability.

Risk Mitigation strategies can include the following:

- Diversify offerings and focus on niche markets or specialized solutions to stand out.
- Invest in partnerships or acquisitions to strengthen capabilities in emerging technologies like AI and cybersecurity.
- Implement robust data governance frameworks to comply with data localization laws and varying international regulations.
- Establish dedicated R&D units to foster innovation and remain competitive in emerging technology domains.
- Develop modular solutions that allow easy customization for different industries or clients.
- Focus on diversifying the client base across industries and regions to mitigate localized economic downturns.

Opportunities

- **Opportunities in Developed Overseas Markets**: Companies can tap into developed overseas markets where demand for high-quality, cost-effective solutions continues to grow. Developed economies often seek expertise in areas like AI, cybersecurity, and cloud services, presenting lucrative prospects.
- **Growth Across Multiple Sectors:** The versatility of IT solutions enables expansion across varied industries like banking, retail, and manufacturing. Success in one sector often eases entry into others by leveraging existing expertise and adapting solutions accordingly.
- **Public and Private Sector Digitization**: Increasing adoption of digital transformation initiatives by both public and private sectors provides consistent opportunities for IT companies to offer e-governance platforms, ERP systems, and smart solutions.
- **Emerging Sector Opportunities**: Growing acceptance of IT in sectors such as agriculture, healthcare, and mining creates untapped markets. Companies can provide tailored solutions like precision farming tools, digital patient management systems, and resource tracking platforms.

12 Competitive Landscape

12.1 XtraNet Technologies Limited (XtraNet)

Business overview: The company specializes in a wide range of technology solutions, from enterprise application services and managed infrastructure to digital transformation platforms. It also offers BPO/ITES services. With a focus on quality and operational functionality, evidenced by its CMMI and ISO certifications, XtraNet serves a global client base across numerous industry verticals. XtraNet is a technology partner with over 23 years of experience in delivering IT services and solutions.

Certifications: XtraNet's commitment to quality is reflected in its certifications, being a CMMI SVC/5 certified organization and holding multiple ISO credentials, including ISO 9001 for Quality Management, ISO 27001 for Information Security Management, ISO 20000 for IT Service Management and ISO 22301 for Business Continuity Management.

Joint Venture: XtraNet has established a joint venture in Dubai under the name Extranet Technology Solutions L.L.C.

Clientele: XtraNet's government clients include BSNL, Central Power Research Institute, Employee's Provident Fund Organisation, Indian Oil, Income tax department, Delhi Police, Mumbai Metro Rail Corporation, M.P. Council of Science and Technology, Municipal corporation of Mumbai, Madhya Pradesh Forest Department, Railtel Corporation of India, Stockholding Services Limited, United India, Maharashtra water resources regulatory authority, SHCIL, Food corporation of India and Gujarat Informatics Limited.

Their corporate clients include Andrayan IT, Birla Soft, BLA Industries, BLS E-Services, DB Corporation, Dilip Buildcon Limited, FutureSoft, HDFC, HEG Limited, Galfar, IL&FS, Hewlett Packard Enterprise, Honeywell, Hitachi, Hexagon, Netlink, Path, Reliance, Sonic BioChem, Tata teleservices limited and Trident group.

Products and services: XtraNet operates across two key divisions: Technology Services and Supply, Installation, and Commissioning (SIC) and specialised subsidiaries, providing end-to-end enterprise technology solutions. Few of the products and services are as follow:

- Technology Services cover enterprise applications such as ERP, BI, AI/ML, analytics, and application development. They also include managed services for databases, applications, and platforms; digital services spanning IaaS, PaaS, SaaS, enterprise mobility, and consulting; and IT and non-IT infrastructure for smart cities and data centres, including virtualization, automation, facility management, and Wi-Fi solutions.
- SIC Services encompass the supply of hardware, software, and licenses; installation of IT and infrastructure systems, including NOC/SOC setups, cabling, and OS installation; and commissioning through configuration, testing, validation, and documentation. Additional offerings include training, manpower supply, operations, and managed services.
- Synergy is XtraNet's low-code digital transformation arm, offering a platform with modules for Business Process Management (BPM), Content Management Systems (CMS), analytics, and a full-featured commerce platform.
- XtraTrust specializes in Public Key Infrastructure (PKI) and digital signatures, providing secure electronic signature services that can be integrated with enterprise applications.
- XtraNetBPO delivers IT-enabled and Business Process Outsourcing (BPO) services, including call centre operations, telemarketing, and technical support.

- AsalJobs is an international manpower solutions and outsourcing provider, offering recruitment services that cover the complete hiring cycle, supported by a global network and compliance expertise.
- X-Sign, a digital document signing application that enables secure signing of PDFs, Word, and Excel files using Digital Signature Certificates (DSC).
- XERP, a dedicated ERP solution for small and medium enterprises, automating processes across CRM, sales, marketing, and human resources.
- P2PXAP (Procure-to-Pay Anomaly Predictor), a machine learning-driven tool designed to detect and predict anomalies in financial transactions.
- Integrated Intelligence Portal (IIP), developed for law enforcement, which integrates multiple data sources such as social media and news feeds for analytics and visualization.

Verticals and end use applications: XtraNet's services cater to a wide range of industry verticals and end-use applications, addressing diverse organizational requirements. The company's solutions are deployed across:

- Government (Public and Private Sectors)
- Law Enforcement and Defence
- Railways, Transportation, and Logistics
- Manufacturing – including chemicals, life sciences, food & beverages, and engineering
- Financial Services and Insurance
- Telecom and Utilities
- Healthcare and Agriculture
- Automotive
- Wholesale and Retail
- Education

Financial Metrics:

Financial indicators	FY22	FY23	FY24	FY25
Net Sales (Rs Lakhs)	8,636	22,224	23,294	27,608
Operating Profit (Rs Lakhs)	454	1,270	1,885	4,720
Operating Margin (in %)	5.3%	5.7%	8.1%	17.1%
Net Profit (Rs Lakhs)	93	578	1,094	3,003
Net Profit Margin (in %)	1.1%	2.6%	4.7%	10.9%
Total Debt (Rs Lakhs)	2,227	1,915	4,119	3,924
Debt -to- Equity	1.7	0.6	1.0	0.4
Current Ratio	0.2	6.2	1.2	1.2
Return on Capital Employed (ROCE) (in %)	11.6%	26.4%	29.6%	39.1%
Return on Equity (ROE) (in %)	6.9%	19.6%	27.0%	31.1%
Return on Assets (ROA) (in %)	1.6%	2.5%	5.3%	9.2%

Source: Company reports, CareEdge Research
Note: FY23 data is as on 1st April 2023

12.2 Coforge Limited (Coforge)

Business overview: Coforge Limited, formerly known as NIIT Technologies, is a multinational IT services and digital solutions provider. Established in 1992, the company leverages emerging technologies and deep domain expertise to deliver measurable business impact across industries. Its service portfolio spans Application Development and Maintenance, Managed Services, Cloud Computing, and Business Process Outsourcing (BPO).

Coforge has built a global presence, operating in 23 countries with 30 delivery centres, and employs over 32,000 professionals worldwide. The company serves more than 260 global clients, including marquee names such as British Airways, ING Group, and SEI Investments. Recognized among India's top software exporters, Coforge distinguishes itself through its product engineering approach and proprietary platforms that enable mission-critical processes for its core verticals.

Certifications: Coforge holds several certifications that demonstrate its commitment to quality, security, and service excellence. The company is certified with ISO 9001:2015 for digital assurance and engineering services, and ISO 27001:2022 for information security management. It has achieved CMMI DEV V3.0 Level 5 and CMMI SVC V3.0 Level 5, reflecting the highest maturity levels in digital engineering and managed testing services. Additionally, Coforge is HIPAA compliant, ensuring adherence to data protection standards in healthcare and life sciences projects.

Geographical Location: They have operations in key markets like the USA, UK, Germany, Singapore, Australia, and India.

Clientele: Coforge has a partnership with Sabre Corporation and is a technology partner for the Airports Authority of India (AAI), implementing Airport Operations Control Centre (AOCCs). Also, Coforge's clients include companies like British Airways, IAG, Eurostar and ING group. Coforge has secured contracts with existing BFSI clients in the US and Tokio Marine HCC, Aflac and Duck Creed.

Products and services: Coforge's business is centred on leveraging next-generation technologies such as Cloud, Data, Integration, and Automation to deliver digital transformation and business impact. Its service portfolio includes:

- Digital Services: Enabling intelligent operations and building a robust digital backbone for enterprises.
- AI, Data & Insights: Developing cognitive-powered applications and harnessing data to drive actionable business outcomes.
- Digital Process Automation: Streamlining operations through platforms such as Appian and Pega.
- Cloud & Infrastructure Management: Delivering end-to-end cloud solutions and IT infrastructure management services.
- Cybersecurity Services: Enhancing enterprise resilience with threat intelligence, vulnerability management, and identity and access management.
- Business Process Solutions: Driving efficiency and superior customer experience through tailored BPO offerings.
- Quality Engineering Services: Ensuring seamless quality assurance across both digital and legacy environments.
- SAP Services: Enabling digital transformation and modernization of SAP landscapes.

Verticals and end use applications: Coforge caters to a diverse set of industry verticals, delivering technology-driven solutions tailored to sector-specific needs.

- Financial Services: Banking, Wealth Management, and Insurance.
- Travel, Transportation & Hospitality: Airlines, Airports, and Logistics.
- Government: Public and Private Sector initiatives.

- Manufacturing and Distribution.
- Healthcare & Life Sciences.

Financial Metrics:

Financial indicators	FY22	FY23	FY24	FY25
Net Sales (Rs Lakhs)	6,43,200	8,01,460	9,00,890	12,05,070
Operating Profit (Rs Lakhs)	1,10,190	1,28,070	1,44,710	1,69,370
Operating Margin (in %)	17.1%	16.0%	16.1%	14.1%
Net Profit (Rs Lakhs)	71,470	74,510	83,560	93,610
Net Profit Margin (in %)	11.0%	9.2%	9.2%	7.7%
Total Debt (Rs Lakhs)	35,450	33,820	43,660	70,050
Debt -to- Equity	0.1	0.1	0.1	0.1
Current Ratio	1.9	1.5	1.7	1.6
Return on Capital Employed (ROCE) (in %)	23.2%	24.6%	25.1%	13.6%
Return on Equity (ROE) (in %)	25.2%	23.5%	22.4%	11.2%
Return on Assets (ROA) (in %)	14.4%	13.1%	13.7%	7.7%

Source: Company reports, CareEdge Research

12.3 Silver Touch Technologies Limited

Business Overview: Incorporated in 1995, Silver Touch Technologies Ltd (STTL) is a provider of end-to-end IT and digital transformation solutions. Its offerings include enterprise software services (including development, system integration, e-governance), emerging technologies such as AI, ML, Big Data & Analytics, IoT, RPA, cloud-based solutions, and ERP implementations.

STTL is headed by the top management team with over 27 years of experience in the areas of E-Governance, project and operations management and Software Solutions. They have a workforce of over 1,400+ qualified IT professionals and over 2,000+ clients worldwide.

Certifications: STTL holds industry certifications that demonstrate its commitment to quality, security, and process excellence. The company is CMMI Level 5 (version 2.0 appraised), reflecting the highest process maturity. It is certified under ISO 9001 for quality management, ISO/IEC 27001 for information security management, and ISO 20000 for IT service management.

Geographical location: Headquartered in Gujarat, they have presence across India and have subsidiaries in USA, UK and Canada.

Clientele: Their government clients include National Informatics Centre, BSNL, RailTel Corporation, Gujarat Government, Maharashtra Government, Uttar Pradesh Government, Haryana Government, Telecommunications Consultants India Ltd. and Broadcast Engineering Consultants India Ltd.

Their corporate or private sector clients include RGK Group, Vishaka group of companies, Kelvin pipes, Venus Manufacturing Co and Mankind Pharma Ltd.

Products and services: STTL offers a wide range of products and services which includes:

- Enterprise Software Services: Digital engineering, enterprise architecture, cloud application development, mobile applications, and enterprise DevOps.
- Digital Transformation Services: Applied AI, data analytics, Blockchain & IoT, Robotic Process Automation (RPA).
- ERP Solutions: SAP Business One, SAP S/4HANA, SAP SuccessFactors; also Odoo ERP, hosted/cloud SAP solutions
- Managed Security Services: SOC-as-a-Service, Cloud Security, Email & Endpoint Security, VAPT (Vulnerability Assessment & Penetration Testing), Identity & Access Management, etc.
- Modern Workplace / Infrastructure: Data centre, communication tools, backup & disaster recovery, cloud services; also Microsoft/.NET development, front-end technologies.
- E-Governance Services: Portals (G2C, G2B, G2G), single window solutions & dashboards, AI-powered assessment solutions.

Verticals and end use applications: STTL's solutions are applied across many industry verticals. These include:

- Government / E-Governance
- Education
- Banking & Financial Services
- Manufacturing
- Healthcare
- E-Commerce & Retail
- Transport & Travel
- Research, Health, Education, Fashion, HR, Entertainment and Wholesale

Financial Metrics:

Financial indicators	FY22	FY23	FY24	FY25
Net Sales (Rs Lakhs)	13,959	16,378	22,430	28,838
Operating Profit (Rs Lakhs)	1,164	1,692	2,500	3,752
Operating Margin (in %)	8.3%	10.3%	11.1%	13.0%
Net Profit (Rs Lakhs)	643	971	1,606	2,220
Net Profit Margin (in %)	4.6%	5.8%	7.1%	7.6%
Total Debt (Rs Lakhs)	25	1,088	1,098	4,348
Debt -to- Equity	0.0	0.1	0.1	0.3
Current Ratio	3.0	2.4	2.8	1.8
Return on Capital Employed (ROCE) (in %)	9.0%	11.6%	15.3%	19.7%
Return on Equity (ROE) (in %)	7.5%	10.2%	14.2%	16.6%
Return on Assets (ROA) (in %)	5.2%	6.6%	9.3%	9.1%

Source: Company reports, CareEdge Research

12.4 Dynacons Systems & Solutions Limited (Dynacons)

Business overview: Dynacons Systems & Solutions Limited, established in 1995 and headquartered in Mumbai, is an Indian information technology company with a global outlook. The company specializes in end-to-end IT infrastructure solutions and services, with core expertise in systems integration and managed services.

The company has built a customer base of over 2,000 clients, including global corporations, government agencies, Public Sector Undertakings (PSUs), and organizations across the BFSI and healthcare sectors. Dynacons' strength lies in its team of 1,200 highly skilled IT professionals and its commitment to global standards. Leveraging its domestic reach and international presence, the company continues to enable businesses and institutions to modernize, scale, and secure their IT environments.

Geographical location: Dynacons has presence in over 300 locations across India and an expanding international footprint in the USA, Europe, Australia, and Asia.

Clientele: Dynacons serves a diverse client base across industries, including global corporations and Indian enterprises. Some of its clients include Lonza, Medpace, Volkswagen, Valvoline, MoneyGram, Mapletree, Springer, H&M, Goa Shipyard Limited, Bank of India, Axis Finance, CEAT, Pfizer, Uber, and Mahanagar Gas.

Products and services: Dynacons' business is focused on delivering a broad range of IT infrastructure solutions and managed services. The key areas of operation include:

- System Integration – Implementation and integration of advanced technologies for enterprise requirements.
- Datacentre Solutions – Solutions covering cloud, virtualization, and hyper-convergence.
- Workplace Solutions – Products and support services designed to improve workplace productivity.
- Security & Surveillance Solutions – Cybersecurity, firewalls, intrusion detection, and identity management.
- Networking Solutions – Development of resilient, scalable, and secure network infrastructures.
- Managed Services – IT infrastructure management, break-fix services, managed print services, and cloud computing.
- Application Development & Maintenance – Development and ongoing support of applications.
- Project Management & Execution – Support for planning, execution, and optimization of IT projects.

Verticals and end use applications: Dynacons' services are utilized by organizations across a broad spectrum of industries, with a primary focus on the following:

- Financial Services: Banking and Insurance.
- Government & PSU: Central and State Government departments, and Public Sector Undertakings.
- Healthcare
- Manufacturing and Distribution
- Education

Financial Metrics:

Financial indicators	FY22	FY23	FY24	FY25
Net Sales (Rs Lakhs)	65,398	80,447	1,02,446	1,26,722
Operating Profit (Rs Lakhs)	3,044	5,462	7,799	10,529
Operating Margin (in %)	4.7%	6.8%	7.6%	8.3%
Net Profit (Rs Lakhs)	1,643	3,345	5,382	7,249
Net Profit Margin (in %)	2.5%	4.1%	5.2%	5.7%
Total Debt (Rs Lakhs)	6,174	6,543	2,218	5,189
Debt -to- Equity	0.9	0.6	0.1	0.2
Current Ratio	1.4	1.4	1.4	1.4
Return on Capital Employed (ROCE) (in %)	34.7%	42.3%	44.3%	34.3%

Return on Equity (ROE) (in %)	24.2%	31.9%	34.1%	31.4%
Return on Assets (ROA) (in %)	5.5%	8.3%	9.2%	9.3%

Source: Company reports, CareEdge Research

List of formulae:

Parameter	Formula
Operating Profit	Profit Before Tax + Finance Cost + Depreciation – Other Income
Operating margin	Operating Profit / Revenue from Operations
Net Profit Margin	PAT / Total Income
Total Debt	Long term borrowings + Short term borrowings
Debt - Equity Ratio	Total Debt / Total Equity
Current Ratio	Total Current Assets / Total Current Liability
Return on Capital Employed	EBIT / (Total Assets – Total Current Liability)
Return on equity	PAT / Total Equity
Return on assets	PAT / Total Assets

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