ASSOCHAM
Ideate · Innovate · Impact

pwc

Karnataka's digital vision: The roadmap for becoming India's sustainable data hub

Foreword

The global digital infrastructure is expanding rapidly, with worldwide data centre capacity projected to exceed 2,300 facilities by 2026 and investments surpassing USD 400 billion by 2030, driven by cloud, AI, 5G, and digital services. India is among the fastest-growing markets, expected to attract USD 10–12 billion by 2030 and reach over 1,300 MW of IT load capacity by 2027. With its large-scale digital ecosystem, surging data consumption, and supportive policies, India is poised to become a top 5 global data centre hub.

Karnataka leads India's digital growth, backed by strong tech talent, progressive policies, and a vibrant innovation ecosystem. It is emerging as one of the top destinations for data centres, GCCs, and advanced technologies, with focus on expanding capacity, integrating renewables, and enabling sustainable, AI-ready operations. The New IT Policy and GCC Policy further drive emerging tech adoption, R&D, digital skilling, and ease of business. Karnataka is also promoting balanced growth by expanding into Tier-2/3 cities like Mysuru, Hubballi, Mangaluru, and Belagavi.

ASSOCHAM has played a key role in shaping India's data centre ecosystem through consultations, investor meets, and policy advocacy, pushing for sustainable, renewable-energy-powered infrastructure and ease of doing business.

In this context, ASSOCHAM and PwC present "Heading Towards the Sustainable Data Hub Vision: Karnataka Leading the Way". This report outlines Karnataka's digital vision and roadmap to become India's sustainable data hub, highlighting its strategic advantages, policies, investment potential, and infrastructure strengths.

As India advances toward a sustainable and competitive digital future, I am confident this report will be a valuable resource for all stakeholders

Manish Singhal
Secretary General
ASSOCHAM

Message

“India is witnessing remarkable progress in digital innovation and transformation across both the public and private sectors. At the heart of this transformation lies the development of sustainable and efficient data hubs.”

This paper delves into the pivotal that role data centres play in enabling digital initiatives across various industries and sectors. It also explores how Karnataka is positioning itself as a frontrunner in building a sustainable data hub ecosystem and outlines the immense opportunities this ecosystem presents for businesses and policymakers alike.

While these opportunities are exciting, they come with challenges related to infrastructure, regulatory complexities, environmental concerns, global uncertainties, and operational costs. To address these, the paper proposes various actionable recommendations, including fostering strong collaborations between industry, stakeholders, policymakers, and regulators. It also highlights Karnataka’s strategic advantages such as robust infrastructure, ease of doing business, and renewable energy capabilities which make it one of the country’s prime destinations for sustainable data centre growth.

We are proud to partner with ASSOCHAM as the knowledge partner for the event **‘Heading towards the sustainable data hub vision: Karnataka leading the way.’** Together, we look forward to collaborating further and contributing to India’s journey of achieving a greener, smarter, and more connected future.

Shivendra Singh
Partner, IDAC (iDAC (Data, AI & Analytics | Agents Cloud)
PwC INDIA

Table of Content

Introduction

Data is an important asset in today's world. As technological growth and innovation paved the way for even more data, the responsibility to store it effectively became paramount, because even a byte of information today is more precious than gold. Every company is aware of the latest AI trends and wants to adopt the most effective cloud computing option, hiring the most competent blockchain experts to help them all board the train to digital transformation.

While digital transformation has been the buzz for some time now, the dynamics to achieve it have changed. Now, it is about sustainable and ecofriendly ways of achieving digital transformation.

Approximately 181 zettabytes of data are produced every year, according to a report by Statista. Much of this data is stored in the cloud, which means that it gets absorbed by energy-hungry infrastructures – Data centers (DCs). These DCs consume 1 –1.5% of the world's total annual electricity. They are responsible for emitting more than 330 million metric tons of carbon dioxide, which is more than the emissions from all commercial air travel in the United States- produced in a year.

This poses significant threat to the environment and, to address this, leading companies are opting for sustainable data hubs that blend technological prowess with ecological mindfulness.

1. Global Scenario on Hyperscalers and Why Betting Big on Bharat Market Dynamics: Rising Data Consumption, AI, and Cloud Adoption

Many countries have begun embracing the green DC model to meet growing DC demands sustainably.

Singapore

Singapore is setting a benchmark by introducing the Green Data Centre Roadmap, ensuring that growth in computing capacity meets environmental responsibility goals.

With a strong focus on green energy deployments to support AI, robotics, and immersive technologies, Singapore aims to add at least 300 MW[1] of new DC capacity.

Energy efficiency is being targeted through liquid cooling, tropical DC methodologies, and green software practices, along with the adoption of green energies such as bioenergy, building-integrated photovoltaics, fuel cells with carbon capture, and low-carbon hydrogen/ammonia.

Singapore's partnership model promotes the co-development of sustainable solutions by DC operators, solution providers, academia, and enterprise users

The government also supports this initiative with a refreshed BCA-IMDA Green Mark certification and new standards for IT equipment and liquid cooling. It offers financial incentives (e.g., resource efficiency grant for emission, energy efficiency grant) to support industry adoption.

The bar is being raised for power usage effectiveness (PUE), aiming to achieve a PUE of 1.3 or lower, positioning Singapore's DCs among the most energy efficient globally.

- Having 1.4 GW[2] of existing DC capacity and more than 70 operational DCs[3], Singapore has positioned itself as a regional digital and business hub and is ready for the next wave of digital transformation.
- The message is clear: sustainability and digital growth are mutually reinforcing, not mutually exclusive.

1 Green DC Roadmap | IMDA
2 Singapore to add at least 300 MW in data centre capacity, potentially more with green energy - The Business Times
3 files-Speeches 2024-1__Factsheet_IMDA_Green_DC_Roadmap.pdf

The UK

The UK government has recognised DCs as Critical National Infrastructure (CNI)[4]—a status previously reserved for sectors such as energy, water, and defence.

Assigning CNI status to DCs will ensure government support during outages, cyberattacks, and extreme weather events, similar to water and electricity utilities.

A £3.75 billion investment plan in Europe's largest DC in Hertfordshire will create over 700 local jobs and 13,740 tech jobs nationwide.

Due to government oversight, not only does the DC receive enhanced protection, but it also has a dedicated CNI data infrastructure team to monitor threats, coordinate responses, and ensure resilience across the sector.

- A Cybersecurity and Resilience Bill are in the pipeline, which will mandate stronger protections for supply chains and essential infrastructure, empowering the UK's digital defences and attracting more investment in the UK, which already generates £4.6 billion annually.

These initiatives demonstrate the pivotal role of government intervention in safeguarding a country's digital economy while also enabling innovation.

The US

The US Environmental Protection Agency (EPA) has prioritised chemical reviews for DC projects under the Toxic Substance Control Act (TSCA)[5].

Starting on 29 September 2025, the EPA has fast-tracked the review of chemicals used in DC projects or in the manufacturing of components defined under Executive Order 14318, aimed at accelerating federal permitting for DC infrastructure.

This act focuses on removing regulatory bottlenecks from critical AI and DC developments supporting the US's AI Action Plan.

The initiative has already resulted in, $90 billion in energy and tech investments announced in Pennsylvania to power the AI revolution and create job opportunities.

Although the reviews are being fast-tracked, EPA is also ensuring that human health and the environment are not compromised in the process.

4 Data centres to be given massive boost and protections from cyber criminals and IT blackouts - GOV.UK

5 EPA Prioritizes Review of New Chemicals Used in Data Center Projects, Supporting American Manufacturing and Technological Advancement | US EPA

This policy shift is a significant step towards understanding the need to assess DC components and their impact, ensuring that the environment is not sacrificed for economic development.

Regulatory landscape: sovereignty, and compliance

In the era defined by the data boom from 5G to AI, India's focus should be on meeting computing demands sustainably, ensuring that our environment isn't compromised for the sake of growth.

The recent guidelines[6] for state data centres by MeitY focus on establishing secure, scalable, and efficient digital infrastructure across states.

Acting as centralised repositories for state data, SDCs serve as core infrastructure for delivering G2G, G2C, and G2B services, enabling secure storage, online service delivery, disaster recovery, and remote management.

SDC setup, operations, and management are fully funded by the government for five years, including infrastructure, human resources, and performance monitoring.

States have rigid policies on physical security, data protection, privacy and business continuity, along with a multilayered architecture to support interoperability standards like XML(Extensible Markup Language) and SOAP (Simple Object Access Protocol).

NIC provides regional disaster recovery support through its national DCs in Delhi, Hyderabad, Pune, and Bhubaneswar.

While the guideline aims to standardise and promote the development of digital infrastructures with a strong foundation in security and resilience, it does not explicitly emphasise the economic feasibility of achieving this or the need to keep our ecosystem in mind.

It is equally important to highlight energy efficiency, water conservation, and green processes in these policies, reducing reliance on fossil fuels and promoting judicious resource consumption.

This is a great step towards putting India on the map as a champion of sustainable development and aligning with India's vision to become a 'global data hub'[7], yet the pace must accelerate. With the exploding demand for digital services and intensifying climate change, the time to act is now.

Milestones with global impact like this cannot be achieved at a central government level. Every state must do its part in making these goals a success, especially those with the highest IT establishments. The future of India's data centre ecosystem hinges on coordinated investments from government, industry, and global hyperscalers. Public sector initiatives, such as MeitY's

6 DRAFT

7 India can emerge as a 'data hub', says PM Modi at India Mobile Congress 2025 - The Hindu

data centre guidelines and state-level IT policies, provide the foundation for secure and scalable infrastructure. At the same time, private players are committing billions toward hyperscale facilities, renewable energy integration, and advanced cooling technologies.

Strategic partnerships between technology giants and Indian states are accelerating AI-ready infrastructure deployment, while fostering innovation through deep-tech labs and skill development programs. These investments not only strengthen India's position as a global data hub but also ensure sustainability and resilience in the face of rising digital demand.

AI-driven infrastructure needs include GPUs, TPUs, and liquid cooling.

Modern data centres must evolve to support the computational intensity of AI workloads. This requires high-performance GPUs and TPUs for accelerated processing, alongside advanced cooling technologies such as liquid cooling to manage heat efficiently. These components are critical for enabling large-scale AI training, real-time analytics, and quantum-ready environments, ensuring that data centres remain scalable, energy-efficient, and future-proof.

Role of Indian states in hyperscaler expansion: India's population of digital natives is among the largest in the world, with 50% of global real-time digital transactions occurring here. This makes India a global leader in digital payments and cloud adoption. Everything from AI-driven healthcare diagnostics to smart agriculture is driving demand for high-performance computing infrastructure.

This momentum is clear in one of the major tech giants[8] establishing a 1-GW AI DC in Visakhapatnam. To make it a global hub for AI innovation, the facility will include TPUs, GPUs, liquid-cooling systems, and subsea cable connectivity to 12 countries.

Additionally, the Digital Swaraj Mission by GTRI[9] is also calling out the risks of U.S. tech dependence and highlighting the need for India's sovereign cloud and operating system, with the goal of achieving self-reliance by 2030.

> *"Just as UPI and ONDC changed the world of payments and commerce, we can do the same for core digital infrastructure. In an era of tariffs, sanctions, and technology wars, sovereignty will be measured not just by territory or GDP but by who controls the code." – GTRI*

This strategic move by India is nudging the hyperscalers to go local. Indian states like Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, and Maharashtra have become active enablers, creating innovation corridors, green zones, and policy sandboxes to attract hyperscalers and promote sustainable growth.

8 Google to invest ₹87,520 crore in AI Data Centre in Visakhapatnam - The Hindu
9 'Digital Swaraj Mission': GTRI flags risks of US tech dependence; calls for India's cloud and OS self-reliance by 2030 - The Times of India

2. India and the Future Outlook: 5-Year and 10-Year Projections for India's DC Industry

There is no doubt that the DC industry has become the backbone of India's digital economy, with exponential data consumption, AI adoption, and policy-driven localisation all fuelling this transition.

- **Contribution to GDP:**

In FY25, India's GDP grew by 6.5%[10] and is already among the world's fastest-growing major economies. Traditional sectors like manufacturing and agriculture are major contributors to this performance, but digital infrastructure—especially DCs—has emerged as a significant driver of GDP.

- **Contribution to the digital workforce**

The DC industry will not just demand servers and cooling systems—it will also demand people and skilled professionals. The AI hub in Vizag[11] alone is expected to generate 188,000 direct and indirect jobs.

- **Employment Generation: Direct and Indirect**

India's data centre industry is on a transformative growth trajectory, underpinned by strong government initiatives and rising digital demand. The India AI Mission, with an allocation of ₹10,300 crore[12], aims to strengthen AI and computing infrastructure as part of the vision for Viksit Bharat by 2047. According to the Press Information Bureau, India's digital economy is projected to reach $1 trillion by 2025[13], creating 55–60 million jobs.

- **Investment Trends:**

State-level policies, such as Andhra Pradesh's plan to add 200 MW of DC capacity, and MeitY's draft Data Centre Policy, are designed to attract hyperscale investments and promote localisation.

10 India GDP data Q4 FY25 Highlights: GDP growth accelerates to 7.4% in Q4, full year growth at 6.5%; Indian economy retains 'fastest growing' tag - The Times of India
11 Keen on data centres, Andhra aims for 6GW as $10-billion Google deal puts Vizag on global tech map - The Economic Times
12 Press Release:Press Information Bureau
13 Press Release:Press Information Bureau

Industry reports forecast $100 billion investment by 2027, with a CAGR of 24.68% (2023–2029), while Crisil estimates ₹55,000–60,000 crore investment by FY28, doubling capacity to 2.3–2.5 GW and generating ₹20,000 crore annual revenue. Long-term projections indicate India's DC capacity will rise fivefold to 8 GW by 2030, requiring $30 billion capex[14], and hyperscale hubs could unlock $2.1 trillion in additional value by 2047, supporting 10 million jobs.

- **AI, IoT, and 5G as Catalyst**

With AI, IoT, and 5G acting as catalysts, India is positioned to become a global leader in sustainable data infrastructure and digital innovation. The convergence of AI, IoT, and 5G is redefining the data centre landscape, driving unprecedented demand for high-performance computing and ultra-low latency infrastructure. AI workloads require massive processing power and advanced cooling systems, while IoT generates real-time data streams that need edge computing capabilities for faster decision-making. Meanwhile, 5G enables seamless connectivity, unlocking new use cases in smart cities, autonomous systems, and immersive technologies. Together, these technologies act as powerful catalysts, accelerating hyperscale data centre growth and positioning India as a global hub for next-generation digital services.

14 Inside India's $30 billion data center "gold rush"—and the tycoons set to win - Industry News | The Financial Express

3. Unlocking potential in Tier 2 and Tier 3 cities

Karnataka's digital growth story is expanding beyond Bengaluru, with Tier 2 and Tier 3 cities emerging as promising destinations for data centre investments. These cities offer cost advantages, reliable power supply, and improving connectivity, making them ideal for edge computing and distributed cloud services. Government initiatives like the Karnataka Digital Economy Mission and the Beyond Bengaluru program are actively promoting a hub-and-spoke model to decentralize infrastructure and attract hyperscale investments. Combined with a skilled talent pool and supportive policies under the IT Policy 2025–2030, these regions are poised to play a critical role in building sustainable, next-generation data infrastructure that drives inclusive growth and strengthens India's digital backbone.

- Emerging DC Hotspots: Karnataka is strategically positioning its Tier 2 and 3 cities, such as Mysuru, Hubballi, Mangaluru, and Belagavi, as emerging DC hubs to decentralise growth beyond Bengaluru. These cities offer strong connectivity, abundant resources, and government-backed infrastructure projects, making them ideal hosts of next-generation DCs. By leveraging regional strengths and creating innovation clusters, Karnataka ensures that the benefits of digital transformation reach every corner of the state.
- Cost arbitrage and land availability: One of the key advantages of expanding DCs into Tier 2 and Tier 3 cities is the potential for cost arbitrage. These regions offer significantly lower operational costs than metropolitan areas, along with easier access to large parcels of land for greenfield projects. This combination of affordability and availability enables hyperscalers and enterprises to scale sustainably while optimising capital expenditure.
- Local government incentives: Local governments in Karnataka are actively offering incentives to attract DC investments in smaller cities. These include tax rebates, subsidised power tariffs, and fast-track approvals for land acquisition and infrastructure development. Such measures reduce entry barriers for investors and accelerate the creation of regional technology hubs, fostering inclusive economic growth.
- Edge AI and regional case studies: Edge AI is emerging as a game-changer for Tier 2 and Tier 3 cities, enabling processing for applications at local level such as healthcare diagnostics, smart manufacturing, and real-time retail analytics. Regional case studies from Karnataka showcase successful deployments of edge DCs that support 5G-enabled services and IOT ecosystems. These examples highlight how smaller cities can become critical nodes in India's digital infrastructure, driving innovation closer to end users.

Karnataka is uniquely positioned to lead India's next wave of digital transformation through robust data centre infrastructure.

4. Building India's next-gen data infrastructure: Opportunities in Karnataka

Karnataka, home to India's tech capital Bengaluru, is emerging as a strategic hub for next-generation data infrastructure. With its robust digital ecosystem, advanced connectivity, and progressive policies, the state offers unparalleled opportunities for hyperscale data centres, cloud services, and AI-driven platforms.

Greenfield and brownfield DC projects: Karnataka is actively promoting both greenfield and brownfield DC projects to meet the growing demand for digital infrastructure. Greenfield projects offer the advantage of designing sustainable facilities from the ground up, incorporating renewable energy and advanced cooling systems. In contrast, brownfield developments focus on upgrading existing facilities to improve efficiency and reduce carbon footprints. This dual approach ensures rapid capacity expansion while aligning with ESG goals, making Karnataka a preferred destination for hyperscalers and enterprises seeking scalable and ecofriendly data solutions.

Role of startups and MSMEs: Startups and MSMEs play a pivotal role in Karnataka's DC ecosystem by driving innovation and offering niche solutions in AI, IOT, and edge computing. The state's supportive policies and funding initiatives empower these smaller players to collaborate with large enterprises and hyperscalers, creating a vibrant technology corridor. By fostering partnerships and providing access to incubation centres, Karnataka ensures that startups and MSMEs contribute significantly to the development of modular, cost-effective, and sustainable data infrastructure.

Talent development and skilling: Karnataka's competitive edge lies in its robust talent pool and proactive skilling initiatives. With Bengaluru ranked among the top global cities for AI skill penetration, the state is investing heavily in training programmes for emerging technologies, such as AI, quantum computing, and green engineering. Government-backed skilling programmes and academic partnerships with leading institutions ensure a steady pipeline of professionals equipped to manage next-generation DCs. Prioritising human capital development has strengthened Karnataka's position as a global hub for digital innovation.

AI-optimised, modular, and sustainable DCs: The future of DCs in Karnataka is being shaped by AI-driven optimisation and modular design principles. AI-powered systems enable predictive maintenance, energy efficiency, and dynamic workload management, reducing operational costs and environmental impact. Modular architectures enable rapid scalability and customisation, while sustainable practices such as liquid cooling and renewable energy integration ensure

compliance with global green standards. These advancements position Karnataka as a leader in building intelligent and eco-conscious data infrastructure.

Karnataka's competitive edge: Karnataka stands out as India's most attractive destination for next-generation data infrastructure, owing to its policy foresight, talent density, and innovation ecosystem. Contributing over 40%[15] to India's IT exports and hosting thousands of startups and GCCs, the state provides unmatched advantages in connectivity, a skilled workforce, and government incentives. Strategic initiatives, such as the Karnataka Digital Economy Mission and the GCC Policy, further enhance its appeal, making it a frontrunner in driving sustainable digital transformation at scale.

15 Bengaluru accounts 40% of India's GCCs, plans to double by 2029: Report, ETGCC

5. Edge data centres: Future prospects in Karnataka

- **Role in smart cities and 5G:** Edge DCs are becoming critical enablers for Karnataka's smart city initiatives and 5G rollout. By bringing computing power closer to end users, these centres reduce latency and enhance real-time data processing for applications such as traffic management, IOT-based surveillance, and AI-driven public services. Their integration with 5G networks ensures seamless connectivity and supports advanced use cases, such as telemedicine and autonomous systems, making them indispensable for urban digital transformation.

Use cases: Healthcare, manufacturing, retail, and BFSI.

- **Manufacturing:** Karnataka's Industry 4.0 clusters in Peenya and Tumakuru are adopting AI and robotics, requiring edge nodes for predictive maintenance and real-time analytics.
- **Retail:** A country with almost 700 million internet users[16] who like to shop online. Edge DCs support hyper-personalised shopping experiences, inventory tracking, and smart checkouts.
- **BFSI:** Autonomous operations, real-time credit scoring, and AI-driven fraud detection are pushing BFSI firms to adopt resilient, edge-ready infrastructure.
- **Deployment models and infrastructure:** Edge DCs have a modular, scalable deployment model:

Edge DCs are designed to be flexible and modular, allowing operators to scale capacity quickly as demand grows. This approach ensures faster deployment, lower upfront costs, and the ability to adapt to changing workloads without major infrastructure overhauls.

Micro DCs are compact facilities typically located in telecom towers, retail outlets, or hospitals. They bring computing power closer to end users, reducing latency and improving service delivery for applications such as telemedicine, point-of-sale systems, and real-time analytics.

Regional hubs serve clusters of cities or industrial zones, acting as intermediate nodes between micro DCs and hyperscale facilities. These hubs provide higher capacity and redundancy, making them ideal for supporting smart city initiatives and large-scale IOT deployments.

Hybrid models combine hyperscale DCs with edge facilities to create a seamless data flow. This architecture balances centralised processing with localised computing, enabling businesses to optimise performance, reduce latency, and maintain cost efficiency.

Infrastructure requirements:

16 AI and digital solutions integration to bolster BFSI sector in India: Google McKinsey report, ETBFSI

High-capacity fibre networks: Reliable, high-speed fibre connectivity is the backbone of edge and hybrid deployments. It ensures low latency, high bandwidth, and uninterrupted data transfer between edge nodes, regional hubs, and hyperscale centres.

Liquid cooling and energy-efficient systems: As workloads become more computing intensive, traditional air cooling is no longer sufficient. Liquid cooling and advanced energy-efficient systems help maintain optimal temperatures, reduce power usage, and support sustainability goals.

AI-optimised computing nodes: Modern DCs need AI-ready infrastructure with specialised computing nodes designed for GPUs and TPUs. These nodes enable faster processing of machine learning and deep learning workloads, making them essential for next-generation applications.

Karnataka's edge computing readiness

With its strong digital infrastructure and proactive policy framework, Karnataka is well-positioned to establish edge computing data centres. The state boasts extensive fibre connectivity, a reliable power supply, and a thriving tech ecosystem centred around Bengaluru. Initiatives like KDEM Beyond Bengaluru are expanding this readiness to Tier 2 and Tier 3 cities, creating regional clusters that can support.

Karnataka's readiness in building edge expansion. This capacity can be seen in the following:

- Futuristic policies: The GCC Policy and Industrial Policy 2024–2029 promote decentralisation, green practices, and AI integration.
- Talent pool: Home to millions of tech professionals[17] and + startups, Karnataka has the human capital for edge deployment.
- Infrastructure: With projects like Airport Metro Line[18], suburban rail, and Global Innovation Districts, edge deployment will ensure connectivity and scalability.
- Innovation mindset: Bengaluru leads in laying the cognitive foundation for DeepTech, quantum computing, and AI, which is a preferred ground for edge experimentation.

17 Bengaluru leading in deeptech that will define 21st century, says Siddaramaiah - The Economic Times
18 Bengaluru leading in deeptech that will define 21st century, says Siddaramaiah - The Economic Times

6. Karnataka's digital vision: Roadmap to becoming India's sustainable data hub

Karnataka's policy push: Digital economy mission, ESDM, and AI COEs

The ambition is not just to lead exponentially but also to do so responsibly. Through key initiatives, such as the Karnataka Digital Economy Mission (KDEM)[19] and the Global Capability Centres (GCC) policy 2024–2029[20], the state is fostering AI, electronics, and semiconductor ecosystems while embedding ESG goals into its development model. Karnataka is one of the front runners (ranking fifth) of the SDG Score index in the country, with a score of 75 for 2023–24. The state is actively promoting energy-efficient equipment, rainwater harvesting, and green procurement across industries, including MSMEs.

Infrastructure readiness: Fibre, power, land, and talent

While promoting sustainable development is vital, it is equally important to assess infrastructure readiness, ensuring the vision has a strong foundation. This is something the Karnataka government is working towards by focusing on:

- **Connectivity:** Karnataka has ensured high-speed digital infrastructure across urban and semiurban regions.
- **Resources:** Power and water are essential factors in this development. For instance, Mangaluru is being positioned as a future DC capital due to its abundant water resources and upcoming energy parks[21].
- **Land:** Projects like KWIN City[22] (5,800 acres) and GBIT Township (8,493 acres) are being developed as smart, sustainable ecosystems with dedicated zones for AI and data infrastructure.
- **Talent:** The state is investing 1000 crores to build innovation clusters[23] across Mangaluru, Mysuru, Hubballi-Dharwad, and Belagavi, ensuring that the benefits of growth reach every region. Karnataka has 50% of India's AI/ML talent and 38% of the digital workforce, with Bengaluru ranked among the top five cities globally for AI skill penetration.

19 KDEM – Karnataka Digital Economy Mission
20 GCC policy 2024 lr
21 State plans technology park in Mangaluru to meet working capacity of 3,500 people, says Priyank Kharge - The Hindu
22 Karnataka CM launches 5,800-acre KWIN City. All you need to know - The Hindu
23 Bengaluru leads globally in AI skill penetration: Priyank Kharge - The Hindu

The integration of the ESG goals into its DC strategy will be implemented through economic policies/ energy-efficient cooling and computing systems/green building certifications and incentives/ skilling programmes for green jobs in AI and data infrastructure. The roadmap[24] also includes air quality monitoring, employee welfare, and the adoption of renewable energy in industrial clusters.

The competitive advantage

Karnataka is one of the leading states which are investing in developing data centre capabilities. It also fosters conducive policies and contributes 42%[25] to India's total share of IT exports. It is also the first state to launch a dedicated GCC policy, with a target of 500 new centres and $50 billion output by 2029. It is currently nurturing 14,000 startups[26], 40 unicorns, and a promising innovation ecosystem. Karnataka is the most attractive destination for a transformational data. infrastructure because of its incentive offerings, infrastructure readiness, and deep talent pool.

ESG and sustainability goals in state-led DC development

Karnataka has always been on the radar for growth and economic development. It is India's tech powerhouse, pioneering some of the leading innovations in the digital transformation space:

- **Quantum Research Park:** The state is planning to build a $20 billion quantum economy by 2035, with Bengaluru as a global hub. A quantum research park will be constructed at IISc[27] with a Q-City dedicated to R&D, startups, and manufacturing.
- **Climate-tech solutions:** The Namma Bengaluru Challenge 2026[28] will tackle the climate crisis through innovation, inviting startups to pilot scalable solutions in air pollution, water, waste, and sustainable construction.
- **Renewable energy focus:** By 2030, Karnataka aims to add 19.2 GW of renewable energy[29], supported by solar–wind solutions and facilitating land acquisition for clean energy projects.
- **Policy amendments:** With a focus on creating 20 lakh new jobs, the Karnataka Industrial Policy 2025–2030[30] targets ecofriendly industrial clusters, the growth of the green economy, and sustainable urban development, with an investment of ₹7.5 lakh crore.

These initiatives by Karnataka are helping the state become a forerunner in ESG as well as becoming a digital economy.

24 Karnataka, a leader in Sustainable Development Goals: Khandre - The Hindu
25 Karnataka IT exports jump 27% to Rs 3.2 lakh crore, make for 42% of India's total share | Bengaluru News - Times of India
26 Karnataka IT exports jump 27% to Rs 3.2 lakh crore, make for 42% of India's total share | Bengaluru News - Times of India
27 Karnataka invites global collaboration to build $20 billion quantum economy | India News - The Times of India
28 Namma Bengaluru Challenge '26 launched to tackle climate crisis through innovation - The Hindu
29 Karnataka set to add 19.2 GW of renewable energy by 2030 | Bengaluru News - Times of India
30 Karnataka unveils new industrial policy to attract ₹7.5 lakh cr, create 20 lakh new jobs - The Hindu

Public-private partnerships and innovation clusters

Through Karnataka's collaborative model KATALYST[31], a dedicated ease of doing business cell, the government offers:

- Concessions in power tariff, reimbursements in property taxes, and quality certification support
- R&D events funding, internship stipends, and IT filing reimbursements.

With innovation clusters being built across Karnataka to decentralise growth and ensure tech ecosystems are not limited to Bengaluru, the state is gearing up for the next phase of digital transformation.

AI innovations from Bengaluru GCCs

Bengaluru's GCCs are driving AI-led transformation by developing advanced solutions in predictive analytics, intelligent automation, and edge computing. These centres are leveraging cutting-edge technologies to optimise enterprise operations, enhance customer experiences, and align with ESG goals. With strong policy support and access to a vast talent pool, GCCs in Bengaluru are not only serving global markets but also reinforcing India's ambition to become a sustainable data hub. Their focus on AI-powered infrastructure and green practices highlights Karnataka's commitment to responsible technological leadership.

31 Department of Electronics, Information Technology and Biotechnology - Gcc-policy-2024---incentives

7. Powering and making data centres carbon neutral

India seeks to meet the demands of growth and digital transformation, yet the DC environmental footprint is under intense scrutiny. The DC power demand is projected to increase from less than 1% to 6% of India's total electricity consumption by 2030[32]. Hence, the question arises–how fast can we achieve carbon neutrality?

Renewable Energy Integration

- India's renewable energy capacity has reached 197 GW (excluding large hydro), with a target of 500 GW non-fossil capacity by 2030. This growth is crucial for DCs, which mainly source solar and wind power through open access and green energy contracts[33].
- A recent summit on carbon-free energy emphasised that carbon-free DCs could create green jobs and boost indigenous renewable manufacturing[34] while also stressing the collaboration between the digital and clean energy sectors. Solutions like agrivoltaics are emerging as innovative, scalable models in which DCs procure solar power directly from farmers.

Innovations in cooling, cabling, and efficiency

- Cooling systems with AI technology and predictive maintenance are imperative for hyperscale projects. For instance, with the collaboration of two major firms, an AI hub in Vishakhapatnam has been set up that integrates AI-powered energy management and advanced cooling technologies, advocating sustainable hyperscale infrastructure.
- Next-gen cabling used for this project, along with liquid-cooling systems, is reducing thermal inefficiencies while ensuring renewable power reliability during peak loads with energy storage integrations.

Circular Economy and E-Waste Management

- In 2023–2024, India generated 1.7 million tonnes of e-waste[35], which is projected to double by 2030. However, only a third is processed formally. This is a major environmental issue that

32 Data centers to push India's power generation needs, $280 billion investment expected, ETEnergyworld
33 India's renewable revamp: From capacity expansion to absorption - The Times of India
34 India's renewable revamp: From capacity expansion to absorption - The Times of India
35 India's E-Waste Challenge: A Call for Strategic Action, ETEnergyworld

is currently being addressed through circular-economy principles that involve designing for modularity, repairability, and material recovery, unlocking $624 billion in economic benefits by 2050[36] and cutting emissions by 44%.

- The government is also planning to recover lithium, cobalt, and nickel from discarded electronics to reduce dependence on imports through initiatives such as the ₹1,500 crore incentive plan for critical mineral recycling[37].

ESG reports and green certifications

- According to India's Business Responsibility and Sustainability Reporting (BRSR) framework[38], ESG disclosures are mandatory for top-listed companies, requiring DC operators to obtain, ISO 50001 and other certifications.
- The government's Greenhouse Gas Emission Intensity Target Rules (2025)[39] introduce legally binding carbon reduction targets, signalling a shift towards carbon credit trading and a domestic carbon market.
- Making India's data economy not just the fastest growing but also the greenest is an opportunity for all of us. This would require a synchronised effort from the government, industry, and academia, while anticipating emerging trends that could redefine the sector.

36 e waste: What is circular economy and why is it important for India? - The Economic Times
37 Supply chain, e-waste issues can hit critical mineral plan - The Economic Times
38 Budget 2025 and India's sustainable growth: ESG Trends to watch for, ETEnergyworld
39 India notifies first emission intensity targets for carbon-intensive sectors - The Economic Times

8. Recommendations for government, industry, and academia

To accelerate Karnataka's journey towards becoming a sustainable data hub, the government should fast-track approvals, expand renewable PPAs, and incentivise edge deployments. Industry players must invest in AI-ready infrastructure, modular DC designs, and advanced cooling technologies. Academia should collaborate on R&D for quantum computing readiness and sustainable cooling solutions. Policy simplification under the DPDP Act and the introduction of sovereign cloud frameworks will further strengthen India's position as a global leader in data infrastructure. Adopting these recommendations will ensure a collaborative approach to building a future-ready ecosystem.

- Karnataka's vision for next-generation data infrastructure is backed by strong physical and digital foundations. High-speed fibre connectivity, reliable power supply, and abundant water resources in cities like Mangaluru make them ideal for large-scale DC projects. Smart townships, such as KWIN City and GBIT Township, provide thousands of acres for greenfield development, integrated with renewable energy parks and advanced cooling systems. These initiatives ensure that hyperscalers, startups, and enterprises can scale sustainably while maintaining operational efficiency.
- India's data centre industry is gearing up for a major capacity expansion, with IT load expected to rise significantly from the current 1,000 MW[40]. The National Informatics Centre (NIC) plays a pivotal role in this ecosystem by operating state-of-the-art National Data Centres (NDCs) in Delhi, Pune, Bhubaneswar, and Hyderabad, delivering robust cloud services to government ministries, state governments, and PSUs. These facilities ensure continuity through disaster recovery and hosting services, supported by an impressive 100 PB storage capacity featuring All Flash Enterprise Class Storage, Object Storage, and Unified Storage.

The following are needed to maintain this momentum:

Tax incentives: The government should implement the proposed tax exemption policy for DC operators, which could be a pathbreaker for attracting global hyperscalers.

Green mandates: the government should mandate renewable energy sourcing for DCs.

Industry collaboration and innovation hubs

The AI hub in Visakhapatnam exemplifies how consortium-led models can deliver gigawatt-scale, clean-energy-powered DC campuses. Similar hubs should:

40 Press Release: Press Information Bureau

- Integrate subsea cable landings for global connectivity.
- Coinvest in green energy and storage systems for sustainability.
- Foster AI innovation clusters to attract startups and enterprise R&D.

Academic partnerships

- It is essential to partner with the right minds to support the evolving needs of growth. Global Capability Centres have repeatedly proved their capability[41] in adopting innovative approaches to developing solutions. From hosting AI to R&D analytics, GCCs have supported every use case with professionalism.

Academia must:

To support the development of advanced data centre ecosystems, it is essential to integrate AI and quantum computing curricula into engineering programs, ensuring a future-ready workforce. Academic institutions should collaborate with industry leaders to establish deep-tech laboratories and offer hands-on internships, similar to initiatives like Western Digital's partnership with Indian universities for hardware innovation. Such collaborations will bridge the gap between theoretical learning and practical application, fostering innovation and accelerating India's journey toward becoming a global hub for cutting-edge technologies.

Regulatory simplification

- The government should explore ways to improve the ease of doing business. A national single-window clearance platform[42] for DC projects, integrating state and central approvals, is under development by the Ministry of Commerce and Industry. Tamil Nadu's initiative to establish a dedicated GCC clearance desk[43] is also worth replicating nationwide.
- The journey of data centres is no longer just about capacity—it is about building an intelligent, sustainable, and sovereign digital ecosystem. The next decade will reward those who innovate without compromising sustainability, foster collaborative industry-academia models, and embrace transformative trends like AI and quantum readiness. Embedding security and sustainability into design will be critical to ensuring resilience and trust. In a world where technology shapes economies and societies, the only way to stay ahead of the curve is to lead responsibly creating solutions that serve today's needs while safeguarding the interests of future generations.

41 How India can leverage its new brain power - The Economic Times
42 Single window digital platform for clearances and approval of industries across India on the anvil: Som Parkash, ETGovernment
43 TN to set up single window clearance system for GCCs | Chennai News - Times of India

9. Emerging trends

- **Sovereign cloud**

Governments and regulated sectors, such as banking and healthcare, are increasingly demanding that sensitive data remain within national borders. This is where the sovereign cloud comes in—it ensures compliance with India's data residency laws under the DPDP Act while providing organisations full control over their data. Karnataka's state-backed sovereign cloud frameworks for public services and critical infrastructure could be leveraged to gain an advantage in this domain. AI-optimised DCs and liquid cooling

Artificial Intelligence is changing the game for DCs. High-performance AI workloads require powerful GPUs and TPUs, which generate enormous heat. Traditional air cooling can't keep up, making liquid cooling and immersion cooling the new standards for efficiency and sustainability. Karnataka can set itself apart by encouraging AI-ready DC designs and advanced cooling technologies. T

- **Quantum computing impacts**

Quantum computing may still sound futuristic, but it's closer than we think—and it will completely redefine how data is processed. Preparing for this shift means investing in research, specialised cooling systems, and secure environments capable of handling quantum workloads. Karnataka must start building partnerships with academia and tech leaders now to stay ahead of the curve.

- **Cybersecurity and resilience**

As DCs grow and edge computing spreads, cybersecurity becomes a top priority. Threats such as ransomware, AI-driven attacks, and supply chain vulnerabilities are evolving rapidly. Karnataka needs to adopt strong security frameworks, zero-trust models, and AI-powered threat detection to keep its infrastructure safe.

Karnataka should act swiftly to capitalise on these opportunities and proactively work in areas such as sovereign cloud and quantum computing, which are expected to redefine global data strategies in the coming decade. Investments and policy interventions will be key to maintaining leadership in this evolving landscape.

10. Way Forward

India's DC industry is at a turning point. With exponential growth in AI, cloud adoption, and digital services, the demand for robust and sustainable infrastructure has never been higher. Karnataka, as well as many other states, is uniquely positioned to lead this transformation through its policy foresight, talent density, and innovation ecosystem. From hyperscale projects to edge deployments, the state is setting benchmarks for how technology and sustainability can go hand in hand. However, the journey is not without challenges—energy consumption, regulatory complexity, and environmental impact remain critical concerns that need immediate attention and managing these challenges effectively could pave the way for a new age of data centre industry in India

The next decade will define India's role in the global digital economy. The country should focus on accelerating greenfield and edge DC projects, embedding ESG principles into every stage of development, and fostering collaboration between government, industry, and academia. Policy reforms, including long-term tax incentives, renewable energy mandates, and streamlined approvals, will be vital to attracting global investments. At the same time, skilling programmes and academic partnerships must prepare a workforce ready for AI-driven and sustainable infrastructure.

For Karnataka, the key focus area should be combining innovation with responsibility. The future of data is not just about speed and scale; it's about sustainability and resilience and the time to act is now.

About PwC

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 151 countries with over 360,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com.

PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.

© 2025 PwC. All rights reserved.

Contact us

Shivendra Singh
Partner – Cloud and Digital Transformation
shivendra.singh@pwc.com

Zachariah Mathews
Director – Cloud and Digital Transformation
zachariah.mathews@pwc.com

About ASSOCHAM

The Associated Chambers of Commerce & Industry of India (ASSOCHAM) is the country's apex national chamber since 1920. It advocates actionable policy suggestions to strengthen the Indian economy by leveraging its extensive membership reach of over 450,000 companies, comprising of large corporates and SMEs. With over 70 Sector and State Councils, ASSOCHAM effectively represents diverse segments of Indian industry and focusses on aligning industry priorities with the nation's growth aspirations.

© 2025 ASSOCHAM. All rights reserved.

ASSOCHAM Contacts

Arunima Sharma
Asst. Secretary General
Arunima.sharma@assocham.com

Varun Aggarwal
Sr. Director & HOT-ICT
varun.aggarwal@assocham.com

Vicky Pandita
Dy. Director
ASSOCHAM
vicky.pandita@assocham.com

Disclaimer

The report is prepared using informationm from various sources and is not intended to address the circumstances of any particular individual or entity. The report has been prepared from various public sources and the information received from these sources is believed to be reliable. The information available in the report is selective and subject to updation, revision and amendment. While the information provided herein is believed to be accurate and reliable, ASSOCHAM do not make any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and data available in the public domain. While due care has been taken while preparing the report, ASSOCHAM do not accept any liability whatsoever, for any direct of consequential loss arising from this document or its contents.

ASSOCHAM®

Ideate · Innovate · Impact

The Associated Chambers of Commerce and Industry of India

ASSOCHAM Corporate Office:

4th Floor, YMCA Cultural Centre and Library Building,

01, Jai Singh Road, New Delhi - 110001 • Ph: 011-46550555

Email: info@assocham.com • Website: www.assocham.org